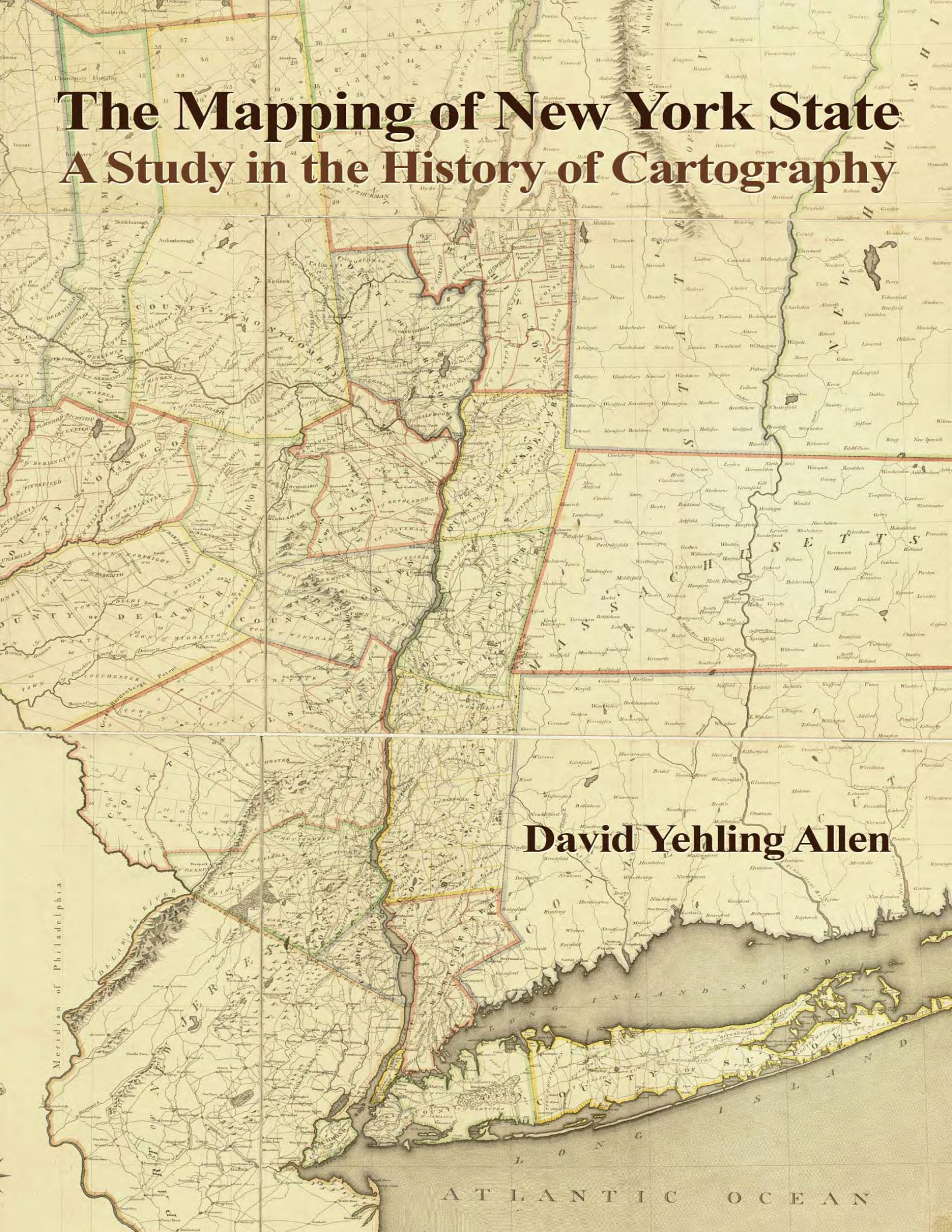
The Mapping of New York State

A Study in the History of Cartography



David Yehling Allen

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Preface

Without maps, New York State as we know it would not exist, for there is nothing "natural" about the State of New York. It exists only in our minds, and it could not have come into being were it not for its conceptualization through maps (along with other forms of symbolic representation). The very mention of the state is likely to conjure up a kind of mental map—a vague image of its boundaries, and the approximate location of its most prominent features. Historically speaking, the New York we are familiar with was formed in large part through the use of maps on paper. The first European explorers found their way to the East Coast of North America with the aid of maps, and they made increasingly accurate and detailed maps to guide others to their discoveries. Maps played an essential part in the establishment of the boundaries of the state, which is a process that took place over more than two hundred years, and is still not complete. Much of what exists within the state also could not have come into being without maps. Settlers and landowners have used them to claim and define their properties. Without maps of boundaries within the state, New York's political and electoral procedures as we know them would not exist. Census and tax maps are indispensable for its administration. Without street and road maps, people would not be able to find their way from one part of the state to another. Many other examples could be given to illustrate how maps have profoundly shaped both our conception of New York, and how we live within its boundaries.

Old maps and other cartographic materials (including atlases, aerial photographs, and digital geospatial data) can also tell us much about the past. They are densely packed with information; it has been estimated that the contents of an average-sized map would occupy an entire volume if presented as written text. Maps also present their information in a tangible and graphic form, which enables us to perceive at a glance geographic patterns and relationships that might not otherwise be evident. Thus, maps made in the past constitute a huge library of information about what is or was in the state, and also about what previous generations of map makers knew about the place, and what they thought important.

Like other historical documents, maps need to be interpreted. It is an illusion to think that they depict what is or was "really there" on the surface of the earth. They are symbolic and stylized representations of the human version of "reality" (whatever that may be). It is true that most of what maps show is in some sense reflects what is "out there" in the "real world," but they are selective, and distort what they depict. They may also contain errors or be deliberately misleading. They reflect the interests, biases, training, and abilities of the persons who made them. Because maps are expensive to produce, they generally serve the needs of the rich and powerful. Like poetry and music, they are cultural creations, and they cannot be fully understood outside their historical contexts.

These generalizations apply to maps of any state or nation, but New York has a particularly rich cartographic heritage because of its diverse history over the last 500 years. Early maps of this region reflect the differing viewpoints, needs, and traditions of Native American, Dutch, French, and British mapmakers. Since the end of the colonial era, maps have reflected the perceptions of successive generations of explorers, soldiers, scientists, land speculators, tourists, bureaucrats, and others. Consequently, they tell us as

much about the people who made them as they do about the changing geography of the state.

Because of New York's diverse heritage and its centrality to the history of the United States, the cartographic history of New York can also serve as a window onto the mapping of our nation and the world. Developments within the state often reflect trends which began elsewhere, or are part of larger trends. The development of large-scale topographic mapping, thematic mapping, and the application of aerial photography or computer imagery to maps are examples of larger trends that are not specific to any particular place, but whose overall features can be understood through studying their application to New York.

Because maps are so essential for the study of anything that has a geographic aspect, the cartographic history of New York is of interest not only to historians and geographers, but to many others. This book should be particularly useful to educators, urban planners, map collectors, environmental analysts, and those interested in the development of transportation.

Different users will probably want to use this work in different ways. Some may want to read it through from beginning to end, as it tells a coherent story of how cartography has developed in New York over several centuries. For me, it is fascinating to see how map making has changed over time, even in the limited context of a fairly representative portion of post-Renaissance Western culture. The changes depicted here do not constitute a celebratory story of teleological progress, but they do show a kind of structured development as map makers have responded creatively to the needs and possibilities of an increasingly populous, wealthy, complex, and technologically sophisticated society. Specialists may want to use this work as a guide or reference work for research on specific subjects, or on specific areas of regional history. In addition to providing an overview of developments, this work includes extensive footnotes, a bibliography, and numerous hyperlinks to other resources for those who want to use it as a starting place for further research. Please note that all hyperlinks are located in the endnotes, which are themselves linked to the text. These notes include numerous links to high-resolution images of maps discussed in the body of this work.

The existing literature on the mapping of New York is uneven. The literature on the mapping of New York City, particularly of Manhattan, is quite extensive and generally of high quality. A good deal has also been written about the mapping of New York during the era of the Revolutionary War. Other regions and certain subjects are quite neglected. I have not ignored completely the mapping of New York City, since it forms an important and integral part of my subject, but I have focused more heavily on the relatively neglected topics and places. Where a subject is covered in depth elsewhere, I usually provide a summary, and refer the reader to more detailed accounts.

This book is the result of more than twenty years of intermittent work, much of it during my career as a map librarian at Stony Brook University (State University of New York). Portions of this study have previously been published in *The Portolan*, *Meridian*, *The Long Island Historical Journal*, *Coordinates*, and the Web sites of The New York Map Society and the Stony Brook University Libraries. Complete citations for these and other works used in this publication can be found in the bibliography.

List of Illustrations

Links to high-resolution images of many of these maps can be found in the endnotes of this publication.

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Figure 14.7. A recent example of a GIS-produced choropleth map. Median age by county in 2009. Produced using U.S. Census Bureau, *American Factfinder*.

Chapter 1
The Period of Exploration, 1500-1632

Native American Mapping

The ability to make maps appears to be hard wired into the human brain. People orient themselves in space through the construction of cognitive or "mental maps" (which exist only in the mind). This faculty for spatial orientation is important for human survival, and the origins of this ability probably antedate the appearance of modern humans.[1] The earliest known maps to make the transition from mental images to a durable medium are prehistoric pictographs and petroglyphs, some of which probably antedate the appearance of writing.[2]

Thus, it is certain that New York's aboriginal inhabitants were also its first map makers, although we can only speculate about the appearance of maps produced prior to the period of European contact. Recent research has shown that many American Indian cultures made maps, some of which were quite sophisticated.[3] Unfortunately, any "mental maps" that pre-contact Indians in New York may have transferred to a physical medium have been lost. This is not surprising, since Indian maps were usually created as temporary sketches to illustrate verbal descriptions of travels or military ventures. Early explorers report that they often were drawn in the dirt or sand. Although a few Indian maps took the form of pictographs or other images on stone, no maps of this kind have been found in New York. Iroquoian groups in Canada are reported to have made maps on birch bark, but no bark maps made by New York Indians prior to the nineteenth century have survived.[4]

On the other hand, there are reports of maps being sketched out by Indians for the early European explorers of what is now New York. One of the first of these is by an Indian who in 1619 sketched out in chalk a map of the rivers around Manhattan for the English explorer Thomas Dermer.[5] Somewhat later, in the well-known "Narrative of a Journey into Mohawk and Oneida Country" (1634-35), it is related that Oneida Indians made a map of their country for Dutch explorers using stones and grains of corn.[6] Several copies of Indian maps showing portions of New York, which were made by Europeans, have also come down to us. One of the most spectacular of these is a map of the area around Susquehanna River made in 1683 by two Cayugas and a Susquehannock.[7] A somewhat similar map showing Indian routes from the Susquehanna River to the Iroquois villages was made in 1681.[8] Since these latter maps date from well after the initial contact between Indians and Europeans, and were put on paper by Europeans, it is possible that they reflect some European influences in their techniques.

Throughout the colonial period, Native Americans continued to provide information that found its way into maps made by Europeans. In some cases these contributions were acknowledged. As late as 1771, Guy Johnson's map of the country of the Six Nations credited information derived from "sketches of intelligent Indians."[9] In other cases, we can deduce the borrowings from Indian sources through the analysis of certain features on European maps. For example, Indian maps are not based on European conceptions of uniform scale or the location of places by coordinates of latitude and longitude. They

tend to exaggerate the size of important features, such as islands in lakes, and frequently "misplace" or "misorient" things according to our lights. Since most Indian maps were made for purposes of hunting, trade, or war, they also frequently emphasize communication routes by water, without showing the relative sizes of different steams, or even differentiating between streams and portages. When we see these characteristic features on European maps, it is probable that they are derived from unacknowledged Native American sources. Indian contributions to colonial-era maps, both acknowledged and unacknowledged, will be discussed in greater detail as we come across them on particular maps.

Maps of the Early European Explorers, 1500-1600

It is not certain when the first European set foot on present-day New York. It is possible that the Vikings reconnoitered this far south, but no generally accepted archaeological or documentary evidence has so far been uncovered that proves a Viking presence here.[10] It is also possible that other European fishermen or explorers may have touched upon the shores of New York before 1492, but no solid evidence has been found to confirm this possibility. All widely accepted evidence of European discoveries in New York postdates Columbus. Even here, it is uncertain which European was the first to sight New York. Two early maps of the east coast of North America may possibly show the coastline of present-day New York. One of these is the famous world map of Juan de la Cosa (1500), which presents the east coast of North America in very stylized fashion.[11] A stronger case can be made that the Cantino chart of 1502 shows the results of an actual voyage along the coast of North America, since it contains more details and some place names. Arne Molander has argued plausibly that this map shows the coast of Long Island and Montauk Point, and that it reflects the discoveries of a Portuguese expedition headed by the Corte Real brothers.[12]

The first certain sighting of New York by a European was made by Giovanni da Verrazano in 1524. Verrazano, after sailing over the site of the future Verrazano Bridge, anchored briefly in New York Bay. He then sailed along the coast of Long Island (which he called "Flora"), passed Block Island ("Louisa"), and proceeded to Narragansett Bay, where he overhauled his ship. Verrazano's discoveries are recorded in several manuscript maps drawn in the 1520s, including the Maggiolo world map of 1527, and maps by Girolamo Verrazano (the explorer's brother) created in 1529.[13] These are all small-scale maps; a better representation of Verrazano's discoveries is presented in Gastaldi's map of New France, which was published later in 1556. The Gastaldi map, which also incorporates information from Cartier's voyages, will be discussed below.

Verrazano's voyage was sponsored by the King of France (Francis I). Not to be outdone, his Habsburg rival, the Emperor Charles V, dispatched his own expedition later in the same year to explore the east coast of North America. This was led by Esteban Gomez, a Portuguese explorer, who had previously sailed with Magellan (and had deserted him before he rounded South America). We know that Gomez sailed past New York, going from north to south, but it is doubtful whether he actually saw New York Harbor or any areas immediately surrounding it. He seems to have kept so far off shore that he could gather at best only a vague impression of the coast. There is a whole group of maps based on the voyages of Estaban Gomez. They show the East Coast of North

America, but their depiction of the New York area is extremely unclear. The earliest most influential of this group is Diogo Ribero's World Map (1529), which set the standard for the depiction of the east coast between Cape Cod and Chesapeake Bay until the explorations of Henry Hudson. A conspicuous feature on these maps is a large river with many islands at its mouth labeled Rio de las Gamas" (Deer River). Some have thought that this might be New York Harbor, but the river is clearly north of Cape Cod, and is almost certainly the Penobscot Bay and River.[14]

The next explorer to contribute to the exploration of New York was Jacques Cartier (1491-1557). Cartier made three voyages between 1534 and 1542, in which he explored the Gulf and River of St. Lawrence as far as the present site of Montreal. In none of these voyages did Cartier actually enter the boundaries of present-day New York, although he apparently saw the Adirondack Mountains from Mont Royal near Montreal. He spent considerable time with Iroquoian Indians (possibly Huron) near the sites of what later became Quebec and Montreal, and learned from them about the existence of the Great Lakes and Lake Champlain, as well as something about the Iroquoian tribes in what is now New York. Cartier's explorations formed the basis of the French claim to the St. Lawrence River Valley, and led to later French activities in northern New York, including extensive mapping.[15]

Of the maps reflecting these early voyages, the most revealing is Giacomo di Gastaldi's map of New France, which was first published in Ramusio's *Viaggi* (Voyages) in 1556, and is represented here by a copy from the 1565 edition of that work (Figure 1.1).[16] One would like to know more about the sources of this map, but it clearly drew on the narratives of both Verrazano and Cartier, which are both included in Ramusio's book (The *Viaggi* was an early collection of travel narratives and a predecessor of Hakluyt's *Voyages*.) Gastaldi's map, which is the first regional map of the Northeast, looks crude and very strange to our eyes, but its basic features are clear enough. New York harbor is labeled *Angoulême* (the title of Francis I before he became king). The embayment to the right of New York Harbor is probably Jamaica Bay, which was much more open to the ocean at that time. Long Island is the peninsula labeled *Flora*. Narragansett Bay and probably Buzzard's Bay are shown on the mainland. Narragansett Bay seems to be *Port Réal* , and Buzzard's Bay is probably *Port du Refuge*, although the map seems to reflect some confusion between the two. Practically nothing is shown of the coastline between Buzzard's Bay and Cape Breton. The odd snake-like object in the ocean is a stylized representation of the Grand Banks and the shoals off Cape Cod. One of the most interesting features of this map is the depiction of the Hudson and St. Lawrence Rivers, which are shown as joining. This is probably an indication of the use of Native American sources. Rivers almost never cross watersheds, but Indians carrying canoes do, and, as previously mentioned, Native American maps often did not differentiate between streams and portages. Indians made trips from the St. Lawrence to the Hudson River via the route that runs through the Richelieu River, Lake Champlain, and Lake George. Since this route was as yet unexplored by Europeans, this feature almost certainly reflects knowledge derived from Native American sources. It appears also that the Mohawk River may be shown flowing to the west where the Hudson River "joins" the St. Lawrence. If this is actually what is represented here, this information would also have come from Indians.[17]

Figure 1.1 Giacomo di Gastaldi, Map of New France, 1565. Courtesy of the Norman B. Leventhal Map Center at the Boston Public Library.

Even at this early date, the Gastaldi map already reflects a salient feature of New York's geography—one that is critically important for the subsequent exploration, mapping, and settlement of the region. This is the easy access to the interior of New York and the continent via rivers and inland waterways. New York is bounded on the north and west by the St. Lawrence River, and by the Great Lakes. The Hudson River penetrates its center. These great inland passages are joined by relatively easy routes via Lake Champlain and the Mohawk River. These waterways largely explain New York's strategic position as an entryway to the North American continent.

Unfortunately for the French, they fell into a period of civil war shortly after the time the Gastaldi map was made, and did not resume their explorations in North America until the first decade of the seventeenth century. During the fifty years following the publication of the Gastaldi map, there were no significant improvements in the mapping of what is now the Northeastern United States. Verrazano's discoveries were almost forgotten, and maps of this area were typically based on the model established by the Ribero chart with its indistinct depiction of the New York area. The popularity of the maps based on the explorations of Estaban Gomez reflects the reputation of the Spanish as the foremost explorers of the sixteenth century. Only after 1600 did the French resume their explorations, and by that time the English and the Dutch were also on the scene. A period of relatively rapid exploration and mapping ensued, stimulated in part by rivalry between the three nations.

Hudson, Champlain, and Their Successors, 1603-1632

The first decade of the seventeenth century was pivotal for later developments. In 1603 Champlain arrived in New France, and French explorations were vigorously resumed. The English founded Jamestown in 1607, and were active in exploring parts of what later became New England. Of most direct relevance to New York, Henry Hudson rediscovered New York harbor in 1609, and sailed up what is now known as the Hudson River to its limit of navigation near Albany.

Hudson's voyage was by no means a complete shot in the dark. Although Verrazano's discoveries had been overshadowed, they were not completely forgotten, and they were apparently supplemented by some unrecorded voyages made to the New York area later in the sixteenth century. A world map by Jehan Cossin dating from 1570 seems to show the area around New York Harbor, including (possibly) Long Island, along with the Hudson River flowing into a large lake, which might represent one of the Great Lakes or even Hudson's Bay.[18] An account of Verrazano's voyage was translated and published in Hakluyt's *Principal Navigations* (1598-1600). This same edition of Hakluyt also includes a world map by Edward Wright, which appears to show the Hudson River flowing north to the St. Lawrence River, which then leads to "The Lake of Tadouac, the boundes whereof are unknowne."[19] Probably acquaintance with some or all of these materials led John Smith to write Hudson from Virginia that he should look for a large river or straight a few degrees north of the Virginia Colony.[20]

Hudson nonetheless thought he was making a new discovery, and he certainly can be credited with being at the right place at the right time. Because of the political situation in Europe, his "discovery" was the one that mattered for future developments. In spite of this, the immediate cartographic consequences of Hudson's voyage are unclear. Hudson is known to have made maps of his discoveries, but they have been lost. On Hudson's return from the New World, his charts were confiscated by the English when he was forced to stop in London, and they have never resurfaced. In Holland, Hudson and other members of his crew communicated the results of his voyage to the Dutch authorities, but the earliest map produced by the Dutch that shows New York Harbor and the Hudson River appears to be the Adriaen Block Chart of 1614, which will be considered below.

Thus, it appears that no maps made before 1614 still exist that depict Hudson's discoveries. In many histories the gap between 1609 and 1614 has been filled in with a discussion of the so-called "Velasco Map"(Figure 1.2). I have argued elsewhere that this map is almost certainly a nineteenth-century fake, and a number of scholars agree with me.[21] But just in case I am wrong, something should be said about this map, since, even if it is a forgery, it provides a good summary of the extent of European knowledge of the Northeast in the years immediately following Hudson's discovery. The "Velasco map" does much more than show the results of Hudson's voyage: it summarizes results of the European discoveries in northeastern North America made in the decade before 1610. This map supposedly was produced for the English court around 1610, and was acquired or copied by the Spanish Ambassador to the Court of Saint James, one Don Alonso de Velasco, who sent the map (or more likely a copy of it) back to the King of Spain. The author of the map is unknown, and Velasco's role (assuming the map is authentic) was only that of a forwarding agent. It was believed that it reposed

in the Spanish archives along with associated documents until it was rediscovered at the end of the nineteenth century by Alexander Brown.

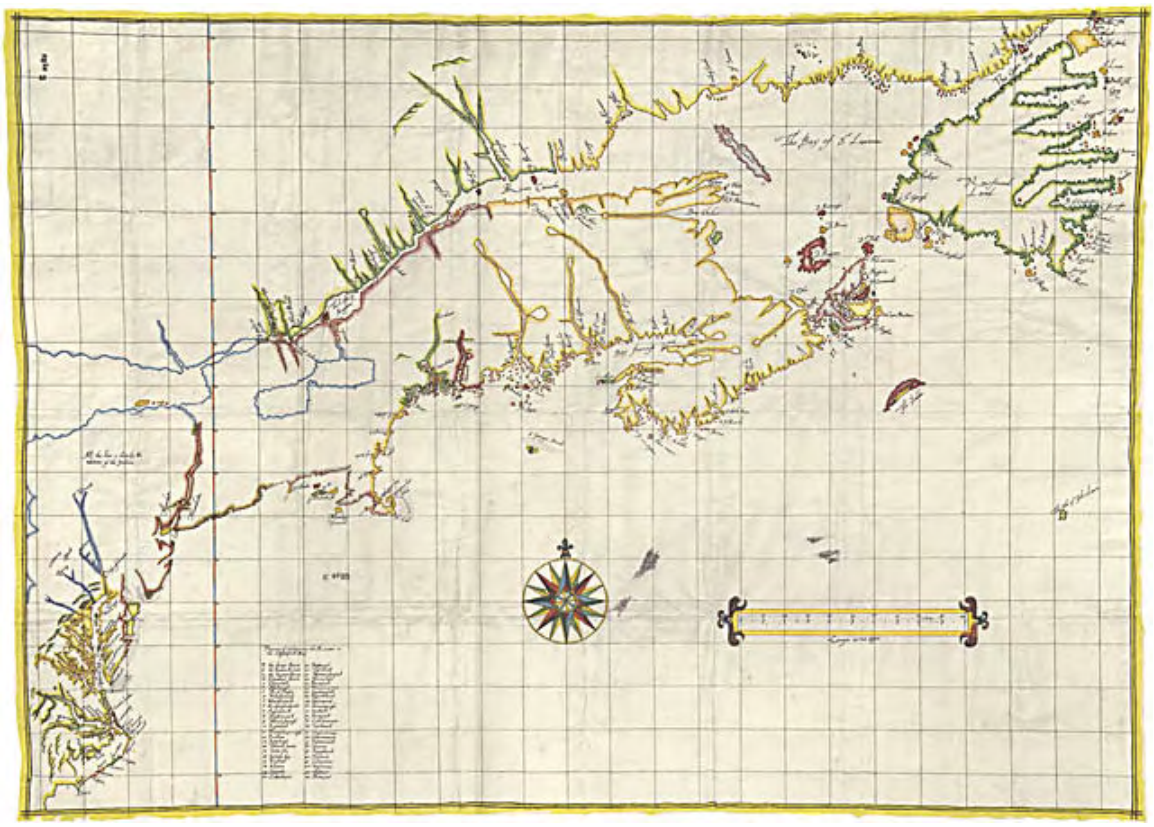

Figure 1.2. Almost certainly a fake: the so-called “Velasco Map.” Image from Stokes, *Iconography of Manhattan Island*.

The contrast between the Velasco map and everything that went before it is remarkable. It is the first map that shows the Northeast coast of the United States in a form we can easily recognize. In fact, the modern appearance of the map first raised questions in my mind about its authenticity. Nothing closely resembling it is known from the first half of the seventeenth century, and its depiction of what is now southern Canada is much more accurate than anything that Champlain, an expert cartographer who spent many years in the area, produced as late as 1632.

Even though it is probably a fake, the Velasco Map is still a skillful synthesis of several early seventeenth-century sources. The depiction of the Hudson River and the area around New York harbor is almost certainly derived from published accounts of Hudson’s voyages.[22] The area around the Saint Lawrence River and the Coast of New England is mostly derived from maps of Champlain, including his manuscript map of New England, now held by the Library of Congress.[23] Champlain was busy in 1604 and 1606 mapping the coast of New England as far south as the southern shore of Cape Cod and the Elizabeth Islands. What might have happened if Champlain had gone a bit farther and rediscovered New York Harbor prior to Hudson, is an interesting question for those who like to ponder the “what ifs” of history.

Other sources were also used in the construction of this map. The depiction of coast of North Carolina and Chesapeake Bay appears to be largely derived from John Smith's map of Virginia. The depiction of parts of the coast of New England appears to be derived from accounts in *Hakluyt's Voyages*.

The depiction of the New York area on the Velasco map is remarkable both because of what it includes and what it omits. The Hudson River is clearly shown, as are several of the features of New York Harbor, including Sandy Hook and Staten Island. The names *Manahata* and *Manahatin* can be found on both sides of the lower river. These names probably indicate Indian tribes, and appear to be located further north than Manhattan Island, possibly as far north as the Hudson Highlands, which are sketched in on the map. The map does not show Long Island as separate from the mainland, and it also did not show Manhattan as an island. Nor does it show any recognizable details on the coast of Connecticut or Rhode Island. In most respects, then, the Velasco map accords with what is known Hudson's explorations in the New York region—i.e. that he sailed straight up the Hudson River, and did no additional exploring in the region before his return.

The sources for the depiction of northern New York are more of a mystery (assuming again that the map is authentic). The Velasco map includes a depiction of the Saint Lawrence River, which could only have been derived from Champlain's first voyage to Canada in 1603, although Champlain had not yet published any maps of the area. As mentioned above, the overall depiction of the St. Lawrence River area is also very different from anything Champlain ever published. The map also shows a large inland lake, which is almost certainly Lake Champlain, although it had not yet been discovered by Europeans. This lake is connected to the St. Lawrence River by what appears to be the Richelieu River. But the lake depicted is much larger than Lake Champlain; it runs from west to east; and it is divided into two nearly equal parts. Possibly the two parts are meant to represent Lake Champlain and Lake George. The exaggerated size of the lakes, and the neglect of scale and proportions are characteristic of maps derived from Indian sources. We know that both Hudson and Champlain gathered information from the Indians. Because of the depiction of the Richelieu River and the failure to show the connections between Lake Champlain and the Hudson River, it is most likely that the information about the inland lake was gathered by Champlain, if indeed the map is not a fake. Further west is a much larger lake that could only be Lake Ontario, although no European is known to have seen it. Lake Ontario is left open to the west, suggesting that it might be the long sought after passage through North America to the Pacific Ocean. A river is shown arcing from the Hudson to Lake Ontario. This is strongly suggestive of the Mohawk River, which (with the help of a portage to Lake Oneida) does eventually lead to Lake Ontario. The source of all of this information would be (if the map is authentic) once again, most likely American Indians, who could have communicated it to either Hudson or Champlain. As Champlain is known to have gathered geographical information from the Indians, he is the most likely source. The Velasco map acknowledges the use of information from Indian informants—there is a note on the map located to the west of the Hudson River which states that "all the blue is done by the relations of the Indians."

Almost all of the features on the Velasco Map were or could have been known to at least some Europeans in 1610, and this is what gives the map some value as a summary of European knowledge of New York as of that date, regardless of its authenticity.

However, the map presents these features with a clarity and precision that cannot be found on other maps produced around that time, or even much later. In this sense, it is misleading, and gives the impression that Europeans had at this time a much clearer picture of eastern North America than they actually possessed. We will see that it took another fifty years of effort before European explorers and map makers were able to confirm the essential correctness of the picture presented by the Velasco Map.

Let us now turn to the maps of Champlain, the authenticity of which have not been seriously questioned. After completing his explorations of the New England coast, Champlain returned to the Saint Lawrence River area in 1608 and founded Quebec. The French were much interested in the fur trade, which got them involved in supporting Algonkian and Huron Indians against their traditional Iroquois enemies. The wars that ensued brought French troops repeatedly into northern and western New York. The first of these actions took place in 1609—just as Hudson was exploring his eponymous river—when Champlain and his Indian allies voyaged down the Richelieu River into Lake Champlain, and fought a successful skirmish at the bottom of the lake, possibly near Fort Ticonderoga.

In 1612 Champlain published his first map of New France, which shows what he had learned of the geography of the area in the preceding years (Figure 1.3).[24] The Richelieu River is depicted, as well as Lake Champlain, which he apparently named after himself. The orientation and shape of Lake Champlain are approximately correct, although it is depicted as much too large, and shown far to the east of its true location. Champlain's map also hints at the existence of the Adirondacks, which the explorer certainly would have seen from "his" lake. It also shows the course of the St. Lawrence River, which he had explored as far as the rapids just beyond Montreal. Remarkably, the map also shows the remainder of the Saint Lawrence River, including the Thousand Islands, as well as Lake Ontario, Lake Oneida, Niagara Falls, and Lake Erie. Neither Champlain nor any other Frenchman had yet visited these places, and his sole sources of information for these features would have been American Indians. In certain respects, this part of the map, based entirely on Native American sources, is more accurate than any maps of that area that Champlain subsequently made.[25]

Figure 1.3. Samuel de Champlain, New France (1612). Detail of image from Bibliothèque nationale de France. Image source: Wikipedia Commons.

In the following years, Champlain was to see more of New York. He discovered Lake Huron by taking a route via the Ottawa River (he never reached Lake Erie). Then he backtracked and crossed Lake Ontario. Still fighting the Iroquois, he continued southward with his Indian allies and laid siege unsuccessfully to an Onondaga fort near Lake Oneida. Champlain's narrative is accompanied by a drawing of a formidable looking Onondaga fort, which was published in the 1619 edition of his *Voyages and Discoveries*. Like many of the illustrations on seventeenth-century maps, this drawing needs to be viewed with caution: it is by no means certain that the artist who made this engraving was supervised by Champlain. Based on what is known about Iroquois fortifications, the fort was probably much less elaborate than the one shown in Champlain's book.

At about the same time, one of Champlain's lieutenants, Etienne Brûlé, was sent on a mission to make contact with the Iroquois' southerly enemies, the Susquehannocks (called by the French the Andastes). In the course his travels, Brûlé explored either the Delaware or the Susquehanna River to its mouth.[26] Most likely it was the Delaware River, since Champlain's maps of New France made in 1616 and 1632 show the Delaware River reaching up to the Iroquois villages, and do not depict the upper reaches of the Susquehanna. There is a good chance that Brûlé, who was traveling with Indians, started his trip on a branch of the Susquehanna and portaged at some point over to the Delaware, but was unaware that he had changed rivers, or failed to communicate this to Champlain. It will be seen that the relationship between the two rivers also confused the

Dutch, and it was not until the end of the seventeenth century that their intertwined watersheds were known at least approximately.

While Champlain was exploring northern New York, the Dutch were not idle. Hudson's initial discovery was followed up by Dutch fur traders and explorers. After several preliminary voyages, a group of merchants sent a fleet of three ships to the vicinity of the Hudson River in the fall of 1613. The captain of one of these ships, *de Tijger* (The Tiger), was Adriaen Block, who was already on his third voyage to the Hudson River. Block was able to fend off threats from competing merchants, the destruction of his ship by fire, and a mutiny by his own sailors. He built a small sloop to replace the incinerated *Tijger*, which he called the *Onrust* (Restless)—the first ship to have been constructed in Manhattan. In the Onrust, Block circumnavigated Long Island in 1613/1614, and explored both sides of Long Island Sound. In 1614, the Dutch founded their first permanent trading post, Fort Nassau, which was located on the Hudson River south of Albany. In 1615/16 Cornelis Hendrikson, the captain of another ship sent out at the same time as Block, carried out additional explorations along the Hudson River, and also explored the lower Delaware River.[27]

These early Dutch discoveries are reflected in two important manuscript maps, which are conventionally called the "figurative maps." Their authorship is not completely certain, but the first figurative map is almost certainly at least in part by Adriaen Block, and the second is ascribed to Cornelis Hendricksen. These two maps constitute the cornerstone of the cartographic history of New Netherland.[28]

The first figurative map, the so-called "Adriaen Block Chart" (1614), is thought to have been made in a somewhat unusual way (Figure 1.4).[29] It appears that on setting out on his voyage Block was furnished with a copy of a chart of the Northeast by the Dutch cartographer Cornelius Doetsz. According to this theory, the outline of the map was drawn in red ink by Doetsz, and Block filled in his own discoveries in dark ink.[30] The portion of the map in red resembles the Velasco map, although the two are not identical. On the Doetsz chart, unlike the Velasco map, the depiction of the St. Lawrence River valley and Lake Champlain is a close copy of the map in the second edition of Champlain's *Voyages* (1613). This, Champlain's second published map is cruder, curiously, than the one published in the 1612 edition, and may actually have been created earlier. In addition, some features and names along the coast of New England are also taken from Champlain's 1613 map. Also, the coast of Connecticut is outlined in considerable detail in red, indicating (if this theory is true) that Doetsz must have used information from Dutch voyages made between the time of the voyages of Hudson and Block's 1613 expedition.

Figure 1.4a. [Map of New Netherland, the "Adrian Block Chart"], 1616. Copy of a nineteenth-century facsimile. From the American Geographical Society Library, University of Wisconsin-Milwaukee Libraries.

Figure 1.4a. [Map of New Netherland, the "Adrian Block Chart"], 1616. Detail showing lower New York. Copy of a nineteenth-century facsimile. From the American Geographical Society Library, University of Wisconsin-Milwaukee Libraries

This composite map was presented to the States General of the Netherlands in 1614 by the merchants who had sponsored Block's voyage. They submitted it as part of a claim seeking a trade monopoly in the area. Constituted as the New Netherland Company, they succeeded in obtaining a monopoly to conduct four voyages for each of three years. The existing Block Chart at the Royal Archives in The Hague is almost certainly a copy of the original, and may include omissions and errors introduced by the copyist. Since we only have a copy of the map, and do not know exactly what Block's role was in producing it, it needs to be read with some caution. Nonetheless, it does provide, a good picture of what the Dutch knew about the Northeast around 1614, and there are no serious questions about its authenticity, as there are about the "Velasco Map."

The part of the Block Chart that reflects discoveries made by Block himself includes the valleys of the Hudson and Connecticut rivers, as well as Long Island and parts of the coast of Connecticut and Rhode Island. This is the first map that shows Long Island as an island, and that recognizes the insular character of Manhattan. It is also the first to show the Connecticut River and the coast along the northern side of Long Island Sound. Block also rediscovered what is now known as Block Island (which had been called "Louisa" by Verrazano), and named it after himself. Block's explorations took him as far as Cape Cod, and the map is sprinkled with Dutch place names as far north as southern Maine. Thus, Nantucket Sound is labeled the "Zuyder See" and Cape Cod Bay is called "Staaten Hoeck." This practice of renaming geographic features after the home country is characteristic of colonial mapping, and is a way of laying claim to, and asserting control

over, newly "discovered" lands. The practice conveniently ignores any claims to possession by the aboriginal inhabitants, and serves to preempt colonial rivals.[31]

The treatment of northern New York on the Block Chart is also revealing. The northernmost part of the map, which covers areas not visited by Block, is mostly derived from Champlain's map of 1613. Here the upper St. Lawrence River and the Ottawa River are depicted in a confusing way that appears to make them appear to be of equal size. The Ottawa River is shown branching in a peculiar fashion, which may indicate some confusion between the river and an outline of the shore of Lake Ontario. Ignorant though he was of the geography of this area, the person who made this portion of the map, and who was totally reliant on information from Champlain, did not hesitate to label the upper part of the St. Lawrence "The Great River of New Netherland." Lake Champlain is depicted very much as it appears on Champlain's maps of 1612 and 1613. It is displaced far to the east, and shown encircled by mountains.

A final feature worth noting on the Block Chart is its treatment of the area to the west of the Hudson River, which appears to be based on information gathered from the Indians by the Dutch, probably mostly by Block himself. The Mohawk River is clearly shown, as is a village of the Mohawk Indians. The Mohawk are called the Maquas or alternatively "canoemakers." There is a note on the map indicating that the Mohawk were trading with the French along the St. Lawrence. The Mohawk River is shown flowing into a lake, which is probably Lake Oneida. The word "Sennecas" appears below the lake, along with the Gachoi (Cayuga) and the Capitannesses (Onondagas).[32] Evidently by then the Dutch had already heard of the Iroquois tribes in western New York, but here they are misplaced far to the east. These villages are located along a river shown flowing south from the lake. In spite of the names of Iroquois tribes, the river appears to represent the upper reaches of either the Delaware River or the Susquehanna River, although it is not shown flowing to the coast. The Susquehannocks (Minquas) are shown on the lower portion of the river. To put it mildly, this is a very confused representation of the region, and we will see that disentangling the upper branches of these two rivers was a major problem for map makers through most of the colonial era.

After Block departed for the Netherlands in 1614, the *Onrust*, was used for further explorations by Cornelis Hendricksen, which were eventually recorded on a work known as "the second figurative map." [33] This map is now thought to have been compiled by the Dutch mapmaker Hessel Geritsz using information supplied by Hendricksen.[34] Hendricksen explored the Hudson River more thoroughly than Block had done, and he also made a careful reconnaissance of the coast of New Jersey and Delaware Bay. Hendricksen obtained information about the area west of the Hudson River from a fur trader named Kleytjen and a companion. They apparently traveled from the Fort Nassau area down the Susquehanna River. The story of Kleytjen casts a bit of light on Dutch-Iroquois relations at this early period. A note on the map, translated by Stokes, states "that [Kleytjen] also traded with the inhabitants of Minquaus (Sussquehannocks) and ransomed from them three persons belonging to the people of this Company, which three persons had suffered themselves to be employed by the Maquas (Mohawks) and Machicans (Mohicans); giving for them kettles, corals, and merchandise."[35] This should be read alongside Champlain's statement made in 1615 that the Dutch were fighting alongside the Iroquois against other Indians.[36] It appears that at least some of the Dutch were involved in military activities that have not otherwise come down to us.

This additional information is also recorded on the "second figurative map," which is a subtly colored and beautiful bird's eye view. The attractiveness of this map is not readily apparent in the black-and-white reproductions, which are most commonly seen. The second figurative map covers a smaller area than the Block Chart, focusing on the area between the Hudson and the Susquehanna Rivers. The depiction of the Hudson River is more detailed and accurate than on the Block Chart, and it provides valuable information about local Indians as well as about the state of Dutch geographical knowledge of the area. On this map, a number of familiar Dutch names appear along the Hudson River, including Esopus and Kinderhook. The names and locations of Indian tribes are presented in considerable detail, and have been analyzed by Shirley Dunn.[37] The depiction of the area west of the Hudson, which is probably based solely on the oral account received from Kleytjen, is very confused, but expands somewhat on the information on the Block Chart, which evidently used some of the same sources. As on the Block Chart, a segment of the Mohawk River is depicted, but it is not shown as joining the Hudson. Below the Mohawk River, there is a large lake labeled "fresh water," which somewhat resembles Lake Oneida in shape, but which could just as well be a distorted representation of Otsego Lake. Once again, the names of the Iroquois tribes are written below, with the Oneida (Jottecas) now being added to the list. On this chart, however, the Susquehanna River is shown flowing out of the lake, which strengthens the Otsego hypothesis. Most likely, the information on this map is a conflation of the two lakes.

On the Second Figurative Chart, The Susquehanna River is shown flowing to the coast, although it is shown emptying into Delaware Bay just south of the Delaware River. Various Indian tribes are indicated along the Susquehanna, including the Susquehannocks (Minquas) near its mouth. Drawings of palisaded villages of the Susquehannocks are sketched in—apparently the first drawings of Indian fortifications in lower New York to appear on a map. Reflecting Hendrickson's own discoveries, the lower part of the Delaware River is clearly shown, although there is still a lot of confusion between the upper reaches of the Delaware and Susquehanna rivers. The compiler of the second figurative map (in this case probably Gerritsz rather than Hendrickson) was aware of the confusions underlying this portion of the map, and acknowledged his uncertainty with admirable candor:

> Regarding what Kleyntjen and his companion have told me of the situation of the rivers, and the places occupied by the tribes, which they found going inland away from the Maquaas and along the New River down to the Ogehage (namely the enemy of the aforesaid northern nations,) I cannot at present find anything but two sketches of small maps relating thereto, partly finished.
>
> And when I think how best to make the one correspond with the rough notes, to the best of my knowledge I find that the dwelling-places of the Sennecas, Gachoos, Capitannasses, and Jottecas, ought to have been indicated rather more to the west.[38]

For all practical purposes, the two "figurative maps" constitute the full extent of surviving Dutch mapping of New Netherland prior to 1630. There are a few other

manuscript and printed maps, but they reveal little additional information. Starting around 1617, small-scale printed maps of North America started to show the territory the Dutch claimed as New Netherland. The earliest and best known of these is Willem Janszoon Blaeu's *Paskaart van Guinea, Brasilien en West Indien* (ca. 1621).[39] Only after 1630 do we start to get more detailed printed maps. The two figurative maps were eventually used as the basis for the first reasonably large-scale printed maps of New Netherland, which were published by De Laet in 1630 and by Blaeu in 1635. The next important manuscript maps also date from after 1630. This later phase of Dutch mapping will be discussed in the following chapter.

Champlain's famous map of New France made in 1632 provides a good summary of the geographical knowledge of the Northeast gained in the first three decades of the seventeenth century (Figure 1.5).[40] For the modern reader, it provides an immediately recognizable overview of the entire area between Chesapeake Bay and Hudson's Bay. Although many features appear distorted to our eyes, almost all of the major coastal landmarks, islands, rivers, and lakes can be discerned.

Figure 1.5. Samuel de Champlain, *Carte de la Nouvelle France*, 1632 . Detail courtesy of the Norman B. Leventhal Map Center at the Boston Public Library.

Focusing on the area comprising present-day New York, we can also recognize most of the major landmarks. Champlain's depiction of northern New York is little changed from his map of 1612, and on the whole it is slightly inferior, perhaps in part because of

its smaller scale. Lake Champlain, which is still exaggerated in size and shifted much too far to the east is the most prominent feature in northern New York. In central and western New York we can recognize Lake Ontario, some of the Finger Lakes, and the Iroquois villages in their vicinity. On the other hand, Lake Oneida is not clearly differentiated from the Finger Lakes, and Lake Erie is reduced to a kind of channel connecting Lake Ontario and Lake Huron.

The depiction of southern New York on Champlain's map of 1632 is an intriguing mystery. Although he provides only a small amount of detail, Champlain does a good job of capturing the basic features of the area. Long Island is shown with approximately the right size and proportions. Islands are shown in the mouth of New York Harbor, and the Hudson River is shown flowing to the north. Even the Mohawk River appears, although it is depicted as flowing north, rather than west. The course of the Delaware River is also delineated with reasonable accuracy.

Champlain never explored southern New York, and it would be reasonable to assume that he copied this information from a Dutch map of New Netherland, but, that does not seem to be the case. Champlain's depiction of the above-mentioned features does not resemble that on either of the two "figurative maps" discussed above. The only printed map that Champlain could have used was the one published by Johannis De Laet in 1630 (discussed in the next chapter), which was based almost entirely on the figurative maps. Overall, De Laet's map bears little resemblance to Champlain's, and De Laet makes some conspicuous errors derived from the figurative maps that would have almost certainly be found in Champlain's map if he had relied on De Laet as a source.

Thus, Champlain's depiction of southern New York depends either on unknown Dutch sources, or on some unknown French source. A fairly strong case can be made for a French origin for this portion of Champlain's map. Champlain uses several French place names that do not appear on any other maps (except those derived directly from this one). Long Island is called "Isle de l'Ascension" (Ascension Island), the Hudson River appears as the "Rivière des Trettes" (River of Traders), and an Indian village east of the Hudson is called the "Habitation de sauvages maniganaticouoit" (settlement of the Maniganaticouoit Indians)—a group that can not otherwise be identified. Stokes noted the appearance of these names, and could not explain their origins. To the best of my knowledge the mystery remains unsolved.

There are some indications of a French presence along the Hudson River in the first decades of the seventeenth century. One of the most intriguing is an annotation on the Block Chart, which has been translated as follows: "But as far as one can understand by what the Mohawk say and show, the French come with sloops as high up as their country to trade with them."[41] This notation, which Block placed on his chart near present day Albany, lends itself to more than one interpretation. It seems to refer to French ships actually sailing up the Hudson River, but it might also be a confused reference to French goods being transported by Indians from the Saint Lawrence River via the Lake Champlain route. Another, and more certain, reference to early French activities on the Hudson River comes from 1624, when Dutch colonists arriving at the mouth of the Hudson found a French ship, which they escorted out of the river.[42] Perhaps a lucky researcher in French archives will someday make a discovery that will throw more light on early French activities in southern New York, and on the origins of the names on Champlain's map.

Regardless of the sources he used, Champlain's 1632 map stands as a magnificent summary of these early explorations. Champlain is recognized as being the most technically skilled mapmaker of all the early explorers of the Northeast, and he seems to have developed the ability to select out valid information from sources of varying quality. Throughout the remainder of the colonial period, explorers and map makers had the more mundane tasks of verifying, correcting, and filling out the picture established by their pioneering predecessors in the early seventeenth century.

Chapter 2
The Dutch Period: 1624-1664, 1673-1674

Regional Overview Maps

The Dutch were slow to settle New Netherland.[1] The Dutch West India Company (WIC), which sponsored the colony, was chartered by the States General in 1621, and granted a trade monopoly. The company was primarily interested in fur trading, and settlement was not at first a priority. Only in 1624, did it send the first permanent settlers to the new province—prompted in part by the realization that an unpopulated colony was vulnerable to seizure by the English or the French. The role of the new settlers was primarily to raise food and engage in other activities to support the company's commercial enterprises. Shortly thereafter, in 1626, Peter Minuit made his famous purchase of Manhattan from the Indians. Nonetheless, the population grew very slowly. Estimates vary, but in 1628 the population of New Netherland was somewhere between 300 and 500. It increased somewhat in the 1630s, but then dropped again as a result of the destruction caused by Director-General Kieft's Indian wars. Historian Michael Kammen estimates the population in 1640 as about 500; Oliver Rink estimates 2,500 in 1645, and no more than nine thousand in 1664.[2]

The slow development of what was little more than a trading post helps explain why it was not until 1630 that the Dutch published the first reasonably detailed map of New Netherland. This map, which bears the title *Nova Anglia, Novum Belgium et Virginia*, was engraved by Hessel Gerritsz for publication in the second edition of Johannes De Laet's *The New World* (Figure 2.1).[3] The intellectual content of this map was provided by De Laet, who is an important figure in the history of New Netherland. De Laet was an accomplished historian, and an important publicist for Dutch colonization. In addition, he was one of the directors of the Dutch West India Company, and had a major financial stake in the new colony. He is a major source for the early history of New Netherland, and particularly for its cartographic history. De Laet had access to the archives of the West India Company, including the two "figurative maps" discussed in the previous chapter. In his book he gives an account of Block's voyage around Long Island, which provides important information about some of the place names that appear on the Block Chart.

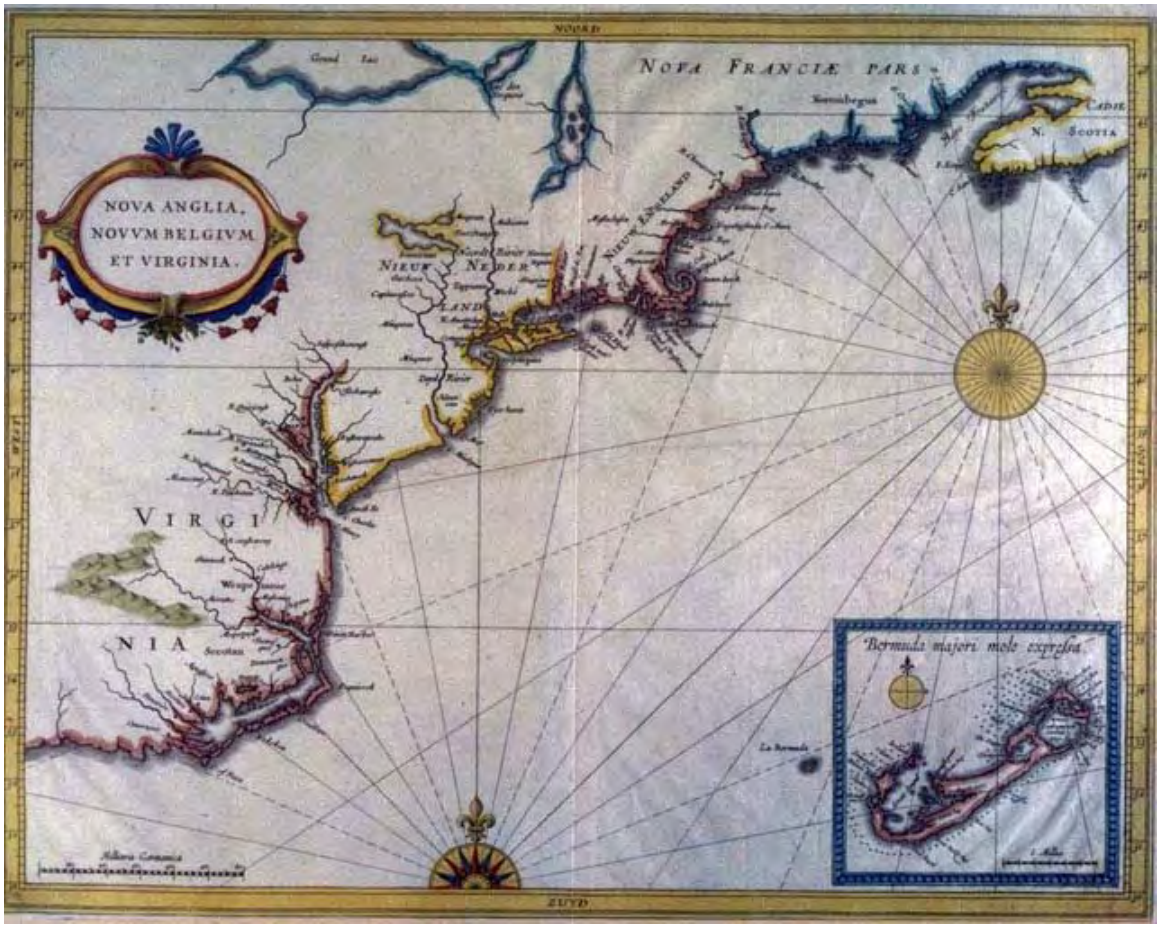

Figure 2.1. Johannes De Laet, *Nova Anglia, Novum Belgium et Virginia* (1630). Courtesy of the Osher Map Library, University of Southern Maine**.**

The depiction of New Netherland on the De Laet map is basically a synthesis of information from the two figurative maps, although it also relied on English and French sources for areas north of Cape Cod and South of Delaware Bay. The boundaries of New Netherland, although never unchallenged by the English, extended from the Connecticut River to the Delaware River. In their more imperialistic moods, the Dutch also laid claim to Cape Cod, and to lands as far north as the St. Lawrence River, although they never made a serious effort to gain control of these areas. In comparison with subsequent printed maps, the De Laet map is relatively modest in the claims it makes for the boundaries of New Netherland.

The De Laet map provides a good overview of New Netherland in its embryonic form. Long Island is shown split into three parts by waterways. This is a carry over from the Block Chart, where these channels also appear, although less distinctly. It has been surmised that Block, in sailing around Long Island, caught sight of the deep estuaries on the North Shore and the breaks in the barrier beach of the South Shore, and that (connecting the dots, so to speak) he imagined that they ran clear through the island.[4]. Long Island itself is labeled “Matowacs,” a name that is probably connected with the Montauk Indians, and which can be found on maps of Long Island throughout the colonial period. This name replaces “Nahicans” on the Block Chart, which reinforces the

suspicion that it was transferred from the mainland to Long Island on the Block Chart as a result of an error by a copyist. “Nahicans” was the Dutch word for Narragansett, and appears on the mainland in later Dutch maps.[5] At the tip of Long Island, Montauk Point is labeled “Hoek van Visschers” (Fishers’ Point). As De Laet explained in the text of the first edition of his book, this name was assigned by Block himself on account of the native fishermen he saw there.[6] As on the original Block Chart, Block Island is labeled “Ad. Block Eyland.”

The area of the Hudson and Delaware Rivers on the De Laet map is a close copy of the second figurative map of Cornelis Hendricksen (also discussed in the previous chapter), although it is simplified and some names are added. The connection between these two maps is not very surprising, since Hessel Geritsz is now thought to have been involved in the preparation of both. As one would expect, the two Dutch settlements founded in the 1620s, New Amsterdam and Fort Orange, appear on De Laet’s map. Fort Orange, on the site of what later became Albany, had by this time replaced Fort Nassau, which had been damaged by a flood and abandoned. Hell Gate (*Helle gat*, “bright passage”) also appears on this map, as do the names of several Indian Tribes along the Hudson and Delaware Rivers. The Hudson River bears the name Noordt Rivier (North River), which was long used as a synonym for the Hudson River on navigation charts. Many of the Dutch names for features along the Hudson River, which appear on the Hendricksen chart, are missing on De Laet’s map—they were probably omitted because of its smaller scale. The Delaware River appears as the South River (Zuyd Rivier), and the Connecticut River as the Fresh River (Varsche Rivier). Both of these names were used throughout the Dutch period.

De Laet’s treatment of the lakes and rivers of northern New York is peculiar and interesting. As on the Hendricksen chart, the Mohawk Indians are placed near their eponymous river, but the Mohawk River is still not shown joining the Hudson. Instead, it is depicted as flowing into what is probably a wildly displaced Lake Oneida, which in turn drains into the Delaware River. The watershed of the upper Susquehanna River is not shown, and the upper reaches of the Delaware seem to include some of the tributaries of the Susquehanna. The name “Sennecaas” again appears directly under Lake Oneida, although the Senecas lived far to the west. To the north, Lake Ontario is shown, labeled in French (betraying the source of this information) “Grand Lac.” What appears to be a second Lake Oneida (“Lac des Yroquois”), which is derived from Champlain’s maps, is shown flowing into Lake Ontario. The relationship between these bodies of water and the St. Lawrence River is obscured by the frame of the map. The biggest surprise on this part of the map is the treatment of Lake Champlain, which resembles that on Champlain’s map of 1612, but is considerably improved. On De Laet’s map, the lake is more correctly oriented in a north-south direction, and what appears to be Lake George is more sharply differentiated from Lake Champlain. The lakes are also correctly located much closer to the Hudson River than on other Dutch maps, including those produced decades later. There are no records of the Dutch having visited either Lake George or Lake Champlain, although Dutch fur traders could well have made one or more unrecorded trips to the area. It is also possible that De Laet’s information about these bodies of water came from Indian sources. In any case, the depiction of Lake Champlain on De Laet’s map is better than on any other map, either Dutch or French, produced prior to the 1660s.

The next important Dutch map of New Netherland is Willem Janszoon Blaeu's *Nova Belgica et Anglia Nova*, which appeared in 1635 (Figure 2.2).[7] Blaeu was one of the most prominent Dutch map makers of the seventeenth century, and benefited from close ties with the West India Company.[8]

Figure 2.2 Willem Janszoon Blaeu, *Nova Belgica et Anglia Nova* (1635). John Carter Brown Library at Brown University.

Before describing Blaeu's map, it should be mentioned that there is some lack of agreement among scholars as to why the name *Nova Belgica* (New Belgium) appears so often on Dutch maps of New Netherland. The correct explanation is that there is no Latin equivalent of "New Netherland," and that *Nova Belgica* was its closest Latin approximation. It is also true that many of the settlers of New Netherland were French-speaking Walloons, who were Protestant refugees from Spanish rule in the area that later became known as Belgium. It has occasionally been maintained that the name was adopted in their honor.[9] There is no documentary evidence for this, and in the seventeenth century the name Belgium was applied to both the southern and the northern provinces of the Netherlands (in 1648 the northern provinces were known officially as *Belgium Foederatum* and the southern provinces as *Belgium Regium*). Belgium only became established as the name of a country separate from the Netherlands in 1839. Thus, it appears clear that on seventeenth-century maps the name *Nova Belgica* had no special meaning other than being the Latin equivalent of New Netherland.[10] This is

confirmed by the usage on the Blaeu map, where names are often given in both Dutch and Latin—e.g. *Niev Nederland* and *Novvum Belgivm* or *Niew Engeland* and *Nova Anglia*.

The Blaeu map, which is a personal favorite of mine, used much the same sources as the De Laet map, but the two differ significantly in details. In many respects, Blaeu's work follows the Block chart more closely than the De Laet map. This is particularly evident on the northern portions of the map, in which the depictions of the St. Lawrence River and Lake Champlain are almost identical to those on the Block chart. On both maps, the upper St. Lawrence River is labeled *Die Groote Rivier van Nieu Nederland* (The Great River of New Netherland), and Lake Champlain is displaced far to the east. The coastline of Long Island and southern New England is also modeled very closely on the Block Chart. However, Blaeu added an updated depiction of the Delaware River, which very closely follows De Laet. Most of De Laet's place names are also on the Blaeu map, along with some additional names.

The Blaeu map is also notable for its fine engraving, and its extensive and attractive iconography, which make it popular with collectors. Its drawings of Native Americans and wildlife were widely copied in the seventeenth century, and many of its other features appear on later maps. As progenitors of numerous cartographic offspring, such maps are sometimes called "mother maps" by specialists in the history of cartography.

The animals and Native Americans on the Blaeu map were not purely decorative, although they had a decorative function: the paintings of seventeenth-century Dutch masters, particularly Vermeer, frequently show such maps on the walls of homes. These drawings were also serious efforts to inform map users of conditions in the newly discovered lands. There are no fanciful unicorns or dragons here. The Blaeu map tried, by and large successfully, to depict the typical native animals of what was to become the northeastern United States. In addition to showing such widely distributed species as rabbits and bears, the map depicts such characteristic North American animals as otter, elk (wapiti), beaver, and turkey.[11]

The accuracy of the depiction of Native Americans on the Blaeu map is more open to question. The couple on each side of the cartouche look suspiciously like European models dressed as fanciful Indians. More realistic are the drawings of boats in the ocean to the south side of Long Island. These are labeled (in Latin) "canoe, or little boat made from the bark of trees" and "boat made from a tree trunk hollowed out by fire." Birch bark canoes would probably not have been used along the coast, although they were found on the inland waters of what is now upstate New York. Large log canoes were, however, regularly used by Natives in the ocean off Long Island for communication with the mainland and even for whaling. These paddling Indians closely resemble those that appear in the earliest view of New York, which has been dated 1626-28.[12] The two palisaded Indian villages labeled "manner of dwelling among the Mohegans" have caused considerable controversy among archaeologists. The houses in the villages are fairly good representations of Indian long houses, but the neat rectangular shape of the larger village does not appear to be historically accurate. The smaller round village labeled resembles what is known of actual Indian villages more closely, although many Indian settlements were not fortified at all. At best, both drawings are highly idealized, as one would expect, since they were made by engravers in Europe who had never seen an Indian village. The artists might or might not have been working from crude sketches and

written descriptions brought back by explorers or traders. Many of the illustrations on the Blaeu map can be shown to have been copied from other sources. These methods of compilation left much room in which the imagination could frolic, and such illustrations should be used with caution.

By the early1640s, the Dutch West India Company realized that it would have to attract more settlers if the colony was to survive. New Netherland lost much of its small population between 1639 and 1645 in a disastrous Indian war under Director-General Willem Kieft. The Dutch colony was also rapidly being overshadowed by the rival English settlements in New England and Virginia. After 1647, the colony's new director-general, Peter Stuyvesant, made considerable efforts to bring in settlers and help them to get started. His efforts met with some success, but even at the end of Dutch rule, in 1664, the population of New Netherland was only about 9000, including some 2000 English-speaking settlers on Long Island. At the time of the fall of New Amsterdam, the population of New England was around 50,000. The disproportion between these numbers made the eventual fall of New Netherland all but inevitable.[13]

The landmark map for this later period of New Netherland is the famous Jansson-Visscher map, which was reprinted with minor changes at least 31 times between 1650 and the middle of the eighteenth century (Figure 2.3).[14] The earliest map in this series was published by Jan Jansson, and usually dated 1651, although it is now thought to have appeared in 1650.[15] Recent research has shown that this map is based on a manuscript drawn for Adriaen Van der Donck, probably by Augustin Herman (or Hermann).[16] Van der Donck was an important figure in the political life of New Netherland, as well as the author of a *Description of New Netherland* (1655), which is an important source for the history of the period. Van der Donck is more than anyone else responsible for the intellectual content of the map, which makes his role is remarkably similar to that of de Laet vis à vis the Garritz/de Laet map. Augustin Herman himself is an interesting person. An associate of Van der Donck, he was official surveyor of New Netherland, and apparently the first Czech immigrant to America. He later went on to acquire a large grant of land in Maryland, and drew an early (1670) map of Virginia and Maryland. Probably we should now speak of the Van der Donck/Herman/Jansson/Visscher series of maps, but I will continue to follow general usage and refer to it as the Jansson-Visscher series. All of the maps in this series are very similar, and most of the features I will be describing appear on all of the versions of the map. The most important changes in the later maps in this series are the addition of new settlements, such as Philadelphia, and of place name changes, including the change from New Amsterdam to New York. When a feature is confined to only part of the series, it will be noted here.

Figure 2.3 Jan Jansoon**,** *Belgii novi* (1651). New York State Library.

The famous Jansson-Visscher maps reveal much about New Netherland towards the end of Dutch rule. By this time the Dutch had a reasonably good knowledge of the geography of their domain. The major rivers and their tributaries are clearly shown. The Catskill Mountains and the Hudson Highlands are sketched in. Some fortifications, and various Dutch and English towns are depicted. Characteristically, boundaries are not shown, and only two large land holdings are named (Rensselaerswyck and the abortive "Colonie van de Heer Nederhorst"). Instead, numerous Indian villages and tribal names are given, which makes this map an important resource for students of Native Americans in the Northeast. Since the fur trade remained vital to the economy of New Netherland, it was important for the Dutch to know who their Native customers were, and where they were to be found.

Remarkably, the overall framework of this map is still based, directly or indirectly, to a large extent on the two figurative maps. This is particularly evident in the treatment of northern New York, which is clearly derived from the Block chart via the Blaeu map. The depiction of the St. Lawrence River is little changed from the Block Chart, and it is still labeled "De Groote Rivier van Nieu Nederlandt." There is scarcely a hint of the Great Lakes, and Lake Champlain is still displaced to the east of the Connecticut River.

There is no indication on this map of the important trade route between Albany and Montreal via Lake George, Lake Champlain, and the Richelieu River. Lake Oneida, which was badly misplaced on previous maps, disappears completely from the vicinity of the headwaters of the Mohawk River. There remains a small lake flowing into the St. Lawrence far to the west that may or may not represent Lake Oneida. The Seneca and other Iroquois tribes are still shown living in the vicinity of the headwaters of the Susquehanna River. All of this indicates the extent to which the rulers of New Netherland were focused on water born trade supplemented by some farming along the Hudson River and Long Island. No real effort was made to explore the hinterland and build up a land-based empire, in spite of their extravagant territorial claims.

Dutch map makers were not shy about borrowing from each other. The Janszoon-Visscher maps lifted most of their iconography from the Blaeu map. Blaeu's whole menagerie of animals is here, as well as the two palisaded Indian villages. There is an interesting change in the way the villages are labeled in some of the later maps in this series, which may be of interest to archaeologists and anthropologists. On the Blaeu map, both villages were labeled "manner of living of the Mohegans." On the third state of the Visscher version, that description applies only to the larger rectangular village. The round village is labeled "another manner that of the Minnesinks."

The most significant feature in the iconography of the series is the inclusion in most versions of a view of Manhattan. The best known of these views appeared for the first time in the earliest edition published by Visscher, usually dated ca. 1655, but possibly produced as early as 1650. This view has been shown to be based on a drawing by Van der Donck recently discovered in the Austrian national archives. In some versions of the map issued after the Dutch recapture of New York from the English in 1673, this view is replaced by another view of Manhattan, known as the "restitutio" view, which shows the growth of the city in the intervening years. These views will be discussed in greater detail in the final section of this chapter.

The Jansson-Visscher maps make their most important contribution in depicting the areas between the Connecticut and Delaware rivers, particularly along the Hudson River and on Long Island. These are the areas in which there was a strong Dutch presence, and it is possibly significant that in the versions of the map that were printed in Van der Donck's book, it was cut down to show only these areas. This is the part of New Netherland that Van der Donck and other members of the Dutch elite knew at first hand.

The depiction of Long Island is in most respects greatly improved from previous maps. The island is now assembled in one piece instead of broken up by channels, although the name *Gebroken Landt* is retained to the west of Hempstead. Long Island is now labeled "t'Lange Eylandt alias Matouwacs." A number of Dutch and English town names appear on Long Island. The Dutch place names on western Long Island include Brooklyn (Breukelen), Maspeth (Mispat), Amersfort, and Flushing (Vlissingen). Named English settlements include Jamaica, Greenwich (Greenwyck), Gravesend (Gavesant), Hempstead (Heemstee), Southold (S. Holt), East Hampton (Hampton), and Gardiner's Island (Garners Eylant). Other Long Island features on this map series I have discussed elsewhere.[17]

The Hudson Valley region is likewise sprinkled with familiar features and names. The Hudson Highlands and the Catskill Mountains are clearly sketched in. Although there were still practically no Dutch settlements between Manhattan and Fort Orange

(Albany), numerous creeks and other features bear names that can still be found (often with some variation in spelling) on modern maps These include Catskill or Cat Creek (Kats Kill), the Esopus River, Wappinger Creek, Rensselaerswyck, Kinderhoek, and Roeloff Jansoons Kill. The Mohawk River is shown, including on later editions the settlement of Schenectady. Numerous Indian tribes and village sites are shown along both the Mohawk and the Hudson Rivers, as well as in New Jersey. There are so many of them that they seem to overshadow the Dutch settlements, and they constitute a valuable resource for anyone interested in Indian settlement patterns.

The Jansson-Visscher maps are the only general purpose maps of New Netherland that make an attempt to give some idea of where people actually lived. Dutch and English villages, individual farms, and a few Indian settlements are marked by symbols resembling tiny houses with pitched roofs and chimneys. A few places are indicated by hollow circles, which may show proposed settlements. Individual farms along the Hudson River are sometimes depicted with one of these house symbols, accompanied by a square symbol, which might indicate one or more outbuildings. Some attempt is made to show the size of settlements by repeating these symbols. (Hempstead, for example, has eight of them.) Nobody appears to have attempted a detailed analysis of these symbols, which might repay additional work. As things now stand, it is often unclear whether individual symbols are meant to indicate Indian or European or settlements, and to what extent they can be relied upon to represent the actual number of houses at a particular location. Nonetheless, they are valuable for giving us some idea of the distribution of settlements in New Netherland around 1650. In a nutshell, the land was practically uninhabited by Europeans, except on Manhattan, Long Island, and in the immediate vicinity of Fort Orange.

The Jansson-Visscher maps contain a few remarkable errors or omissions. There is no indication of the barrier beach on the south shore of Long Island, or of the Great South Bay, although they are mentioned in contemporary written sources. Thus, Adrian Van de Donck, whose role in the creation of this map has been noted, wrote: “Along the seacoast of Long Island there are also several safe, commodious inlets for small vessels, which are not much frequented by us. There are also many spacious inland bays, from which, by the inlets (at full tide), the sea is easy of access; otherwise those are too shallow.”[18] Another striking mistake is that the Delaware River is erroneously shown joining the Hudson River. This error is corrected on some later maps in the series. This may be another example of misapplication of information obtained from the Indians, who traveled from the Delaware River to the Hudson River via the Walkill River with the aid of portages (along the later route of the Delaware and Hudson canal). Another error in the course of the Delaware was to underlie a land dispute between New York and New Jersey, which listed until nearly the time of the American Revolution, and will be discussed in subsequent chapters. Many of these errors result from the map having been engraved in Amsterdam, and serve as reminders that people who actually lived in New Netherland may have known more about their surroundings than appears on maps.

The Dutch maps in this series still reflect the expansive Dutch claims to control the entire region between the Delaware and Connecticut Rivers, and even show Dutch names as far up the coast as Cape Cod. Recently a good deal of attention has been paid to the propagandistic aspects of Dutch and English colonial maps of the seventeenth century.[19] There can be no doubt that the Dutch, like the English and the French,

fortified their claims to vast areas of land by renaming them in their own language. The name “New Netherland” itself, plastered over thousands of square miles of forests unexplored by Europeans, is an extreme example of this practice. I doubt that this war of names had very much practical impact either on the Indians, who were thus on paper made subjects of the Dutch, or on other European powers, which were more concerned about actual settlement and military power than with names on maps. Although the maps did succeed in irritating the English, they did nothing to prevent the eventual English takeover of New Netherland. However, these maps would have had considerable effect in the Netherlands. Maps like those in the Jansson-Visscher series were often published with books describing the new colony, or hung on the walls of merchants and statesmen. The familiar names would have helped to persuade settlers that “New Netherland” would have been a good place to call home, and served to convince investors or politicians to support the infant colony. As is the case with most propaganda maps, they seem to have been most effective at home. It may also be that the widespread use of this map helped ensure the continued use of many Dutch place names in New York and as far south as the mouth of the Delaware River, where we can still find Cap May (named after Captain Cornelius Mey) and Cape Hinlopen (now Henlopen).

In spite of their errors, omissions, and propagandistic distortions, the Jansson-Visscher maps were reasonably accurate for their time and place, and are rightly considered to be among the finest products of the golden age of Dutch cartography. Because of their intended audience of statesmen and merchants, they were of limited practical use to navigators or administrators in New Netherland. These users needed more detailed and specialized maps. For example, one would not want to sail into New York Harbor and up the Hudson River using one of the Jansson-Visscher maps. For this purpose one would need a more detailed nautical chart, and these were also supplied by Dutch cartographers.

Navigational Charts

The Dutch trading empire depended on shipping, and consequently it should come as no surprise that many of the most important maps of New Netherland are nautical charts. It is not always possible to distinguish nautical charts from general reference maps. Even a regional map like the Jansoon-Visscher map could be of some use to the captain a ship. It provides a general outline of the coast, and even includes some shoals and soundings in New York Harbor and the mouth of the Delaware River. Viewed in this broad sense, the two figurative maps could be considered the first nautical charts of New Netherland. The second figurative map (the Cornelis Hendricksen map) even includes named “reaches” on the Hudson River. (A reach is a length that can be sailed without tacking when the wind is coming from one direction.)

Maps that are primarily intended to serve as nautical charts are quite distinctive. They focus on such things as soundings, shoals, channels, islands, and landmarks, which can help a sailor ascertain his position and avoid hazards. Other information is minimized—particularly most details on the shore other than such things as hills or mountains that might serve navigators as landmarks. In the seventeenth century, most nautical charts also featured elaborate patterns of “rhumb lines.” Rhumb lines, which

usually coincide with compass points, were intended to aid navigators in following a course in a particular direction.

The first true nautical charts of New Netherland are two anonymous manuscript maps drawn around 1630. Both are in the Harrisse Collection at the Library of Congress. The more general of the two (Figure 2.4) bears the title *Pascaert van Nieuw Nederlandt Virginia, ende Nieuw-Engelandt...* (Chart of New Netherland, Virginia and New England...).[20]. A high- resolution color image of the chart has been made available by the Library of Congress as part of its project *The Atlantic World: America and the Netherlands*.[21] At first sight, it looks a good deal like the Gerritsz/De Laet map of 1630, which is its primary source, but a close examination shows significant differences. As one would expect on a nautical chart, it has rhumb lines, and it depicts shoals, rocks, and other features not found on the de Laet map. For a nautical chart, it shows an unusually large number of inland place names, including those of many Indian tribes. It improves in several ways on earlier maps of New Netherland. Long Island is shown in one piece, although it is distorted in a peculiar way. Many English place names are shown in red ink (other names are in black). There are major improvements in the way the Delaware and Susquehanna rivers are depicted, although the Mohawk River is still not shown as connecting to the Hudson. The misplaced Lake Oneida on the de Laet map is removed from this map. The depiction of the area around the St. Lawrence River is closer to that on the Blaeu map than it is to that on the de Laet map, and Lake Ontario is shown (labeled Lac de S. Louis, as on Champlain's maps). In spite of the improvements, Manhattan is still shown as a squat triangle, which is barely detached from the mainland. In short, this chart presents a rather odd mixture of improvements and errors, which will likely make it the subject of much discussion now that it is more widely available.

Figure 2.4. Joan Vinckeboons, *Pascaert van Nieuw Nederlandt* (1639?). Library of Congress, Geography and Map Division.

The second chart in the Harrisse collection (Figure 2.5) bears the title *Noort Rivier in Niew Neerlandt* (The North River in New Netherland).[22] This map was probably prepared for Peter Minuit around 1630, and is sometimes known as the Minuit Chart. I will refer to it as the North River chart (the Dutch usually called the Hudson River the North River). It is remarkably detailed and carefully drawn. In addition to showing the "reaches" along the Hudson, it provides a careful depiction of shoals, islands, headlands, and soundings in the river. These are accurate enough to provide useful information to anyone interested in tracing changes in the configuration of the river. It has been claimed that this is actually the first map to show a continuous line of soundings in a river.[23] As one would expect from a nautical chart, it provides little information about features on the land, although landmarks useful to sailors, such as the Catskill Mountains and the Hudson Highlands, are shown. It includes the names of several Indian tribes, but these can also be found on other maps. Nonetheless, like other Dutch nautical charts of this period, it does occasionally provide bits of information that cannot be found elsewhere. Shirley Dunn has pointed out that two Mohican villages on this chart were labeled "vasticheyt," indicating that they were palisaded.[24] The North River chart also provides limited amounts of information about the types of vegetation on individual islands in the Hudson River.

Figure 2.5. Joan Vinckeboons, *Noort Rivier in Niew Neerlandt* (1639?). Library of Congress, Geography and Map Division.

The history of printed nautical charts of New Netherland is particularly difficult to disentangle. Many of the published charts appeared in atlases, and clearly depict conditions a number of years prior to their actual date of publication. In some cases these maps may have been issued separately long before their appearance in an atlas, and without any date on the map. In other cases, the maps may have existed as manuscripts for years before their publication. Many of these charts were republished several times,

sometimes without change, and sometimes with major or minor revisions. All of this makes it difficult to construct a precise chronology of the published nautical charts.

The earliest published nautical charts of New Netherland were basically adaptations of previously published general-purpose maps. The first printed nautical chart of New Netherland is now thought to be Jacobs Theunis' *Pascaerte van Nieu Nederlandt, Virginies, Niewu Engelant, en Nova Freancia, van C. of Faire tot C. Forchu* (ca. 1650).[25] It is based on a 1636 map of New Netherland by Jansson, which is very similar to the De Laet map, and not separately discussed in this book. The Theunis chart follows its prototype closely, but bears the typical appearance of a nautical chart, including a dazzling display of rhumb lines and a picturesque drawing of a Dutch sailor preparing to take a sounding.

Until Burden established the priority of the Theunis chart, the earliest printed nautical chart of New Netherland was thought to have been published by Arnold Colom in 1656.[26] This chart exists in several states, with later editions being published by Hendrick Doncker.[27] Doncker was another map maker with close ties to the West India Company, and he published the chart in an atlas called *The Sea-Atlas, or the Water-World*. Bearing the title *Pas caarte van Nieu Nederlandt* (Chart of New Netherland), this map covers the whole area from Cape Cod to Cape Hatteras. Although it has the typical appearance of a nautical chart, it appears to be an adaptation of the coastal features from the Jansson-Visscher series. It contains little additional information, and it is not especially accurate. For what it is worth, it does seem to be the first map of New Netherland to include the place name Oyster Bay, but overall one would do at least as well using the Jansson-Visscher map for navigational purposes as the Colom chart, even though the latter was sold specifically as a nautical chart.

The Colom chart was followed by a similar, but somewhat improved, chart by Johannes Van Loon in 1661.[28] The next printed charts of New Netherland appear to be a pair published by Pieter Goos in a sea atlas in 1666. The first of these covers the area from Cape Cod to Cap Hatteras, and appears to be identical with Van Loon's chart of the same area.[29] The Van Loon/Goos charts are noteworthy mainly for the additional information they provide about shoals, particularly around the entrance to New York Harbor, and for showing the rocks in the East River at Hell Gate. They show Jamaica Bay as being much more open than in more recent times—apparently there was only a shoal in the seventeenth century where there is now a barrier beach. Like many Dutch maps of this period, they sport handsome engravings of sailing ships approaching New York Harbor. Ocean going ships were the jet aircraft or space shuttles of their day, and they were both the primary tools and the symbols of Dutch maritime power. Their frequent appearance on maps is not only decorative, but also served to celebrate and assert the might and glory of the Dutch republic.

The other chart in Goos's sea atlas is more original and innovative. It covers the coastline from Delaware Bay to the western part of Long Island, and it is more detailed and larger in scale than its companion chart.[30] It includes extensive soundings and carefully delineates shoals in the mouth of the Delaware River and in New York Harbor. This chart is most noteworthy for its depiction of the Delaware River and New Jersey, but it is also of interest for what it shows about the New York harbor area and western Long Island. Manhattan and the East River are depicted much more correctly that on previous maps, and this chart provides a picture of the western Long Island coastline that differs

somewhat from that shown on the previously discussed chart in the same atlas. Coney Island (*Knynen Eylandt*) is shown as still an island detached (just barely) from the mainland. Jamaica Bay is labeled *Rechkewach* (Rockaway), and is given a different configuration than on the previous chart, although it is still not shown as being fronted by a barrier beach. This second chart, which marks an important advance in the mapping of the New York area, gives the impression of having been created later than its companion chart.

The next nautical chart of New Netherland to be published appears to be Arent Roggeveen's 1675 *Pascarte van Nieu Nederland streckende vande Zuydt Revier tot Hendrick Christians Eylandt* (Figure 2.6).[31] This chart is very different from its predecessors, and appears to be compiled from materials gathered in the 1650s or 1660s. Roggeveen obtained permission to publish a sea atlas called *The Burning Fen* in 1668, but the earliest known edition of the atlas using Roggeveen's plates was published by Goos in 1675. It is possible that an earlier edition of this atlas was published, or that some of the maps were published individually. A later edition by Jacob Robijn appeared in 1685.[32]

Figure 2.6. Detail of Arent Roggeveen**,** *Pascarte van Nieu Nederland streckende vande Zuydt Revier tot Hendrick Christians Eylandt* (1675). Library of Congress, Geography and Map Division.

The remarkable Roggeveen chart covers all of Long Island, along with New York Harbor and the Coast of Connecticut. The section of the chart dealing with New York Harbor and western Long Island resembles the more detailed of the two Goos charts, although the maps are not identical. The Roggeveen chart is most notable for its unusual

(and very strange) depiction of eastern Long Island. As can be seen in the illustration, the shape the island is very distorted. It seems that there is almost a backwards evolution in the overall depiction of the shape of Long Island on seventeenth-century Dutch maps of New Netherland. The Block Chart and the Blaeu map (which was derived from the Block Chart) do a fairly good job of capturing the overall shape of the island. The Jansoon-Visscher map and the charts by Donckers and Goos are somewhat less successful at presenting the shape of Long Island, although they do show more details and contain many more names than the earlier maps. Some of the nautical charts published at the end of the seventeenth century verge on the bizarre. Part of the explanation for this lies in the difficulty of mapping a large island from the water using the technology of the age. Distances had to be calculated from the speed of a ship, which was usually estimated or, at best, measured by throwing a piece of wood into the water (known as a chip log). Such a method of measuring speed and distance could easily be thrown off by offshore currents, of which there are many around Long Island. The method worked fairly well on a straight reach, such as along either the north or the south shores of Long Island. Hence approximate distances on early maps between landmarks on such stretches can usually be relied on. But the offshore currents could wreck havoc with the charting activities of any ship that circumnavigated the island. Consequently, the overall shape of Long Island and the alignment of opposing coasts were often distorted. The situation was not helped by these maps being engraved in Holland, which made it difficult for publishers to check on the accuracy of their information.

In the case of the Roggeveen chart, Long Island is somewhat stylized and compressed, making it appear a bit too thick. The most dramatic error is that Peconic Bay, which on some earlier maps is tilted considerably too far to the north, is now rotated to an almost north-south direction, instead of being properly oriented east-west. As a result, there was no place for the North Fork, which completely disappears from the map. To find room for Southold (“Zuyt Hol”), Roggeveen moved it westward along the North Shore to an embayment, which is unnamed on earlier maps, and probably originally represented modern Huntington Bay or Port Jefferson Harbor. In addition, the East End of Long Island has several place names, which appear on no other printed maps, and seem to be derived from Spanish or Portuguese sources. These are “Cabo Baya,” “Cabo Sinhoes,” and “Cabo Peeck.” These names seem to be in accord with Koemen’s observation that Roggeeveen used Spanish and Portuguese maps, which he could have found in the archives of the West India Company.[33]

In spite of its peculiarities, the Roggeveen chart contains some information about central and eastern Long Island that cannot be found on previous maps. It includes soundings along the South Shore of Long Island, and for the first time provides considerable hints of shoals and the barrier beach in that area. Roggeveen also delineated the strategic neck of land at Canoe Place on the South Fork (where the Shinnecock Canal is now located). Another interesting and distinctive feature on the Roggeveen chart is the depiction of the area on the South Shore around “Suketewachly” (the Sickete Wachly of the Jansson-Visscher map). Here are several clues to both the nature of SicketeWachly and to one of the sources Roggeveen used to compile his chart. Note the name “Prinz Mouritz Eylandt” given to one of the fragments of the barrier beach. This island must have been named after the Prince Maurice, a Dutch ship bringing settlers to New Amsterdam that was wrecked off the South Shore in 1657—one of the more dramatic and

well-documented events in the history of New Netherland. Briefly told, the ship foundered off Fire Island and its passengers were cast upon the barrier beach in late winter. Nearby Indians brought word about the plight of the emigrants to Manhattan, and Peter Stuyvesant himself directed a small fleet of boats that saved all of the passengers and much of the cargo. These events were described in reports sent back to the Netherlands, some of which survived to be translated and published.[34]

The section of the Roggeveen chart depicting the area around Sickete Wachly is clearly based on information about the wreck of the *Prince Maurice*. Read in conjunction with the surviving Dutch documents, the chart sheds considerable light on the identity of Sickete Wachly. Judging from the nature of the rescue mission, the wreck must have taken place far from the Dutch settlements on western Long Island, but well short of the English at Southampton. This is consistent with the representation on the Roggeveen chart. It is also clear, both from the map and the written sources, that there was a break in the barrier beach and a river at Sickete Wachly. This break could not have been Fire Island inlet, which is too far to the west to be the one shown on this map. Thus it seems likely that the river at Sickete Wachly was either the Carmans or the Connetquot. Given the configuration of the river on the chart (and the apparent depiction of a second river to the west), it is almost certainly the Carmans River. The inlet would then have been in the general area of Smith Point on Fire Island National Seashore. This is an unstable area of the barrier beach, and at least two inlets existed there between 1750 and 1830. This location agrees with that of “Sickete Wachly” on the Jansson-Visscher map, which also shows an Indian village located nearby. The presence of small settlements of Indians (ancestors of the Poospatucks) near the Carmans River is well documented, and this agrees with contemporary reports that the stranded settlers were helped by local Indians.

The last in this sequence of nautical charts was drawn by Claes Janszoon Vooght, and published by his partner Johannis van Keulen in 1685. It bears the title *Pas-Kaart Vande Zee Kusten van Niew Nederland Anders Genammt Niew York* (Chart of the Sea Coasts of New Netherland, Also Called New York).[35] As the title reveals, Dutch mapmakers showed an understandable reluctance to acknowledge the finality of the English conquest of New York.

This handsome chart combines on one sheet three separate maps: a chart of the Hudson River, a chart of the Connecticut River; and a chart of the area around Long Island and New York Harbor. The part depicting the Hudson River is apparently the first published chart of that river. It does a fairly good job of showing the bends and islands in the river, along with some shoals, but it lacks soundings and is overall much less detailed than the previously discussed manuscript chart drawn around 1630. Many villages inhabited by Native Americans are shown along the river, making the map potentially useful for tracing shifting Indian settlement patterns.

Vooght’s depiction of Long Island is another partially failed attempt to grapple with the island’s illusive shape. This part of the chart is clearly modeled on the Roggeveen chart, but manages to correct some of its most conspicuous errors. Peconic Bay is given its proper east-west orientation, the North Fork and “Zuyd Hol” are restored to their proper places, and the strange Latinate names on eastern Long Island are removed. However, Peconic Bay is too small, the North Fork is dwarfed, and the South Fork shows symptoms of elephantiasis. Overall, the shape of Long Island is even more compressed than on the Roggeveen chart, making it look exceptionally obese. In spite of these

failings, Vooght's chart manages to capture some shapes, such as that of the North Fork, better than previous charts, and adds a few new names, including "Zuyd Hampton" (Southampton). It also provides much more extensive soundings than its predecessors, and does a better job of depicting shoals.

Town Plans and Property Maps

Relatively few maps of New Netherland tell us much about what the Dutch actually did with the land. With the partial exception of the maps in the Jansson-Visscher series, the regional overview maps provide us mostly with such information as the locations of rivers, towns, Indian tribes, and fortifications; but they do not include land boundaries or other property information. In this respect, as we shall see, they differ from many of their Anglo-American counterparts. Moreover, the Dutch produced only a handful of specialized cadastral maps, which show such things as property boundaries, the layout of cities and settlements, or the location of buildings.

There are a number of reasons for this dearth of property maps. It should be remembered that many maps have been lost, and there are references in written documents to maps that have disappeared.[36] Also the low population of New Netherland has to be taken into account. Even at the end of the Dutch period, there were only a few small settlements beyond the immediate vicinity of New Amsterdam and the area around Fort Orange and Beverwijk (later Albany). People sometimes inquire about Dutch "patroonship maps," forgetting that Rensselaerwijk was the only patroonship that actually succeeded and survived the Dutch period. Several other patroonships were created, but they failed to attract settlers, or were destroyed in the Indian wars that plagued the colony. In comparison with the tiny population, land was so plentiful that farms could be allocated without paying much attention to the formalities of surveying, mapping, and registering the land. Indeed, prior to 1638, colonists were allowed to simply "choose and take possession of as much land as they [could] properly cultivate."[37] It has been estimated that at the end of Dutch period there were only about 350 farms in present in modern New York State, excluding the English settlements on eastern Long Island.[38]

Finally, there may be cultural reasons behind the Dutch disinclination to produce property maps. These have been presented by historian Donna Merwick in *Possessing Albany*.[39] The leaders of the West India Company and New Netherland were mostly merchants or their employees. With a few exceptions, most notably Killian van Rensselaer, they had little or no interest in building large landed estates in the New World. They were also not able to attract large numbers of settlers interested in becoming farmers. The inhabitants of New Netherland included a fair number of outcasts who could not find a place in European society, along with company employees, and those interested in making quick money in the fur trade; but the mix of settlers included few would-be yeomen or freeholders. Unlike the Anglo-Americans, the Dutch settlers of all social groups were not obsessed with improving their status by gaining land. Their aim was to make money, preferably lots of it, and without too much work.

In spite of these constraints, the Dutch did a good deal of land surveying, especially in the last ten years of their occupation of New Netherland. From1642 onward, there was a succession of officials occupying a position comparable to the position of Surveyor

General in English colonies.[40] The texts of many Dutch land patents have survived, but, remarkably, it appears that not a single one of these surveys was accompanied by a map.[41] Perhaps, as Merwick has suggested, property was seen as something so personal that it was considered an invasion of privacy to be forced make one's property holdings publicly known, much less to produce maps of them.[42] However, Merwick's thesis seems questionable, since the Dutch were quite as capable of surveying and producing cadastral maps as the English, and did so extensively in some of their colonies, especially Brazil. In Virginia (unlike New England) the English also did not do much detailed property mapping until the end of the seventeenth century. Even after 1664 in New York, as will be seen, it was many decades before land patents were routinely accompanied by maps. Thus, I am inclined to think that the exigencies of time and place, rather than the mysteries of the Dutch psyche, are primarily responsible for the small number of property maps from New Netherland.

New Amsterdam is the only city or town in New Netherland for which maps from the Dutch period still exist that show individual buildings or property boundaries. Although these materials have been analyzed extensively by Stokes and others, it is worth reviewing them quickly here for the light they shed on Dutch mapping practices in New Netherland. In this context, it is not altogether clear what to count as a map. Several of the earliest images of the city are usually described as "views" rather than maps—they are drawings showing the city from a particular vantage point, rather than schematic representations drawn to scale. But the distinction between maps and views is not clear cut—especially when one is dealing with seventeenth-century Dutch maps. Inset views of New Amsterdam were frequently included in Dutch maps of New Netherland, and several maps of specific areas within the colony have many of the characteristics of bird's-eye views. Generally speaking, the more "map-like" views resemble photographs taken from a high elevation, whereas ordinary city views are taken from ground level or a modest elevation. The pictorial quality of many Dutch maps reflects the influence of Dutch landscape painting, which sometimes shows the countryside from a high aerial perspective. It is worth noting that seventeenth-century Holland produced a number of artist-cartographers, including Johannes Vingboons, whose studio produced maps, perspective water colors, and full-fledged landscape oil paintings—often of the same scene.[43]

The earliest view or map of New Amsterdam fits into this hybrid category. This is *T'Fort Nieuw Amsterdam op de Manhatans* (known as the Hartgers View), which shows the city as it existed around 1626.[44] Although this view was not published until 1651, the printed version is almost certainly a copy of a drawing made by Crijn Fredricx (or Frederycs) between 1626-28.[45] Fredricx was the military engineer who built the first fort at New Amsterdam. He returned to the Netherlands after a brief stay in the New World, and went on to pursue a distinguished career as military engineer and mapmaker in his native country, where he was known by his proper name, Quirijn Fredericksz van Lobbrecht.

The Hartger's View functions very much like a map in that it shows us the buildings and fortress of New Amsterdam from a sufficiently high perspective to give a clear picture of the layout of the embryonic city and the appearance of its surroundings. The impressive fortress that dominates the city is the one Friedricz wanted to build, rather than the more modest structure that was actually constructed. The engraving also shows

some Indians in canoes. They may look familiar, since they are a reversed image of an illustration that later appeared on both the Blaeu and the Jansson-Visscher maps. Friedricz was also sent out with detailed instructions from the Board of Directors of the West India Company on how to lay out lots for farms and buildings in the new city. With some alterations necessitated by the topography of Manhattan Island, these plans formed the basis for the layout of the oldest part of New York City.

Later views give us a good idea of the development of New Amsterdam, although they are drawn from a perspective closer to ground level, which makes them less "map like" than the Hartgers view. The best- known view of New Amsterdam is the one that was first published in the Visscher edition of the Jansson-Visscher map, which is usually dated ca. 1655, but which probably dates from 1650 or 1651. This view bears the title *Nieuw Amsterdam op t Eylant Manhattans*. Only recently has the remarkable history of this view come to light. The original version was drawn for Adrian Van der Donck—most likely by Augustin Herman, who probably also drafted the manuscript used as the basis for the Jansson-Visscher maps. The original of this view makes New Amsterdam look like it is falling apart. The houses are ramshackle, the walls and fort appear to be melting into the ground, no people can be seen, and the windmill has only two arms. This view was apparently intended to go along with the map to illustrate Van der Donck's "Remonstrance" to the Dutch West India Company, indicting Stuyvesant's alleged misadministration. Once this view had served its original purpose, it was polished up to serve other purposes. Johannes Vingboons, who worked for the West India Company, made a beautiful watercolor based on this view, in which the fort is repaired, the city is populated, and the windmill is provided with a full complement of arms.[46] Johannes Blaeu also made an engraving of the view, which was similar to the Vingboons drawing, and which was then re-engraved for the 1655 Visscher map of New Netherland. This pattern of reworking maps and views for different purposes and users was not unusual in seventeenth-century Holland, and serves as a reminder of the extent to which maps are often anything but "objective" representations of reality.

The final view of Dutch Manhattan is the so-called "Restitutio view," which appeared in some editions of the Jansson-Visscher map published after 1673 to celebrate the brief Dutch recapture of the city. This view bears the title *Niuw-Amsterdam onlangs Nieuw Jorck genaemt en nu hernomen bij de Nederlanders op den 24 Aug 1673* (New Amsterdam erstwhile called New York and retaken by the Netherlanders on August 24, 1673). The rapid growth of the city in the previous thirty years is evident in this view.

The most detailed and impressive plan of New Amsterdam was produced by Jacques Corteljou, the last surveyor general of New Netherland. It will be discussed below along with other works by Corteljou. No maps showing street plans or buildings of cities in New Netherland other than New Amsterdam have come down to us from the Dutch period. This is mainly because the other settlements were so small that they scarcely needed to be mapped. The only other settlement with more than a few buildings is the town that later became Albany, which grew out of a group of houses huddled around Fort Orange. This settlement was only separated from Rensselaerswyck and formally organized as a town in 1652, when Stuyvesant gave it the very appropriate name of Beverwijck (Beaver-town). The town was informally known to its residents as "the Fuyck." This name, which comes across to Anglophones as singularly inelegant, means "animal trap," and refers to the unusual funnel-like shape of the town within its walls,

which resembles the converging stockades sometimes used to drive large animals towards hunters (see Figure 4.2 in Chapter 4 of this book) . There were, however, two maps that showed property ownership in larger geographic areas.

For a birds-eye view that more closely resembles a map, let us turn to the view of the colony of Rensselaerswyck drawn for Kiliaen van Rensselaer around 1630 (Figure 2.7).[47] Van Rensselaer had purchased this land in 1630, and the map was made to give him and his associates a picture of their new holdings along the Hudson River near Albany. Most of the surveying for the map was done on the spot by Bastiaen Janz Krol. Recent research has shown that the map was drafted in Amsterdam by Gillis Van Schendel, who was paid six *rixdollars* by van Rensselaer to produce a map on vellum with four additional copies on paper.[48] The carefully drawn vellum map is now in the New York State Archives. It provides us with an unusually detailed view of the islands in the Hudson River, and of the topography of the east bank of the river, where van Rensselaer wanted to locate his colonists. It also shows several farms which van Rensselaer was in the process of establishing, and also fortified villages of the Mohican Indians. The map needs to be interpreted with particular caution. All maps present selective views of reality, but this one is particularly selective. As Merwick puts it: “First, it was what van Rensselaer wanted to see, modified by what he wanted others, especially his partner Johannes de Laet, to see. Second, it was what the overseas surveyors and draftsmen wanted van Rensselaer to see.”[49] Among other things, it contains odd omissions in the area of the Mohawk River, and accentuates the desirability of the lands along the east side of the Hudson River for settlement.

Figure 2.7. [GilisVan Scheyndel, ?], Renselaerswyck, [ca. 1632]. New York State Archives.

This same pictorial “birds-eye” quality is also evident on the well-known “Manatus” map (Figure 2.8).[50] This manuscript map, which exists in three variant copies, is dated 1639, and was probably made for the West India Company. The author of the original map is unknown, but the copies were very likely made by the studio of Johanness Vingboons. As previously noted, Vingboons maintained a kind of “picture archive” of maps, which he used to produce everything from simple copies to elaborate oil paintings. This type of high-altitude aerial perspective watercolor is a characteristic production of the Vingboons studio, and it is quite possible that he modified a simpler sketch to give it a more artistic appearance.[51]

Figure 2.8. Joan Vinckeboons, "Manatvs gelegen op de Noot [*sic*] Riuier" (1639?). Library of Congress, Geography and Map Division.

The original Manatus map was clearly created as an administrative tool for the West India Company. Its chief purpose seems to have been to provide the directors of the company with information about the Dutch settlements; attracting new settlers was possibly a secondary purpose. New Amsterdam itself is not shown in detail, although the Dutch fort at the foot of Manhattan is depicted, along with two windmills. The map focuses on farms in the vicinity of Manhattan, and the names of landowners are provided. In a few cases, property boundaries are also indicated by dotted lines. Several of the farms are shown with associated hayricks, which resemble belfries. These may provide a clue to the meaning of the symbols associated with some of the farms shown on the Jansson-Visscher maps. Several Indian villages are shown on Long Island, and are symbolized by drawings of long houses. Not to be overlooked is the presence of a slave camp on Manhattan Island. Labeled with the letter "F," it is located opposite present-day Blackwell's Island. The legend reads in translation "Quarter of the blacks, the Company's slaves." A more detailed analysis of the Manatus map can be found in Stokes, who describes almost everything he could find out about every feature on the map.

During the final years of Dutch occupation, property mapping became more prominent. As previously noted, the first Dutch Surveyor-General (Andries Huddle) was appointed in 1642. The modest surge of population under Peter Stuyvesant after 1644 prompted an increase in land ownership and surveying. We know enough about the personality and activities of the last Surveyor-General of New Netherland (or Sworn

Surveyor as he was called by the Dutch) to gain some insight into the life of a surveyor towards the end of the Dutch period. His name was Jacques Corteljou. He was a French-speaking Fleming, who arrived in New Netherland in 1652, and was appointed to his office in 1657.[52] Corteljou continued as Surveyor General until 1671, several years after New Netherland passed into the hands of the English. He continued to make his living as a farmer on Long Island and as a surveyor until his death in 1692 or 1693. He was one of the founders of New Utrecht (now part of Brooklyn), and had seven children, one of whom, Pieter Corteljou (ca. 1665 –1757), was also a professional surveyor. Both names appear frequently in New York colonial land records.

Some intriguing comments on Jaques Corteljou's life and character have come down to us from Jaspar Danckaerts, who made a tour of several of the British colonies in search of a place to found a settlement for a religious sect to which he belonged (the Labadists). In 1679, Dankaerts wrote in his journal: "Jaques is a man advanced in years. He was born in Utrecht, but of French parents, as we could readily discover from all his actions, looks and language. He had studied philosophy in his youth, and spoke Latin and good French. He was a mathematician and sworn land-surveyor. He had also formerly learned several sciences, and had some knowledge of medicine. The worst of it was, he was a good Cartesian and not a good Christian, regulating himself, and all externals, by reason and justice only; nevertheless, he regulated all things better by these principles than most people in these parts do, who bear the name of Christians or pious persons."[53] Rationalists and religious skeptics were not common anywhere in the middle of the seventeenth century, and Corteljou would have been one of very few in North America at the time. His background in mathematics and science would have served him well as a surveyor; it was not uncommon prior to the twentieth century for surveyors to have wide-ranging scientific interests.

We also know something about Jaques Corteljou's activities as a land surveyor. A number of his property surveys are recorded in the state Land Papers.[54]. None of the surveys he made during the Dutch period were accompanied by maps, although a sketch map appears in one of his later surveys. Toward the end of the Dutch period, he was also involved in surveying cities and new settlements. In 1664 he was sent by Stuyvesant to survey for a land patent the small settlement that had grown up at Schenectady.[55] It was not until 1684 that an actual patent for Schenectady was granted by the English.

Corteljou's most important achievement is a detailed map of New Amsterdam, which is preserved in a copy known as the Castello Plan. Corteljou is reported to have conducted four surveys of New Amsterdam between 1657 and 1661. The Castello Plan, which was made around 1665-68, is thought to be a copy of his 1660 map. It is contained in an atlas of manuscript maps that includes one of the copies of the Manatus map, and other maps similar to those in the Harrisse collection. It is therefore likely that this copy comes from the studio of Johannes Vingboons. The Castello Plan is quite detailed. It is carefully drawn to scale, and shows streets and fortifications, along with individual houses and lots. It was declared by Stokes to be "the most complete and accurate of any map of any city in the New World north of Mexico, at that Period, not excepting French and Spanish maps." One of the most important maps in the history of New York City, it also has been described extensively elsewhere.[56]

Dutch Mapping under English Rule

Dutch mapping of present-day New York did not come to an end in 1664. Not only was there a brief restoration of Dutch rule in 1673-74, but the province of New York remained predominantly Dutch well into the eighteenth century, and Dutch influences continue to the present. The area continued to maintain trading relations with Holland, and Dutch map makers continued to produce maps of New Netherland. After about 1680, most of the maps of New York published in the Netherlands were reprints, or were based on English sources. It was many years before Dutch publishers could bring themselves to remove the name "Nieu Nederlandt" from their maps of the New York area.

Students of New Netherland should not neglect to study some of the maps made during the English period, which often throw light on earlier conditions. This particularly applies to property maps. As will be seen, the English were generally much more meticulous than the Dutch about surveying and recording property boundaries. Consequently, in order to defend and maintain their holdings, Dutch landowners in the English period often had to commission surveys of their properties. These were frequently made by Dutch surveyors and written in Dutch. Some of them reveal characteristic features of Dutch map making, and they are useful for such purposes as studying patterns of Dutch Settlement.

Although there are no maps from the Dutch period for cities other than New Amsterdam, this lack is partially remedied by maps that were produced by English surveyors towards the end of the seventeenth century. Albany, Schenectady, and Esopus (Kingstown) were mapped by Wolfgang Römer and John Miller. These maps, which show characteristic Dutch settlement patterns, will be discussed in Chapter 4.

Finally, it should be noted that Amsterdam financiers did not entirely lose interest in New York after 1664. In the first part of the nineteenth century, a group of Dutch investors, much like those who stood behind the West India Company, created the Holland Land Company. As we will see, the Holland Land Company played a major role in the settlement of western New York, and was much more profitable for its backers than the Dutch West India Company ever was. One of its legacies is the city of Buffalo, which was the second city in New York State to start its career under the name of New Amsterdam.

Chapter 3
French Maps, 1633-1760

Introduction

The early mapping of New York State includes maps produced by three of the leading colonial powers of the seventeenth and eighteenth centuries. Both the similarities and the differences between the Dutch, French, and British maps of the area are remarkable. During this period, these three nations were in the forefront of European mapping. They participated in a common mapping culture—i.e. their maps were based on shared conventions, such as uniform scale, the use of mathematical projections, and the use of latitude and longitude to specify place locations. By and large, they also used the same conventions for map symbolization. However, there are appreciable differences in the ways the map makers of these countries went about depicting the region that was to become New York, and these differences reflect the culture, political systems, and priorities of each nation. Studying the maps they produced tells us much about the nature of their colonial enterprises.

Less attention has been paid to the French mapping of New York than to that of the Dutch and the British. There are a number of reasons for the neglect of the French contribution. Linguistic barriers and the fact that the French never established a permanent colony in New York help explain why their maps have often been overlooked. Nonetheless, in the seventeenth and eighteenth centuries the French maps of northern and western New York generally excelled those of both the Dutch and the British. And, as was seen in the first chapter of this book, even in the early phase of exploration, French explorers, such as Verrazano and Champlain, played important roles in charting out the new landscape. The French continued to make pioneering and important contributions to the cartography of New York through the seventeenth and eighteenth centuries.

In the first chapter, we left off the story of French mapping of the area that was to become New York with Champlain's map of 1632. In spite of thirty years of struggle, New France was scarcely viable as late as that date. In 1629 the English had actually seized Quebec, and it looked as though the short career of New France was over, but it was returned to France a few months later under the treaty of St.-Germain-en-Laye. After the fall of Quebec, Champlain returned to France where, among other things, he prepared the 1632 version of his map of New France. In 1633 he returned with three ships and again took charge of a colony now consisting of slightly more than 100 people.[1]

This feeble colony had two things working in its favor. The first was the geographical advantage that came from its position on the corridor leading down the Saint Lawrence River to the Great Lakes. This allowed the French to control much of the valuable fur trade, and eventually enabled them to build a tenuous empire over a large part of inland North America. The exploits of the French on the Great Lakes and in the Mississippi Valley fall largely outside of the framework of this study, although they are reflected in several landmark maps of eastern North America, which will be discussed below.

The other major support of New France in the middle of the seventeenth century was its missionary activities, which were largely carried out by the Company of Jesus. The determined and partially successful attempts of the Jesuits and other religious orders to

convert the Indians had no real parallel among the Dutch or the English. The first Jesuits arrived in 1625, and in the following decades they were quite active in attempting to introduce the natives to Christianity. Although most of the efforts of the Jesuits focused on areas that are now in Canada, they also established missions among the Iroquois south of Lake Ontario. In the process, they made important contributions to the exploration and mapping of northern and western New York.

Maps by Missionaries

The Jesuit fathers were among the most educated men in Europe, and their skills sometimes included surveying and cartography. At the very least, they knew how to read a map and use a compass, how to measure distances by pacing, and how to put their observations down in writing and in crude maps. Some of them possessed more specialized skills, such as the knowledge of how to measure latitudes using the sextant or cross staff. A few even made estimates of longitude using spherical trigonometry or lunar eclipses.[2] Probably their basic literacy and familiarity with the use of maps is more important than any specialized knowledge individual Jesuits may have had. It is easy to overlook the importance of the ability to read and write for explorers, especially in the context of the seventeenth century. The Jesuits were sometimes preceded in their discoveries by illiterate or semi-literate explorers and fur traders, such as Champlain's assistant Etienne Brûlé and later the fur trader Pierre Radisson, but such people were unable to make maps or even provide useful geographical descriptions of their discoveries.[3] Thus, the Jesuits were largely responsible for the earliest detailed maps of northern and western New York. Many of their maps were sent to an institution in Paris usually referred to as the *Dépôt de la Marin*, which served as the central repository for French colonial maps.[4] Some of the most detailed and interesting of them exist only in manuscript, and are little known. Others were used later together with other sources to produce superb manuscript and printed maps of New France.

For those Jesuits who wished for martyrdom—and some of them did so fervently—Iroquoia was truly a land of opportunity. As was seen in the brief discussion of Champlain earlier in this book, the French and the Iroquois got off on a bad footing from the start. Some conflict was probably inevitable because it was underlain by the economics of the fur trade. To obtain furs, the French needed to cultivate good relations with Indians to their west, most notably the Hurons and the Ottawas. These nations were traditional enemies of the Iroquois, and they looked to the French for arms and other support. In addition, the interests of the Iroquois were challenged by the French efforts to control the fur trade, by the cultural challenge posed by French missionary activities, and by the efforts of the French and their Indian allies to control lands claimed by the Iroquois.[5] The Iroquois were closely allied with the Dutch, and exchanged furs with them for trade goods (including arms) at Fort Orange. The introduction of firearms made warfare between groups of Indians much more deadly, and enabled the Iroquois to fight effectively against the French. The formidable Iroquois were spectacularly successful against other Indians (they nearly annihilated the Hurons as a tribe), and they brought New France to the brink of disaster.

Several Jesuits became acquainted with the Iroquois through being taken captive and tortured. Those who survived sometimes returned to found missions. The French

missionary effort to the Iroquois was an intermittent affair, which depended on the politics of the moment, but it helped give the Jesuits a good geographical knowledge of the Iroquois lands. One of the first Jesuits to visit New York was Father Isaac Jogues, who was captured in Canada by the Mohawks in 1643. He was brought down to the Mohawk villages via the Lake Champlain route. Upon arrival he was horribly tortured, and then held captive. Eventually Father Jogues escaped from his captors, and with the help of the Dutch at Fort Orange returned to France.[6] He almost immediately returned to Canada, and, in 1646 (after a brief peace had been made between the French and the Iroquois) he returned to the scene of his torments and began the mission to the Mohawks. On his second trip from Canada to the Mohawk River, Father Jogues once again traveled by way of Lake Champlain, accompanied by a surveyor named Jean Bourdon. He may have been the first European to see Lake George, which he named *Lac Saint Sacrement* (Lake of the Holy Sacrament).[7] This name appears on many British as well as French maps of the colonial era. Only in the middle of the eighteenth-century did the British honor their reigning monarch (George II) by giving the lake the prosaic name it bears today.[8] Jogues' career as a missionary ended later in the same year when was killed by the Indians, who suspected him of witchcraft.

In 1653, the French and the Iroquois signed another peace treaty, and Jesuit missionaries were allowed to establish themselves in the villages of the Five Nations.[9] In 1658, war broke out again, and the Jesuit mission at Onondaga was abandoned. In 1667, the missions were reopened after the Iroquois decided to conclude peace again following French raids against the Mohawk (described below).[10] The period of intensive Jesuit missionary activity lasted only until around 1680. The Jesuits made a practice of encouraging their converts to move to Canada where they could be better controlled and be less tempted to relapse by pagan Indians. This emigration particularly affected the Mohawk, almost half of whom moved to Canada. This practice did not endear the Jesuits to the remaining Indians, who were concerned about the loss of population. An alliance between the English and the traditional Indians gradually forced the Jesuits to withdraw their missions. In 1679 the last Jesuits and their converts left the Mohawk country for Canada.[11] Some Jesuits remained among the Seneca and Onondaga until about 1710, and they continued to have considerable influence among the western Iroquois until the fall of New France.[12]

The French produced a number of manuscript maps of central and western New York between 1640 and 1690. Many of them were drawn by Jesuit missionaries, or were based on information derived from Jesuit sources. Most remained in manuscript form, although they often influenced later printed maps. These maps are not often reproduced, but photographs or copies of most of them can often be found in large research libraries.[13] Many of them were used by nineteenth-century historians, such as Francis Parkman and Justin Winsor, but have since been largely neglected. Some of them are anonymous and undated, and there is a good deal of uncertainty concerning their dating, and how they and relate to each other. One of the purposes of this chapter is to make them more readily available, and to relate them to each other and to the context in which they were made.

One of the earliest of these manuscript maps is an anonymous work that bears the title *Chemin des Iroquois* (path of the Iroquois).[14] It is fairly certain that this map, which is shown in Figure 3.1, was drawn in 1646 by Jean Bourdon, a surveyor who

accompanied Father Jogues on his trip to the Mohawks in that year. It shows the entire region from Montreal to Manhattan. Parts of it are inaccurate, and its scale is best described as “variable,” but for a first effort it gives quite a good impression of the corridor between Montreal and the Mohawk Villages. It shows Lake Champlain, Lake George (which is not named), and “Fort Orange or Nassau, inhabited by the Dutch.” One of the most interesting features on the map is a dotted line, labeled “*chemin des Iroquois*,” running from the base of Lake George to three villages of the Mohawks (*Agniè*). It also shows a path running between the Hudson River and Wood Creek (which flows north into Lake Champlain). This is labeled “route by which the Canadian Algonquians (*Montaignez*) sometimes go to war.”[15]

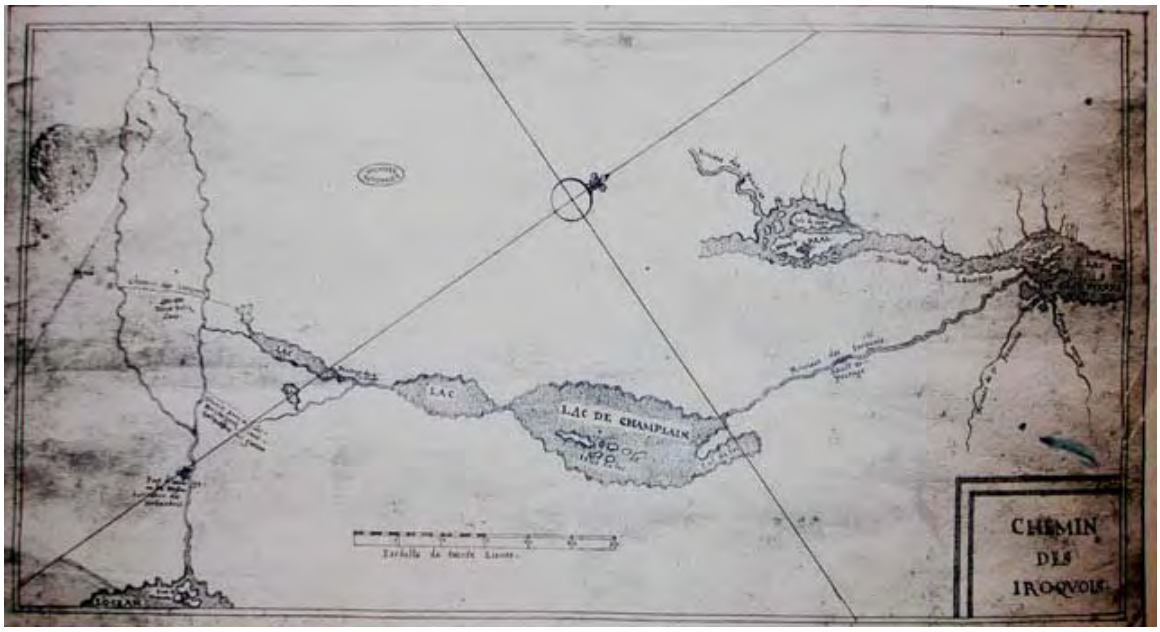

Figure 3.1. [Jean Bourdon], "Chemin de Iroquois," [1646?]. Photograph from Karpinski Collection.

The geographical knowledge acquired in the early period of missionary activity prior to 1653 is best summarized in a map entitled *Novae Franciae Accurata Delineatio* (1657).[16] This map, part of which is shown in Figure 3.2, was almost certainly prepared by Father Francesco Bressani, the only Italian Jesuit active in New France, for inclusion in a book he published describing his work as a missionary.[17] Although the map was engraved on copper, it was not published in Bressani’s lifetime. Bressani was primarily active as a missionary to the Huron in what is now Canada. At one point he was captured by the Mohawks, and suffered horrific tortures, which he was lucky to survive with the loss of three fingers on one hand. The account of his sufferings has come down to us, and it is not recommended reading for the squeamish.[18]

Figure 3.2 West sheet of Francisco Bressani, *Novae Franciae Accurata Delineatio* (1657). National Archives of Canada.

The parts of Bressani's map dealing with the area around Georgian Bay on Lake Huron, where he worked for many years, are considered to be outstanding in their detail and accuracy. The portions dealing with western New York are also quite carefully drawn, although they do not reflect such an extensive geographical knowledge of the area. Nonetheless, the map shows a much more wide-ranging knowledge of the geography of New York than one would expect from the limited contacts between the Jesuits and the Iroquois. The Five Nations are shown in approximately their correct locations. Such important features as the Finger Lakes, Niagara Falls, and the Oswego River already make their appearance. The courses of the Genesee River and its tributary Honeoye Creek are clearly shown, along with the Seneca villages in their vicinity. Even the northern edge of the Appalachian Mountains near the present Pennsylvania border is sketched in, along with the headwaters of the Delaware River, and the map includes a clear indication of the Ohio River. Nonetheless there are some serious errors in geography—showing that the area had yet to be systematically explored. Although Bressani was taken captive by the Mohawks, he misplaces the Mohawk River and has it running almost directly north rather than west. The headwaters of the Delaware River are misplaced far to the north and west, and the Delaware seems to be confused with both the

Susquehanna and the Mohawk rivers. Finally, Lake Oneida is shown far to the west of its correct location—reflecting a general lack of knowledge of the area between the Mohawk River and the Finger Lakes.

In spite of its errors, Bressani's map shows that as early as 1650 the French already had a fairly good working knowledge of the geography of central and western New York. Many of the features shown on this map were unknown to contemporary Dutch and English map makers. Most of the information on the Bressani map could not have been based on his own experiences. Aside from his involuntary trip to Mohawk country in 1644, he did not visit New York. His sources seem to have been completely unknown manuscript maps, which must have been in the possession of the Jesuits. Much of the information available to the Jesuits might have been obtained from Indians, or possibly from fur traders, for the map includes many areas where French missionaries or explorers are not known to have visited. In the following decades, as we will see, the French were to further expand and improve on their knowledge of the geography of New York.

Before proceeding to other maps, something should be said about the iconography of the Bressani map, which makes it an impressive example of a propaganda map. A propaganda map is not necessarily false or distorted; its purpose is to convey a motivational message. In this case, the message is to support the Jesuit missions, and it achieves its purpose by depicting the cruelty and barbarism of the pagan Indians, and contrasting them with the redemptive sacrifices of the Jesuit fathers. This message is conveyed most obviously through the depiction of a family of praying Indians in the upper-left corner. This engraving is counterbalanced by another on the eastern sheet (not shown here), which shows the martyrdom of Fathers Brébeuf and Lalemant at the hands of the Iroquois. The smaller details on the map subtly reinforce the basic message, besides which they are true to life and convey interesting information about the New World. On the upper-right is a good representation of a moose, along with a bear and an Algonkian Indian on snowshoes. Rather less successful is a drawing of buffalo or "wild cows"(vaccae silvestres). Several drawings show details of Iroquoian life, including a longhouse, food preparation, and women carrying babies on their backs, as well as dancing, and men at a council fire. Some of the other drawings are more pointed. There is a drawing of an Indian carrying a gun in the section of the map covering New Netherland: a none-too-subtle reminder of where the Iroquois obtained their arms, which they put to such effective use against the French and their Indian allies. This Indian is wearing a remarkable suite of armor made of twigs bound together. At the bottom of the map there is a rather disturbing drawing of mummified Indians in Virginia.

After 1654, when semi-permanent missions were established among the Iroquois, a new chapter opened in the Jesuit mapping of New York. The first European to visit the western Adirondacks was probably Father Antoine Poncet, who was captured by the Mohawks in 1653, and also taken on an involuntary journey from Canada to the Mohawk River via the Lake Champlain route. After a brief captivity and a relatively mild bout of torture, Father Poncet was released, as peace negotiations were underway between the French and the Iroquois. Because of the season of the year, he was returned to Canada by a different route. This route has been plausibly reconstructed as leading from West Canada Creek to Cranberry Lake, and from thence down the Oswegatchie River, which joins the Saint Lawrence at Ogdensburg.[19]

In the following year (1654), Father Le Moyne ascended the Saint Lawrence River to found the first French mission among the Iroquois of central New York. Ascending the river, he saw the Adirondacks, which he named after Saint Margaret.[20] He crossed the Salmon River and made his way overland to the chief village of the Onondagas. There he sampled the salt springs at Lake Onondaga, and returned via the Seneca and Oswego Rivers. In the following years, other missionaries expanded on his discoveries and founded missions among the Seneca farther to the West. By 1680, the Jesuits had obtained a good working knowledge of the geography of much of northern, central, and western New York.[21]

A good overview of the geographical knowledge acquired by the early Jesuit missionaries is contained in a map of northern New York that first appeared in the Jesuit Relation of 1664-65. This map bears the title “Plan of the Forts Constructed by the Carignan Salieres Regiment…” (Figure 3.3).[22] Although somewhat schematic, it provides a reasonably good picture of the major features of northern and western New York. It presents the villages of the Iroquois in approximately their correct locations—showing considerable improvement in this respect over Father Bressani’s map. Reflecting the adventures of Father Poncet, the Oswegatchie River is shown, approximately where it belongs; it is labeled “River that comes from the direction of the Mohawks.” A second river—apparently the Salmon—bears the same inscription. The Jesuits were uninhibited by modern ideas concerning the separation of church and state, and most of their maps served the French army, as well as provided information useful to missionaries and their friends. This map is fairly typical in its intermingling of military and religious purposes. In addition to sketches of forts, it shows the route that the French were to use in their invasion of the territory of the Mohawks in the following year—an adventure that will be touched upon below. This is essentially the same route as that followed by the Mohawks in conducting Father Jogues and other French captives to their villages.

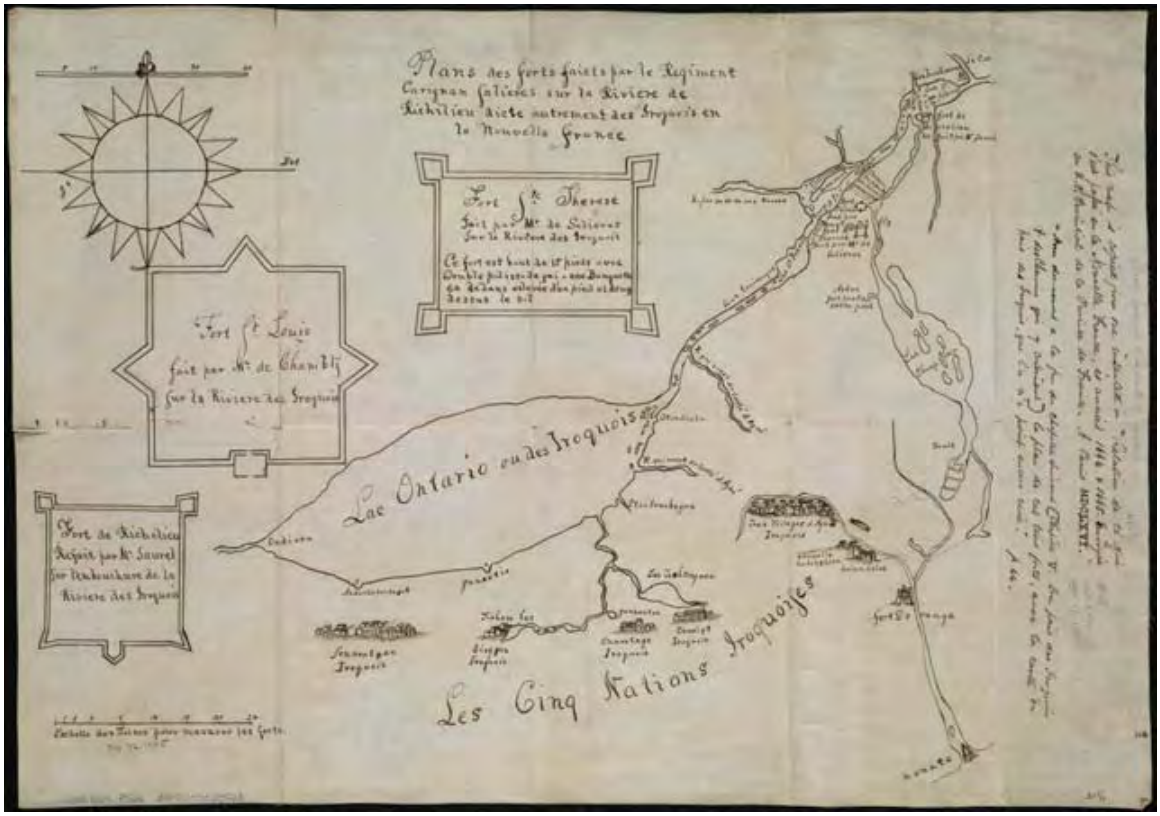

Figure 3.3. Map of Northern New York Published in the Jesuit Relations for 1664/65. Courtesy of the Norman B. Leventhal Map Center at the Boston Public Library.

Somewhat later developments in the French exploration and mapping of this area are summarized in the so-called “Great Lakes Map.” This is an anonymous map of uncertain origins dating from about 1680, which resides in the Archives of the Marine in Paris. It was a favorite of Francis Parkman, and a copy of it can be found in the Parkman collection at Harvard. Its eight sheets cover the entire area from the coast of New England to the Mississippi River. Regardless of who drew it, it is a work of synthesis that draws on a number of earlier maps and reports by explorers and missionaries.[23]

The easternmost sheet of the Great Lakes Map covers present-day New England and northeastern New York (Figure 3.4), and shows how extensive was the knowledge the French had gained of this area by the fourth quarter of the seventeenth century.[24] It clearly shows both the Green Mountains in Vermont and the Adirondack Mountains, which are named for the first time on a map as “the Mountains of St. Mary.” (This may be an error in copying, since on later French maps the Adirondacks are consistently called the Mountains of Saint Martha.) A note on the Green Mountains reads “here one can find veins of lead, although not in great abundance,” which indicates that the French were active enough in this area to engage in prospecting.[25] Northern New England is shown as inhabited by “savages called Mahingans or Socoquis.” The depiction of the Lake Champlain corridor is not particularly noteworthy, but it is interesting that the Hudson River is labeled “the North River, or of Traders (*traittes*), or of Maurice"—echoing the Dutch names for the river and the name assigned to it by Champlain, but ignoring the name favored by the British. The mapmaker showed more willingness to

acknowledge political reality in naming "*Albanie ci devant Fort d'Orange*." This sheet also shows quite clearly the Black River, which is shown flowing from the "Country of the Iroquois" in northern New York into the St. Lawrence, and is here called the Soegansi River.

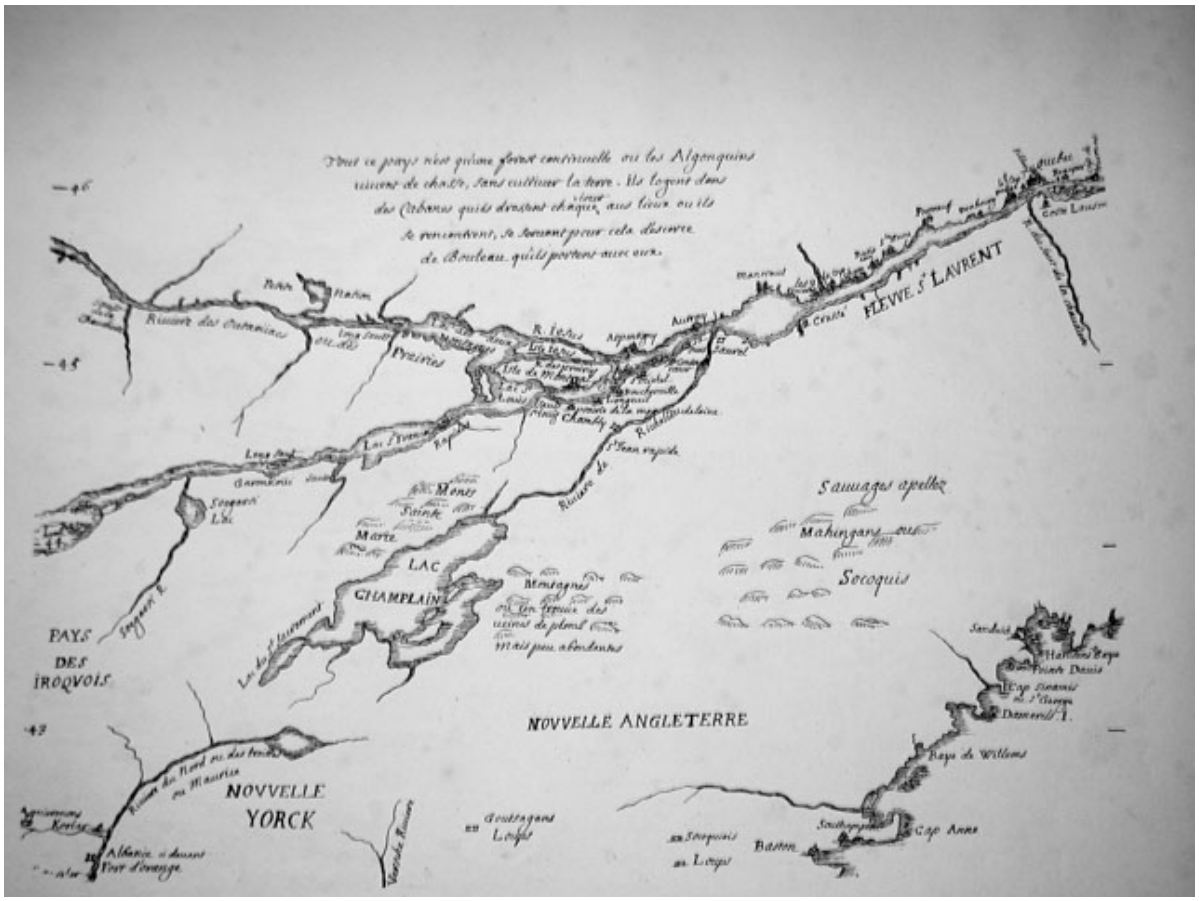

Figure 3.4. Eastern portion of "Great Lakes Map." Photograph from Pinart, *Recueil de cartes*.

The second sheet of the Great Lakes Map continues the first, and shows the region around Lake Ontario (Figure 3.5).[26] This sheet focuses primarily on the area north of the lake, but it includes some information in what is now New York. The Iroquois villages south of Lake Ontario are shown, as well as some of the paths connecting them. Niagara Falls is described (with a bit of exaggeration) as a "waterfall 120 toises high, by which Lake Erie drops into Lake Ontario."[27] The Salmon River is shown with the annotation: "Cahihonoüagé, the place where most of the [Canadian] Iroquois and the Algonquin disembark and set forth to trade in beaver with New York, following the paths marked by double rows of dots."[28] This same route is shown on the previously discussed "Plan of the Forts Constructed by the Carignan Salieres Regiment….", although there the Salmon River is called "La Famine," and there is no annotation.

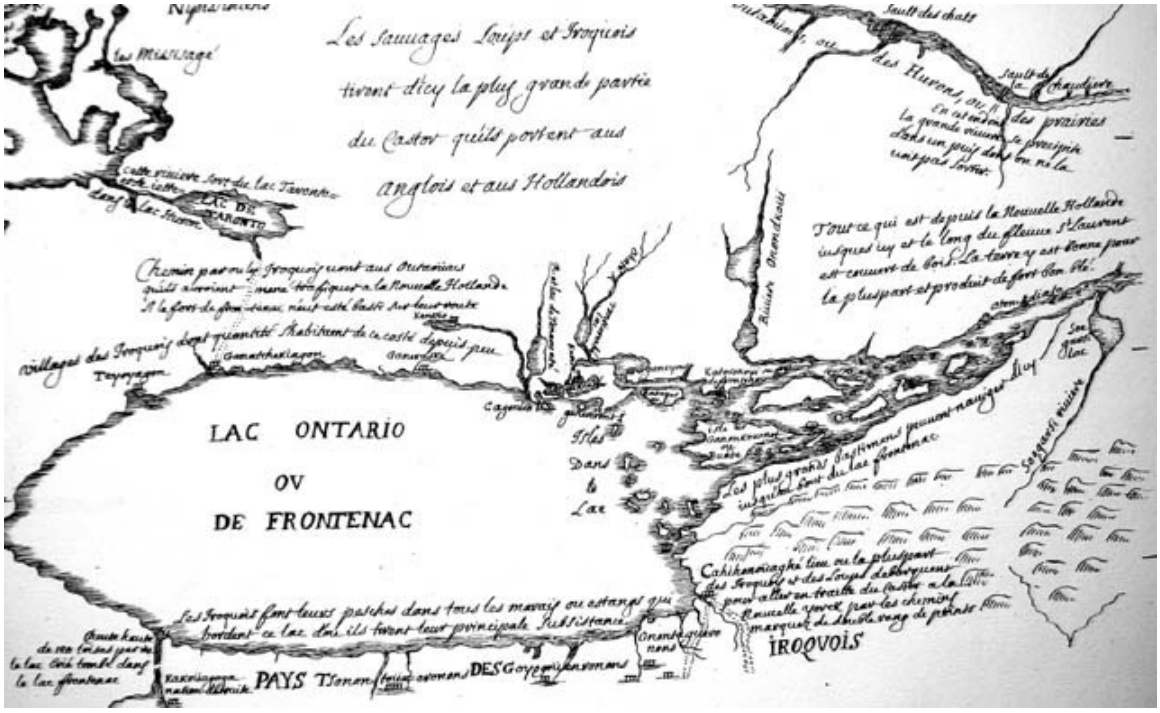

Figure 3.5. Western portion of "Great Lakes Map." Photograph from Pinart, *Recueil de cartes*.

Maps produced a few years later reflect greatly improved knowledge of the Finger Lakes Region. A summary of French knowledge of upstate New York made several years after the "Great Lakes Map" is provided by a map entitled "Lake Ontario with its Surroundings, and Particularly the Five Nations of the Iroquois, 1688" (Figure 3.6).[29] This map is a reworking, probably by Jean-Baptiste Louis Franquelin (of whom more later), of a somewhat more crudely drawn map with a similar title by the Jesuit missionary Pierre Raffeix, who was active in much of this area between 1666 and 1680. This map appears to draw on a variety of sources, including (along with missionary accounts), the explorations of La Salle, and records from Denonville's expedition against the Seneca in 1687.

The Lake Ontario map shows both shores of the lake, and the entire Iroquois country from the Mohawk River to Lake Erie. It shows the location of a short-lived Sulpition mission to emigrant Cayugas on the Quinte Peninsula on the north shore of Lake Ontario, along other villages north of Lake Ontario where Iroquois were living at the time. The locations of the Five Nations in present-day New York are carefully depicted, along with the Finger Lakes and trails connecting the Iroquois settlements. A trail is also shown leading from the Salmon River (here called, as on most French maps, "La Famine") to the villages of the Oneidas and the Onondagas. Near the Senecas (Sonnontouans), the Genesee River can be seen with a waterfall (*saut*) at its head, as well as Irondoquoit Bay with its surrounding wetlands (*Marais des Sonnontouans*). Along with more conventional information, the map shows favorite Indian fishing locations along the Oswego River, and the location of a salt spring near Onondaga Lake. The map does not neglect military affairs. It shows the site of Fort Niagara, "to be constructed soon." (The beginnings of a

fort were built at this location by La Salle in 1679, although it was not until 1725 that a permanent fort was constructed.)[30] Also shown is the “Grand portage of 30 leagues by which the Senecas go to war against the Illinois”—a path from the Seneca villages near the Genesee River to Lake Erie.[31]

Figure 3.6 "Le Lac Ontario auec les lieux circonuoisins" (1688). Probably by Jean-Baptiste Louis Franquelin. Photograph from Karpinski Collection.

At about the same time as the Lake Ontario map, the French produced two remarkably detailed maps of the Finger Lakes area. The first of these is a polished and accurate "Carte du pays des Irroquois" (Map of the Country of the Iroquois), which was drawn by Jean-Baptiste Louis Franquelin, probably around 1688 (Figure 3.7).[32] Its depiction of the area around the Finger Lakes is so detailed and precise that it excels anything else produced prior to the American Revolution. The Finger Lakes themselves are carefully depicted, along with surrounding rivers and the shore of Lake Ontario. In addition, Lake Oneida is shown, along with the Seneca and Oswego Rivers, Wood Creek, and the headwaters of the Mohawk River. The Iroquois villages appear, complete with counts of the number of longhouses in each. Finally, trails connecting the villages are shown, along with some topography, hydrology, and other information. This map should be of great interest to anthropologists and students of Iroquois history.

Figure 3.7. Large detail from Jean-Baptiste Louis Franquelin**,** "Carte du pays des Irroquois," [ca. 1688]. Photograph from Karpinski Collection.

An even more detailed map of a portion of western New York has been given the title “Map of Route from Villages of La Conception and St. Jacques to Lake Ontario.”[33] This map has been dated between 1670 and 1688, but the latter date is almost certainly correct, since the it clearly reflects information collected shortly before or at the time of Denonville’s expedition against the Seneca in 1687. It shows in careful detail the area between Iroquois villages and Irondoquoit Bay (near present-day Rochester). In addition to fortified villages and Indian paths, it shows topography, wetlands, and a sandbar at the mouth of the bay. It is so carefully drawn that it could be used to study changes in streams and shorelines in the area since the end of the seventeenth century.

All of these maps are summarized to some extent in Franquelin’s relatively well-known manuscript map of North America, which is a masterly synthesis contemporary French geographical knowledge of the new continent (Figure3.8).[34] It is appropriate that Franquelin should have made this map, for he is the most important single figure in the seventeenth-century mapping of New France. As a summary of the geography of New France, this work was unsurpassed until the publication of the Delisle’s map of 1703 (which will be discussed below)—and even the Delisles failed to equal Franquelin’s depiction of northern and western New York. Franquelin had first-hand experience of his

subject, having lived in Canada between 1671 and 1692, and having produced maps for the governors and intendants of New France. Although he never visited central New York, he had access to maps produced by the Jesuits and other explorers and missionaries who were active in that region. In 1693 he returned to France, where he continued to be employed by the King, and had access to the manuscript maps at the Dépôt des Cartes et Plans de la Marine.[35]

Figure 3.8. Jean-Baptiste Louis Franquelin, "Carte de l'Amerique Septentrionnale," [1685 or 1686?]**.** Detail showing New York Area. Library of Congress, Geography and Map Division.

The maps discussed above represent a high point in the cartography of western New York that was not reached again for over 100 years. The decline in the quality of the mapping of this area has much to do with the expulsion of the Jesuits from the territory of the Five Nations, and it underlines an important lesson in the history of cartography. Under pre-modern conditions, there was often no reliable way for European cartographers to evaluate the accuracy of individual maps of distant places. This was especially true for areas like the Iroquois lands, which were on the fringe of European colonization, and in which there was no literate population able to inform distant mapmakers of errors on particular maps. Under these circumstances, mapmakers usually examined whatever maps they had available, and based their works on what they perceived as a rough average of the features found in several examples. This method

almost guaranteed the perpetuation of errors. The occasional gems that might come under their purview often could not be recognized as such.

French Military Maps, 1660-1713

The distinction between military maps and maps made for civilian purposes is not clear cut even today. This certainly applies to maps made for the centralized French monarchy, where civilian administrators, military leaders, explorers, and missionaries all acted as servants of the king. Individual maps could simultaneously serve to further exploration, to guide missionaries to the scene of their labors, to provide fur traders and their employers with information useful for their business, and to help in the planning of military campaigns. Several maps that have already been discussed show the locations of fortifications and routes for the movement of troops, which are among the most important identifying characteristics of military maps. Nonetheless, it is worthwhile to single out for special attention some maps that were made primarily for military purposes.

Maps made specifically for military use became prominent shortly after1660, when New France entered a more dynamic and aggressive phase. By this time France had recovered from the Thirty Years War and from the civil war known as the *fronde*. Louis XIV's position was by then firmly established in France and in Europe, and he and his minister Jean Baptiste Colbert were able to devote more attention and resources to their struggling colony. In 1660, New France was made a royal province. Its finances and administration were reorganized, and it was strengthened by several companies of regular troops, including the famous Carignan Salières regiment.

The stage was thereby set for French military intervention in what is now New York. At this particular time, the French were not so much concerned with strengthening their position against the Dutch and the English as with fending off the Iroquois. In 1665 The French began construction of their first forts on the Richelieu River and at the northern end of Lake Champlain. In 1666, the Carignan Salières regiment accompanied by Canadian militia launched two expeditions against the Mohawk Villages west of Albany. The first expedition, launched in January, did the French more damage than the Natives, and several wounded French soldiers had to be saved by the Dutch at Fort Orange. A second expedition, which took place that autumn, was more successful. Although it caused no Mohawk casualties, their villages were burnt and crops destroyed. The Iroquois decided to sue for peace, and the French claimed possession of the Mohawk lands by right of conquest. When the first of these expeditions set forth, the French were not aware of the English takeover of New Netherland, although they found out about it in the course of their campaign. Needless to say, the English were thoroughly alarmed by these incursions, which mark the beginning of the struggle between the two nations for the control of New York and North America.

These military activities were duly recorded by mapmakers. Under Louis XIV, the French were the leading producers of military maps, and when the French troops arrived in the New World they brought their cartographers with them. Several maps connected with the military campaign of 1666 have come down to us—all of which are very similar. It is not unusual for such maps to have been made in multiple copies for use in the field and by headquarters. Many of them appear to update or correct information found on earlier maps of the region. These maps are worth examining carefully because, in spite of

their overall similarity, each provides unique information about the critically important route between Montreal and the Mohawk Villages via Lake Champlain.

A map mentioned in the previous section of this chapter records the earliest French military activities in the Lake Champlain corridor. This is Bourdon's map of northern New York, which was published in the *Jesuit Relations* for 1664-65 (Figure 3.3). It presents, among other things, an overview of the corridor between Albany and Montreal at that time. It includes ground plans for the three forts the French had recently constructed along the Richelieu River (then called the Rivière des Iroquois), and it reflects improved and updated geographical knowledge of the area. Lake Champlain is shown with considerable accuracy, and Lake George appears bearing the name given to it by Father Jogues, *Lac du Saint Sacrement*. The alignment of the Hudson and Mohawk rivers is considerably improved in comparison to Bourdon's *Chemin des Iroquois* of 1646, and the Dutch settlement at Schenectady is shown in addition to the three Iroquois villages.

A more elaborate depiction of this area is contained in a manuscript map dated 1666, which may also be by Jean Bourdon.[36] This new map contains a much more accurate delineation of the lakes and rivers between Montreal and Albany than its predecessors, and its military purpose is more explicit. Like the "Route of the Iroquois" map it shows a path from Lake George (*Lac du St Sacrement*) to the Iroquois villages, which are here labeled "*habitations Iroquois que les troupes du Roy doivent attaquer*" (Iroquois settlements which the troops of the King are to attack). This map appears to show Lake Saratoga and two other lakes north of Albany. The Dutch fort on the site of Albany is identified (*Orange*), as is Schenectady (*Petit village Hollandais*).

With the outbreak of King William's War (1689-1697), the rivalry between the French and English in North America erupted into open conflict. By this time the French had developed definite plans for seizing the province of New York. From a strategic point of view, the French would have gained much from the possession of New York: it would have given New France a warm water port, largely cut off the English from the fur trade, separated New England from the southern colonies, and generally deprived the English from access to the interior of the continent. In practical terms, the population difference between New France and the English colonies probably made this program impractical, but the seizure of Albany was a real possibility. After 1689, the French tried to realize these ambitions, which had brewing since at least the 1660s. In 1690, a small party of French and Indians destroyed Schenectady. Albany was in serious danger of being taken, and the French even entertained plans for seizing New York City. With a brief interruption between 1697 and 1702, warfare between the French and the British continued until Queen Anne's War (The War of the Spanish Succession) was ended by the treaty of Utrecht in 1713.

Few manuscript maps have been uncovered that show French military activities in New York during these years. Most of them come from the early part of King William's war, when the French posed the most serious threat to New York. Most of the fighting in the latter part of King William's War and in Queen Anne's War took place in eastern Canada, and neither side had sufficient resources to engage in extensive aggression along the New York frontier. Fur traders and merchants in Albany continued to do business with Montreal during most of Queen Anne's War, and for all practical purposes there existed a state of undeclared neutrality between New York and New France.[37]

One of the most detailed maps produced during this period of war shows the entire strategic corridor between Boston and New York City. It has been attributed to the French military engineer Robert de Villeneuve, and dated to 1693 (Figure 3.9).[38] It shows the area between Montreal and Albany, and for much of this area it is more detailed and accurate than any of its predecessors. It also includes a fairly good delineation of the Hudson Valley, including the settlements in the vicinity of Kingston, which are labeled "*Les Villages D'Isope*" (which at that time would have included Hurley, Marbletown, and New Paltz along with Kingston). Villeneuve's map makes an unabashed claim for the French to the area around New York City, labeling what is now known as New York Bight as the "*Mer de la Nouvelle France*" (Sea of New France).

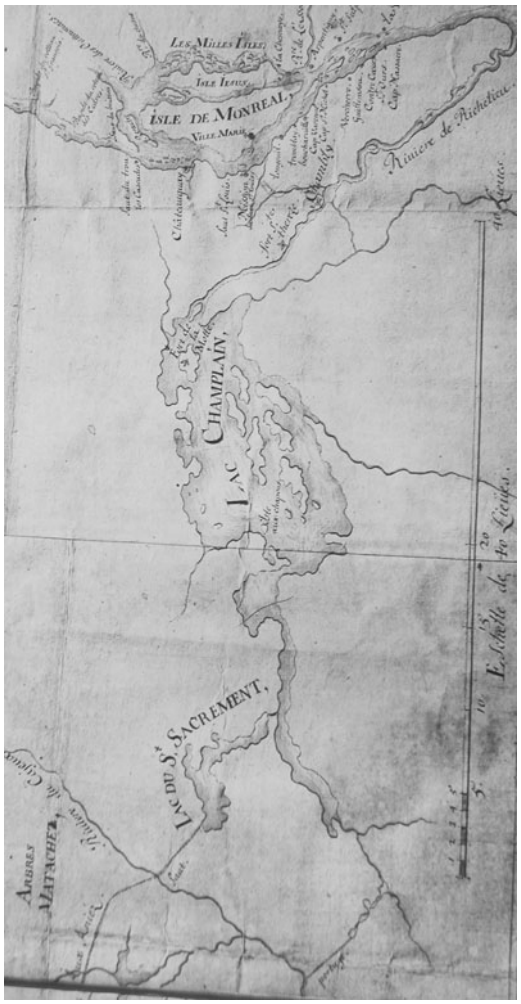

Figure 3.9a. Robert de Villeneuve?, [Region from Montreal to New York, 1693?]. Map photographed in two parts. Photographs from Karpinski Collection.

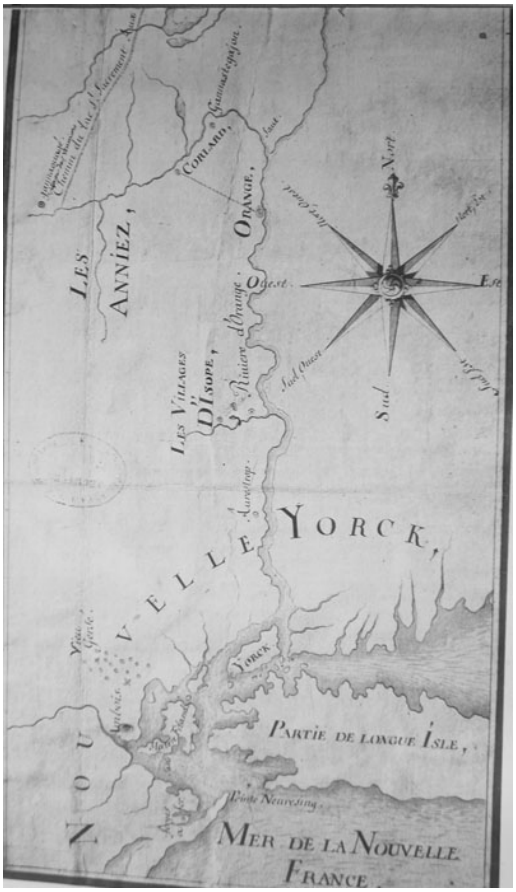

Figure 3.9b. Robert de Villeneuve?, [Region from Montreal to New York, 1693?]. Map photographed in two parts. Photographs from Karpinski Collection.

An interesting manuscript map showing southern New York was compiled in 1693 by J.B.L. Franquelin—the same cartographer who produced the remarkably accurate maps of northern New York discussed in the previous section. This map, however, is more notable for its errors than for its accuracy. It bears the title: “Map of the Coast of New England from Cape Ann to Neversink Point, Including the Route by Land and Sea from Boston to Manhattan.”[39] Franquelin compiled this map shortly after his return from Canada, at the time when the French were seriously contemplating an invasion of New York. This map appears to have been put together from information supplied by a spy, who was probably a double-agent, since some of the details on the map appear to be deliberately misleading. The map’s focus on roads and harbors is understandable, since such information is always useful for invading armies, but at least one of the roads was imaginary. The map shows “a great road” running down the center of Long Island. This road is presciently located where the Long Island Expressway is now found, but no such road existed in the seventeenth century. This map also includes an inset showing Manhattan, which has been reproduced recently by Cohen and Augustyn in *Manhattan in Maps*.[40] As Cohen and Augustyn remark, this inset shows New York as a “veritable fortress,” equipped with much stronger defenses than it actually had.

Many of the military activities that took place in New York during this period are summarized in an anonymous manuscript map drawn around 1710.[41] It shows the entire passageway from Canada to Albany via Lake Champlain. Both British and French fortifications are depicted, as well as well as portages and other information useful for military planning. Similar sketch maps were prepared by the British and French armies throughout the period of their conflicts—field maps of this type were a staple of military cartography.

Small-Scale Maps of New France, 1650-1720

Before proceeding further in our discussion of specialized maps, it would be worthwhile to consider some of the less detailed (small-scale) maps of New France. These show much or all of New France, or even the eastern half of North America, and, unlike the manuscript maps discussed above, all of them were published. Because of their small scale, they do not contain as much information specific to New York as do more narrowly focused maps, but they can nonetheless be quite informative. Occasionally they contain bits of information that are not found elsewhere. Because they were published and therefore widely distributed, they give us a good idea of the overall development of French knowledge of New York and North America. Many of them were distributed throughout Europe, and were sometimes used to assert French claims vis à vis the English. Thus, they often functioned as propaganda maps, and throw light on the English and French rivalry in the area.

Because most of the information relating to New York presented on these maps has already been discussed, I will go through them selectively and in relatively little detail. A complete list of French maps published prior to 1700 covering North America can be found in Philip Burden's useful *Mapping of North America*.

Several maps that appeared around the middle of the seventeenth century updated earlier maps by Champlain. Until around 1650, Champlain's 1632 map of New France remained the best published map of New France. In 1643, Jean Boisseau published a slightly amended edition of Champlain's 1632 map.[42] In 1653 Pierre Du Val provided an interesting update of Champlain's work. Du Val obtained a plate that Champlain had prepared in 1616 for a map of New France that was never published. Du Val amended the plate with additional information for his 1653 map, which he republished with further additions in 1664, 1667, and 1677.[43] None of these maps contain new information about New York, but Du Val's are among the first to show the boundaries claimed by New France against New England and New Netherland.

Several maps published between 1650 and 1660 resemble the Bressani map, and are clearly based on similar sources. At the time of its publication, the best widely available synthesis of French knowledge of northeastern North America was contained in Nicolas Sanson's map of "Canada or New France," which was published in 1656 (Figure 3.10).[44] Sanson (1600-1667) was Geographer to the King of France between 1630 and 1665, and therefore had access to the manuscript maps arriving from New France. The Sanson map, which closely resembles Bressani's, shows how much French knowledge of the Great Lakes region had improved since Champlain's time. In the maps of Champlain and Duval there is only a hint of Lake Erie. Here Lake Erie is clearly shown, and the other great lakes make a recognizable appearance. Sanson's depiction of modern New

York also closely resembles Bressani's, but Sanson does a somewhat better job of handling the geography of central New York. Like Bressani, Sanson was confused by an error appearing on early Dutch maps (including De Laet's map of 1630), which showed a large lake as the source of both the Mohawk and Delaware Rivers. But Sanson partially corrected this error by placing the lake closer to the position of Lake Oneida, and by having the Mohawk River flow westward into it. He also did not extend the Delaware River into the Finger Lakes region. Sanson seems to have been working with more recent Dutch maps than Bressani, and his work is an excellent synthesis of contemporary French, British, and Dutch sources. It should be remembered that it is almost exactly contemporary with the Visscher map of New Netherland, and as an overall depiction of northern New York, Sanson's work is superior to Visscher's.

Figure 3.10. Detail of Nicolas Sanson, *Le Canada ou Nouvelle France* (1656). Courtesy of the Norman B. Leventhal Map Center at the Boston Public Library.

Sanson's map went through several editions, and it shows the boundaries that the French claimed between their territory and New England and New Netherland. As do later French maps of North America, Sanson's 1656 map of New France minimizes English and Dutch possessions, and shows New France sprawling off indefinitely toward the west. Of course, these claims constitute audacious and extravagant propaganda, since at this time the French had no settlements or fortifications whatsoever in present-day New York (to say nothing of the Ohio Valley and other regions further to the west). All

of these territories were still firmly in the hands of their original Native American possessors, and at best French missionaries and fur traders visited them at their sufferance. The effectiveness of maps as vehicles for propagandistic territorial claims is shown by the fact that even today people looking at these maps are drawn into regarding the tenuous French empire in North America as much more of a geographic reality than it actually was.

In 1664 François du Creux (1596-1666), another Jesuit missionary, published a map of New France, which closely resembles those of Bressani and Sanson.[45] It also has a fairly detailed depiction of present-day New York State, which differs in some details from the other two maps. These differences make the map potentially useful to historians and archaeologists interested in studying the Jesuit missions or Iroquois settlement patterns.

Among best-known maps of New France published in the last half of the seventeenth century are those of Vincenzo Coronelli (1650-1718).[46] Coronelli's maps are carefully crafted, and are important for their depiction of the western Great Lakes and the northern Mississippi Valley, but they do not present substantial new information about New York. Coronelli was a Venetian map maker, who worked for only two years in France, and appears to have had fairly limited access to the many unpublished maps of New France. And by the 1680s, the focus of French exploration and missionary activity had already shifted to the west.

One family of map makers that deserves particular attention is that of the Delisles (or Delisles). Claude Delisle (1644-1720) and his son Guillaume Delisle (1675-1726) are considered to be among the founders of modern "scientific mapping."[47] Such claims need to be examined carefully, since there is little agreement among historians of cartography as to what constitutes scientific mapping, or even if the concept is valid at all. On the surface, the maps of the Delisles do not look very different from those of Sanson or Coronelli. And, in fact, the Delisles put together their maps in much the same way as their predecessors—mainly by collating and updating earlier manuscript and printed maps. Their maps of North America are not derived from surveys based on triangulation, like those their near contemporary Giovanni Domenico Cassini (1625-1712) made of France, and this type of survey-based mapping was considered (at least in the nineteenth and early twentieth centuries) to be the hallmark of "scientific" cartography. On the other hand, the Delisles did make particular efforts to evaluate their sources, to avoid placing on their maps information that they could not confirm, to cite their sources, and to obtain from others accurate longitudes and latitudes. Thus, their work might be said to be scientific in the same way that a work of history can be described as scientific when it is based on the careful evaluation of verifiable sources. Another characteristic of the Delisles' maps is their stylistic simplicity. Rather than fill their maps with pictures of animals, Indians and sailing ships, the Delisles left out most art work, which might detract from the purity and scientific seriousness of their cartographic message. In this respect the Delisles started a trend that is also seen in subsequent scientific cartography.

Claude and Guillaume Delisle's 1703 *Carte du Canada ou de la Nouvelle France* (Map of Canada or of New France) summarizes much of the French mapping of North America in the seventeenth century.[48] Another work of synthesis, it updates Sanson's map and has much more accurate estimates of latitude and longitude than previous maps

of the area. As far as its depiction of New York is concerned, it does not constitute a radical improvement over the work of Sanson, although it finally did away completely with the fictitious lake at the headwaters of the Mohawk and Delaware Rivers.

In 1718, Guillaume Delisle published an even more important landmark map, which is entitled in its English edition *A Map of Louisiana and of the River Mississippi* (Figure 3.11).[49] This map shows the tenuous French empire extending over most of the eastern two-thirds of what is now the United States and much of Canada. It is indeed a notable production. Its depiction of the Mississippi River system was remarkably accurate for its time—so much so that it was consulted as late as the beginning of the nineteenth century by Thomas Jefferson in preparing his instructions for the Lewis and Clark Expedition. Delisle's map was not merely a brilliant work of cartography, but it was also a bold piece of propaganda. When Governor Burnett of New York saw the French version of this map in 1720, he noted that the French were claiming huge swaths of territory that the English considered to belong to themselves: "Particularly all Carolina is, in this new Mapp, taken into the French Country, and in words there said to belong to them, and about fifty leagues all along the edge of Pennsilvania & this Province taken into Canada, more than was in their former Mapp."[50] In other words, the French were already claiming on paper territories in the Ohio Valley and elsewhere that they would actually to try to occupy militarily only later in the eighteenth century. This map was the opening salvo in a lively exchange of cartographic artillery that continued until the end of the French and Indian War.

Figure 3.11. Detail of Guillaume Delisle, *Carte de la Louisiane et du cours du Mississipi* (1718). Library of Congress, Geography and Map Division.

In spite of its smaller scale, the depiction of New York on Delisle's 1718 map of Louisiana is considerably better than on his 1703 map of Canada or New France. It appears that Delisle had consulted Franquelin's unpublished maps in the interim. Lake Oneida is finally shown in its correct position close to the headwaters of the Mohawk River. The depiction of the Finger Lakes, which is clearly copied from Franquelin, is better than on any published map made prior to the end of the American Revolution. The courses of the Hudson, Delaware, and Susquehanna Rivers are all shown closer to their correct locations than on any earlier map. Delisle also shows Lake George (Lac du Saint Sacrement), which is not identified on his 1703 map, or on earlier published maps. The boundary between New France and New York is shown running through the middle of the Mohawk River and bending east well south of Lake George. The British, who claimed sovereignty over the Iroquois and everything south of the St. Lawrence River, were predictably upset. In spite of their political objections, the British recognized the cartographic superiority of this map. Cadwallader Colden, Surveyor General of New York from 1720 to 1763, complained for decades that there were no British maps of interior North America comparable to those of the French. As will be seen in the next chapter, he paid Delisle's depiction of central and western and central New York the compliment of copying it and publishing it at as his *Map of the Country of the Five Nations Belonging to the Province of New York*.[51]

One oddity on Delisle's 1718 map illustrates the limitations of his version of scientific mapping. The portion of the Hudson River north of Albany (called here as on some other French maps "R. du Cayeux") is shown flowing westward almost as far as Lake Ontario. In fact, there is just a short portage ("Portage d'Anwuenre") connecting the Hudson with Lake Ontario near Sacketts Harbor. This particular feature does not appear on Franquelin's maps, and is most likely derived from one of the written sources that Delisle consulted. Apparently De Lisle read an account of someone who had traveled up the Hudson River and reached—after several long portages—the Black River, which flows into Lake Ontario at approximately the location shown on the map. This description could have come from a French explorer, or possibly from an Indian account. Such dramatic errors can easily arise when one attempts to convert vague travelers' reports into the precise imagery of a map. On the 1703 *Carte du Canada*, the Delisles famously fell into the same kind of trap when they added a good deal of fictitious geography to the Great Plains, which they had derived from the later discredited "explorations" of Baron Lahontan.

In spite of its limitations, Delisle's 1718 map is an outstanding summary of more than a century of French exploration in and around New York. It continued to dominate the depiction of northern and western New York until the middle of the eighteenth century.

From Delisle to the Fall of New France, 1714-1760

During the eighteenth century, the French did not produce such spectacular contributions to the mapping of the New York area as they had in the previous century.

Surveyors and map makers were not inactive in New France during this period, but their efforts were directed mostly to the west of our area. This period can be broken down into two phases. During the first phase, which runs roughly from 1714 to 1744, there was an uneasy peace between France and Great Britain. The lack of military activities, combined with the exclusion of the Jesuits from most of Iroquoia, led to a reduction in French activities in present-day New York, and consequently few maps of the region were produced. After 1744, the military rivalry between the two powers heated up and led to open war, which culminated with the fall of New France in 1760. Not surprisingly, the last fifteen years of New France saw a resurgence of military mapping, as well as the production of many general-purpose maps displaying the competing claims of the French and the British

It was more than twenty-five years before Delisle's 1718 map of French North America encountered any serious competition from published maps. However, some important regional explorations and surveys took place between 1720 and 1740. Many of the manuscript maps produced during this period are associated with the name of Gaspard-Joseph Chaussegros de Léry, which was shared by a father-son team of mapmakers. The elder de Léry, a French military engineer, arrived in New France in 1716, and made maps until his death in 1756. His son, who became his assistant, started work in the 1730s. Since both shared the same name, and they did not always sign their maps, or signed them only "de Léry," there is much confusion concerning the authorship of their maps.

In the 1720s, the elder de Léry was involved in surveying the south shore of Lake Ontario.[52] He also made many plans of fortifications, including drawings of the French Fort Niagara, and of the British fort at Oswego, which was established on what the French regarded as their territory in 1727.[53]

Starting around 1730, the French moved to strengthen their hold on the strategic Lake Champlain corridor. In 1731 they began construction of Fort St. Frederic (Crown Point), which is about two-thirds of the way down the lake. This fort was designed by the elder Chaussegros de Léry, who also helped fortify Québec and Montreal. During time of war, the fort at Crown Point was used effectively by the French to launch raids against the British settlements in the Connecticut River Valley. In 1755, the French pushed even further south with the construction of Fort Carillon (later Fort Ticonderoga). As was usually the case with fortifications, both French and British military engineers lovingly drew numerous maps of these structures and their surroundings. These military maps and plans will be discussed at the end of this chapter.

The French also drew a number of regional maps of the Lake Champlain area, several of which show French land grants in the vicinity of the lake (Figure 3.12).[54] This is the only area in what is now the Northeastern United States that the French attempted to settle. In New York, the French, like the Dutch, produced little in the way of property maps, since they had few settlements in the region. Again like the Dutch, they were primarily oriented towards fur trading, and the population of New France was small in comparison to that of the British colonies. The French attempted to settle their colony using a system of seigniorial grants. This system was only slightly more successful for the French than it had been for the Dutch or the English, and almost all of the French settlements were in the Saint Lawrence River Valley. When the attempt was made to extend settlement to the vicinity of Lake Champlain, the area was divided up into estates,

as shown on Figure 3.16. Most of these estates were never populated, and the grants were eventually withdrawn because of a clause requiring settlement. French settlement in this area was inhibited not only by of the small population of New France, but also because the incessant warfare with the English and their Indian allies discouraged people from living in this border area. The few seigneuries that lasted for more than several years were in the vicinity of the French fort at Crown Point, where they enjoyed some protection.[55] Several of the French land grants survived the French and Indian War, and were acknowledged by the British. They appear on some of the British maps made between 1763 and 1775, and created legal problems for the British settlement of the area.

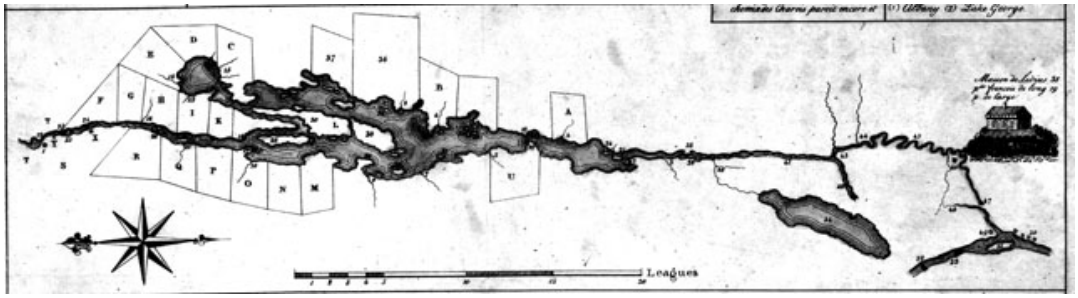

Figure 3.12. Gaspard-Joseph Chaussegros de Léry, *Carte du Lac Champlain depuis le fort Chambly jusquáu fort St. Frederick*. Facsimile from the *Documentary History of New York*.

In addition to their work along the shores of Lake Ontario and Lake Erie, military surveyors explored some inland parts of western New York, especially around the headwaters of the Allegheny branch of the Ohio River. This region was important for communication between the Great Lakes and the Ohio Valley, where the French founded Fort Duquesne on the site of Pittsburgh.

Materials from these surveys were used in 1744 by Jacques Nicolas Bellin (1703-1772) in his map of the area around the Great Lakes (*Carte des Lacs du Canada*).[56] This map is an important work of synthesis, and it opens the final phase of the mapping of New France. It was later largely incorporated in Bellin's *Partie occidentale de la Nouvelle France ou Canada* (1745), which was accompanied by a *Partie orientale de la Nouvelle France ou Canada*, covering eastern Canada and New England.[57] On the whole, the depiction of New York on these maps reflects only a modest improvement over Delisle's rendition, and Bellin's delineation of the Finger Lakes is actually less accurate than that of Delisle. By this time the Iroquois had wisely become cautious about letting either English or French surveyors make maps of the region around their villages, which largely explains the inaccuracy of the Bellin map in this area.

On the other hand, Bellin makes up for this weakness by a much more careful rendition of the shoreline of Lake Ontario, along which all the major rivers and inlets are carefully detailed and named—reflecting the previously mentioned military surveys. The map also shows the strategically important British fort at the mouth of the Oswego River (labeled Fort de Chougen), as well as the French fort near Niagara Falls, which served to cut off the British from the western Great Lakes. Several new features in southwestern New York make their first cartographic appearance here. Lake Chautauqua is clearly shown, along with a portage to it from Lake Erie. The sources of the Ohio River in New

York also appear in approximately their correct location. The explorations of the French in this area mark the beginnings of their efforts to build a chain of forts from Lake Erie to modern Pittsburgh, and thereby prevent the English from expanding into the Ohio Valley. The Genesee River is shown to its headwaters with the note appended to its upper regions, “river unknown to geographers which is full of waterfalls and cascades.” The lower reaches of the Genesee were shown on many maps reaching back to the middle of the seventeenth century, but this map apparently reflects the first attempts to explore the scenic middle and upper reaches of “the Grand Canyon of the East.”

In 1755 Bellin issued a revised edition of his *Partie occidentale de la Nouvelle France ou Canada* (Figure 3.13).[58] The revised edition is significantly different from its predecessor. It is on a smaller scale and omits many of the details in western New York found on the earlier version. However, it provides us with a drastically revised view of Lake Ontario, which is presumably based on the new surveys mentioned above. The new version captures more successfully the correct shape of the lake, but it is tilted to the northeast. (This may be the result of using surveys that failed to correct for the magnetic declination of the compass.) The new edition also provides a better rendition of the British colony of New York (except for most of Long Island). For the portion of the map showing areas controlled by the British, Bellin clearly relied on British and American sources, particularly on Lewis Evans. Bellin shifts the line of demarcation between the British and the French colonies slightly to the west from where Delisle placed it. Here it passes just to the west of the headwaters of the Mohawk River and arcs slightly to the west before passing through the middle of Lake George and the southern portion of Lake Champlain.

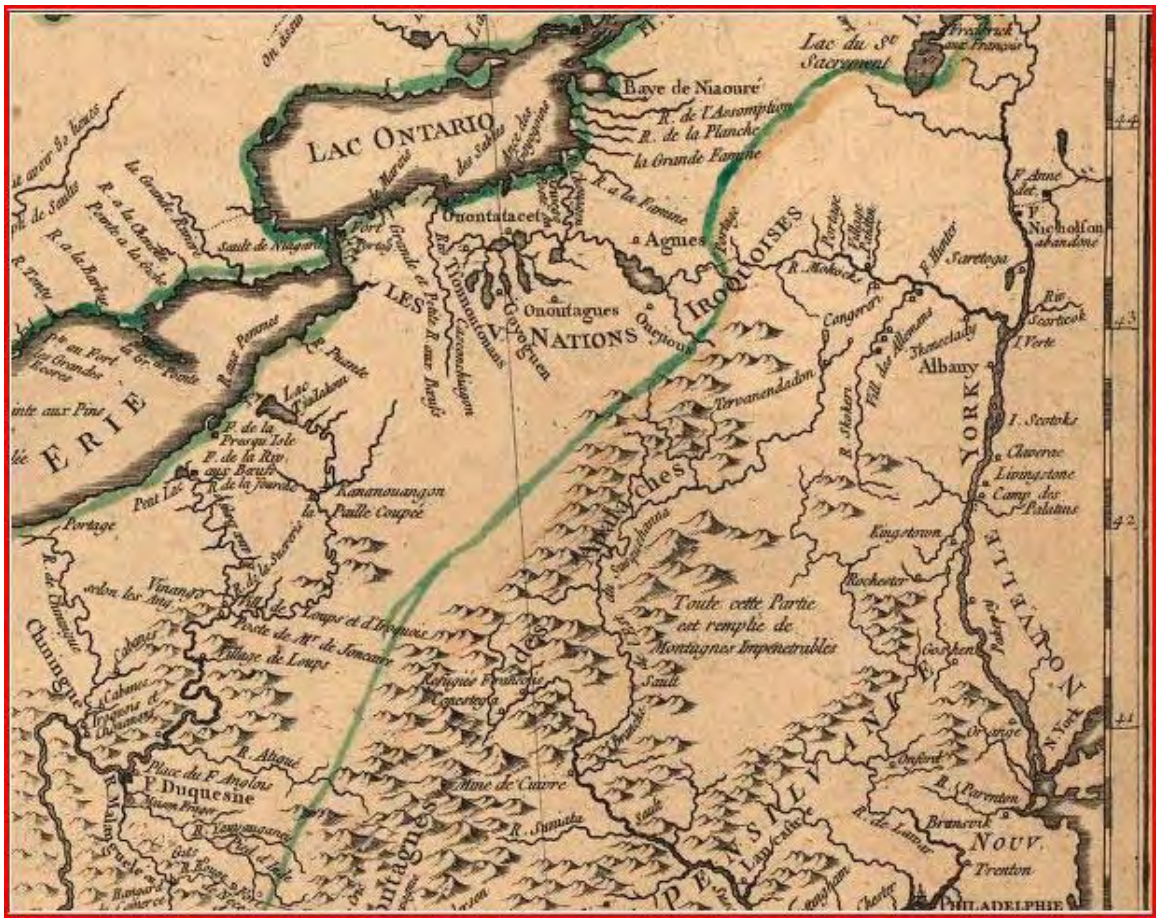

Figure 3.13. Detail of Jacques Nicolas Bellin, *Partie occidentale de la Nouvelle France ou Canada* (Paris?, 1755). Library of Congress, Geography and Map Division.

One other map by Bellin from this period deserves special notice. This is his 1757 map of the St. Lawrence River region from Quebec to Lake Ontario.[59] It is notable for its relatively detailed depiction of northern New York, including the Adirondack Mountains, and the rivers flowing into Lake Champlain, Lake Ontario, and the St. Lawrence River. Here is another example of a French map that is considerably more detailed than anything produced by the British or the Americans until after the American Revolution. This map also reflects the status of military activities in the opening years of the French and Indian War. The British fort at Oswego is noted as being destroyed. The French Fort Carillon (Ticonderoga) is shown at the foot of Lake Champlain; the nearby British forts Edward and George are shown at the base of Lake George. The small French fort at Ogdensburg ("La Présentation") also makes an appearance here, which is unusual on maps. Among the new fortifications depicted is "Fort Toronto, francois," making it the earliest printed map I have seen that shows the existence of a European settlement on the site of the present city of Toronto. (The French Fort was destroyed by the British a few years after its construction in 1755, and a permanent settlement was established only after the American Revolution.)

After 1755, both the French and the British published numerous maps of their North American colonies. Bellin himself published several more maps, and he was joined by

such famous competitors as Jean Baptiste Bourgiugnon d'Anville (1697-1782), Phillippe Buache (1700-1773), Jean Baptiste Nolin (1686-1762), and Didier and Giles Robert de Vaugondy (another father and son team).[60] Many of these maps are beautifully engraved and quite detailed, which makes them popular with collectors. They were mostly works of compilation, in which French mapmakers copied freely from each other and from their British counterparts to produce the best possible synthesis. British and French mapmakers continued to make outrageous claims on each others territory, although it is doubtful whether anybody took them very seriously, or if they had much effect on diplomacy. However, except for those of Bellin, the published French maps of this period do not show very much that is new in regard to New York. At this time, the French and British armies were too busy fighting each other for them to engage in extensive new surveys or explorations. For new information from this final phase of French North America, we need to return again to more specialized military maps.

French Military Maps, 1714-1760

The peace concluded between France and Great Britain in 1714 was never very stable. As we have seen, the French continued to annoy the British by incursions into the Champlain Valley and along the south shore of Lake Ontario. If the British had good reason to be alarmed by the French incursions into upstate New York, other activities by the French were even more upsetting. After 1714, the French followed a policy of trying to pen in the British colonies behind the Appalachian Mountains. While the British settlements remained huddled along the Atlantic Coast, the French, with a much smaller population, were developing a far-flung empire that embraced the Great Lakes and the Mississippi Valley. However tenuous their occupation of most of this area may have been, the French had effectively encircled the British colonies and were in a position to launch raids and invasions along the entire frontier.

Armed conflict between the French and the British in North America finally broke out between 1744 and 1748 with King George's War (the American counterpart of the War of the Austrian Succession). Most of the fighting in this war took place in eastern Canada, but when war broke out again in 1755, the region around New York was at the center of much of the fighting. This final conflict is known in the United States as the French and Indian War (1755-1760), and was part of the world-wide Seven Years War (1755-1763).

As one would expect, these wars produced the usual outpouring of military maps, ranging from those covering the entire "theatre of war" to detailed plans of individual fortifications. The French mapping of New York during this period is not as extensive as the British, and relatively few of the French maps achieved publication. By this time the British military had caught up with the French in its cartographic capabilities, and the British had much more extensive economic resources to put into the North American war. The British maps are better known than the French in part because so many of the British maps were published. This is partially a consequence of the natural tendency of victors to celebrate their triumphs. Nonetheless, the French maps produced around the time of the French and Indian War are often quite detailed and informative.

A good overview of the "theatre of war" during the French and Indian Wars is provided by a map published in 1781 in Pierre Pouchot's memoirs, which shows

fortifications, battlefields, and communications routes.[61] It typifies the type of general purpose military map that commanders in the field and headquarters would use to orient themselves. A copy of this map is available on the Web from the John Carter Brown Library, and is linked to the endnote for this paragraph.

A remarkable and little-known map serves to illustrate the high quality of some of the French military mapping in the years after 1755. This is an anonymous manuscript map held by the Séminaire de Québec, and assigned the title *Rivière Richelieu, lac Champlain, lac Saint-Sacremont et rivière Connecticut* (1758).[62] It shows in great detail the rivers, streams and paths between the Montreal-Albany corridor and the Connecticut River. The possession of such a map would obviously have been invaluable in planning and conducting the guerilla style raids which the French and their Indian allies conducted against the English settlements in the Connecticut Valley.

The French plans of fortifications and their surrounding areas are too numerous to discuss individually. They are invaluable to military historians, and sometimes provide unique information about landscape features, roads, and structures near the forts. Two examples will serve to illustrate the general characteristics of these maps. The engravings presented here show Fort Niagara (Figure 3.14) and Fort Carillon (Figure 3.15).[63] Note that both show a good deal of the topography of the surrounding area. The map of Fort Carillon (Ticonderoga) also shows the positions of the French and British troops at Montcalm's famous defeat of the British General Abercrombie in 1758.

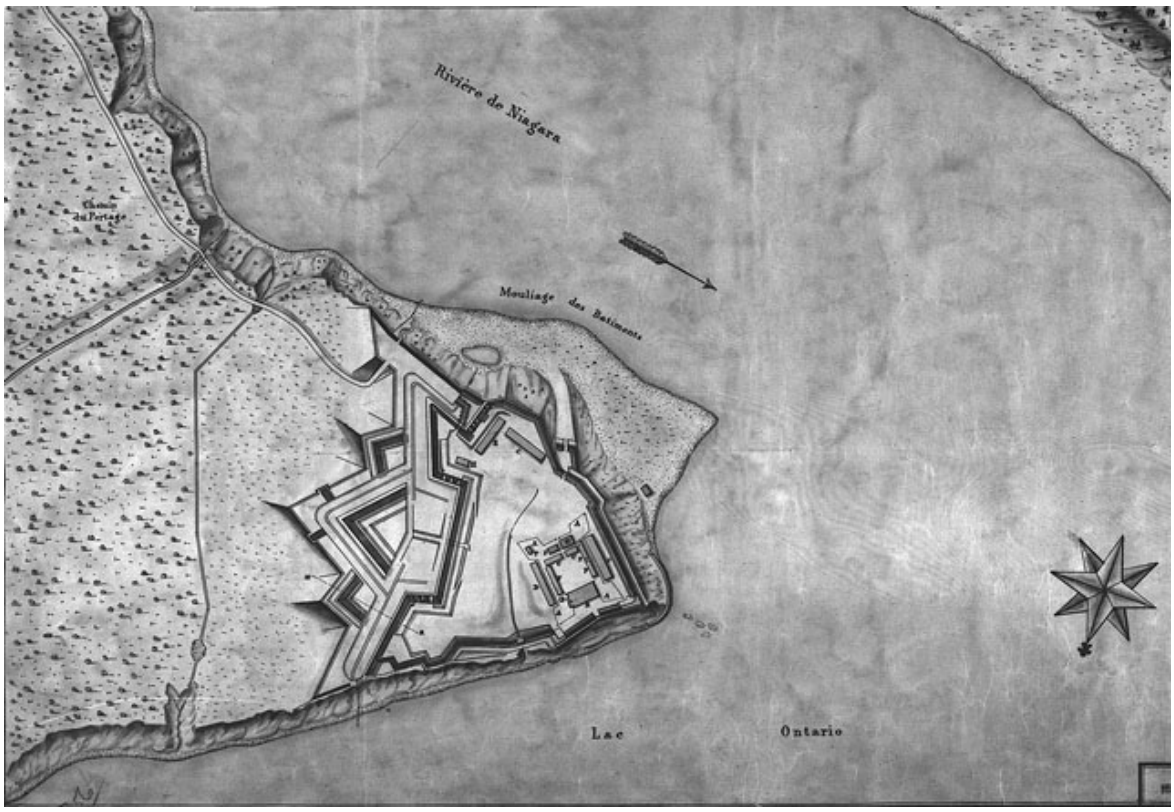

Figure 3.14. Anonymous, Detail of "Plan de Niagara et des fortifications faites en 1755 et 1756". National Archives of Canada (NMC 0026647)

Figure 3.15. Anonymous, Detail of “Plan du Fort Carillon, 1758.” National Archives of Canada (NMC 0007792).

The involvement of the French military in mapping New York did not, of course, end with fall of New France in 1760. During the American Revolution, the French army along with its mapmakers returned to fight the British, and we will have occasion to examine their work in the context of the mapping of the Revolutionary War. Even after the conclusion of the War of Independence, individual French and French-Canadians continued to participate in the mapping of New York, but they no longer did so in an official capacity as representatives of the French government.

Chapter 4
Anglo-American Mapping, 1664-1750

Introduction

When the English took possession of New York in 1664, they knew little about the geography of their new province. Initially, their knowledge was derived largely from Dutch maps. Even the boundaries of the colony were quite uncertain. Shortly after seizing New Netherland, the British carved out New Jersey as a separate province, although it was only in 1769 that the land boundary between New York and New Jersey was finally determined. The lands granted by Charles II to the Duke of York (the future King James II of England) also included, on paper, all of Connecticut up to the west bank of the Connecticut River, much of Maine, Martha's Vineyard, Nantucket, and other islands. The boundaries of northern and western New York were completely indeterminate. Only after the American Revolution did the boundaries of New York take on something close to their modern form.

The English (officially British after the Act of Union in 1707) brought with them a new set of priorities and cartographic traditions. Like both the French and the Dutch, they were interested in profiting from the fur trade. They shared with the French an impulse towards empire building, but they went about it in a much less systematic fashion. There was no state-sponsored missionary activity on a scale similar to that of the Jesuits in New France, and military intervention and efforts at political control by the central government were more sporadic. On the other hand, the English were considerably more successful than their rivals in populating their new province. From the beginning, the growth of New York under English and British rule owed more to private enterprise than to state initiatives.

English mapping activities took place against the backdrop of a complex and, initially, unstable ethnic and political situation. The English hold on the colony was at first quite tenuous, and there was a brief restoration of Dutch rule in 1672-73. Prior to about 1690, the English in New York were too busy consolidating their rule, establishing a government, and dealing with Leisler's "Rebellion" to engage in extensive mapping. The political and cartographic problems of the new rulers were complicated by the ethnic diversity of the province: even under the Dutch, the colony had been very much an ethnic mix. In 1664, Dutch settlers predominated in the Hudson Valley, with the English occupying eastern Long Island, and Manhattan being a mix of nationalities. Native Americans and African Americans (both slave and free) could be found everywhere. As the colony moved into the eighteenth century, this mixture became even more varied. English speaking settlers moved in larger numbers into Westchester County and the Hudson Valley, and there were significant settlements of Germans in the Hudson and Mohawk River Valleys. French Protestants (Huguenots) settled in such places as New Rochelle and New Paltz. This complex mosaic created a unique set of problems for imperial administrators and for cartographers, especially those engaged in property mapping.

Defining New York—English and American Manuscript Maps, 1664-1720

Initially after their seizure of New York, the English were almost completely dependent on Dutch maps. The Jansson-Visscher maps (described in the previous chapter) seem to have been the primary source for the English picture of their new province in the years after 1664. As previously mentioned, one of these maps was consulted when New York was divided from New Jersey, and an English version was printed by John Speed in 1676.[1] The famous early map of Manhattan known as "The Duke's Plan" (1664) was also essentially an adaptation of Jacques Corteljou's Castello Plan (described in chapter two).[2] The Duke's Plan is accurate and highly decorative, as befits a map that was probably prepared for the new master of the province James, Duke of York. It was not until the mid-1670s that the English started to publish their own maps showing New York in any detail, and not until the 1730s did British printed maps significantly improve over the Jansson-Visscher map.

However, during the seventeenth century Anglo-American mapmakers produced some remarkable manuscript maps of all or parts of New York. Through them we can see how the English struggled with the problem of conceptualizing their new province in maps, and gradually came to refine the detail and accuracy of their image. From the very beginning the English were aware of the strategic importance of maps. They not only had to be concerned about a possible restoration of Dutch rule, but after the French incursion of the Mohawk Valley in 1666, the possibility of French invasion was constantly on their minds. To defend their province, the English needed a working knowledge of its rivers, roads, fortifications, and topography. Although the English lagged behind the Dutch and the French in publishing their maps, some of the English surveyors did excellent work, and left behind a number of important manuscript maps.

The interesting English manuscript maps from the seventeenth were mostly filed away in British archives and forgotten. Shortly after taking control of New Netherland, the English produced an important manuscript survey of Manhattan and its vicinity. This is known as the Nicolls map, after Richard Nicolls, the first governor of New York, who may have ordered the map to be made. It appears to be the work of a military surveyor and was probably made for official purposes. It is less polished than the "Dukes Plan," but it shows a larger area, and it provides a good overview of the region at the time of the English conquest. It shows significant details of the topography of Manhattan Island and surrounding areas that cannot be found on any Dutch maps.[3]

Less well known is a fairly detailed map of western Long Island that was produced at about the same time. This map bears the title "A Plott off ye Situation of the towns & places on ye western end of Long Island to Hempstead," and was drawn in 1666 by a Long Island surveyor named Sergeant James Hubbard.[4] The appearance of this map is deceptively crude, and the overall picture of the landscape it presents is quite distorted. Nonetheless, parts of it appear to reflect careful surveying, and it provides a revealing picture of western Long Island as seen through the eyes of an early colonist. The map shows the layout of several towns, including Gravesend, Flatbush, Flushing, and Newtown. It also provides detailed information about roads, property boundaries, streams, and tidal estuaries. The glacial moraine running the length of Long Island is sketched in with the note "These hills run from one end of the Island to the other." Other topographic features labeled include meadows and sand dunes. A field of the Canarsie Indians is identified, as are individual houses of European settlers. A close look at the map also reveals an interesting mixture of Dutch and English geographic terminology.

Estuaries and creeks are labeled using the Dutch terms *kill* and *fly*. An area near Jamaica Bay that is broken up by tidal estuaries is labeled "broken lands"—a reminiscence of the Dutch term *gebrokene land*, which appears in this general area on some of the early Dutch maps showing Long Island.

Nothing is known for certain about why this map was made, but it has the appearance of being another overview map drawn to acquaint English officials with the overall lie of the land. Prior to its destruction by fire in the early twentieth century, it formed part of the Surveyor General's records in Albany.

A few years later, sometime around 1668, another Long Islander, John Scott, drew an unsigned and untitled map of New York and New England, which is quite revealing.[5] Scott himself is one of the most colorful and controversial figures in the early history of New York.[6] Although much about his career is in doubt, it appears that he was deported as a very young royalist from England to Massachusetts. After serving as an apprentice in Massachusetts, and following a stint as a pirate in the Caribbean, he made his way to Long Island in the 1650s, where he became involved in real estate speculation and politics. He also worked as a surveyor and an attorney for several towns. As a speculator in Long Island real estate he compiled a record unmatched by any of his talented successors. Through dubious purchases from the Natives, he succeeded in obtaining title to about one-third of Long Island (most of the area between the English and Dutch settlements). He also managed to find time to lead an unsuccessful coup attempt against Peter Stuyvesant.

After the English seized control of New York, Scott continued to engage in political intrigue, and eventually got himself in so much trouble with Governor Winthrop of Connecticut that he was forced to flee to England—leaving his wife behind. Fortunately for him, his royalist background gave him good connections with the royal court, and eventually he came to hold the unsalaried position of Royal Geographer to King Charles II of England. In this position he made a number of maps, including the one which concerns us here, which now resides in the British Library.

For its time and place, John Scott's map is remarkably well done. Scott's depiction of Long Island is vastly better than that of any of his Dutch predecessors. He provides, for the first time, a reasonably accurate picture of the South Shore barrier beaches, the harbors and estuaries along the North Shore of Long Island, and the glacial moraine running the length of the island. The major rivers of Long Island can be identified on this map, as well as such features as the Hempstead Plains and Lake Ronkonkoma. His depiction of the area around Jamaica Bay confirms the impression—also given by the Hubbard map—that the shoreline was quite different from what it is today. Scott clearly shows Jamaica Bay as being open to the ocean, with only a sandbar partially closing its mouth.

Scott's depiction of the Hudson Valley is not nearly so original and impressive, and appears to be largely copied from Dutch maps. It does show major features, such as the Hudson and Mohawk Rivers, the Hudson Highlands, Esopus Creek, and the Catskill Mountains in approximately their correct locations, but his treatment of this area is rather uneven. He shows some features—such as tributaries to the Mohawk River—that do not appear on printed maps until much later. On the other hand, there is no indication of the Tappan See, or the narrowing of the Hudson River at the Hudson Highlands. The depiction of human features in this area is also rather perfunctory. He shows Albany and

a settlement at Kingston, along with a few other place names. But, on balance, his depiction of the Hudson valley is less detailed and interesting than his delineation of Long Island, or even of the Connecticut River Valley, where he shows palisaded Indian villages and cleared fields. There is also no hint of Lake Champlain, Lake George, or Lake Otsego on this map, although it extends far enough to the north and west to include at least parts of these features. This map confirms that at this time the English still knew little about the Hudson Valley, where the European population was almost entirely Dutch, and almost nothing about features further to the north and west. Only after about 1690 did English maps start to reflect first-hand knowledge of the Hudson Valley and the regions beyond it.

The final manuscript map from the early period of English occupation of New York to be discussed here is Robert Ryder's relatively well-known map of Long Island and its vicinity, which bears the title *Long Island Sirvaide by Robartte Ryder* (ca. 1675).[7] This work (Figure 4.1) bears the distinction of being the first map of any sizable part of British North America that was based on an actual survey. Robert Ryder (16?? - 1681) was a professional surveyor, who lived in Gravesend on western Long Island, and served as New York's deputy surveyor general in the 1670s. He also carried out surveys of individual parcels of land on Staten Island, Westchester County, and elsewhere in New York. Ryder was clearly highly respected professionally: he was recruited to take part in astronomical measurements to determine the longitude of New York, and may have been involved in surveying the boundary between New York and Connecticut.[8]

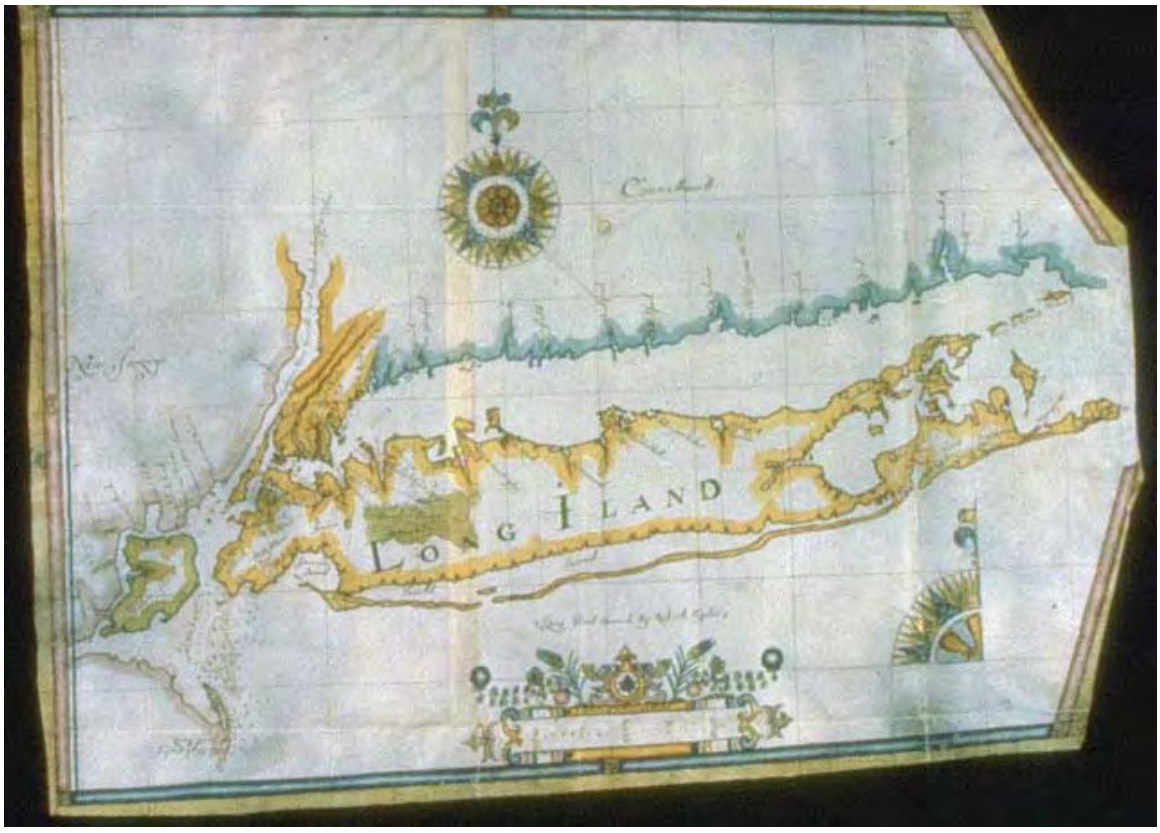

Figure 4.1. Robert Ryder, *Long Island Sirvaide by Robartte Ryder* (ca. 1675). John Carter Brown Library at Brown University.

We know something about the background of the Ryder map. In 1670 Ryder had made a preliminary version the map, which can still be seen at the New York Historical Society.[9] The final version was apparently made for Governor Edmund Andros, who in 1675 asked his officials to aid Ryder "to Survey and make a Draught of the Coasts, Harbours, Creeks, and Townes of Long Island."[10] The resulting map is remarkably accurate for its time, and one would like to know more about how the survey on which it is based was made. Most likely Ryder measured distances by pacing or on horseback, although it is possible that he used chains. Certain features of the map, such as the way irregular promontories are delineated, suggest that he may also have used some triangulation, which would have been a very advanced surveying technique for his time (more will be said about triangulation when we get to late eighteenth and early nineteenth-century mapping). Although not widely used, triangulation had been known as a technique since the sixteenth century, and Ryder appears to have had the expertise to use it.

Here again we have a map that was designed to provide administrators with a useful overview of a major portion of their new colony. This is confirmed by its inclusion in an atlas that was assembled by William Blathwayt (1649-1717), who had a long association with the Board of Trade, and was later Commissioner of Trade and Plantations under William and Mary.[11] The Ryder map is carefully finished and handsomely decorated, as befits a map prepared for an aristocratic audience. It is likely that its polished appearance owes something to another hand. According to Jeanette Black, the map in the *Blathwayte Atlas* was made in England by "an unidentified Thames School copyist."[12]

The Ryder map shows, in addition to Long Island, the area around New York Harbor, and the north coast of Long Island Sound in Westchester County and Connecticut. A major focus of the map is on political boundaries. New York, New Jersey, Staten Island, and Connecticut are all colored differently. Although easily overlooked, there are even faint dotted lines on Long Island indicating town boundaries. This boundary information is supplemented by the names of towns and harbors. With the exception of the Hempstead Plains on Long Island, almost no information is included about inland features. However, the carefully delineated coastlines are supplemented by some additional information useful to navigators, including soundings and shoals near the entrance of New York Harbor.

It is difficult to assess the actual extent of English knowledge of northern and western New York in the first decades of their rule. Even the Dutch had a better knowledge of these areas than is reflected on Dutch maps. There was constant trade between Albany and Montreal from an early date, and the Dutch knew that it was possible to make most of the journey between the two cities by water. We also know that the Dutch agent Arent Van Curler was drowned in Lake Champlain in 1667 on a voyage to Canada undertaken at the behest of Governor Nicolls.[13] It is probable that individual Dutch traders followed in the footsteps of Harmen Meyendertsz van den Bogaert's expedition to the Oneidas in 1634, and made visits to trade in various Iroquois villages, but such trips were discouraged by the West India Company, and they were not documented. It is also known that in the 1670s and 1680s English messengers paid visits

to Iroquois villages, including those of the Seneca in western New York. These early travels culminated in a trading expedition led by Johannes Roseboom (or Rooseboom), which paddled through lakes Ontario and Erie to Mackinac, Michigan (much to the consternation of the French).[14] However, none of these explorations are reflected on contemporary maps.

Only after 1690, did the English start to produce maps of the Hudson Valley and upstate New York. By this time, the English had a considerably firmer hold on the colony. Small garrisons were posted at Albany and Kingston, and there was a gradual increase in English influence and settlement throughout the region. The accession of William III to the English throne ushered in a period of warfare with France, which continued with some interruptions until the conclusion of the War of the Spanish Succession in 1714. These wars had their counterparts in conflicts between the English and French colonies in North America (King William's War and Queen Anne's War), and the frontier regions of northern and western New York were involved in these wars. It is a general rule that military activity stimulates the production of maps, and such was the case in this instance.

A revealing set of maps of towns and fortresses was produced by one John Miller, the dyspeptic author of *New York Considered and Improved* (1695).[15] Miller was a clergyman of the Church of England who served as chaplain for two companies of soldiers sent to New York in 1691. Miller, who remained in New York until 1695, was the only Episcopal clergyman in the province at the time. His book combines insightful observations alongside denunciations of the "wickedness & irreligion" of the inhabitants, and expressions of pious regret at the failings of the dissenting churches. The reverend served under a military commission, and took considerable interest in military affairs—going so far as to devote a section of his book to a scheme for the conquest of Canada. It seems likely that his drawings of towns and fortifications reflected both his own interests and the desires of his military superiors. Both his book and his remarkably detailed drawings were reconstructed from memory, for he was forced to throw all of his papers overboard when he was captured by a French privateer on his return to England in 1695.

Miller is best known for his plan of New York City, which others have analyzed at length.[16] Miller's map of New York was the first plan of the city produced since the Nicolls Map some thirty years earlier, and it provides accurate drawings of the fort and of the city itself, which had nearly doubled in size under English rule. Equally interesting are Miller's drawings of upstate cities and fortifications. Except for a very crude sketch dating from around 1659, Miller's drawing of Albany is our first map of that city, which had changed little since the final years of Dutch rule (Figure 4.2)).[17] It is easy to see from Miller's plan why the Dutch nicknamed Beverwyck/Albany *de Fuyck* (a funnel-shaped animal trap): its streets form the shape of a funnel running from a broad base at the river to a narrow "spout" at the fortress.[18] Equally interesting is Miller's drawing of Kingston (formerly Esopus, then Wildwyck), which appears like a fortress huddled defensively behind its palisades. The town had been moved to this location and fortified by the Dutch after the original Dutch settlement near the river had been largely destroyed by the Indians.[19] This map, and to a lesser sense the map of Albany, give a strong sense of how isolated and threatened European settlements along the Hudson River still were: they appear as tiny footholds barricaded against the threatening wilderness and its "savages."

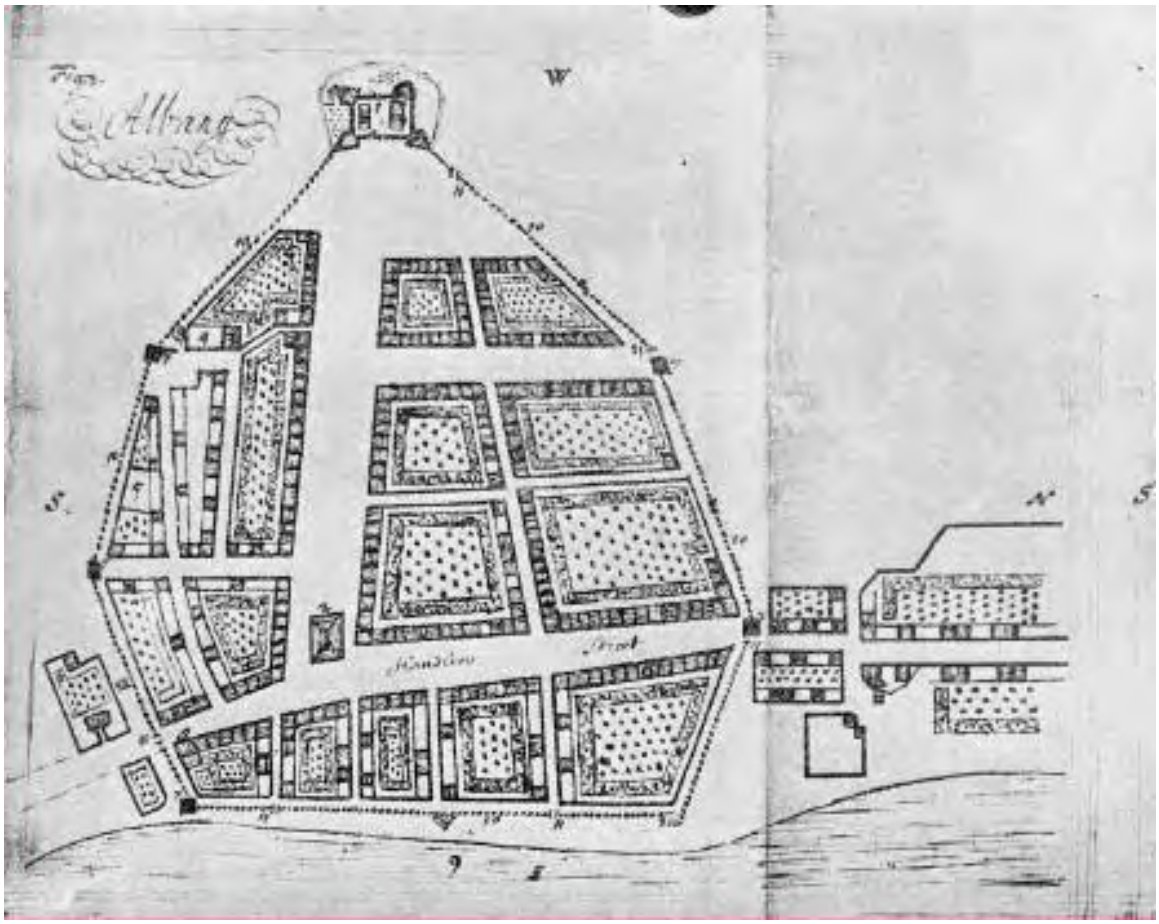

Figure 4.2. John Miller, Plan of Albany (1695). University of Nebraska-Lincoln Digital Commons.

Those interested in Native Americans will want to take particular note of Miller's drawing of "The Indian Fort at ye Flats," which was located north of Albany near Watervliet. Miller's plan of this fort shows five longhouses, along with a house for the use of British soldiers. Miller's maps also include a drawing of the fort at Schenectady, which was rebuilt following the town's destruction by the French and their Indian allies in 1690. His plan of the fort includes two longhouses, as well as accommodations for Europeans and "styes for hoggs."

An even more important group of maps was produced around 1700 by a military engineer named Wolfgang William Römer (1640-1713).[20] Colonel Römer was the first of a succession of British military engineers to survey the province of New York. A talented builder of fortifications and cartographer, he was typical in one respect of British military engineers in America—he was not very English. The aristocrats who dominated the British army regarded the work of engineers as beneath their dignity, and hence the army frequently had to look to people with foreign antecedents to staff the Royal Engineers.

Römer was son of the ambassador to the Netherlands of the Elector of the Palatinate. He was born in The Hague, and received his military education in Holland. Eventually, he entered into the service of the Prince of Orange, whom he accompanied to England in

1688, when he became King William III. Among his many activities in English service, he had served, in 1693, under Lord Bellomont (Richard Coote) on an expedition to the Mediterranean. Bellomont formed a high opinion of Römer, and when Bellomont was appointed governor of New York in 1697, he made certain that Römer accompanied him across the Atlantic. In New York, Römer not only made maps (of which more below) but constructed fortifications and served as a member of Bellomont's council and that of his successor, Lord Cornbury. Between 1701 and his return to England in 1706, Römer was involved in fortifying Boston Harbor. On his return voyage he suffered the same fate as Miller: he was captured by a French privateer and threw all of his maps and papers overboard. One wonders what maps may have been lost as a result of that incident.

Four maps of New York made by Römer are known to exist (originals of all are in the British Public Record Office). Two of the maps predictably focus on fortifications. One of these is a skillfully executed map of Albany bearing the title *Plan de la Ville d'Albanie* (1698).[21] This map is a kind of bird's-eye view, which shows only the bare outlines of the city, and focuses on its military situation. It shows very clearly the topography of the city and how the fort is dangerously overlooked by higher terrain—a feature that made it vulnerable to an enemy equipped with artillery. Römer was very concerned about the weakness of the fort, as well he should have been, for at this time the capture of Albany by the French was a real possibility. Römer's map of Albany also shows with great precision the streams, roads and fields surrounding the city—features which also would be important for anyone contemplating military activities. At about the same time, Römer also drew a similar map of Schenectady, which bears the title *Plan de Sconectidy frontiere dan le conté d'Albanie et province de la Nouvelle Yorck en Amerique*.[22] Unlike Miller's plan of the fort at Schenectady, Römer's map provides us with a detailed portrayal of the whole town. Both of Römer's maps are more accurate than Miller's, as one would expect, since Römer did not have to reconstruct his maps from memory, and he was trained as a surveyor.

In addition to these important town plans, Römer produced two masterpieces covering larger areas. The first is a map of lower New York Harbor and surrounding areas that bears in Römer's shaky English the astonishing title: *A new mappe of part of Hutson's, or the North River, Rareton River, which have their aiet lett* [outlet] *in to the sea by Sandy Hoocke, where the comming in is from sea to go up to New Yorck, north throw the narrows betwin Staaten Island and Long Island, and west up towards Amboye; survoyed in the year 1700, by Col. W.W. Romer*.[23] This map covers much the same area as the Dutch Manhatus map (discussed in chapter two above), and it is worth comparing them to observe the changes that had taken place during the intervening period. Unlike the Manhatus map, the primary focus of Römer's New York Harbor map is navigational. It includes many soundings and delineates shoal areas in considerable detail. It is accurate enough so that its depiction of such shoreline features as Sandy Hook and Coney Island (which was then still very much an island) should be of considerable interest to students of New York's changing shoreline.

The most notable in this series of four remarkable maps covers western New York and bears the title, *A mappe of Colonel Romers voyage to ye 5 Indian Nations*.[24] This map was produced to document an expedition to the Iroquois, which Römer undertook at the request of Lord Bellomont, the instructions for which have survived.[25] This map covers the entire area south of Lake Ontario and east of Lake Erie as far as the Hudson

River and Lake Champlain. Although no match for contemporary French maps of the area, Römer's map captures the main features of western New York. Lake Erie is called here Cadragqua Lake, and Lake Champlain is called Corlars-Lack (after Arnt van Curler, who drowned in its waters). Also shown are Niagara Falls and two of the Finger Lakes. Great detail is devoted to the route along the Mohawk River to Lake Oneida and the Iroquois villages in central New York. Individual Indian villages are shown and named, and the route connecting them is indicated by a dotted line. The map also shows the French Fort Frontenac on the north shore of Lake Ontario. A peculiar feature is another fort shown at the mouth of the Oswego River on the south shore of the lake. No fort existed at this time, but clearly Römer was suggesting that it would be a good idea to construct one here! Römer was well ahead of his time. The British finally constructed Fort Oswego at this site in 1724, and it was instrumental in their efforts to compete with the French for control of the Great Lakes. It took even longer for the British to catch up with Römer's cartography, and no better map of western New York was produced by the British until the 1750's.

Another important map made around the same time shows in considerable detail the routes from Albany to Canada.[26] This little-known map was presented to the Board of Trade by John ("Fitz-John") Winthrop (1638-1707), a soldier and later governor of Connecticut.[27] Winthrop led New York and Connecticut troops in an unsuccessful invasion of Canada in 1690, and he would have been in possession of the best available intelligence concerning routes to Canada. Given the time when this map was made, his information was remarkably good, and it gives a better rendition of some areas than Römer's map of upstate New York. Winthrop's map shows the route from Albany to Montreal and Quebec, including such features as the portage from the Hudson River to Lake Champlain, and the locations of French fortifications at the northern end of Lake Champlain and on the Richelieu River. It is surpassed by the best contemporary French maps of the area, but nonetheless presents a very serviceable guide to the roads and waterways needed to move troops through this corridor. Winthrop's map also shows with equal accuracy the route to Lake Ontario via the Mohawk River and Lake Oneida. In addition, it depicts many settlements in New York and Canada, including the Iroquois villages south of Lake Ontario, and shows a number of roads and Indian paths. It even includes a scale of distances for the route between Albany and the French settlement of Chambly, south of Montreal on the Richelieu River.

Also indicative of British interests in what is now northern New York is a little-known map prepared by New York surveyor Samuel Clowes. Drawn in 1701, it roughly sketches out the territory in New York and Ontario claimed by the Five Nations of the Iroquois. This map, which probably is based on information provided by the Indians themselves, is historically important, since it accompanied a deed putting this territory under the protection of the English, although providing for continued Iroquois occupation of the land. We will see that this treaty is reflected in later British claims to this area.[28]

The last of this group of manuscript maps was made by Augustin Graham in 1698.[29] Graham was for many years Surveyor General of New York (starting at least in 1691 and continuing until his death in 1719).[30] We will meet him again in the following chapter on property maps. Graham's map of New York, which was prepared at the request of the Board of Trade, appears to be the earliest surviving English map of the

entire province, although an earlier map of New York (now lost) had been sent to the board by Governor Dongen in 1687.

Graham's map shows most of the features found in the more detailed regional maps described above, and thereby reveals how the Province of New York appeared at that time to any British or colonial official who cared to contemplate it. What is new on this map is its delineation of the boundaries of large landed estates in the Hudson Valley and elsewhere in upstate New York. This preoccupation with landed property is a characteristic feature of British mapping throughout the colonial period, and more will be said about its significance in the next chapter.[31]

Considering these manuscript maps as a group, it is evident that by 1710 the British had constructed a reasonably good picture of New York, including its northern and western frontier areas. It is equally remarkable how little the British actually did with these maps. For the most part, they seem to have been filed away at the Board of Trade and forgotten. With a few partial exceptions, which will be discussed below, they had little influence on published maps. Probably because of the rapid turnover of colonial officials, copies of most of these maps do not appear to have been kept in New York. For most practical purposes, they might as well not have been drawn. Only after 1750 were maps of comparable accuracy published, and then they were constructed from entirely different sources. In partial exculpation of the British map publishing industry, it should be pointed out that map makers in London had no way of knowing which of these maps were most accurate: lacking first hand knowledge of the geography of New York, they had no basis for comparing maps and deciding which were best.

Cadwallader Colden Surveys New York, 1720-1750

Following the spate of activity around 1700, there was a slowdown in the British mapping of New York. Not much was done in the twenty years after the death of Lord Bellomont. His successor, Lord Cornbury, seems to have had little interest in maps, or perhaps he was too distracted by virulent political opposition to manifest any interest.[32] The end of Queen Anne's War, signalized by the Treaty of Utrecht in 1713, ushered in a thirty-year period of peace with the French, which relieved the pressure to undertake mapping for military purposes.

A significant turning point in British efforts to map New York occurred in1720, when a young Scottish physician named Cadwallader Colden (1689-1776) was appointed as New York's surveyor general. Colden occupied this post until 1763, when he passed it on to his son Alexander (1716-74). After Alexander's death, the dynasty was continued by Cadwallader's younger son David (1738-84). After ceasing to be surveyor general, Colden was active in New York politics as deputy governor, and occasionally as acting governor until his retirement in 1775. During most of these years, he was heavily involved with the mapping of his adopted province.

Figure 4.3. Portrait of Cadwallader Colden. Wikipedia Commons.

Colden was no ordinary surveyor general. He was one of the leading intellectual lights of eighteenth-century colonial America. An early member of The American Philosophical Society, he was a friend and correspondent of such men as William Douglass, James Alexander, David Rittenhouse, John Bartram, and Benjamin Franklin. In addition to geography and maps, his wide-ranging interests included botany, physics, medicine, and education. He is best known as the author of *The History of the Five Indian Nations Depending on the Province of New York* (1727), a pioneering work on Iroquois ethnography.[33] Politically, he was an outspoken Tory with a taste for confrontational politics. Early in his career, he took on most of New York's large landowners for failing to pay reasonable taxes on their huge estates. In 1747, his activities so infuriated the Provincial Assembly that it passed a resolution declaring him "an Enemy to the Colony."[34] Later, as acting governor during the Stamp Act crisis, he was hanged in effigy by the Sons of Liberty, and his carriage was destroyed. His opposition to American independence helps explain why his intellectual accomplishments are not more widely celebrated in this country.[35]

Colden's interest in surveying and map making was not unusual for an early eighteenth-century physician. At that time, scientific specialization had not progressed very far, and physicians often took an interest in a wide range of scientific subjects. At least two other medical doctors in eighteenth-century North America also engaged in map making: William Douglass (Colden's friend and counterpart in Massachusetts) and John Mitchell.

When Colden took office as surveyor general in 1720, the British had still made remarkably little progress in mapping New York. Important manuscript maps, such as Ryder's map of Long Island and the maps of Wolfgang Römer, never made it into print, and seem to have been almost completely forgotten. The situation was no better in New York than in London. Colden himself complained that when be first became surveyor general, he could not find a single map in his office.[36]

In 1723 and 1724, Colden, together with Governor Burnet and James Alexander, undertook to determine the longitude of New York City by making a series of observations of the eclipses of the first moon of Jupiter—a technically difficult procedure pioneered by Galileo. This procedure involved ascertaining the exact times when a moon was eclipsed by the planet, and then comparing the times with those in tables established for London. The time difference between the two locations was then used to calculate the longitude. The calculations made by Colden and his friends were almost a degree off from the modern figure. As reported in the *Philosophical Transactions of the Royal Society*, the longitude of the fort at the tip of Manhattan island was calculated to be 74°, 57' 30" seconds.[37]

As surveyor general, Colden was much preoccupied with the interconnected problems of surveying the boundaries of New York's land grants, and of establishing its borders with neighboring colonies. These subjects will be discussed in the next chapter. But Colden also wanted to create a reliable map of New York as a whole, and even hoped to construct a map of the northern British colonies in North America. His involvement in these more ambitious projects will be considered next.

Colden's efforts to create an improved map of New York tell us a lot about the problems of mapping the British colonies in the eighteenth century. That he was starting off from a very low point is revealed by the title of his first published map, which appeared in 1724: *A Map of the Country of the Five Nations Belonging to the Province of New York and of the Lakes Near Which the Nations of Far Indians Live, with part of Canada Taken from the Map of the Louisiana done by Mr. De Lisle in 1718* (Figure 4.4).[38]

Figure 4.4. Detail from Cadwallader Colden, *Map of the Country of the Five Nations Belonging to the Province of New York* (1747). John Carter Brown Library at Brown University.

It must have been mortifying for Colden to have to copy his depiction of upstate New York from Delisle's map, which along his friend Governor Burnett he regarded as an unvarnished piece of French propaganda. In spite of its other merits, the Delisle map did not even provide a particularly good picture of northern and western New York. It was on such a small scale that the information it gave on upstate New York was sketchy, and it was none too accurate. Colden would have done better if he could have taken his information from the manuscript maps produced by the French in the seventeenth century, although he nonetheless used the best information available to him. As late as 1738, Colden wrote to the Board of Trade that the geographic situation of New York "cannot be sufficiently understood, without a Map of North America," and lamented: "the best which I have seen is Mr. Delisle's Map of Louisiana, published in French in the year 1718. For this reason I frequently use the French names of places, that I may be better understood."[39] As late as 1750 he wrote: "All the English Maps of the Inland parts of the Continent are either absolutely erroneous or servily taken from the French even as far as to set bounds to the English Colonies from the French maps."[40]

Colden managed to improve slightly on Delisle's map by noting the location of the portages between the Hudson River and Lake Champlain, and between the Mohawk River and Wood Creek. It is thought that his *Map of the Country of the Five Nations* is the first map actually printed in colonial New York.[41] In an effort to refute the

cartographic claims of the French to vast areas of upstate New York, Colden pointedly referred in the title of his map to the territory of the Iroquois as "belonging to the Province of New York." This claim was based on the 1701 deed and map discussed above, and was recognized by the French in the Treaty of Utrecht. The British persistently used this claim in their maps and documents to assert their sovereignty not only over western New York, but over all the Indian tribes and territories that the Iroquois had ever conquered or managed to intimidate into paying tribute. This is why Colden notes on his map over what is now southern Ontario: "The Countries conquer'd by the Five Nations." Of course this claim reflects a very partisan interpretation and extension of the British alliance with the Iroquois.[42]

Colden's admiration for Delisle provides an important clue about how he tried to construct his maps of the New York region. Both Delisle and Colden were exemplars of early Enlightenment cartography. They prized accuracy and "correctness" in their maps, and thought of their work as being in some sense "scientific." Their unspoken ideal was a map that somehow replicated reality on paper, but on a smaller scale. However, their style of mapping was necessarily limited by the materials they had at hand, and by the conditions under which they worked. As was noted under the discussion of Delisle, the hallmark of scientific mapping for the nineteenth century was triangulation (which will be described in chapters six and ten). Although the basic principles of triangulation were known in the early eighteenth century, and were already being applied by the Cassinis in France, this type of labor-intensive cartography was out of the question in colonial North America. In their striving for accuracy, both Delisle and Colden had to resort to less exact methods. They both attempted to construct an overall framework for their maps by ascertaining accurate longitudes and latitudes of specific locations. This would enable them to establish the distances between important points on their maps. The details were then filled in with whatever information they had at hand. This might include travelers' reports, route surveys made for military or navigational purposes, boundary surveys, and maps of large estates. The quality of these materials varied greatly, and a cartographer had to exercise judgment in selecting these materials, evaluating them, and fitting them together.

There is some evidence about how Colden tried to apply these procedures. A letter survives from William Douglass to Colden, written in 1724, about their joint interest in producing better maps of the British North American colonies, especially New York and New England.[43] Douglass was in many respects Colden's intellectual counterpart in Massachusetts, and much later (in 1753) his estate was to publish an important map of New England that may have been pirated by Thomas Jefferys (see chapter six). In this letter, Douglass advised Colden to proceed along lines similar to those outlined above. In the words of Douglass: "I presume the most natural easy and exact method of beginning a draught or Map is by first laying down some certain fixed points accurately determined as to Lat. And Longitude, and the other principal parts laid down according to their exact distances and bearings from those invariable points will prevent any gross mistake."[44]

In practice, this "natural easy and exact method" was not as simple as it appeared to Douglass. In 1738 (some fourteen years after the letter quoted above), Colden sent to the Board of Trade quite a good written geographical description of New York, which included a table giving the latitude and longitude of a number of places in the province and in neighboring areas.[45] Still, he was able to supply the Board with only a very

limited number coordinates for places in New York. These were (in degrees and minutes): New York City (40.42N x 74.37W, modern: 40.47N x 73.58W); Albany (42.48N x 74.24W, modern: 42.39N x 73.45W); Oswego (43.35N x 76.50W, modern 43.27N x 76.30W); and Crown Point, 44.10N x 74.00W, modern: 43.57N x 73.26W). As has been seen, it was relatively easy to measure latitudes in the early eighteenth using sextants or similar instruments, although many of these measurements were inaccurate by modern standards. In fact, the only astronomically calculated longitude reading Colden had for anyplace in New York was his own estimate for New York City, which he still obtained "from the Immersions & Emersions of Jupiter's first Satellite, and the Calculations made from Dr. Pound's Tables of that Satellite."[46] This reading was about 20 minutes more accurate than the one Governor Burnet had reported using the same technique in 1724. In addition to New York City, Colden had available longitudes that others had calculated astronomically for Boston, Philadelphia, Montreal, and Quebec. His estimates of the longitudes of the remaining places in New York were "computed from their distance & situation, with respect to some one or more of these that are determined by Observation."[47]

All things considered, Colden's estimates of longitudes and latitudes were remarkably good, considering the time and place in which they were made. Colden's estimate of the latitude of New York City was within 5 minutes of the modern figure (it was off by about 5.75 miles); his estimate of the longitude was off by 39 minutes (approximately 34 miles). Interestingly, Colden's estimate of the longitude of New York City, is appreciably less accurate than those made by others for Montreal, Boston, and Philadelphia. Probably as a result of chance, Colden's estimate of the coordinates for Albany was slightly better than his estimate for those of New York City. Even in the case of remote Oswego, his estimate of latitude is off by only 8 minutes, and his estimate of longitude by 20 minutes. Oswego at that time was a trading post with a small military garrison, although it would have been visited by competent military surveyors.

In spite of their flaws, Colden's measurements were adequate to serve as a framework for a serviceable map of much of New York, at least by eighteenth-century standards. Thus, Colden overestimated the north-south distance from New York City to Albany by 4.6 miles. Although this error would be unacceptable today, it would hardly have been noticed by anyone making the two-day trip up the Hudson by boat or horseback. It is remarkable that Colden's distance estimates are as good as they are—especially for remote locations like Oswego and Crown Point, where no astronomically measured longitudes were available. It would be interesting to know more about how these distances were obtained, but no records appear to have survived indicating who made these distance estimates, or how they were made. We can be certain that the distances were not obtained by triangulation, but only by some form of direct measurement. Because of their relative accuracy, it is likely that most of these distances were measured along roads by chains, with a compass being used to record changes in direction. Otherwise, they would have been estimated by such primitive means as counting paces and using a compass.[48] A major weakness of Colden's table of latitudes and longitudes is the small number of places he records. Most conspicuously, no coordinates are recorded for eastern Long Island, which apparently meant that Colden could only guess at its length. And, of course, he had to rely on the French for the geography of most of New York north of Saratoga and west of Oswego.

Although Colden never published a map of New York other than *The Country of the Five Nations*, he made at least two pen-and-ink sketch maps, which went a considerable distance toward his goal of producing an improved map of the province. One of these, which at least until recently was preserved at the Huntington Library in California, covers the entire state from Long Island to the Saratoga area, and as far west as the German settlements on the Mohawk River. Significantly, it omits the eastern part of Long Island, and much of northern and western New York. A similar map was in the New York State Library prior to its destruction in the catastrophic fire of 1911, but fortunately much of it was reproduced by Justin Winsor in his *Narrative and Critical History of America*.[49] These two maps are so similar that they can be treated as copies or variants of a single map, which has been dated to 1726. Although not polished, it is accurately plotted, and was certainly an improvement over Augustin Graham's somewhat similar 1698 map of the province. Colden's map provides carefully drafted outlines of coasts, rivers, and streams—including such details as islands and shoals in the Hudson River—along with the location of numerous towns and fortifications. It depicts the boundaries of major land grants, and is extensively annotated with information about land patents and quit rents. The focus on land patents and rents reflects the administrative concerns of Colden and his superiors—illustrating another way in which maps reflect the agendas of their makers.[50]

Colden believed that he was never provided the resources to complete his project of producing a detailed map of New York. In 1756 he complained, with considerable bitterness, to a correspondent:

> What surveys we have are in parts of the country distant from each another in detached pieces which it was impossible for me to join or to lay doun [*sic*] in their proper places on one general map of the province without having those large tracts previously surveyed which I am not able to bear & I have not one farthing from the Croun for any services I do in my office. The charts which my son has of surveys in detached pieces are on such various scales and these generally so large that it will give a great deal of trouble to reduce them & place them in any general map.[51]

Colden had good reasons for his complaint: the extensive surveying he thought necessary to produce an accurate map of New York could not have been done without considerable government resources. Still, there is a somewhat self-serving note to his complaint, which was made to excuse himself for not being able to provide the British army with a better map at the time of the outbreak of the French and Indian War. If it were not for his numerous other interests and responsibilities, he probably could have created a map similar to the one that William Douglas made of New England. Colden himself also produced a number of manuscript maps of specific areas within the province, but the only map he actually published remained *The Country of the Five Nations*.

In spite of the frustration of Colden's plans to map New York, the information he gathered eventually found its way onto several maps that did provide relatively good information about the province. In particular, Colden played an important role in the creation of two of the most important maps of colonial America published in the first half of the eighteenth century—Henry Popple's *Map of the British Empire in America* (1733), and Lewis Evans' *A Map of Pensilvania, New Jersey, New-York, and the Three Delaware*

Counties (1749). Colden's role in the making of these two maps will be considered in the next section of this chapter.

It was only in the years between 1755 and 1775 that Colden's plans for producing a better map of New York were partially realized. At this time, as will be seen in chapter six, military needs finally motivated the British to commit money and people to surveying the province in greater detail. Although Colden remained active and conspicuous during these years, neither he nor his sons seem to have played much of a role in this final phase of the mapping of colonial New York.

Published Maps Showing New York, 1680-1750

British map publishing in the seventeenth and early eighteenth centuries lagged behind that of the Dutch or French. It was not until Henry Popple's *Map of the British Empire in America* (1733) that the British published a map that included a significantly better depiction of New York than the Jansson-Visscher maps (described above in chapter two). Even then, British cartographers continued to copy their depictions of northern and western New York from French sources, such as the maps of Delisle and Bellin.[52]

The initial years of English rule saw the production of few printed maps—in part because the English map publishing trade was undeveloped in comparison to that of the Dutch, and the English monarchy did not have the financial resources that enabled Louis XIV to subsidize systematic surveying and map making. The maps published in England prior to 1730 were largely adaptations of Dutch maps, although there were some significant modifications. As with Dutch and French maps, the information contained in published maps lagged behind that in manuscript maps, and for this reason our review of the published maps will be relatively brief. It is also worth noting that only at the very end of the colonial period (after 1775) did any printed maps appear that depicted only the Province of New York by itself. Earlier maps showed New York as part of North America, or at best as part of the Middle Atlantic or New England regions.

The first English map to show the province of New York in any detail is a very rare chart by Joseph Moxon of the East Coast of North America entitled *Americae Septentrionalis Pars* (1664).[53] There is only one known copy of this map, which appeared in the very year of the English takeover, and seems to have been rushed out to celebrate that event. It bears the distinction of being the first printed map to show New York by its present name. Moxon's map is an adaptation of an earlier chart by Theunis Jacobsz, but it shows some notable improvements over Jacobsz' work, and constitutes a very credible starting point for the English mapping of this area. Because of its small scale, it shows little detail, but it presents a fairly good outline of Long Island, which bears that name in English, as do "Westchester" and "Hudsons R." The depiction of upstate New York is vague and sketchy. The Hudson River is poorly depicted, and both Fort Orange and the long-abandoned Fort Nassau are shown, as is Lake Champlain, which is called here "Lake of ye East Hyraquois." It is probable that most copies of Moxon's map were destroyed in the Great Fire of London in 1666. For a more detailed and accessible map of New York, English readers had to wait until after 1675. As late as 1676, John Speed published a reworking of the Jansson-Visscher map in his *Prospect of the Most Famous Parts of the World*.[54]

The first English printed maps that depart notably from Dutch prototypes appeared in1675 or 1676 when John Seller published his *Atlas Maritimus or the Sea Atlas*. This work includes two maps that contain rather similar information about New York. The first is *A Mapp of New England* (Figure 4.5); the other is *A Chart of the Sea Coasts of New-England, New Jarsey, Virginia, Maryland and Carolina from C. Cod to C. Hatteras*, which is on a somewhat smaller scale.[55] Some of the information on these maps clearly comes from Dutch sources, but both of them contain information from other sources, including the John Scott map of New York and New England discussed earlier in this chapter. Seller bore the title "Hydrographer to the King," which may have given him access to the map that Scott (the Royal Geographer) had recently drawn. The influence of Scott on Seller is particularly noticeable in the peculiar depiction of Long Island on both Seller maps. The Seller maps include a number of unusual Long Island place names, which are first found on the Scott map. Among the names on Seller's *Chart of the Sea Coasts* is "Scot's Hole," which is a copyist's error for "Scott's Hall"—the name of a manor house that Scott built near Port Jefferson and proudly placed on his map. Seller's depiction of Long Island also includes several other features, such as oversized rivers and estuaries, which are characteristic of the Scott map. Seller's *Mapp of New England* shows other obvious signs of borrowing from Scott. In addition to many details being nearly identical, the Scott map and Sellers' map of New England cover almost exactly the same geographic area. Maps showing New England along with the settled parts of New York (mostly Long Island and the Hudson Valley) were to become very common in the colonial era. This particular shape was relatively easy to fit on a rectangular map, and it also reflects the indeterminacy of New York's boundaries. In 1688-89, New York was even briefly incorporated within the Dominion of New England.

Figure 4.5. John Seller**,** *A Mapp of New England* (1676). John Carter Brown Library at Brown University.

In 1675 or 1676, Seller's rival, Robert Morden, broke new ground with his *Map of New England, New Yorke, New Iersey, Mary-Land & Virginia* (Figure 4.6).[56] This appears to be the first printed English map that made a serious effort to depict what is now northern and western New York. The delineation of this area is undoubtedly derived primarily from French sources. It bears a considerable resemblance to Champlain's 1632 map of New France, although some of the information on it is more recent, and appears to be derived from Dutch and English sources. Morden's map succeeds in placing Lake Champlain in approximately its correct location between the Hudson and Connecticut rivers, rather than to the east of the Connecticut River, as on earlier Dutch maps. The map also gives an easily recognizable picture of the St. Lawrence River, Lake Ontario, and Lake Erie. It even provides crude representations of the Oswego River, some of the Finger Lakes, the Green Mountains, the Catskills, and the Adirondacks. On the other hand, its depiction of most of the lakes and rivers of upstate New York is hopelessly confused (note the entanglement of the Delaware, Susquehanna, and Mohawk rivers), and the location of the various Iroquois tribes is thoroughly muddled. The depiction of Long Island on this map is also interesting: it attempts to combine features from the Seller maps and the Jansson-Visscher maps, and succeeds in making a fairly successful synthesis. The size of the rivers and waterways on Long Island, which are exaggerated by Seller, are reduced on this map. The barrier beach on the South Shore, which is not

shown at all on the Jansson-Visscher maps, is depicted as a stippled shoal (as on Seller's maps). All things considered, this map is a credible effort, and shows that the English were making progress in defining the basic geography of their North American colonies.

Figure 4.6. Detail of Robert Morden, *Map of New England, New Yorke, New Iersey, Mary-Land & Virginia* (1675 or 1676). John Carter Brown Library at Brown University.

Between about 1675 and 1730 there was relatively little innovation or improvement in English printed maps of New York. At this time, the British map publishing industry was still in its infancy, and map publishers merged, collaborated and copied from one another in bewildering patterns that are sometimes hard to trace. Maps like the Morden map, described above, were repeatedly reissued for over 50 years, with varying degrees of change. In addition to Seller and Morden, the most important English map publishers during this period were John Thornton, Philip Lea, and (towards the end of this period) Herman Moll. Many of the maps published during these years were basically inferior editions of the Morden map, some of which appeared in inexpensive books and atlases. It can be said in their favor that these maps mark the beginning of the diffusion of cartographic knowledge beyond such traditional elites as government officials, ship captains, and wealthy merchants. Such maps would have been available to just about anybody who could read, including many potential immigrants.

One of the most notable of these later productions is a map jointly issued by John Thornton, Robert Morden, and Philip Lea entitled *A New Map of New England, New York, New Jersey, Pensilvania, Maryland, and Virginia*.[57] This map, which has been dated to between 1685 and 1690 covers a smaller area than Morden's map of 1675-76,

which has a similar name. The Thornton-Morden-Lea map is largely based on the earlier map, but omits its coverage of northern and western New York. On the other hand, it shows marked improvement in its depiction of Long Island and the area around New York Harbor. The depiction of Long Island is almost certainly influenced by Robert Ryder's manuscript map of 1675 (discussed above). It also contains an inset chart of New York Harbor, which is carefully drawn with shoals and soundings, and is the first printed chart of the harbor. The iconography of the Thornton-Morden-Lea map is also notable, although it is mostly derived from yet another map in the same family attributed to Richard Daniel, which was published by Morden in 1679 (Figure 4.7).[58] In addition to the usual array of animals and sailing ships, this map depicts one of the first scenes of whaling in British America. It shows several men in rowboats (most likely Native Americans employed by white settlers) pursuing a spouting whale off the South Shore of Long Island. Whaling at this time was already an important industry for Long Islanders.[59]

Figure 4.7. Detail of Richard Daniel, *A Map of ye English Empire in ye Continent of America* (1679). John Carter Brown Library at Brown University.

Both John Thornton and John Seller were important publishers of sea charts, and in 1689 the two collaborated with William Fisher in the publication of an important sea atlas called *The English Pilot: The Fourth Book*. The "Fourth Book," which covered the North Atlantic, was actually the first volume in a series, which eventually covered the entire world.[60] Historian William P. Cumming comments: "For British trading in North America and for the colonists there, the publication of *The English Pilot: The Fourth Book* must have been a godsend…. To modern eyes the charts are crude and sparse of

detail; but to the navigator of American waters in that period it was his Bible. Whatever its shortcomings, there was really no substitute, no real competitor, for over sixty years."[61]

Among the charts in *The Fourth Book*, the one covering coastal New York has long been regarded as among the best, and Stokes and others have speculated about its origins.[62] This chart, which was probably made by John Thornton, bears the title *Part of New England, New York, East New Iarsey and Long Island* (Figure 4.8). There is nothing mysterious about the origins of this chart, for (as I have pointed out elsewhere) it is a fairly close copy of the Ryder map of Long Island and vicinity.[63] Although many place names and some details on the two maps are different, the overall similarity is overwhelming. They cover the same geographic area, and the outlines of the coasts are virtually identical. Some of the distinctive peculiarities of the Ryder map, such as its schematic treatment of the South Shore and the odd "crook" in the South Fork around Canoe Place, are reproduced almost exactly by Thornton. Where the two maps diverge, the Thornton map is almost invariably the less accurate—again, diagnostic of a copy of a map made by a cartographer working far from the area depicted. Many of the details on the coastline are also slightly simplified or distorted by Thornton, as one would also expect on a copy. The involvement of Thornton in the publication of this map provides confirming evidence that the depiction of Long Island on the roughly contemporary Thornton-Morden-Lea map (discussed directly above) is also derived from Ryder.

Figure 4.8. Detail of [John Thornton?], *Part of New England, New York, East New Iarsey and Long Island* (1689). John Carter Brown Library at Brown University.

The English Pilot: The Fourth Book went through no less than 37 editions between 1689 and 1794.[64] New charts were added to the later editions, and two of them are important for the cartographic history of New York. One of these is an improved chart of New York Harbor made by Mark Tiddeman around 1731, which is much larger and more detailed than the chart published as an inset in the Thornton-Morden-Lea map.[65] Later editions of *The English Pilot* also included versions of a chart of the New England coast by Cyprian Southack (1662-1745), which was originally created in 1718 (Figure 4.9).[66] Southack was a colorful Massachusetts sea captain, but an unreliable map maker, as is seen treatment of the New York area on his charts. His maps and charts are valuable mainly for their interesting descriptive notes and place names. His depiction of Long Island omits the barrier beach, and his outline of the island resembles an eel more than a whale (which Long Island is often said to resemble). Southack's failure to produce an accurate outline of the island reflects the difficulty of measuring distances from on board a ship. In the early eighteenth century a navigator almost always calculated distances based on the speed of his ship. That speed was, at best, measured by throwing overboard a piece of wood (known as the "chip log" or simply "log"), and then estimating the ship's progress by the speed with which the log receded. The result was entered, logically enough, into the log book. Such a method of measuring speed and distance could easily be thrown off by offshore currents, of which there are many around Long Island. This method of "dead reckoning" worked fairly well on a straight reach, such as along either the north or the south shores of Long Island. Hence, distances on early maps between landmarks on such stretches are usually approximately correct. But the offshore currents could wreck havoc with the charting activities of anyone circumnavigating the island. Consequently, the overall shape of the island and the alignment of opposing coasts were subject to major distortions, as seen on most maps of the area made in the seventeenth and eighteenth centuries.

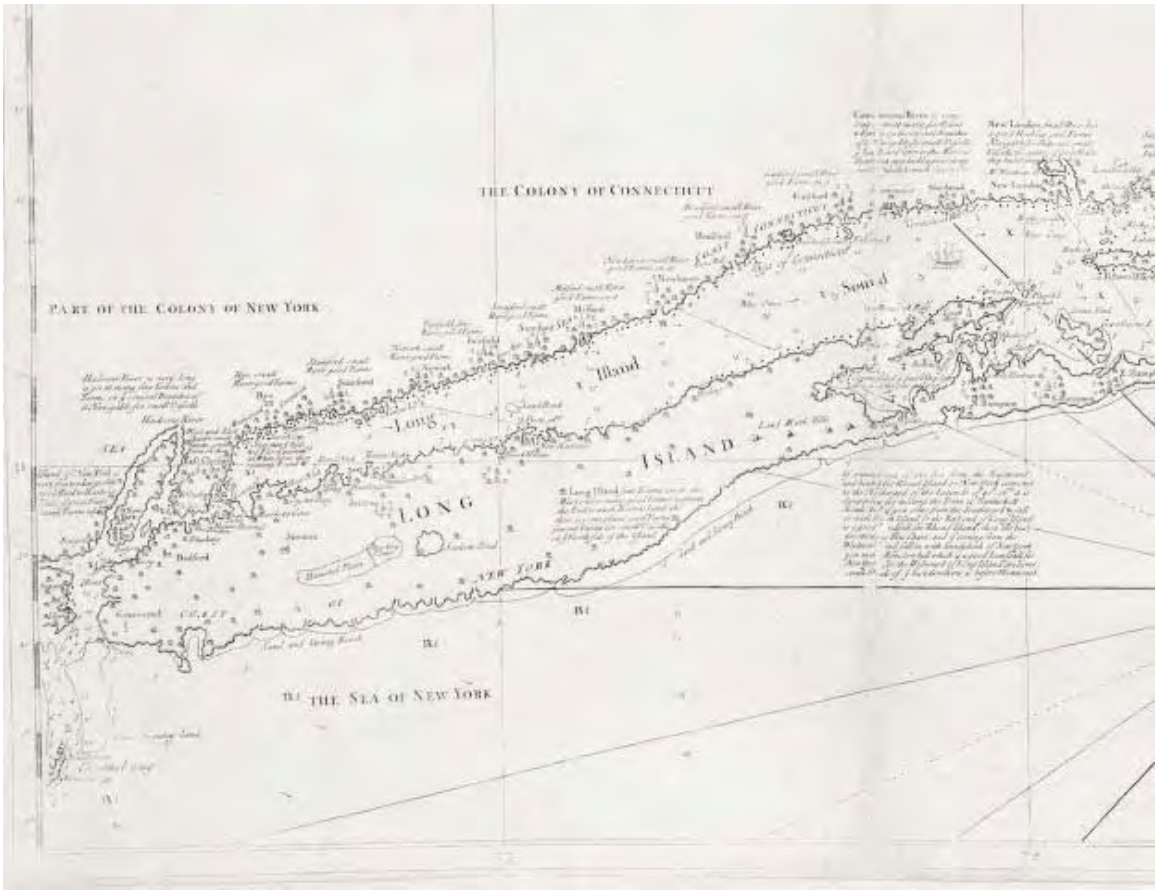

Figure 4.9. Detail of Cyprian Southack, *The New England Coasting Pilot from Sandy Point of New York*, unto Cape Canso (1734). Library of Congress, Geography and Map Division.

In spite of their flaws, Southack's charts enjoyed a good reputation, which lasted through much of the eighteenth century. Not only was his chart of the Northeast reprinted several times in *The English Pilot*, but in some editions it even replaced the more accurate Ryder-Thornton chart. Many other maps published in the eighteenth century show an elongated Long Island, which appears to be derived from Southack's representation. These include John Mitchell's important *Map of the British and French Dominions in North America* (1755), and numerous French maps by Bellin and others that appeared throughout the eighteenth century.[67] The reputation of Southack's charting was only slightly dented in the middle of the eighteenth century by Braddock Mead (alias John Green), an important mapmaker who worked with Thomas Jefferys, and who will be encountered again in Chapter Six. According to Mead:

> It does not appear…that in making this chart he employed any instruments excepting the Log and Compass. On which occasion I must observe, this is he first time perhaps that ever a person bred to the sea undertook to make a chart of so great an extent of coast, without ever taking a single latitude; and for the honour of navigators, as well as safety of navigation, I hope it may be the last.[68]

Mead to the contrary, Southack was neither the first nor the last navigator to make charts without measuring latitudes. But, if nothing else, the relative accuracy of the Ryder-Thornton maps shows the importance of land-based surveying for accurately measuring the proportions of large areas prior to the nineteenth century. It was only when extensive surveys were once again undertaken on Long Island after the middle of the eighteenth century that the Ryder map or the Thornton Chart were equaled or surpassed.

Between 1700 and 1730, British knowledge of New York's geography as a whole, as expressed in published maps, showed little or no overall improvement. Thus, in 1717 Southack published a map known as *A New Chart of the English Empire in North America*, which was not primarily a nautical chart, but rather a crude map of what is now the eastern half of the United States and southeastern Canada. It is thought to be the oldest extant copper engraving published in America, and is notable for its peculiar distortion of the Great Lakes, which was apparently done deliberately to exaggerate the threat posed by the French to the British colonies.[69] Another map, also crude and inaccurate, is Herman Moll's popular *New England, New York, New Jersey and Pensilvania*, which was first published in 1729 (Figure 4.10).[70] Moll was a respected English map publisher, but his depiction of New York as a whole on this map is less accurate than it is on Dutch maps produced 75 years earlier. Moll's greatest claim to fame, at least as far as New York is concerned, is a charming illustration, which shows brigades of industrious beavers building a dam with Niagara Falls in the background (Figure 4.11). This inset appears on a map of the British Colonies of North America, which Moll seems to have first published in 1715.

Only one British map published prior to 1730 shows much improvement over the likes of Morden and Seller in its depiction of New York. This is Daniel Neal's *A Map of New England According to the Latest Observation* (1720), which appeared in his *History of New-England*.[71] Neal was an English Puritan clergyman who had direct access to American sources. He used this locally derived information to produce an updated and improved delineation of western New England, including a more accurate depiction of the area around upper Hudson River and Lake Champlain. Otherwise, Neal's map was based on the Morden-Lea series of maps of New England and New York described above.

Figure 4.10. Large detail from 1732 edition of Herman Moll, *New England, New York, New Jersey and Pensilvania.* David Rumsey Collection.

Figure 4.11. **.** Industrious Beavers at Niagara Falls, as shown on a 1731 edition of Herman Moll's *New and Exact Map of the Dominions of the King of Great Britain on ye Continent of North America*. Library of Congress, Geography and Map Division.

This parade of maps published between 1675 and 1730 does not show any consistent pattern of improvement or progress, although some individual maps are quite impressive. This lack of systematic improvement suggests that maps played a relatively unimportant role in British and colonial life at this time. Neither the state nor private enterprise was willing to make the long-term commitments of time and money required to produce more detailed and accurate maps of the British colonies in North America. Although individual officials, like Colden and some members of the Board of Trade, railed about the need for better maps, their pleas went unheeded. The British government, content with its policy of "benign neglect," did not see fit to finance such efforts. Apparently, maps giving a rather vague general impression of the colonies were regarded as adequate for most purposes. This situation began to change after about 1730.

The first sign of an increasing demand for improved maps of North America is the publication in 1733 of Henry Popple's wall-sized *Map of the British Empire in America* (Figure 4.12).[72] This semi-official map, which appeared with "the approbation of" the Board of Trade, is essentially a work of compilation. Popple relied largely on French sources for information about North America west of the British settlements. His depiction of western New York seems to be based primarily on Delisle's 1718 map, but

he gives Lake Ontario a peculiar north-south orientation, which resembles that on some of the later maps of Bellin.

Figure 4.12. Detail showing New York area from Henry Popple's wall-sized *Map of the British Empire in America* (1733). Library of Congress, Geography and Map Division.

For the parts of modern New York controlled by the British, Popple derived his information almost entirely from Colden. Popple was briefly a member of the Board of Trade, and he was the brother of the Secretary of the Board, Allured Popple, who corresponded directly with Colden. Henry Popple certainly used Colden's *Map of the Country of the Five Nations,* and he probably used the manuscript map of the New York, which Colden had sent to the Board of Trade.[73] Although Popple's map is not impressive in comparison with several maps that appeared in the years between 1755 and the outbreak of the American Revolution, its depiction of New York greatly improved on any map published before it, and it remained the best map of the province available until the appearance of a groundbreaking map by Lewis Evans in 1749.

Lewis Evans' *Map of Pensilvania, New Jersey, New-York, and the Three Delaware Counties* (1749) was the first of an important series of new maps delineating large parts of British North America (Figure 4.13).[74] The maps of Lewis Evans (1700?-1756) have received a good deal of attention—both because of their accuracy and originality, and because of their American origin.[75] Evans was a Welshman whose activities are

completely unknown prior to 1736 when, at the age of thirty-six, he was recorded as purchasing a book on arithmetic from Benjamin Franklin's shop in Philadelphia. In the years prior to publishing his 1749 map, he taught himself surveying and worked as a surveyor, mostly in the back country of Pennsylvania. His maps drew upon his own surveys and explorations, as well as on manuscript maps produced by other American surveyors. The 1749 Evans map and its successors (which will be discussed in Chapter 6) were the first British or colonial American maps to provide extensive original information about the region beyond the Appalachians.

Figure 4.13. Detail showing southern New York from Lewis Evans, *Map of Pensilvania, New Jersey, New-York, and the Three Delaware Counties* (1749). Library of Congress, Geography and Map Division.

Given the map's justified reputation for accuracy and originality, Evans' treatment of New York is somewhat disappointing. Although Evans did a fair amount of traveling in New York, the colony was not at the center of his activities. Most of the information about the province on his 1749 map is actually derived from the ubiquitous Cadwallader Colden. Evans was quite open about his debt to Colden, and acknowledged on his map that "the greatest part of New York Province is owing to the honourable Cadwallader Colden, Esq." On one of his trips to New York, Evans is recorded as paying a visit to Colden at "Coldenham," the surveyor general's Ulster County estate. (Coldenham can also be found on Evans' map.) On this occasion, Evans gathered a large amount of

information about the province.[76] Prior to publishing his map, Evans also sent Colden a draft copy along with a request for corrections.[77] In spite of Colden's participation, the longitudes and latitudes used for locations in New York were often no better, and sometimes even worse, than those on the Popple Map.[78]

Thus, in some respects, as far as New York is concerned, the Evans map is only a modest improvement over Henry Popple's map of 1733, which also benefited from information from Colden. The relatively small scale of the Evans map (1:960,000) limited the amount of information he could put on it. But within the limitations imposed by its scale, Evans' treatment of topography and his location of places in the Hudson and Mohawk River valleys is greatly superior to that of Popple or his other predecessors. Evans' map has a cramped appearance because of the large amount of detail he included on it. He successfully portrayed such features as the Hudson Highlands and the Taconic Mountains, and even squeezed in the New Jersey palisades along the Hudson River (which is quite unusual on a map of such a small scale). The Evans map also provides a credible picture of the major roads existing at that time. An interesting feature of the New York portion of the map is its depiction of the western half of Long Island, which is much more accurately drawn than on other contemporary published maps, and is clearly based on Colden's unpublished manuscript map of 1726. Thus, in spite of its weaknesses, Evans' map of 1749 constitutes a significant advance towards meeting the need for a "correct" map of New York.

Evans published a second edition of this map with some improvements in 1752. It was reprinted numerous times throughout the eighteenth century, and it was widely used and influential. Evans himself published another important regional map showing New York in 1755, which will be discussed in chapter six of this book. Other important maps of New York State, some more detailed and accurate than those made by Evans, were to appear after 1755, but (as we will see) Evans 1749 map influenced the depiction of New York on most of them.

Chapter 5
Property and Boundary Mapping in Colonial New York

Introduction

The most distinguishing feature of British maps of colonial New York is their preoccupation with land ownership. This interest, or obsession, reveals itself in many ways. Numerous surveys of individual farms were carried out, many of which can still be found at the New York State Archives, at local government offices, and at libraries and historical societies. Maps were also produced showing larger land holdings, such as manors and estates. Conflicting boundary claims between New York and neighboring colonies were another favorite subject of British colonial mapmakers. To a lesser extent, town and county boundaries are also featured on their maps. This focus on land ownership and partition reflects the growth of population under British rule, as well as the characteristically English desire of poor men to become independent farmers, and of rich men to become landed gentry. Land was also the primary source of wealth during the colonial period, and land speculation became a popular form of gambling in colonial New York—playing much the same role as the stock market does today.

Much can also be learned about life in colonial New York through the study of the politics of land ownership, and cadastral (or property) maps are of considerable importance for—among others—genealogists, local historians, real estate specialists, environmentalists, and regional planners. The history of land ownership in early New York is murky, controversial, complex, and difficult to summarize. The related subject of the contentions between New York and neighboring provinces over boundaries is only slightly less complicated. The two subjects are interrelated—in part because some land grants were made in areas disputed between two colonies. Both subjects were embroiled in politics, charges of corruption, and conflicting special interests. Although a review of these matters sometimes takes us rather far from cartography, land mapping cannot be understood without some knowledge of the politics of land ownership in colonial New York, which will be summarized in the first part of this chapter. For those who want to study the subject in detail, several specialized works are available.[1]

The Development of New York's Land Policies before 1720

The peculiar complexity of land policies in New York owes much to their Dutch beginnings, as well as to the remarkable weakness of English colonial rule in seventeenth-century New York. Unlike in New England or Virginia, the English in New York did not start from scratch in developing their land policies, and they had to make accommodations with what was already on the ground. This, along with other causes, prevented them from adopting as coherent and clear-cut a land policy as they might otherwise have done.

Something has already been said about land mapping under the Dutch. As we have seen, the Dutch in New York were not strongly interested in farming or estate ownership. Most of the Dutch farms that did exist were in the immediate vicinity of New Amsterdam, and to some extent near Esopus (later Kingston) and Albany. Only one patroonship (Rensselaerswyck) survived the Dutch period. Because the Dutch were

primarily interested in the fur trade, they did not develop a system of land taxation comparable to the English quit rents, which stimulated the production of property maps in the Anglo-American period. In fact, the Dutch produced very few cadastral maps of any kind.

A different situation existed in areas that had been settled by the English during the Dutch period—mainly eastern Long Island, but also parts of Westchester County near Connecticut. Here the characteristic New England land system of small independent landholdings under town control prevailed. The township system continued to predominate in these areas throughout the colonial period, and was strongly defended by the English settlers. Even under Dutch rule, the New England model had considerable influence throughout New Netherland. The English towns under Dutch jurisdiction on western Long Island succeeded in obtaining most of the privileges of their New England neighbors. Furthermore, many Dutch settlers envied the self-government and the independent land holdings of their New England counterparts, and obtained from the West India Company at least some concessions trending in the same general direction.[2]

Thus, there was already a good deal of tension and heterogeneity in land policies under the Dutch. When the English took over New Netherland in 1664, they were unable to make a clean sweep of things. In spite of its pretensions to autocracy, the government imposed on the province by Charles II, King of England, and his brother James, the Duke of York (later King James II), was in reality quite weak. At home, the royal government was poorly funded, and had to avoid policies that might reignite the flames of the recent Civil War. Partially because of these circumstances, the royal governors in New York were not backed by a strong administrative or military presence. Consequently, they were unable to enforce unpopular measures, and could not afford to antagonize either the local Dutch or the New England settlers.[3] Accordingly, they wisely adopted a policy of compromise and conciliation. Existing Dutch land grants were confirmed, and the troublesome New Englanders on Long Island were grudgingly allowed to keep their land system, along with most of their independent ways.

The primary role of the royal government in matters of land policy was granting new estates. The English adopted some of the Dutch practices for granting land, such as requiring that it be purchased in advance from the Indians. The general procedure for obtaining a land grant remained much the same throughout the British colonial period. In theory, a land patent could be obtained by following these not-so-simple steps:[4]
1. Petition the Governor in Council for permission to purchase land from Indians and pay fees; 2. purchase land from Indians (a representative of the state was supposed to be present.) and pay another fee; 3. obtain a warrant from the governor directing that a survey be made (fee again); 4. make the survey, and pay more fees; 5. obtain another warrant from the governor directing the attorney general to prepare draft of the patent, and pay yet another fee.

Predictably, things rarely worked out so neatly. To begin with, the requirement to purchase the land from the Indians was frequently ignored, or else the purchase was carried out by fraud, or it may have been disputed by different groups of Indians. The boundaries of purchases were often so vaguely defined that nobody knew what they were. In some cases, newly granted estates had already been sold to somebody else. Or else they may have been in an area under dispute by two colonies. Sometimes no survey was

made—or it was incomprehensible. On many occasions, the necessary fees were not paid. Most early land titles had several of these flaws.

Nonetheless, granting land could be lucrative for the governor and other royal officials. It was also a way to buy or reward political allies. In theory, land was also a continuing source of income for the crown and its servants. After purchasing land, owners were expected to pay an annual "quit rent."[5] Although quit rents were in part a symbol of feudal subordination, they were mainly a kind of land tax, and a potential source of income for the provincial government. The quit rent was fixed under the so-called "Duke's Laws" (promulgated by Governor Nicolls in 1665) at 2s.6d annual rent per hundred acres, but this provision was rarely enforced.[6] Actual quit rents were set arbitrarily and at various levels; some huge tracts of land were charged nominal rates, which might be measured in bushels of wheat or animal skins. The most notorious example was the Dellius Patent, in which the minister of the Dutch reformed church at Albany received a grant of 620,000 acres in exchange for a quit-rent of one raccoon skin per year. Quit rents were often ignored and went uncollected for years. The setting and collection of quit rents was a major bone of contention throughout colonial period, and a significant cause of the American Revolution. If properly enforced, the collection of quit rents could have destroyed New York's large landed estates. Since they could be collected without the approval of the provincial Assembly, they were also a form of "taxation without representation," which could be used to fund the royal government. As we will see, the efforts of royal officials to assess and collect quit rents were a driving force behind their efforts to draw up accurate property maps.

It should be noted that quit rents and processing fees may have significantly inhibited the settlement of colonial New York. Armand La Potin has calculated that "the surveyor's fees alone could amount to well over two pounds on the average five hundred acre tract," and that the total cost of confirming a land patent on a farm of that size would probably have been over seventeen pounds, which is approximately twice the annual income of such a farm.[7]

Some of the early land patents theoretically conveyed manorial privileges, such as the right to maintain courts leet and baron, but by and large these privileges remained a dead letter, and there was little practical difference between manors and other large estates. Entail never became firmly established in New York. Nonetheless, large land-owners often preferred to lease out their lands to tenants, rather than sell land outright. This system of land ownership contrasted with that of New England, and has been the subject of much criticism and controversy from colonial times to the present. Many historians have attacked the system for discouraging settlement, and for being aristocratic and un-American.

In spite of the widespread criticism of New York's manors, the situation was much more complicated than it at first appears. Critics of New York's land system included royal officials like Cadwallader Colden, who saw the large estates as threats to the royal prerogative.[8] Some recent writers, especially Sung Bok Kim and Armand La Potin, have pointed out that there were other reasons why colonial New York had difficulty attracting settlers: much of the farm land in New York was of poor quality; it was often exposed to Indian attack; and it was difficult to purchase because of the cumbersome procedures and expensive processing fees. These same authors have maintained that manorial rents were quite reasonable, and that the system of tenant farming allowed

farmers without capital to establish themselves. Furthermore, it appears that the difficulty of buying small farms in colonial New York has been greatly exaggerated—farms that were for sale often went without takers for the reasons noted above.[9]

Whatever one's evaluation of the overall consequences of New York's land system, it was certainly chaotic, and it opened the door to various problems and abuses. Usually patentees were expected to settle their lands within a specified period of time, or else forfeit their property. This provision was also frequently ignored, and huge tracts of land went both untaxed and uninhabited for decades. Some of these land patents were vacated, but serious abuses continued throughout the colonial period because of a mixture of political opposition, patronage, corruption, and bureaucratic sloth. Land grants offered many opportunities for corruption and for litigation. Surveyors' commissions, processing fees, and legal fees provided lucre for surveyors, attorneys, and government officials. A number of New York's colonial governors were impoverished aristocrats sent out to the colonies to recoup their fortunes. It was generally expected that they and other officials would use their offices to make profits required to support the expansive life style of a gentleman, and they found many opportunities to do so in New York's land system.

The land policies followed by individual governors varied greatly. Their grants ranged in size from small parcels a few acres in extent to huge manors covering hundreds of thousands of acres. These grants were made at irregular intervals and for various reasons. The prevalence of very large estates is characteristic of colonial New York. With the exception of Rensselaerswyck, none of these are real "patroonships" dating back to the Dutch period, although several of the largest estates were granted to people of Dutch descent. There are a variety of reasons why many of New York's colonial governors tended to favor large land grants. Several governors sincerely believed that large estates would be better able to attract settlers to the under-populated province than small parcels of land offered to individuals. They reasoned that estate owners could pay for the transportation of new settlers, provide land on easy terms, and make available such infrastructure as roads and grist mills. Placing land grants in unpopulated frontier areas was also a way to shore up New York's boundaries against neighboring provinces and the French. In other cases, liberal land grants were seen as a way to win friends and influence people. Political allies could be rewarded with estates, and foes could be bought off with the same reward. In some areas—especially on Long Island—estates seem to have been created as a way to develop countervailing powers to keep in check troublesome town governments. Last, and usually not least, land grants offered numerous opportunities for royal governors to feather their own nests through such devices as processing fees and "gifts" of land from grateful grantees. Let us take a chronological look at how this system operated.

The first land grants were made by governors Richard Nicolls (1665-1667) and Francis Lovelace (1667-1674). They show a distinct geographical pattern, being concentrated on eastern Long Island and in Westchester County. They were clearly intended both to reward friends and supporters, and to serve as political counterweights to the independent communities of settlers from New England in these areas. Another function of these early manors appears to have been to provide a form of government for English settlers that did not live in established townships. They also served to fend off land claims by Connecticut to parts of both Westchester County and Long Island. Most of these early land grants were relatively small. Nicolls granted manorial rights to

Gardiner's Island, Fisher's Island, and Shelter Island off eastern Long Island; and to Pelham Manor in Westchester County. Lovelace created Fordham Manor in Westchester County and Fox Hall near Kingston.[10]

Following the brief Dutch restoration, the next royal governor was Edmund Andros (1674-1682). He made no land grants whatsoever. Andros was one of the more capable and autocratic royal governors. Although his motivation is unclear, he seems to have been aware of the risk to royal authority of creating a class of powerful landowners, which made him the first of several "imperialist" governors who endeavored to strengthen the central government at the expense of the large landowners. He allied himself with the New York City merchants, who at this time were distinct from the estate owners.

Andros' successor, Thomas Dongan (1682-1688), reversed course, and was responsible for setting up or strengthening some of New York's most important grants. The status of Rensselaerswyck (about 850,000 acres), which was uncertain, was clarified and confirmed by Dongan, who also granted the Rensselaer family the 250,000 acre Claverack Manor for good measure. Along the east side of the Hudson River, the Rumbout Patent was given out in 1685, and Livingston Manor (160,000 acres) was patented in1686. In Northern New York, the Saratoga Patent (150,000 acres) was given out in an effort to strengthen the frontier against the French. In addition, Dongan made grants for a number of smaller manors and estates, including Lloyd's Neck on Long Island. Dongan was one of the governors who charged only trivial quit rents for his new patents. He received a variety of fees and kickbacks, as well as several "voluntary gifts," in return for at least some of his patents, and he was willing to turn a blind eye to some spectacular frauds. A notable case in point is Livingston Manor. In words of Robert Livingston's historian: "Dongan took two widely separated tracts—the Jansen's Kill patent for 2,000 acres on the Hudson and the Taconic grant of 600 acres on the Massachusetts border—and treated them as contiguous, converting them into a unified manor. The new patent granted no additional lands; it merely confirmed the earlier titles. Yet when the Manor was finally surveyed years later, 2,600 acres had mysteriously become 160,000!"[11]

In addition to enriching himself, Dongan's purpose was clearly to win friends and gain political influence. Many of his grants went to wealthy merchants or to others with political connections. His policy was to strengthen and ingratiate himself with the local men of property. Characteristically, he increased quit rents for the townships on Long Island in exchange for confirmation of their land patents, while he charged the large estates only trivial quit rents. It is possible that his policies were also designed in part to control the newly formed General Assembly, which was created in 1683 following instructions from the Duke of York. Several of the manors were represented in the Assembly, and people of wealth were in various ways able to dominate that body (which met three times between 1683 and 1687, and was then revived permanently in 1691).[12]

The year 1688 marked a significant turning point both for Great Britain and New York. Britain experienced the "Glorious Revolution," in which James II (the former Duke of York) was deposed and replaced by the Protestants William and Mary. This far-reaching event, which has been seen as a victory for political liberalism and constitutional government, was attended by the birth of the Whig and Tory factions in British politics. An event of this magnitude was bound to have repercussions in British North America,

and it did. In New York, it became intertwined with a curious happening known as "Leisler's Rebellion." To simplify a complex story, the followers of Leisler saw themselves as supporters of the new order in Britain. They were mostly smaller merchants, and were also opponents of the owners of large estates in New York. Although their leader, Jacob Leisler, was executed in 1691, his followers continued to be a major force in New York politics. Respectably middle class, they had many ties with New England and with Whig politicians in Britain. Leisler's rebellion marks the beginning of a period of bitter and vindictive strife between the owners of large estates and their Whigish opponents. It is against this background that the gyrations in land policy of the next few decades need to be viewed.

The next royal governor, Benjamin Fletcher (1692 to 1697), was a political ally of the large estate owners, and his policies resembled those of Dongan. Fletcher saw the Leislerians as a threat to royal control of the province, and was pleased by the willingness of several of the estate owners to provide loans to help finance New York's role in a war with the French (King William's War), which broke out after the Glorious Revolution. He rewarded his friends generously with major land grants, including: the Evans Grant (300,000 acres in Ulster County); the Manor of St. George in Suffolk County; the Dellius Grant (840 sq. miles north of Albany); Philipsburg Manor, Cortland Manor, Morrisania (all in Westchester County); Philipse's Highland Patent north of the Cortland Manor; and a number of small grants along the Hudson River to members of the Schuyler family. Thus, by the end of Fletcher's governorship, families like the Rensselaers, Livingstons, Schuylers, Philipses, and Van Cortlandts were already prominent on the New York scene. Members of these families intermarried and they formed one of the most important forces—possibly the most important force—in the politics of the province prior to the American Revolution. These families, which became increasingly allied to the large merchant families, would remain prominent throughout the colonial period and beyond.

A remarkable change of policy took place with the appointment of Richard Coote (Lord Bellomont), who was governor from 1698 until his death in 1701. Bellomont, whom we have already encountered as the patron of Wolfgang Römer, was an unconventional and energetic governor. Even before his arrival in New York, he was a critic of Fletcher, and had close links with the increasingly ascendant Whig politicians at the British court. Bellomont turned out to be a strident partisan who allied himself with the Leislerians, and he regarded Fletcher's "extravagant grants" as corrupt and the source of much evil. He resolved to undertake a frontal attack on the manors and other large landholdings and "break" their patents. His ideal was a colony made up of small to medium-sized farmers, who would support the government with their quit rents, and be more politically manageable than the wealthy estate owners. Bellomont's plans for a social restructuring of New York bordered on the revolutionary, and they drew the predictable response from large landowners and their political allies. Bellomont's policies were largely thwarted by opposition in both New York and England, and they came to an end with his sudden death in 1701.[13]

It should be noted that Bellomont's ideas resemble those of a number of later British colonial officials, most notably Cadwallader Colden. They cannot be understood in terms of such conventional political categories as Whig and Tory, or liberal and conservative. If they must be given a label, they might be described as "monarchical-bureaucratic" or "imperialist." These officials envisaged a rational, well-run monarchical state. They

thought that the best interests of the colony and the mother country would be realized by the king working through his officials and army on behalf of the pubic welfare. The primary beneficiaries of these policies would be a large class of freeholders or yeoman farmers (somewhat anticipating the Jeffersonian ideal). Such instruments as elective assemblies were considered to have a place in governance, but royal officials were to hold in check both corrupt special interests and the excesses of the ignorant populace. In certain respects, these views resemble those of some of the political theorists of the Stuart monarchy, such as James Harrington, and of eighteenth-century advocates of "enlightened despotism" on the continent.

Bellomont did succeed in vacating several of Fletcher's grants, including the Evans Grant and the Dellius patent with its notorious quit rent of one raccoon skin . In addition, he persuaded the Board of Trade to issue, or reaffirm, instructions to prevent abuses in the future. Once again, the rate for quit rents was established as two shillings six-pence per hundred acres. The amount of land to be granted to one person was limited to two thousand acres, as it had been previously (at least on paper). Later (in 1753) that amount would be reduced to one thousand acres. Requirements were imposed that unsettled grants be vacated, and efforts were made to keep the Indians from being defrauded. Had these rules actually been enforced, the colonial history of New York would have been very different, but, predictably, none of these laws and regulations had much effect. Often they were ignored, or they were circumvented by such subterfuges as establishing paper "partnerships" to purchase large blocks of land. Individual governors or other officials frequently continued to ignore or encourage violations of these rules, since they could profit by turning a blind eye and holding out an open palm. The main result of Bellomont's crusade was to heighten the controversy surrounding the large estates.[14]

Bellomont's policies were reversed by the next governor, Edward Hyde, Vicount Cornbury (1702-08). Lord Cornbury's main claim to fame is as New York's transvestite governor, but the story of his cross-dressing has been discredited by recent research.[15] Cornbury's alleged transvestitism appears to have been a political smear concocted by his numerous enemies, who were mainly Leislerians antagonized by his land policies. Cornbury basically reverted to the policies of Fletcher: he allied himself with the large landowners, and resumed the practice of giving out "extravagant" grants to reward his friends and political allies.

Many of Cornbury's land grants were on the western side of the Hudson River. The largest of his patents in the Hudson Valley region are the Beekman Patent (100,000 acres in Dutchess County, 1703), the Wawayanda Patent (356,000 acres in Orange County, 1703), the Minisink Patent (more than 200,000 acres in Orange and Ulster counties, 1704), and the Cheesecocks patent in Orange County (1707). Taken together, they included almost all of the unpatented land south of Albany. Cornbury's most bizarre patents were in more remote areas, and reflected the rise of land speculation as a primary motive for acquiring tracts of unsettled territory. One of these was the Oriskany Patent in the western Mohawk River Valley. This patent for more than 30,000 acres was made to five partners in 1705. It was in a completely unsettled area still controlled by the Indians; it did not include a settlement clause, and it required a quit rent of only ten shillings per acre. Another spectacularly controversial land grant was the Kayaderosseras Patent (1708), which consisted of 406,404 acres north and west of the Hudson and Mohawk Rivers, including most of modern Saratoga County. It was so full of legal defects and

ambiguities that it kept attorneys and surveyors occupied until well into the nineteenth century. Last, but definitely not least, is the Great Hardenburgh Patent of approximately 1.5 million acres. Made in 1708, it covered almost all of the Catskill Mountain area.[16]

The story of the Hardenburgh Patent is worth recounting briefly as an example of the problems and abuses associated with these large land grants. This huge tract of land has been subjected to painstaking research, which has thrown considerable light on the murky issues surrounding colonial land politics in New York. Only the highlights of its history will be touched upon here as the reader can find the details of this astonishing story elsewhere.[17]

The Hardenburgh Patent was granted in 1708. Like many of Cornbury's patents, it was made without a prior purchase from the Natives or a survey of its boundaries. The description of its bounds in the patent reads as follows:

> "a Certain Tract of Vacant and unappropriated Land Scituate in the Countys of Ulster & Albany beginning att the Sand Bergh or Hills att ye Northeast Corner of the Lands Granted to Ebenezer Willson Derick Van den burgh &c att Minisinck so Running all along their Line Northwesterly as the said Line Runs to the fish Kill or River and so to the head thereof Including the same thence in a Direct Line to the head of a Certain Small River Commonly known by the Name of Cartwright's Kill and so by the Northerly Side of said Kill or River to the Northernmost Bounds of Kingston on said Kill or River thence by the Bounds of Kingstown on said Kill or River thence by the Bounds of Kingstown Hurley Marbletown Rochester and other Patented Lands to the Southward thereof to the said Sand Bergh the place where it first began."[18]

This description was so vague that it left the boundaries of this patent uncertain, but it covered an area of roughly 1.5 million acres (approximately the size of Rhode Island). As was often the case with large land grants, the Hardenburgh Patent was made to a consortium of partners (seven in this case). The use of such consortia (which sometimes included silent partners and dummies) was a common device to evade the limitation of no more than 2000 acres being granted to any single person. Admittedly 1.5 million acres divided by seven works out to considerably more than 2000 acres per person, but the text of the patent does not mention its acreage. This omission was doubtless made in part to avoid drawing attention to this little problem, but also because the land was unsurveyed, and nobody knew exactly how many acres the tract included. The seven partners were a collection of politicians, lawyers, businessmen, and relatives of one Johannis Hardenbergh, a merchant and trader who lived in Kingston. A remarkable feature of this consortium was that it included an eighth person, a "silent partner" in the person of the Surveyor General, Augustine Graham. As Surveyor General, Graham was legally prohibited from purchasing land grants, but a way was found to get around this limitation through a legal device known as "lease and release." It is not known whether Lord Cornbury himself profited directly from this purchase, although at the very least he would have received the usual fees.

It took more than a century to resolve the problems created by this patent. In 1746, most of the land was finally purchased from the Indians. The patent was actually surveyed in several stages starting around 1740. (It was not completely surveyed until the middle of the nineteenth century.) There were numerous changes in the ownership of the

land, and in the middle of the eighteenth century about a third of the patent fell into the hands of the acquisitive Livingston family. As the boundaries of the patent overlapped those of several neighboring patents, legal disputes arose and more surveys were made. Very little settlement actually took place in this area until after the Revolution. Eventually most of the land was broken up into small tracts. In spite of the bizarre history of this huge tract of land, it appears that the overall course of settlement and development of this land took place much as it would have under more normal circumstances.

The Hardenburgh Patent exemplifies problems that appeared throughout much of colonial New York. Although this Patent is an extreme example, several other early land grants have equally bizarre histories. By the end of Cornbury's governorship in 1708, the atmosphere surrounding the large estates was so heated that the land system became a staple of New York politics through the American Revolution and into the nineteenth century.

Cornbury's departure in 1708 marks something of a turning point. His immediate successors, particularly Robert Hunter (1710-1719) and William Burnet (1720-1728) were among New York's most capable colonial governors, and they began a series of attempts to correct the worst abuses of the land system. Hunter is also to be credited for appointing Cadwallader Colden as New York's surveyor general (although his appointment only took effect under Burnet in 1720). In spite of his numerous imperfections and foibles, we will see that Colden made a prolonged and partially successful effort to reform New York's land system. Of particular concern to the subject of this book, the policies he pursued led to the mapping of most of the large estates in the colony.

Land Mapping Prior to 1720

The history of land mapping in New York has to be understood in the context of the chaotic history of the land "system" described above. A respectable number of land maps were produced in the years prior to 1720, but most were of relatively small tracts of up to a few thousand acres.[19] Only a few of the large land grants given out in this period were actually mapped, and (as we have seen) some were not even surveyed. Most land grants were eventually surveyed, but the early surveys were not usually accompanied by maps. The earliest maps showing the boundaries of most of these large tracts appeared around the middle of the eighteenth century. There is no absolute necessity for surveys to be accompanied by maps, and we have seen that land surveys from the Dutch period almost never included them. The boundaries of a piece of land can always be described in words, and a map is basically just another way of presenting the same information.

However, there were advantages to having property maps, which explains why they became increasingly common during the colonial period. A written description of the boundaries of a piece of land is cumbersome to read, and difficult to interpret unless one is physically present on the property and able to compare the description with the features actually on the land. Often, written surveys from the colonial era include features such as piles of rocks or blazes on trees, which disappear or become impossible to identify over time. With the aid of a map, it is possible at a glance to see the size and shape of a piece of property, and the location of any landmarks defining its edges. Maps can identify or prevent truly spectacular errors. An example is a survey of a tract of land in Flatbush

made by Jaques Corteljou. As previously mentioned, Corteljou and other surveyors of the Dutch period almost never made maps of the lands they surveyed. Corteljou's original survey of this property was made using "a rose compass, made upon ye meridian of Holland," which caused the property lines of lots in this tract, which were supposed to be evenly spaced at twenty-five feet apart, to diverge at various angles. It was not until maps were later made of this area that these boundary lines were finally straightened out.[20]

Maps have several other advantages over written descriptions of property boundaries. They can show the boundaries of adjoining properties, and a person looking at several property maps of a particular area can quickly and unambiguously identify overlapping grants and areas that have not yet been granted. Also, because of their abstraction, geometrical lines on a piece of paper can be much more precise and definitive than natural landmarks, provided they are tied in to one or more fixed and easily identifiable points. Thus, maps could do much to remedy the problems created by boundaries defined by shifting stream banks, by heaps of stones, or by lines of blazed trees, which might have been chopped or burned down.

Thus, maps became critical tools for property owners, who needed to define the borders of their lands before selling, subdividing, or developing them. Last but not least, cadastral maps were indispensable administrative tools.[21] As we have seen, quit rents and other property taxes were potentially important sources of income for governments. Without having reasonably accurate maps showing who owned which acres, it was practically impossible to impose and collect land taxes, which largely explains why British officials struggled throughout the colonial period to produce better property maps.

One reason for the slow development of property mapping was the lack of professionally trained surveyors. Most colonial surveyors were self taught, or learned through working with other surveyors. Their knowledge of mathematics was usually rudimentary, and they possessed few surveying instruments. They were often able to measure distances fairly accurately using chains mounted on poles, although even this was difficult and unreliable in heavily wooded areas and other difficult terrain. Angles were measured mostly by using pocket compasses. Usually no effort was made to correct for the magnetic variation of the compass, or to take note of the deflection of the needle caused by large bodies of iron ore. Compass cards were not yet generally divided up into 360 degrees, and it is not unusual to see on early property maps notations such as "west southwest a little more southerly."[22] Corners and changes in the direction of boundary lines were usually marked by landmarks or by blazes on trees. All of this left much room for error and confusion. As the eighteenth century progressed, the training of surveyors gradually improved, and special surveyors' compasses (called "circumferenters") were more widely used. The development of property mapping skills in the course of the eighteenth century will be described below.

The early maps accompanying land surveys were crude, and often showed only boundary lines.[23] Usually such features as creeks and river banks were shown when they defined a part of the boundary. Occasionally, surveyors added other features to their maps—sometimes apparently for reasons of amusement or vanity. Houses, roads, and topographic features appear on a small number of early property maps, and where these things are shown, they can be quite illuminating about early conditions and map making. For example, a map of the area around Hempstead Harbor (Figure 5.1) shows, in addition

to some topographic features, several European houses, along with a corral and three structures that are probably Indian wigwams.[24]

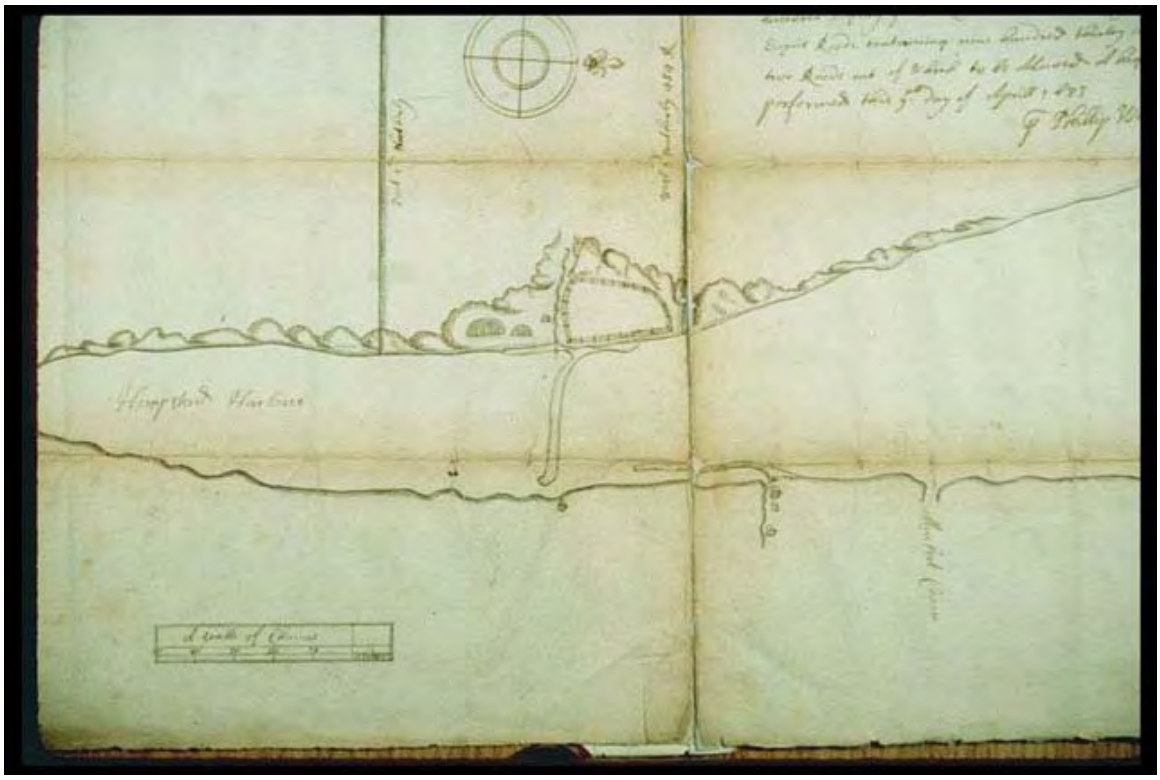

Figure 5.1. Philip Welles, “Draught of a Tract of Land Lying on the East Side of Cow Neck on Long Island,” 1683. New York State Archives.

But detailed property maps were scarce before 1720. Even large estates went completely unsurveyed for decades, although it is possible that some maps may have disappeared without any record of their existence. Rensselaerswick is a case in point. One of the largest and best established of the old manors, we have seen that it was mapped as early as 1632. But the next recorded map of Rensselaerswick does not appear to have been made until1767.[25] I have been able to identify only a handful of maps of land patents and manorial grants made prior to 1720. These include a 1685 map of Lloyd Neck on Long Island; a map of the Minisink Patent (Orange County) dating from around 1703; A map of the Rambout Patent (Dutchess County) dated 1693; and an exceptionally detailed map of Livingston Manor made in 1714 (Figure5.2).[26] As a rule, only later in the eighteenth century did maps of manorial grants become more common and show much detail, such as the location of houses and the names of individual homeowners. Of course, during this early period most of these manors were so sparsely settled that there was little in the way of human geography to show. In spite of their relative scarcity, maps of large estates are the most common form of property mapping in the early colonial period. The estate owners had enough money to pay for extensive surveys, and there is a certain sense of satisfaction to be obtained from contemplating one’s property on a map.

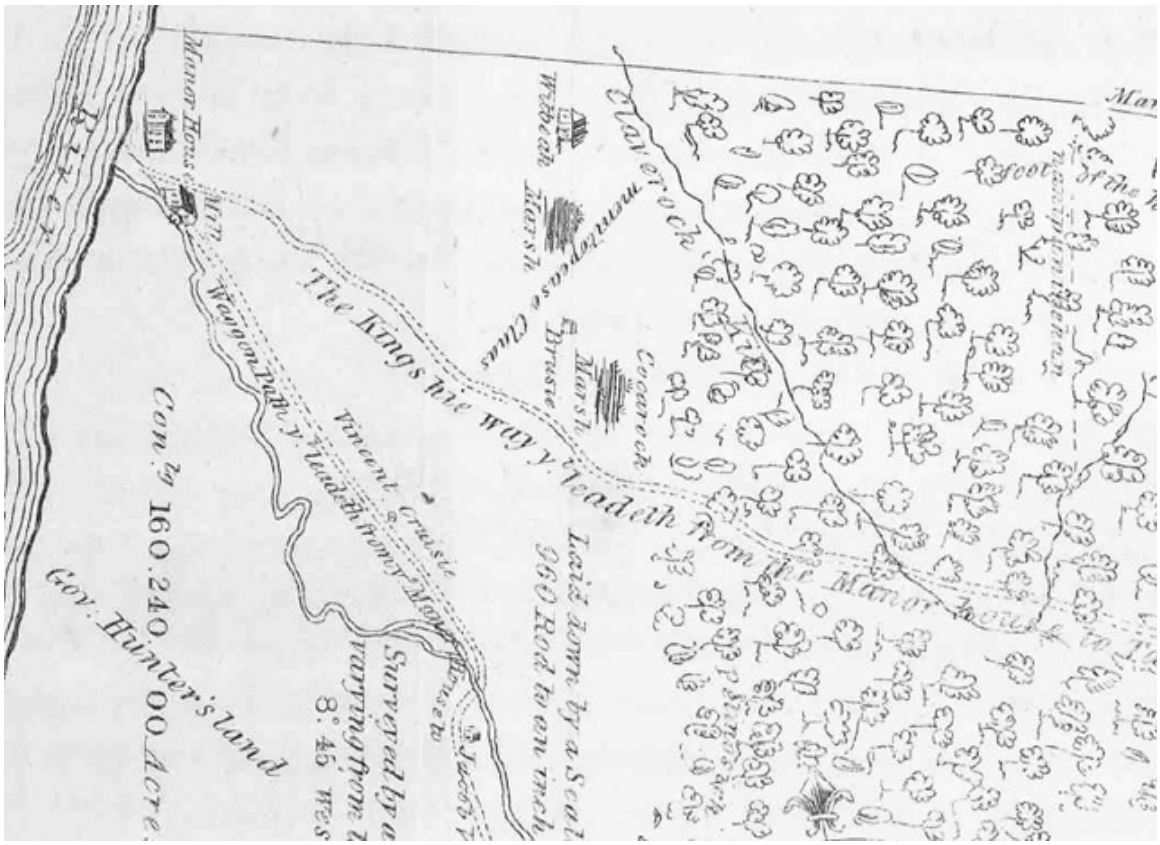

Figure 5.2. Detail of John Beatty, Map of Livingston Manor Anno 1714. Library of Congress, Geography and Map Division.

There are practically no early maps of land allotments for the townships on Long Island and elsewhere. Many maps turn up in libraries and archives showing property distributions in early towns, but almost all are reconstructions from the nineteenth and early twentieth centuries based on real estate records. There is good reason to suspect that landowners and town authorities deliberately avoided mapping their lands to facilitate tax evasion. Township dwellers were assessed taxes based on their land allotments, and, as a contemporary observer complained in 1681: “most of the patents granted in former Governors time make no mencôn of any Quantity of Acres, especially on Long Island, where most is granted in Towne shipps without Quit Rent or any other rent...” [27]

The period prior to 1720 also showed almost nothing in the way of detailed property mapping for the cities of New York and Albany. As we have seen, early maps of these cities were sometimes sufficiently detailed to show individual buildings and street grids, but there are very few examples of what we would describe as real property maps. One of the exceptions is a map dated 1696 by New York City Surveyor James Evetts entitled “A Map or Chart of a Certain Tract of Land Commonly Call’d the Shoemakers Land.”[28]

There are various reasons why there is such a poor showing of property maps during this period. The unsettled character of the land explains a lot, as does the wild and wooly character of life on the frontier (which then included most of modern New York). Another explanation for the dearth of maps is the previously mentioned shortage of skilled surveyors, combined with the expense of surveying. In the last half of the

seventeenth century, skilled surveyors were not completely lacking. In the 1670s, Jacques Corteljou and Robert Ryder were among the best surveyors of their time. Somewhat later, Phillip Welles (or Wells), who was Surveyor General of New York in the 1680s, was at least aware of such things as magnetic declination, and produced reasonably accurate surveys of limited areas, at least judging by his existing work (almost nothing is known about his life).[29] His successor, Augustus Graham, surveyor general from 1691(at the latest) to 1719, was apparently inefficient, and neglected to gather papers and make surveys. Lord Bellomont (admittedly not the most impartial judge of men) remarked of him: "he is a most profligate man, often drunk, and then his common exercise is to break glass windows and disturb all the town in the night."[30] When Cadwallader Colden later became surveyor general in 1720, he complained that there were no maps of any kind in Graham's office.

Land Policy, 1720-1776

From what was said in the first section of this chapter, it might be thought that all of the land in New York had been given away by the end of Cornbury's governorship. Indeed, in the first decades of the eighteenth century, contemporaries, including Governor Hunter and Cadwallader Colden, complained that practically all the land in the province had already been patented.[31] However, it turned out that there was still plenty of land to keep New York's real estate juggernaut rolling through the colonial period and beyond.

To begin with, the boundaries of most of the existing patents were so poorly defined that speculators, politicians, lawyers, and surveyors could keep themselves profitably employed by attempting to snatch pieces of these grants. Furthermore, several of the large patents were completely or partially disallowed (including the Evans, Dellius, Bayard, and Kayaderoseras patents). These lands were thus once again thrown open for distribution. As the eighteenth century progressed, at least some of the large landowners started to sell off portions of their holdings to settlers or to other speculators. Last but not least, land continued to become available on New York's frontiers. The frontier areas included lands disputed between New York and other colonies, as well as Indian lands around the Mohawk River. After the end of the French and Indian War in 1760, vast tracts of land became available in northern New York, including parts of the Adirondacks, the lands around the headwaters of the Susquehanna River, and the land around Lake Champlain. The land available for distribution included all of modern Vermont, which was disputed between New York and New Hampshire.

On the whole, it can be said that land grabbing took place in somewhat more seemly fashion in the latter part of the colonial period. Most of the royal governors after Lord Cornbury were not as lavish in their grant giving or as blatant in their corruption as some of their predecessors had been, but there were several colorful exceptions. The powerful relatives of Governor George Clinton (1743-1753) reputedly secured him the governorship of New York to keep him from being thrown into debtor's prison, and he attempted to use his position to reestablish his fortune.[32] One of his predecessors, William Cosby (1732-1736), reputedly decided that his fair share of graft should be one-third of all of the land he granted.[33]. Individuals like Sir William Johnson (1715-1774) and Robert Livingston of Clermont (1688-1775) showed great talent in accumulating

estates totaling hundreds of thousands of acres. Even the self-righteous Cadwallader Colden and lesser figures like the surveyor William Cockburn managed to acquire sizable amounts of property, often in ways that today would be considered more than dubious.[34] Real estate remained the path to wealth and prestige for established gentry and aspiring gentlemen.

During this period, most major land purchases were made for speculative purposes, often with the intention of eventually reselling the land to individual farmers, rather than establishing quasi-feudal estates with tenants. Larger purchases were usually made by consortia to comply with the requirement that no one person could buy more than 1000 or 2000 acres. Occasionally these consortia consisted primarily of "dummy" partners, who quickly ceded their land to a single owner. In most cases, partnerships seem to have been designed as a means to reduce the individual cost of surveying and other fees. When land was purchased by groups of investors, it was not divided among the purchasers, but held in common by the entire group. All shareholders had to agree before any of the land could be sold, which inhibited land improvement and the sale of individual farms until a more flexible policy was gradually adopted toward the end of the colonial period.[35]

Increasingly after 1720, land grants were better surveyed, and the surveys were better recorded—leading eventually to better maps. Cadwallader Colden had much to do with this, though his efforts were in part a reflection of policies emanating from London. Before going on to describe these policies and the resulting maps, it would be well to summarize the major land grants made in the period between 1710 and 1775.[36]

The first decades of the eighteenth century saw the extension of settlement to the Mohawk Valley area. This process proceeded in piecemeal fashion in part because of the necessity of conciliating the Mohawk Indians, and much of this land was granted in fairly small parcels. A critical event in the settlement of the area beyond Schenectady was the foundation of Fort Hunter in 1712 at mouth of Schoharie River. This encouraged settlement to the west along the Mohawk River, and also in the Schoharie and (eventually) Cherry valleys south of the river. Many Germans from the Palatinate settled in the vicinity of the Mohawk River. However, settlement was not extensive in these areas until after the American Revolution because of the danger of attack from the French and their Indian allies (and later from the British and Indians during the Revolution).

Orange and Ulster counties, on the west side of the Hudson, also were divided up into smaller grants and individual holdings during the 1720s. This was made possible in part by the disavowal of the Evans Patent. This region became an important area for independent farming in the colonial period, although here, too, settlement to the north and west was inhibited by the threats posed by the French and Indians.[37]

Not all of the land patents issued during this period were for individual farms. Even in the Mohawk Valley, several patents were issued to speculators involving sizable tracts of land. Most of these patents were, at least on paper, made to multiple individuals. They included the Morris Patent at Canajoharie (about 12,0000 acres in 1722-23), the Stone Arabia Patent (12,000 acres in 1723), and Cosby Manor (about 42,000 acres granted to Governor Cosby in 1734 through a particularly elaborate piece of chicanery). During this period, Colden's friend and correspondent, Sir William Johnson, began his career as a land magnate. He used a variety of devices to accumulate land, relying on wealth from the fur trade and his friendship with Indians. The Stevens purchase (1753) was one of Johnson's most spectacular coups. To get around the prohibition on granting more than

1000 acres of land to a single individual, he set up a dummy “partnership” of twenty people to purchase 20,000 acres of land from the Indians. According to James Flexner, a biographer of Johnson, Governor Clinton “was secretly assigned a sixth share in the land which, after he had shepherded the grant through his council, he sold back to Johnson for Ł213. The ostensible patentees were given presents and a fine party during which they signed over all their rights.”[38] Johnson eventually managed to put together estates totaling more than one million acres in the Mohawk Valley area. Another of Johnson’s more remarkable acquisitions involved his maneuvering to evade the restriction on large purchases by obtaining from his Indian friends a free “gift” of about 100,000 acres, to which he responded by giving cash and expensive presents in return. Although the legality of this gift was questioned by Colden and others, the land was finally bestowed upon Johnson in 1769 as a personal present from the king in return for an annual quit-rent of two beaver skins.[39]

Other large patents made between 1720 and the French and Indian War include the Oblong Patent along the border with Connecticut (50,000 acres in 1731), Lindsley’s Patent (about 11,000 acres in Otsego County in 1738 and 1741), and the Northampton Patent (6000 acres, northwest of the disputed Kayaderosseras Patent in 1741).

These grants were dwarfed by the flood of new lands opened up after the conclusion of the French and Indian War. With the conclusion of peace, most of northern and eastern New York became available for settlement, although western New York was made off limits for settlement by the Indian line, which was adopted by royal proclamation in 1763. More will be said about this Indian line below.

After 1760, much of the newly available land was granted to veterans of the French and Indian War. Typically, officers received vastly larger grants than enlisted men. In some cases, it was expected that officers would set themselves up as manorial lords and lease land to former soldiers. Among the largest of these new grants were the Provincial and Artillery Patents, which were made between the Hudson River and Lake George. According to Higgens: “The first contained twenty-six thousand acres for William Cockroft and twenty-five commissioned officers of the New York Infantry, and the other embraced twenty-four thousand acres for Joseph Walton and twenty-three officers of the New York Artillery forces.” [40]

The largest grant to the east of Lake Champlain was the Skene Patent (25,000 acres in 1765). This patent was made to Major Philip Skene, and was supplemented by the “Skene Little Patent” of 9000 acres in 1769.

During this period, numerous grants were also made in the area around headwaters of the Delaware and Susquehanna Rivers. George Croghan, an Indian trader and associate of William Johnson, accumulated around 250,000 acres of land in the vicinity of Lake Oswego by 1770. After the Revolution, some of this land came into the possession of William Cooper. Like Cooper after him, Croghan was interested in developing his land and selling it to individual farmers. In 1770, Sir William Johnson added to his holdings in this area through the acquisition of the 54,000 acre Susquehanna and Charlotte River patents.

The largest of the patents issued between 1760 and 1775 is the inadequately researched Totten and Crossfield Purchase (1772). This patent consisted of some 800,000 acres in the southern Adirondacks, and was made in the name of two shipwrights, Joseph Totten and Stephen Crossfield. These two seem to have been front men for one Ebenezer

Jessup, a real estate speculator who headed a consortium of investors that intended to resell this land. The land was surveyed into rectangular townships, but the project had to be abandoned during the American Revolution. This patent is of particular interest because it prefigures some of the land policies followed after the Revolution—both through the wholesale purchase of huge tracts of land by speculators for resale to settlers, and through the use of a rectangular survey system.[41]

Most of the large land acquisitions after 1760 were made by royal officials or former military officers. In contrast to many of the older estate owners in the Hudson Valley region, most of these new land magnates maintained their loyalty to the crown during the American Revolution. Consequently, their land was seized during the Revolution, and it once again became available for purchase and sale.

Land Mapping, 1720-1775

The British government during the decades after 1720 tried to gain control over New York's chaotic land system. Both the Board of Trade and several colonial governors attempted to reform abuses and collect quit rents. Although some progress was made, attempts at reform stirred up opposition from landowners and from some governors, who (as we have seen) continued to use land grants to enrich themselves and reward their friends. Nonetheless, by the time of the American Revolution, property mapping in New York had greatly improved.

The man most closely associated with the reform efforts was our old acquaintance Cadwallader Colden, New York's long-term surveyor general. We have seen that Colden was an unusually energetic and intelligent official, who was not afraid of controversy. Colden consistently argued throughout his long career that the large estates were inhibiting the settlement of New York, undermining the political power of the crown, and preventing the collection of quit rents. He and other royal officials saw quit rents as a way of financing the provincial government—thus making it independent of appropriations from the troublesome provincial Assembly.

Although Colden—rather like Governors Andros and Bellomont before him—can be described as a royalist reformer, he was not entirely disinterested. Colden received much of his income from surveying fees and from collecting quit rents. It therefore comes as no surprise that the he favored land policies that facilitated the collection of quit rents, and which also required extensive fee-producing surveys. There were still numerous possibilities for nepotism and graft in the system, and Colden took advantage of some of them, although he avoided the most outrageous excesses. Colden and his family dabbled in land speculation and become moderately large landowners, with parcels of land scattered throughout New York. His largest holding was a 3000 acre estate in Ulster County, which he called Coldengham, where he lived with his family and up to six slaves. Like many others, he combined a sincere belief in reform with a healthy sense of self-interest.[42]

When Colden took up his position in 1720, the surveyor general's office was apparently in a state of chaos. As previously noted, Colden later claimed that he could not find a single map or survey record in the office.[43] Much of his career was spent in trying to create accurate surveys and land maps of the province. Over a period of more than fifty years, Colden and other royal officials made considerable progress toward

realizing these goals. Although huge land grants continued to be made, their boundaries were better defined, and the number of overlapping grants was reduced. Colden believed that the creation a detailed land map of the entire province was critical to his efforts, remarking with impressively awkward syntax: "...without a good Map of this Province the Crown could not be truely informed of the nature of the Grants made by former Governors that without such Map no compleat rent roll could be formed nor could it be known that any rent roll is compleat nor without such Map could the officer collect the Quitrents effectually."[44]

As early as 1722, the Board of Trade received two memorials from Colden outlining the problems with land grants, and calling for the more effective collection of quit rents. Colden repeated the same basic positions in numerous documents that he prepared throughout his career.[45] The main argument he made to his superiors and the Board of Trade was that accurate records and maps were essential for the collection of His Majesty's quit rents, which could then be used to make the provincial government more independent of the evil designs of the New York Assembly. He also believed that the collection of quit rents would force the break up of large uncultivated estates—thereby encouraging the settlement of the colony by small farmers. As has already been seen, these were controversial subjects, and it appears that British officialdom's preoccupation with collecting fees and quit rents was itself a major cause of the lack of settlement that Colden and others denounced. The blunt and outspoken way in which Colden handled these issues was bound to stir up a hornet's nest of opposition, and it did. Colden's vision of a colony run for the public good by a smoothly functioning royalist bureaucracy was unpopular with just about everybody except other royal officials. As early as 1744, the provincial Assembly passed a resolution declaring him "an enemy to the colony."[46], and this was long before he became involved in enforcing such unpopular measures as the Stamp Act and the tea tax.

Colden was equally persistent in his efforts to map New York's large estates. His important manuscript map of New York, dating from around 1726, has already been mentioned. The main purpose of this map was to inform the Board of Trade of the need to reform the land and quit rent system. Colden must have been referring to this map—or to another very much like it—in his memorial to the Lords of Trade dated December 4, 1726, when he wrote: "...the far greatest part of the lands in this Province are now in the hands of a few persons paying trifling Quit Rents as will more fully appear by a Map of this Province which I am preparing by the Governor's Order for their Lords...."[47] On this map, Colden delineated many of the large estates, and wrote down the amount of quit rent they were paying. For example, his annotation for Rensselaerswyck reads: "The Manor of Renslaerwyck granted to Kilian van Renselaer in the year 1685 containing about 1770 square miles or 113200 acres paying 50 bushels of wheat yearly and confirmed in 1704."

Colden's efforts to produce a better map of New York and neighboring provinces were defeated by the lack of careful surveys of many large estates, and by political opposition. According to Colden, he was paid a salary out of the quit rents "to make extracts of the boundaries and of the Quit rent reserved of all the Grants on Record in the Secretaries office," but was forced to give up this project after he had finished the extracts for grants made prior to 1708. The funding for this project was stopped, Colden claimed (probably correctly), through political intrigue in London by one of his

landholding enemies.[48] The map that Colden showed Lewis Evans around the middle of the 1740s does not appear to have been greatly different from his map of 1726. From the 1720s through the 1740s, Colden confined himself to surveying smaller tracts of land—mostly in the Hudson Valley—and to surveying areas that were in dispute between New York and neighboring colonies. The most significant map he produced during this period was of the "the Oblong," which was the disputed slice of land along the Connecticut border that was supposed to provide compensation to New York for the loss to Connecticut of a wedge of land along the coast of Long Island Sound. This map, which must have been made shortly after the boundary was settled in 1731, shows land allotments in the area, including several to Colden himself.[49]

As the eighteenth century progressed and wealth increased in the British colonies, there was a gradual improvement in the amount and quality of surveying. One indication of this is the establishment in New York City, in 1730, of the first shop dealing primarily in surveying and navigational instruments. This was Anthony Lamb's "At the Sign of the Compass and Quadrant." Lamb's shop was located on the waterfront, and much of his business seems to have been in making and repairing navigational instruments for ship captains. He also sold chains and compasses for surveying, as well as a variety of other things useful to surveyors and mapmakers. He supplemented his income by making and selling a colorful miscellany of products, including German flutes, billiard balls, and false teeth. He seems to have prospered and stayed in business until the Revolution (which he supported).[50]

By the 1740s Colden was paying increased attention to the technical problems of surveying. In 1740/41, he was engaged in correspondence with his agent in London about the possibility of creating an improved quadrant for use by American surveyors.[51]. Two years later, he was writing to his close friend and counterpart in New Jersey, James Alexander (1691-1756), about the problem of determining the magnetic variation of the compass. At this time he also ordered an improved surveyor's compass (circumferentor) from the London instrument maker Sisson, and when Alexander heard about it, he also ordered one for use in New Jersey.[52] Very likely, Colden also tried to improve the standards of surveyors working under his supervision. Although almost nothing has been published about the internal workings of the surveyor general's office in colonial New York, we know that Alexander issued a set of instructions for surveyors in East and West New Jersey around 1746. These *General Instructions* still exist. Given the close relationship between Alexander and Colden, it seems likely that similar procedures were followed in New York.[53]

Alexander's *General Instructions* did not, to put it mildly, call for a high level of technical expertise on the part of surveyors. They included such basic instructions as to check the length of the chain and "forget not the scale." They basically called for surveying by chain and compass, but required that the surveys be conducted carefully and be reported in a uniform manner. Alexander stated his concern that the starting point of a survey be clearly ascertained, and expressed by its relationship to the boundaries of an existing survey or, failing that, "from the meeting of Brooks, from Rocks, or some other remarkable Thing, that there may remain the least Uncertainty that is possible of the Situation of the Tract surveyed." Approximately half of Alexander's instructions dealt with the variation of the compass. Alexander was very much aware that the direction of north varied somewhat in different parts of New Jersey, and that it changed through time.

Accordingly, his instructions included procedures for determining the variation of the compass, and he urged surveyors to observe once a year the variation in the county where they worked, and to forward the results to his office. These procedures were still far from perfect, since they did not address variations caused by such local phenomena as bodies of iron ore. Still, although Alexander's instructions were undemanding, they did ensure, insofar as they were followed, relatively accurate surveys in comparison to the chaos that had prevailed at the beginning of the eighteenth century.

In spite of efforts similar to those followed by Alexander, Colden made little progress in mapping New York until after the French and Indian War. Colden described the difficulties of his situation in a revealing letter he wrote to James Cuningham (aide-de-camp of Lord Loudoun) at the end of 1756. (Loudoun was commander of the British forces in North America during the early years of the French and Indian War; he had apparently requested from Colden a detailed map of New York.) A portion of this letter was quoted earlier, in which Colden complained about the lack of support from the crown for his proposed mapping activities, and about the need for a good map of New York to facilitate the collection of quit rents. In this same letter he remarked: "What Surveys we have are in parts of the Country distant from each another in detached pieces which it was impossible for me to join or to lay doun in their proper places on one general Map of the Province…."[54] Writing from his Orange County estate, he added that what maps he once had were now in the New York office of his son, and that he had only a few maps of the local area on hand. (Said son, Alexander Colden, had been made responsible in 1754 for the "execution" of the duties of surveyor general, while Cadwallader continued to collect his salary!) Colden did, however, send Loudoun a copy of a fairly detailed map he had made of a large area of Orange and southeastern Ulster counties.[55] This map, which shows the houses of individual settlers, includes an annotation observing that most of the houses west of the Shawangunk Mountains had been "either burnt or destroyed" by raids of the French and Indians.

After about 1750, the British made a substantial, if ill-fated, effort to gain greater control over their North American colonies. This involved strengthening the army and the administrative bureaucracy, as well as trying to find ways to tax the colonies to pay for the enlarged establishment. Gaining control of the chaotic land situation in New York was an important part of this effort. As early as 1742, the Provincial Assembly was strong-armed to pass the first of a series of laws to facilitate the collection of quit rents.[56] In 1753, the Board of Trade sent detailed instructions to the new governor, Danvers Osborne, which dealt in part with land issues. Among other things, new efforts were made to reduce the size of land grants and to enforce the collection of quit rents.[57] Another bill to improve the collection of quit rents was passed by the Assembly in 1755, and in 1762 Colden, then Acting Governor, signed a culminating law entitled "An Act for the more Effectual Collecting of his majesty's Quit Rents in the Colony of New York."[58] This long piece of legislation, which elaborated on the earlier laws passed in 1742 and 1755, set out procedures for surveying and subdividing large estates. Two important clauses specified that the surveyor general or his deputy must survey the outlines of all land grants to be subdivided, and that maps be made showing the boundaries of every lot within each subdivision. It also required that copies of these maps and their field books be filed with both the local county supervisor and in the surveyor general's office.

This piece of legislation was a compromise, and Colden thought it much too weak, but the fact that it was passed at all by the provincial Assembly shows that Colden was not totally without allies.[59] It is true that most large landowners—including the Livingstons, the Schuylers, and the Van Rensselaers—viewed with foreboding his efforts to collect quit rents and limit the size of estates, and they resisted them where they could.[60] Their opposition to the extension of the royal prerogative helps explain why many of them became leaders of the American Revolution. However, Colden had a powerful ally in fellow Iroquois expert Sir William Johnson (1715-1774). Johnson exerted immense influence over both white settlers and Indians in the Mohawk Valley area. The reasons for the alliance between Colden and Johnson are complex, but they are rooted in their shared background as royal officials; their mutual animosity against the Kayaderosseras Patent and other dubious land grants (which frequently infringed on lands Johnson wanted to acquire, or which were claimed by his Iroquois allies); and on Johnsons' need for Colden's support for his own land grabbing schemes. Although there is little direct evidence, it appears that Johnson funded or otherwise supported many of the extensive surveys that were made of portions of northern New York in the 1760s and 1770s.[61] Other political notables supported Colden from time to time—either because they needed his help in land transactions, or because they found it expedient to ally with Colden against mutual adversaries. Finally, Colden had the potential of obtaining important support from smaller landowners and tenants, who might have benefited from the breakup of the large estates. He was not able to play this card successfully, but its existence may have caused his opponents to act with greater caution. Later, during the American Revolution, the British appealed to these groups with some success.

After 1760, the efforts of British officials to gain control over the land situation began to produce results. Materials compiled by Colden since the 1720s made it possible by 1765 to make a rent roll listing land grants by counties.[62] The collection of quit rents gradually improved, although the amount collected never approached what it should have been on paper. It has been estimated that in 1721, the amount collected was less than 400 pounds; by 1761 it had increased to 800 pounds.[63] Although small, this increase was enough to provide valuable aid to the royal government in its struggles to attain financial independence from the Assembly. In terms of cartographic output, the years between 1760 and 1775, saw the creation of a considerable number of manuscript maps outlining the boundaries of individual estates. These were eventually fitted together into composites showing groupings of estates in various regions. This process culminated in productions like Sauthier's *Chorographical Map of New York* (to be discussed below), which delineated the boundaries of all of the major estates in the province.

It is difficult to determine exactly how this sequence of maps came to be produced, or what Colden's exact role in this process was. During this period, Colden was no longer surveyor general, although in most of these years he was either lieutenant governor or acting governor. He must have exerted a good deal of influence on the surveyor general's office, both through his official positions, as well as through his sons Alexander and David, who successively held the title of surveyor general.[64] However, very little in the extensive correspondence of Colden during this period directly relates directly to the mapping of New York, or to the activities of the surveyor general's office. Peculiarly, there is very little documentary evidence of any kind—outside of the maps themselves—bearing on cartographic activity in New York during this period. However, there are a

number of bits of information that enable us to put together the outlines of what happened.

To begin with, New York's local surveyors were reinforced by outside help. A number of military map makers, who arrived during the French and Indian War, stayed on through these years, and into the period of the Revolutionary War. These included John Montresor and Samuel Holland, whose activities will be described in more detail in the following chapters. In addition, Claude Joseph Sauthier, who was trained as a surveyor in France, came to New York as the personal assistant of William Tryon, the last British governor of the province. Sauthier was also an architect and designer of landscape gardens, and he was employed primarily in those capacities when he was brought to America by Tryon, who was appointed governor of North Carolina in 1767.[65] The line between military and civilian surveying was not clear cut, and Sauthier himself served as a military surveyor during the American Revolution. These military and civilian officials were instructed by the Board of Trade to cooperate with the surveyor general's office in New York, and to at least some extent they did.[66] It is noteworthy that Sauthier's *Chorographical Map* includes a note stating that it is based on records in the land office (i.e. the surveyor general's office). Nonetheless, there is little in the correspondence or papers of these gentlemen concerning the nature and extent of their collaboration. There seems to have been some coolness in the relations between the military surveyors and their civilian counterparts, and at the very least, their collaboration was extremely loose.

It also appears that the staffing and training of the surveyor general's office was improved in these years. Again, this is more evident from the maps that were produced than from any written evidence. A large number of surveys can be found in the Land Papers after 1760 that are ascribed to Alexander Colden, who was surveyor general at that time, but we do not know whether he actually made these surveys, or (more likely) just approved them. Most of the actual estate mapping done between 1760 and 1775 was probably carried out by people who bore the title "deputy surveyor." This title had existed since the first years of British rule (Robert Ryder was one who bore it), but it is not clear what compensation, if any, was provided for deputy surveyors, or even how they acquired their office. In one case, we know from existing documentation that Alexander Colden appointed Thomas Valentine as deputy surveyor to help survey the line between Quebec and New York, and that his salary was paid by a grant from the legislature.[67] From the existing evidence, it appears that more commonly the deputy surveyors were unsalaried, and gained their income through surveying fees paid by landowners. This seems to have been the case even with Cadwallader Colden II, who was a deputy surveyor, and (unlike his brothers David and Alexander) never became a surveyor general.[68] Apparently, deputy surveyors served at the pleasure of the surveyor general. There is a strong indication of this in a preemptory note Cadwallader Colden sent to dismiss one of his deputies: "I have thought it proper to put an end to a Deputation to Survey lands formerly given you by me & I hereby revoke annull & make void all & every Deputation Power or Authority from me to you to Survey lands or to execute or do any part or branch of the Surveyor Generals office whatsoever."[69]

The names of three deputy surveyors frequently appear on maps of this period: Gerard Bancker (1740 - 1799), John R. Bleecker (1713 - 1800), and William Cockburn (before 1760 - 1804). Bleecker was a member of an important Dutch landowning family.

Active in the Albany area, he was consulted by Lewis Evans in constructing his *General Map of the Middle British Colonies*.[70] Bleecker's productions include the important map of Rensselaerswyck made in 1767, which is mentioned above, copies of which are widely available.[71] It is a careful survey, which is especially useful to historians and genealogists because it shows the owners of individual houses on the manor. This map is also notable as an illustration of the increasing sophistication of surveying techniques in eighteenth-century New York. It includes annotations along boundary lines, such as: "South 87˚ 30´ W. along the Old marked Trees as the Needle pointed in the Year 1765." This shows that the more competent surveyors in New York were by that time at least making precise directional measurements, and that they noted the variation of the compass over time.

Bancker was similarly engaged, mostly in upstate New York. He seems to have been hired to take on some responsibilities above and beyond those of an ordinary deputy surveyor. There exists a written agreement between David Colden and Gerard Bancker, which spells out his salary, and states that "said Gerard Bancker shall prepare all the Returns, and compile and make all the Maps which are necessary to be made in the Office of Surveyor General; That he shall examine all the Returns of Surveys made by Deputy Surveyors or others, which are received in the Office;…"[72]

William Cockburn was one of the most prolific and capable of the deputy surveyors at this time. Born in Scotland, he settled in the Kingston area in the 1760s. In addition to producing numerous maps, he begat five children, and members of his family were active in surveying and land speculation through the first half of the nineteenth century. One of his sons was also named William, and his maps are frequently confused with those of his father. The family papers, which are preserved in the New York State Archives, provide us with a glimpse of the activities of an eighteenth-century surveyor.[73] It is nonetheless hard to assess the extent of his work, since most of his maps are not listed in nationally available online catalogs, and they are scattered around in various archives, libraries, and historical societies. It appears that Cockburn made his living mainly from fees paid to him by landowners, rather than from any salary paid to him as a deputy surveyor.

Predictably, most of Cockburn's maps are of areas relatively near his Kingston home. His career spanned the American Revolution, and he managed the politically difficult transition from colonial surveyor to surveyor for New York State. Through the early years of the Revolution he carried out surveys for landowners of all political persuasions, and never committed himself to either side in the conflict.[74] He did a lot of surveying in and around the Hardenburgh Patent—often as an agent for the Livingstons. Many of his surveys are limited in extent, such as the map of a farm reproduced below, which is a typical example of his work (Figure 5.3).[75] He also produced a few impressive maps of larger areas.[76] All the while, he managed to accumulate substantial pieces of land in most of the areas he surveyed—often as partial payment for his work.

Figure 5.3. William Cockburn, "A Map of the Farm of Johannes & Myndert Dedricks on the Baverkill [*sic*]," 1774. New York State Archives.

During the final years of British rule, the many maps of individual land grants were brought together to form regional property maps covering large areas of New York. Cockburn himself was involved in this activity. Union College holds the original of an elaborate manuscript map produced by Cockburn in 1768 showing land holdings in most of northern New York.[77] In addition to the boundaries of the major land patents, it gives the names of their owners, although it does not include acreage or names of tenants. Like many other maps produced between the French and Indian War and the American Revolution, it shows grants of lands to military officers and soldiers east of Lake Champlain (in what is now Vermont). A similar map, covering a smaller area on the south side of the Mohawk River, is held by New York State Library (Figure 5.4).[78]

Figure 5.4. William Cockburn, Detail of “A Map of Sundrie Patents on the South Side the Mohawk River in the Counties of Albany & Troy” (1775). New York State Library.

In 1774, Cockburn produced a somewhat less detailed cadastral map of the entire province, which he unsuccessfully tried to publish. Cockburn issued several updated versions of this map at least as late as 1783. The 1780 edition contains an interesting note at the bottom: “Whereas this map has cost the compiler great labour and pains, as well as expence in collecting, reducing, and protracting the different patents in the State of New York; and whereas he proposes to make other improvements and corrections thereon, and publish the same by subscription, it is therefore hoped that the commissioners will not suffer copies of all or any part to be taken from it, but such as are requisit for the present business. State of New York 10th March 1780.”[79]

During the years preceding the Revolution, other mapmakers were also diligently surveying estates and producing similar regional collations. The New York Historical Society has an excellent collection of these cadastral maps, many of which are anonymous, and some of which are detailed and carefully drafted. One of the most elegant covers much of northern New York, focusing on the Mohawk River area.[80] In

addition to property boundaries, it shows some rivers, roads, Indian paths, Indian villages and other landmarks. Internal evidence indicates that it was probably prepared under the direction of either Sir William or Guy Johnson. Another map at the New York Historical Society provides an interesting illustration of the difficulties that map draftsmen had to overcome in compiling such maps from individual surveys, many of which were still far from perfect. This map, similar to the one above, was created in 1771 and signed by Augustine Prévoste, who according to a note on the map copied it "from an original of Guy Johnson Esqr."[81] This elegantly drafted map was unfinished with the center left blank. It appears that individual surveys were put together like pieces of a jigsaw puzzle, but that they had to be stretched and modified to make them fit together on a common scale. Apparently, as the cartographer moved to the center of the map, errors started to accumulate to such an extent that additional pieces could no longer be made to fit, and the work had to be abandoned.

In spite of such problems, and doubtless many other unresolved imperfections in individual maps, British cartographers in the decades before the Revolution did succeed in putting together detailed maps showing the boundaries of the major land grants in New York. In addition to Cockburn's efforts, Samuel Holland was involved in trying to create a property map of New York. We know that as early as 1757 Holland had put together a map of much of New York showing the boundaries of the major estates.[82] This map was destroyed in the 1911 fire at the New York State Library, but we can get some idea of its appearance from two maps of smaller areas that Holland created at that time, which probably were incorporated in the larger map, and from a map attributed to Charles Rivez, which will be discussed in the next chapter.[83] Although Holland was later to distinguish himself by his careful regional surveys of British North America, it appears that this 1757 map was a work of compilation based on earlier surveys. Holland also produced the first published map showing property divisions in New York in some detail. This is his map of *The Provinces of New York, and New Jersey* (1768), which shows major land holdings in Northern New York, including French land grants around Lake Champlain.[84]

The years immediately preceding the Revolution saw the production of even larger and more detailed cadastral maps of New York. There exists another anonymous manuscript map, dating from around 1775, which was sent to London and bears the title "A Plan of the Province of New York in North America for the Kings Most Excellent Majesty".[85] This huge map (approximately six by eight feet) is elegantly drafted and beautifully colored (as befits a map made for a king).

The last of this sequence of colonial property maps is Jean Claude Sauthier's *Chorographical map of the Province of New-York in North America* (Figures 5.5 and 5.6).[86] The manuscript of Sauthier's map seems to have been produced by the end of 1775. Unlike most of the property maps under discussion here, Sauthier's was actually published (in 1779). It has been reprinted several times, and it is by far the best known property map of eighteenth-century New York. Although it contains some errors and omits subdivisions of land grants and other smaller properties, it provides an excellent overview of the state of settlement of the province on the eve of the American Revolution. Note that, even at this time, the settled areas of New York had not progressed much beyond Long Island, the Hudson Valley, and the eastern part of the Mohawk Valley. Strategic lines of communication with Canada via the eastern Mohawk-Lake

Oneida corridor, and the Lake George-Lake Champlain corridor are shown as part of New York, but were basically unsettled. Western New York, which was ruled off limits for white settlers by the British government, is designated as “the territory of the Six Nations.” The boundaries of New York were still in the process of being settled. The long-disputed boundary line between New York and New Jersey is shown, and all of Vermont is shown as belonging to New York. County boundaries and the boundaries of most land grants made prior to the American Revolution are carefully depicted.

Figure 5.5 Jean Claude Sauthier, *Chorographical map of the Province of New-York in North America*, 1779. Library of Congress, Geography and Map Division.

Figure 5.6. Detail of Sauthier's *Chorographical Map* showing area around Mohawk River. Library of Congress, Geography and Map Division.

Given the immensity of the task and the strength of the political opposition to it, this map is a testimony to the persistence of Colden and his allies. It is a useful tool for historians and genealogists, and constitutes a fitting culmination for this part of our story. It should nonetheless be noted that the boundaries shown by Sauthier reflect the claims made by his employer (Governor Tryon) and his allies, and were often disputed by others. As historian Sara S. Gronim has observed: "In New York the representation of land in maps was never mistaken for the land itself. Maps were not understood as simply objective and uninflected reflections of territory, for the stakes in their representation were too obvious."[87]

Defining New York's Boundaries

New York's boundaries with other colonies remained partially undetermined throughout the colonial period, although considerable progress was made in defining them.[88] When the Duke of York took over the province in 1664, it included on paper all of New Jersey, Connecticut west of the Connecticut River, Martha's Vineyard, Nantucket Island, and the eastern Maine.[89] Almost immediately, New Jersey was spun off as a separate province, and most of what is now western Connecticut was early recognized as belonging to that colony. But for many years the governors of New York

remained responsible for Delaware, the islands south of Cape Cod, and eastern Maine. In 1681, the Delaware province was transferred to William Penn, but only in 1691 were Martha's Vineyard, Nantucket, and eastern Maine transferred to Massachusetts. For a brief period in 1688 and 1689, New York was officially part of the Dominion of New England. Even after 1700, New York's borders with New Jersey, Connecticut, Pennsylvania, and Massachusetts were unresolved. New York maintained a claim to what is now Vermont until after the American Revolution. And its borders to the North and West remained completely undetermined. Mapping both reflected this inchoate situation, and played an important part is determining New York's eventual boundaries.

Northern New York

Let us take a closer look at these individual areas, beginning with northern and western New York. There was, as has been seen, no agreement between Britain and France concerning the proper boundaries between their colonies in North America, and the boundary between New York and Quebec was not determined until after the conclusion of the French and Indian War. This boundary was determined by royal decree as running along the 45th parallel. It was surveyed as far as Lake Champlain in 1771-72 by Thomas Valentine, who represented New York, and John Collins (surveyor general of Quebec). Valentine died before the completion of the survey, and was replaced by Claude Joseph Sauthier, who drew a manuscript map delineating the eastern portion of this boundary, which can be found at the Library of Congress.[90] This boundary, known as the Collins-Valentine line, was found in the early nineteenth century to deviate as much as a mile both to the north and to the south from the true 45th parallel. These errors were the cause of much tension and negotiation between the United States and Britain, which will be touched upon in a later chapter, although finally in 1842 it was agreed the uncorrected Collins-Valentine line should serve as the final boundary between the United States and Canada. The errors in this important boundary are another illustration of the inability of even the best eighteenth century surveyors to measure latitudinal distances with precision.[91]

Western New York

New York's western boundaries were even more undefined. Most of central and western New York was still held by the Iroquois, although the British asserted a vague claim to sovereignty over the Iroquois based on a clause in the Treaty of Utrecht, and at times paraded this out to assert rightful ownership over all tribes that the Iroquois had ever conquered or forced into paying tribute. In theory, this gave New York a claim to large parts of Canada, and to much of the present United States between the Appalachian Mountains and the Mississippi River. In practice, New York maintained control only over such lands as had been purchased from the Natives (fraudulently or otherwise), and which could successfully be defended from attack in time of war. After the French and Indian War, a demarcation line was decreed by the Crown marking the westernmost boundary allowed for white settlements. This line can be found on some eighteenth-century maps.[92] Only after the American Revolution were the Iroquois sufficiently subdued to make it possible for New York to gain control of the area west of the Mohawk

Valley and Oswego. Even then, the new state had to deal with residual Indian claims and with Massachusetts' claim to much of this area based on its colonial charter.

Boundaries with Other Provinces

The boundaries between New York and the neighboring provinces of New Jersey, Pennsylvania, Connecticut, Massachusetts, and New Hampshire were actively disputed during the colonial era, but here some progress was made in negotiating solutions. It is appropriate that the subject of New York's boundaries should be discussed in the same chapter as New York's land policies, for the two subjects are closely related. Both involved the same basic underlying concept of land as something that can be "possessed" through a legal document, and whose limits can be defined through surveys and maps. The same individuals were often involved in surveying land grants and boundaries, and both were highlighted on British maps of the eighteenth century. Issues such as quit rents figured in imperial decision making regarding boundaries between provinces, as well as in promoting the surveying of land grants. During the period between 1763 and 1775, the imperial government, which was trying to assert its authority in a number of areas, was also active in attempting to resolve boundary disputes.

What is more, land grants were used as tools to assert control of New York's border areas. We have already seen that large grants of land were made in disputed areas in an effort to strengthen New York's claims, including border areas with Connecticut, Massachusetts, and New Jersey. Almost the entire state of Vermont also fits into this category. The situation along these borders was exacerbated by aggressive land owners who pushed their claims as far as possible across these uncertain boundaries. All of these areas were characterized by sporadic violence, which flared up intermittently for decades.

The political maneuvers surrounding some of these disputes were spectacularly complex, and generally make for tedious reading. Those who wish to explore this subject in depth can consult the works referenced in the footnotes of this section. For those interested primarily in interpreting what they see on maps, a brief summary will be presented here of the issues involved on each border, and something will be said about the involvement of surveyors and mapmakers in each case.

Connecticut: The boundary between New York and Connecticut was the first to come under serious dispute, and the first to be largely settled (1731). We have seen that boundary disputes between Connecticut and New Netherland dated back to around 1640, and that they were temporarily resolved when Connecticut worked out an arrangement with Peter Stuyvesant, whereby the Dutch practically gave up their claims to the Connecticut Valley and eastern Long Island to the New Englanders.

The situation was not improved by the English takeover in 1664. In that year, King Charles II decreed that the west bank of the Connecticut River should mark the boundary between New York and Connecticut, and also placed the Yankee settlements on eastern Long Island under New York's jurisdiction. This came as considerable shock to the people of Connecticut, since, as recently as 1662, the same king had decreed that Connecticut's western boundary should reach "to the South Sea" (i.e. the Pacific Ocean).

There ensued a period of negotiation and political maneuvering, in which New York tried to hammer out some kind of agreement with Connecticut. The King and his brother the Duke of York were adamant about keeping eastern Long Island as part of New York,

but agreed to allow Connecticut to retain most of its other settlements. The most intense and long-standing negotiations between the two colonies involved the border area on the mainland. As we have seen, early land grants were made in Westchester County by Governor Fletcher and others to strengthen New York's claims in this area. In the 1683, New York made a fragile agreement with Connecticut, which anticipated the final settlement, but this did not put an end to negotiations, which dragged on until 1731. In the final settlement, which was largely brokered by Cadwallader Colden, Connecticut obtained the small wedge of territory that juts into New York along Long Island Sound in exchange for a strip of "compensatory lands" running along the border further north. As previously mentioned, this strip, known as "The Oblong," was surveyed by Colden, who produced a detailed map of the area, which can be found at the New York Historical Society.[93] "The Oblong" appears on many colonial maps (see Figure 5.7), and the 1731 settlement essentially established New York's modern boundary with Connecticut, although a few small areas of contention between the two states persist to this day.[94]

Massachusetts: The issues involving the border between New York and Massachusetts were similar to those between New York and Connecticut, but they were not completely settled until after the Revolution. Like Connecticut, the charter of Massachusetts extended its western boundary to the Pacific Ocean, which gave it a theoretical claim to a large swath of New York. Massachusetts was more persistent and aggressive in pursuing its claims to western lands than its southern neighbor. For its part, New York interpreted its charter as setting its boundary with Massachusetts at the Connecticut River. Serious conflicts arose during the colonial period over a region extending from somewhat to the west of the present border to the Housatonic River Valley on the east. The most commonly proposed settlements involved extending the boundary between Connecticut and New York to the north, and drawing the boundary line twenty miles to the east of the Hudson River.

Most of this disputed area was included in the Westenhook Patent, or comprised lands claimed by Livingston Manor and Rensselaerswyck. The issue became a matter of serious contention in the eighteenth century when settlers from Massachusetts moved into the Housatonic River Valley and started to push to the west from there. At the same time, the Schuyler, Livingston ,and Rensselaer families tried to extend the boundaries of their lands as far to the east as possible, and to settle the contested lands with tenants. The result was a long period of low-level violence between Massachusetts settlers and the owners and tenants of the New York manors. Most of the alleged tenant "rebellions" on New York manors have been shown to be associated with this conflict, rather than to have been protests by oppressed tenants in New York. After much conflict and intricate negotiations, an approximation of the present boundary was reached by the Hartford Agreement in 1773, but this settlement was not officially adopted until after the American Revolution. Massachusetts' claim to lands reaching from "the west of New York" (wherever that might be) to the Pacific Ocean, remained unresolved prior to 1787.[95]

New Jersey: New Jersey was separated from New York in 1664, but boundary disputes between the two provinces began early on, and have continued to the present day. The Hudson River was supposed to mark the east-west boundary between New York and New Jersey, but it was disputed whether the boundary ran through the middle of the river or along the New Jersey waterfront, which left open to interpretation the possession

of Staten Island and the islands in the Hudson River. As recently as 1998, the U.S. Supreme Court awarded most of Ellis Island to New Jersey in opposition to the claims of New York State.[96]

The major dispute between the two provinces concerned New Jersey's northern boundary with New York, where conflicts arose that resembled those between New York and Massachusetts. When New Jersey was separated from New York, it is thought that the Duke of York consulted Visscher's 1656 map of New Netherland, and drew the boundary from a point 41 degrees north on the Hudson River to the northernmost branch of the Delaware River at a latitude of 41 degrees, forty minutes.[97] The problem was that there was no branch of the Delaware River anywhere near the place where it was shown on Visscher's map, and there was consequently much uncertainty about where the line actually should run. Governor Cornbury's grants in Orange and Ulster counties were intended in part to shore up New York's claims to areas that might be disputed by New Jersey.[98]

In 1719, an attempt was made to settle this dispute by appointing a commission headed by James Alexander (representing New Jersey) and Allane Jarrett (a New York surveyor). The two surveyors took sightings near an Indian village named Kasheton on a branch of the Delaware, which they established as being located at 41 degrees and 40 minutes. This should have settled the matter, but some New York landowners would have lost acreage by accepting this boundary, and Jarrett was persuaded to state that his observation should not be accepted because his surveying instrument was "imperfect." This story illustrates the extent to which conflicting interests and social consent played a role in establishing boundaries, as well as the difficulty of measuring precise latitudes in the early eighteenth century.[99]

The upshot of this situation was that several thousand acres remained in dispute between the two provinces from 1719 to 1769. Farmers in this area were called upon to pay taxes and to serve in the militias of both colonies. This retarded settlement in the area, and led to low-level border warfare, with magistrates arresting each other, barns being burned, innumerable threats issued, and even a few people killed. New York and New Jersey drew up a series of conflicting border claims, which were shown on several contemporary maps (see Figure 5.7). After much political intrigue and complicated maneuvering, the border was settled by a royal commission, which surveyed the boundary in 1769.[100]

Figure 5.7. Detail of Samuel Holland's *The Provinces of New York, and New Jersey* (1768?), showing the disputed border between New York and New Jersey and part of "the oblong" along the Connecticut border. Library of Congress, Geography and Map Division.

Pennsylvania: The boundary between New York and Pennsylvania lay far enough to the west so that there was relatively little conflict over the border in the colonial era, since this area had few European settlers. As was the case with New York's other neighbors, the boundary negotiations between New York and Pennsylvania were incredibly obscure and complex. In this case, they were complicated by Connecticut's claim to part of Pennsylvania on the basis of its "sea to sea" charter, which New York's negotiators were able to turn to their advantage. In the course of the eighteenth century a vague agreement emerged between the two colonies that the boundary should run along the forty-third parallel. Pennsylvania claimed the forty-third degree of latitude as its northern boundary, and this was generally accepted by New York in the Colonial period, even though it potentially excluded much of what is now the western part of the state. However, this latitude line was subject to two interpretations. Today, most people would assume that such boundary would run along the 43rd parallel, just as the boundary with Canada runs along the 45th. This boundary is shown on many colonial maps, including John Mitchell's 1755 map of eastern North America. However, New Yorkers and their allies ingeniously argued that the "43rd degree of latitude" actually begins at the 42nd parallel, where the present boundary with Pennsylvania lies, on the theory that any

latitude higher than 42 is part of the 43rd parallel. It was on the basis of this interpretation that, in 1774, New York and Pennsylvania agreed to survey a border starting at the point where the 42nd parallel crosses the Delaware River. A survey along these lines was commenced in 1775, but it was not completed because of the outbreak of the Revolutionary War. Only after the Revolution, was the border finally surveyed along the forty-second parallel.[101]

New Hampshire (Vermont): An area that included almost all of present-day Vermont was disputed between New York and New Hampshire. The conflicting claims were adjudicated by the King's Privy Council in 1764, which allotted the disputed lands to New York. The decision was based almost entirely on Colden's advice to Board of Trade. Colden did an effective job of selling New York's case to the Crown by promising lands to officers of the army, and by arguing (among other things) that New York would do a better job of collecting quit rents and administering the area for the Crown than the "republican" New Englanders. This decision was supposed to be definitive and final, and it explains why maps of the Province of New York in the later colonial period almost always include Vermont. In this case, the royal decision did not count for much, since Ethan Allen and other New England settlers in Vermont refused to accept it. Only after the Revolutionary War was Vermont constituted as a separate state.[102]

New York's Boundaries as Shown on General Maps

It should be noted New York's boundaries with other colonies frequently appear on general purpose maps depicting New York and neighboring states. The way in which maps depict these disputed boundaries can be revealing. They show the uncertainty surrounding New York's borders, and they served as propaganda for the political claims of various states. Because most of the maps published after 1750 were made by surveyors with connections to the military or to royal officials, they tended to reflect favorably on New York's claims (especially *vis à vis* New England, where the crown had less control over the provincial legislatures). But this was not always the case, and because the boundaries were sometimes colored in by hand, different copies of these maps sometimes show different boundaries.

John Mitchell's 1755 map of eastern North America, which will be considered in the following chapter, shows a boundary line between New York and New Jersey that favored the claims of New Jersey, and it came under attack for this reason.[103] As previously noted, it also shows the boundary between Pennsylvania and New York as running along the 43rd parallel. It describes New York's boundaries with Massachusetts and New Hampshire as disputed, but the hand coloring on at least some copies shows Vermont as belonging to New Hampshire. Mitchell was greatly concerned about the border disputes between New York and its neighbors, which he saw as distracting these colonies from their primary threat—the French.[104]

Both the 1749 and 1755 maps by Lewis Evans also showed the 1719 boundary between New York and New Jersey, and they were criticized for the same reason as the Mitchell map.[105] The hand coloring on different copies of the Evans' 1755 map at the Library of Congress show the boundary between New York and Pennsylvania as running along either the 42nd or the 43rd parallel.

In 1763 a map entitled *The British Governments in Nth. America: Laid Down Agreeable to the Proclamation of Octr. 7, 1763* was published in the influential *Gentleman's Magazine*. A simple black and white map, it provides a clear view of the location of colonial boundaries and of the Indian proclamation line.[106] Its author does not seem to have looked with favor on New York's claims, for it reduces the province to a minimal size.

After the 1764 proclamation granting Vermont to New York, most British maps depicted present-day Vermont as part of New York. We have seen that this was the case with Samuel Holland's 1768 *Map of the Provinces of New York and New Jersey*. As New York's claims to New Jersey had not yet been adjudicated (a process in which Holland was to play a prominent role), this map shows several possible boundaries between the two colonies, although it strongly highlights a line close to the one that was finally adopted. Holland's map also shows New York's boundary with Massachusetts somewhat to the east of the final settlement. Most of the boundaries shown on Sauthier's *Chorographical Map of the Province of New York* are close to the modern ones, although Vermont is still shown as belonging to New York, and western New York is described as "the Six Nations Indian Country."

Chapter 6
Maps of Colonial New York, 1750-1775

Regional Maps Depicting New York, 1750-1755

As remarked in the previous chapter, there was a turning point in the cartography of New York around 1750. From this time on, the British paid much closer attention to the administration of their North American colonies, and particularly to New York. One reason for the end of the benign neglect, which characterized the British colonial administration in the first part of the eighteenth century, may be the cumulative effect of the growth of the population and economies of the North American colonies. Another reason was the increasing military rivalry with France, caused in part by French efforts to consolidate their hold over the Ohio Valley, which led to the outbreak of the French and Indian War in 1754. After the conclusion of that war, British attention remained focused on their American colonies because of the Stamp Act crisis and the other troubles leading up to the American Revolution. The heightened involvement of the British political establishment and its army in American affairs led, as one would expect, to an increase in the production of maps, since they have such extensive administrative and military uses.

Because of the historical importance of the American Revolution, the mapping of New York between 1750 and 1800 has been intensively studied, and it is remarkably well documented. Particular attention should be drawn to the collection of online maps available from the Library of Congress through its American Memory Project. This collection includes over 2000 maps from this period, including many of New York, and it enables anyone with access to the World Wide Web to follow in considerable detail the mapping of New York during these formative years.

The year 1755 saw the publication of three landmark regional maps, which included all or much of New York: Lewis Evans, *A General Map of the Middle British Colonies*; John Mitchell, *A Map of the British and French Dominions in America*; and Thomas Jefferys, *A Map of the Most Inhabited Part of New England*. Taken together, they provide a good picture to the state of geographic knowledge of New York just prior to the outbreak of the French and Indian War. Both for New York and for the rest of eastern North America, they constitute a major improvement over Henry Popple's 1738 map of British North America.

The increasing involvement of the British establishment in the mapping of their North American colonies is reflected in the maps of Lewis Evans. As we saw in Chapter 4, Evans' important 1749 *Map of Pensilvania, New-Jersey, New-York and the Three Delaware Counties* was mainly based on his own explorations and on compilation from surveys taken by provincial officials like Colden. It was largely a domestic American product, in the sense that central British authorities like the Board of Trade and the army were not directly involved in its production.

Evans' 1755 map reflects the tensions leading up to the French and Indian War, and reveals the increasing involvement of the British army in the mapping of the American colonies. This *General Map of the Middle British Colonies* covers a larger area than his previous map, and concentrates on adding new information about the Ohio Valley and other frontier areas (Figure 6.1).[1] Evans himself explicitly acknowledged the importance of "the present Conjuncture of Affairs in America" in the preface to the

important analysis that he wrote to accompany this map. He explained that the map was published, in part, as a response to the construction of the French fortifications between Lake Erie and the Ohio River.[2] Evans' 1755 map also reflects work he performed in preparation for General Braddock's catastrophic expedition against Fort Duquesne (now Pittsburgh), which was the first large-scale battle of the French and Indian War.[3]

Figure 6.1. Detail showing New York State on Lewis Evans**,** *A General Map of the Middle British Colonies* (1755). Library of Congress, Geography and Map Division.

Evans' 1755 map adds relatively little information about New York to what can be found in his earlier work. Its scale is even smaller (1:2,270,000) than his map of 1749, and that limited the amount of detail he could include. He managed to correct some errors in the locations of several places, most notably Albany, but he introduced others at the same time.[4] Nonetheless, His treatment of the Hudson Valley and of the corridor between Albany and Montreal is quite good for a small-scale map. Evans also included parts of what is now northern and western New York that were not shown on his 1749 map, although much of this was copied from French sources. Western New York is shown as mostly empty, and only two of the Finger Lakes are depicted. In this area, Evans would have done better to have copied more extensively from the French! Evans' treatment of Long Island is also disappointing. Although the 1755 map includes all of Long Island, it is copied from a much inferior source than the one he used for his earlier work, and it is ultimately derived from Southack's depiction of the island.

The *Analysis* accompanying Evans' 1755 map is an important document for understanding colonial American cartography. It includes a table of latitudes, many of which Evans took himself. These are generally more accurate than those recorded by

Colden in 1738, especially those that Evans himself measured. Regarding latitudinal distances, he remarked: “Tho’ there have been many other Observations made in several Places, in the Settlements, I have always chosen to adjust their Situations by the actual Mensurations; because many of the Instruments yet used, are not sufficiently accurate to determine the Latitude of Places with Nicety.” He also calculated longitudinal distances by measurement from the longitudes established for Philadelphia, New York, and Boston. Evans stated explicitly that he relied for the measurements of distances on surveys made by chain, distinguishing between “mensurations” and “computations”: “We call nothing *Surveys* but actual Mensurations with a Chain, and the Course taken with a good Surveying Instrument. Courses with a Pocket Compass and computed Distances we call *Computations*.”[5]

Although Evans died in 1756, his map went through several later editions in various languages. Most were inferior pirated editions, but the 1776 edition published by Thomas Pownall contains significant improvements over Evans’ original. Pownall, who had worked with Evans on the 1755 map and *Analysis*, accompanied his edition with a revised *Topographical Description* of the area covered by the map. This description (with unpublished revisions dating from 1785) was edited and published in 1949, and constitutes a valuable compendium of information about British geographic knowledge and mapping activities in the decades prior to the Revolutionary War.[6]

Evans rival, John Mitchell (1711 - 1768), produced a *Map of the British and French Dominions in America*, which also appeared in 1755 (Figure 6.2).[7] One of the most important maps in American history, it is also the only map published by Mitchell, who was a man of many interests. Mitchell was born in Virginia and apparently was educated at the University of Edinburgh. He returned to Virginia in 1731, where he practiced medicine, before emigrating to England in 1746 for reasons of health.[8] He was briefly employed in London by the Board of Trade, and had access to the many manuscript and printed maps on file at the Board. As a medical doctor and an enthusiastic botanist, he was inevitably (given these interests) drawn into the circle of Cadwallader Colden, and, like Evans, he corresponded with Colden about the geography of New York.[9] But, unlike Evans, he made extensive use of French sources to fill in gaps in his information. The resulting synthesis of French and British sources was highly influential, and was reprinted numerous times in four languages. It had the imprimatur of the Board of Trade, and thus had a quasi-official status. It was used by officers in both the French and Indian War and the American Revolution. A later edition was used in determining the boundaries of the United States in the peace negotiations at the close of the Revolution, and it subsequently played a role in boundary negotiations between the United States and Britain.[10]

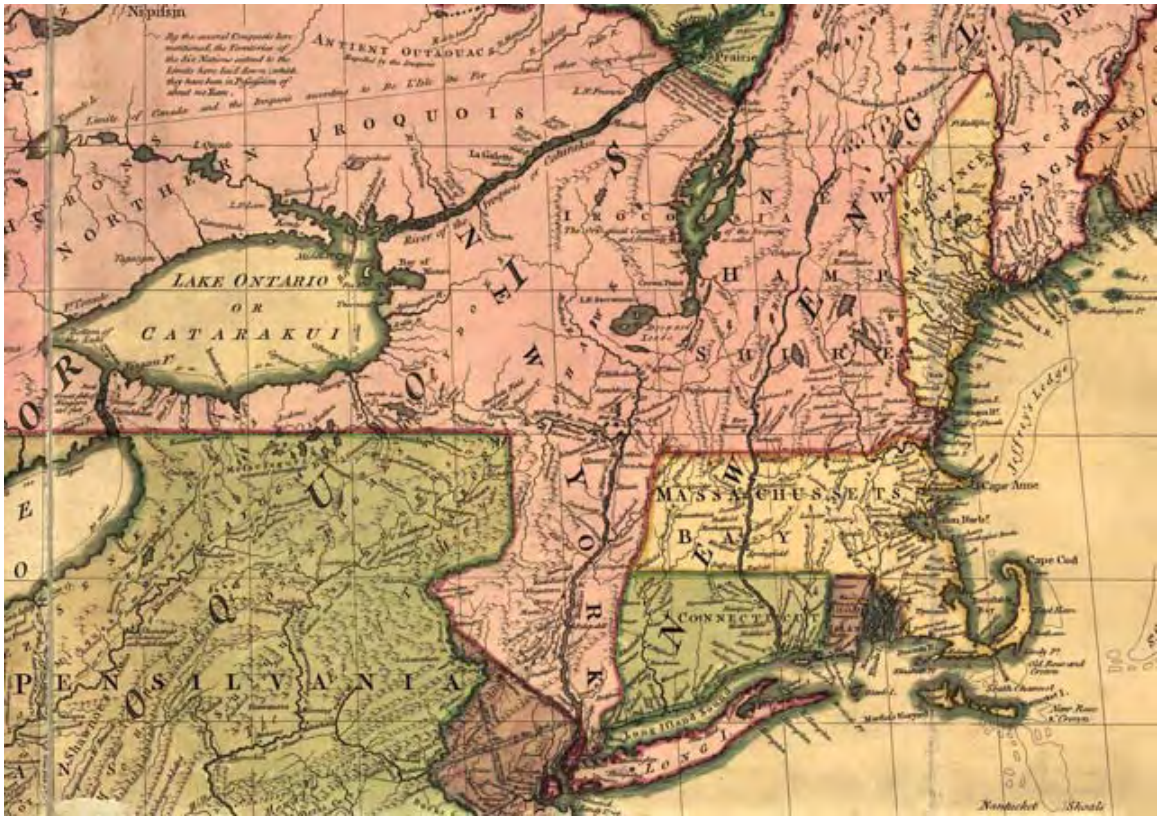

Figure 6.2. Detail showing New York of John Mitchell, *Map of the British and French Dominions in America* (1755). Library of Congress, Geography and Map Division.

It should be noted that, in spite of its reliance on French sources, the Mitchell map is an unabashed work of propaganda. It vigorously promoted British claims to the Ohio Valley, the area around Lake Champlain, and other parts of North America under dispute with the French. Mitchell's program for strengthening the British colonies at the expense of the French is spelled out in detail in his posthumously published *Contest in America Between Great Britain and France With Its Consequences and Importance* (1757).[11]

Mitchell's depiction of New York resembles that of Evans, but differs in several important respects. Mitchell's treatment of the topography and placement of towns in southern New York does not show the painstaking care evidenced in Evans' work. On the other hand, Mitchell relied on the maps of Bellin for his treatment of the area south of Lake Ontario, and his map shows considerably more detail in this area than that of Evans. Mitchell also received reasonably accurate distance measurements for the south shore of Lake Ontario and for the east shore of Lake Erie. These he reproduced on his map, and they helped him to present a fairly good picture of the proportions of western New York (a reoccurring problem on many eighteenth-century maps). In some cases, Mitchell did not copy wisely. His outline of Lake Ontario (derived directly from Bellin) is much more distorted than it is on Evans' map. And his depiction of Long Island is no better than that on Evans 1755 map—Mitchell also appears to have copied his depiction of Long Island

from Bellin, who in turn probably copied from a distorted and outdated chart by Cyprian Southack.[12]

A revealing study of the Mitchell map has been made by Lester J. Cappon and others in their *Atlas of Early American History*.[13] They have put together a deformation grid, which shows the extent of geographical divergence between the Mitchell map and a modern map of eastern North America. As one might expect, the grid shows that much of the Mitchell map is wildly inaccurate by modern standards, which helps explain why there was so much controversy concerning the interpretation of the map in establishing the boundaries between the United States and Canada. Interestingly enough, the portion of the Mitchell map covering New York is among the least distorted parts of it, which reflects rather well on his underlying sources.

The third of this trio of famous maps that appeared in 1755 is Thomas Jefferys' *Map of the Most Inhabited Part of New England* (Figure 6.3).[14] This map is mainly the work of Jefferys' assistant, Braddock Mead (alias John Green), but it will be referred to here as the work of Jefferys, following accepted usage.[15] Thomas Jefferys (died 1771) was England's best-known commercial map publisher around the middle of the eighteenth century. He specialized in North America, and published several other important maps, which will be discussed in this and the next chapter. Many of these works were also republished after his death by Robert Sayer (his former partner) in the classic *The American Atlas*, which was used by leaders on both sides of the American Revolution, and is a fabulously expensive favorite of map collectors.[16].

Figure 6.3. Detail of Thomas Jefferys, *Map of the Most Inhabited Part of New England* (1755). Library of Congress, Geography and Map Division.

In spite of his justified reputation for producing high-quality maps, Jefferys was a notorious cartographic pirate. He was known to reprint maps without crediting their authors; to attribute maps he published to well-known cartographers, who had nothing to do with them; and generally to produce maps of varying quality and dubious origins. To be fair, it should be pointed out that such practices were commonplace in the British map publishing industry prior to 1800, and were probably made inevitable by the under-capitalization of the business.[17] All things considered, Jefferys' maps were among the best produced in any country in the third quarter of the eighteenth century.

The Jefferys-Mead map of New England is one of his better productions, but its origins are particularly murky. Unlike most eighteenth century maps, it contains a list of sources. The sources for most of New York are described as follows: "Long Island, New York Harbor, and course of Hudson's River to Lydius or Nicholson's Fort, are laid down from very large and particular Surveys with that of Hazzen and others." This list is not very specific and, on examination, it turns out to be something of a red herring. Richard Hazzen was in fact active in surveying various parts of New England, including the boundary between New Hampshire and Massachusetts. However, it is well established that the bulk of the map was copied without credit from a little-known map of New England published at about the same time by the heirs of William Douglass.[18] However, this is not the end of our story, for the Douglass map does not extend very far into New York, while Jefferys shows New York as far west as the lands controlled by the Iroquois. What is more, his depiction of New York is considerably more detailed than that of Douglass in the areas where the two maps overlap. On the whole, Jefferys' depiction of New York is quite good. On close examination, it turns out that most of it was copied from Evans' 1749 map of Pennsylvania, New Jersey, and New York. In particular, the depiction of western and central Long Island on the two maps is very close, and the resemblance extends to the Hudson and Mohawk River Valleys. Most of Evans' careful rendering of the topography of the Hudson Highlands and the Taconic Mountains also finds its way onto Jefferys' map. In some places, Jefferys diverges for the worse from Evans—apparently as a result of copying errors. Still, there is also some information on Jefferys' map that cannot be found on Evans. Most notably, Jefferys includes a fairly accurate outline of eastern Long Island, which is missing on Evans' 1749 map. The origin of Jeffreys' depiction of Long Island is unknown, but it was copied on many subsequent maps. Jefferys also shows more roads than can be found on either the Evans or Mitchell maps.

One would like to know what additional source(s) Jefferys used. Contemporary writers like Colden and Pownell are silent on this subject, and I have been unable to identify with certainty the source of this supplementary information. Any information correcting or updating Evans would most likely have come from maps or surveys communicated to London by officials in New York (most likely Cadwallader Colden). As unpaid "Geographer to the King," Jefferys would have had access to maps at the Board of Trade and other government offices. One possible source is a map in the British Public Record office, which comes from the papers of the Board of Trade, and is dated provisionally ca. 1750.[19] This is a detailed and large-scale survey of the Province of New York, which is unfortunately missing many of its sheets, including the sheet depicting eastern Long Island. It resembles closely both the Jefferys map and several

subsequent surveys of New York made by the British military. If the 1750 date is correct, it may be an important source of all of these later maps, but it is puzzling that no contemporary evidence seems to exist for a survey of New York made at this time, and it may be that the map in the Public Record Office was actually made later in the 1750s.

Whatever the origins of the Jefferys map, it was quite influential. It owed much of its success to aesthetics and marketing. The relatively large scale of Jefferys' map (one inch to seven miles or 1:443,520) made it easier to read than the maps of Evans or Mitchell. In addition, Jefferys, unlike Evans, did not clutter his map with annotations or observations that would have been of little use to most readers. By concentrating on topography, roads and towns, and by presenting his information in a clean and uncluttered style, Jefferys produced a work that would have appealed to his primary user groups of colonial officials and military officers. It could easily be consulted in a meeting of several people looking for the location of a tract of land, or planning a military campaign. This helps explain why the Jefferys map was widely copied and used as a base for subsequent maps of New York. Its general framework was adapted and filled in by British military surveyors, who dominated the mapping of New York between the outbreak of the French and Indian War and the American Revolution.

Like the maps of Evans and Mitchell, the Jefferys-Green Map of New England went through several editions and reissues.[20] A version identified by Stevens and Tree as "second edition, 2nd issue" with an imprint date of 1755, but probably published in 1768, is of particular interest because it reflects the competition between New York and New Hampshire over what is now Vermont, and the royal decision of 1764 in favor of New York. The New Hampshire grants are colored in yellow, and a note is added reading: "Connecticut River is fixed by his Majesty in Council to be the bounds between New York and New Hampshire. The Townships coloured Yellow were granted by the Government of New Hampshire."[21] Essentially the same version of the map, now dated 1774, was published in *The American Atlas*. Later editions were brought out during the American Revolution by French and German publishers.

Overview of British Military Mapping, 1755-1775

The outbreak of the French and Indian War in 1754 marks the beginning of a new phase in the mapping of New York—one in which the most important surveying and map making activities were conducted by British military engineers. Prior to the French and Indian War, the British army was hardly involved in producing maps of New York. After the early works by Colonel Römer (discussed above in Chapter 4), the British military made practically no maps of any part of New York, not even during King George's War (1743-48). After 1755, on the other hand, the British military was heavily involved in mapping the province. New York continued to be the recipient of the cartographic skills of the British army until its withdrawal in 1783.

The cartographic activities of the British military establishment centered in the Corps of Engineers of the Royal Army, although many individual maps were made by other officers in the army and the navy.[22] Ironically, many of the maps made for the British army were produced by officers who were born and trained on the continent. As was noted above in the discussion of Colonel Römer, the officers who dominated the British army regarded map making and the other activities of the Engineers' Corps as unworthy

of their aristocratic selves. Thus, many of the military surveyors who played important roles in our story were either born on the continent, or came from émigré families. The continental origins of many of the surveyors working in New York are revealed by their names: Samuel Holland, Claude Joseph Sauthier, John Montresor, Bernard Romans, Bernard Ratzer, Francis Pfister, and Joseph Frederick Wallet Des Barres.

The cartographic activities of the British armed forces can be divided into three periods. The first is the French and Indian War and its immediate aftermath (1755-63). Following this is the period peace from 1764-1775, in which military surveyors were sometimes "borrowed" to work on civilian projects, including several major regional surveys. Finally, during the American Revolution, these wide-ranging surveys were abandoned, and the military cartographers were restricted mainly to producing such things as route maps and battle plans. Because of the widespread interest in the period of the American Revolution, the maps of this era are relatively well documented, and only an overview need be given here.[23]

Military Mapping, 1755-1763

In the Province of New York, the military activity of the French and Indian War focused on the border area between Albany and Canada. Most of the fighting (and the mapping) took place along the waterways of the region. Particularly important was the route from Albany to Montreal via Lake George and Lake Champlain. Also significant was the route from Albany to Oswego via the Mohawk River and Lake Oneida, as well as the route that followed the St. Lawrence River and Lake Ontario to Niagara Falls and the interior of the North American continent. Following the classification suggested by J.B. Harley, we can divide up the military maps of this area into three broad groups: fortification cartography, battle maps, and cartography of military movement.[24]

Maps and plans of fortifications were favorite subjects of both French and British military cartographers. The army engineers were in charge of building these fortifications, as well as of making plans of them, and maps of the areas around them. These were used by both besiegers and defenders of fortified places, and they also served as souvenirs for the participants in sieges, as well as items of interest to armchair strategists and others who followed military affairs. Best documented were the British and French fortresses strung along the line between Albany and Montreal—particularly Forts William Henry (later Fort George), Ticonderoga, and Crown Point, which occupied especially strategic positions. Forts William Henry and Ticonderoga were the scenes of major battles. The British fortification at Oswego and the French Fort Niagara, both of which were captured in the course of fighting, are also particularly well documented. But maps can be found of almost any place that was fortified, such as the British Fort Bull on the Mohawk River, and the small French fortification of La Presentation on the St. Lawrence River in northern New York.[25] The majority of these maps remained in manuscript through the eighteenth century, although many were later published by historians in the nineteenth and twentieth centuries.[26]

Because of their specialized nature, most of these fortification maps are of interest primarily to military historians and to military history buffs. However, some are of broader interest. This is particularly the case with maps of fortified cities, such as Albany and Schenectady, which often include streets and buildings, and consequently are of

interest to urban historians. In fact, almost all of the maps of Albany made during the colonial period were produced by military cartographers.[27] Some fortification maps also present considerable information about the region surrounding a fort. They may include such things as nearby topography, roads, dwellings, farms, and other matters of interest to students of local history and genealogy. Thus, the earliest maps that provide detailed information about the topography of the vicinity of Oswego or of Lake George Village are fortification maps. William Eyre's map of the vicinity of Fort William Henry is an excellent example of this type of map (Figure 6.4).[28]

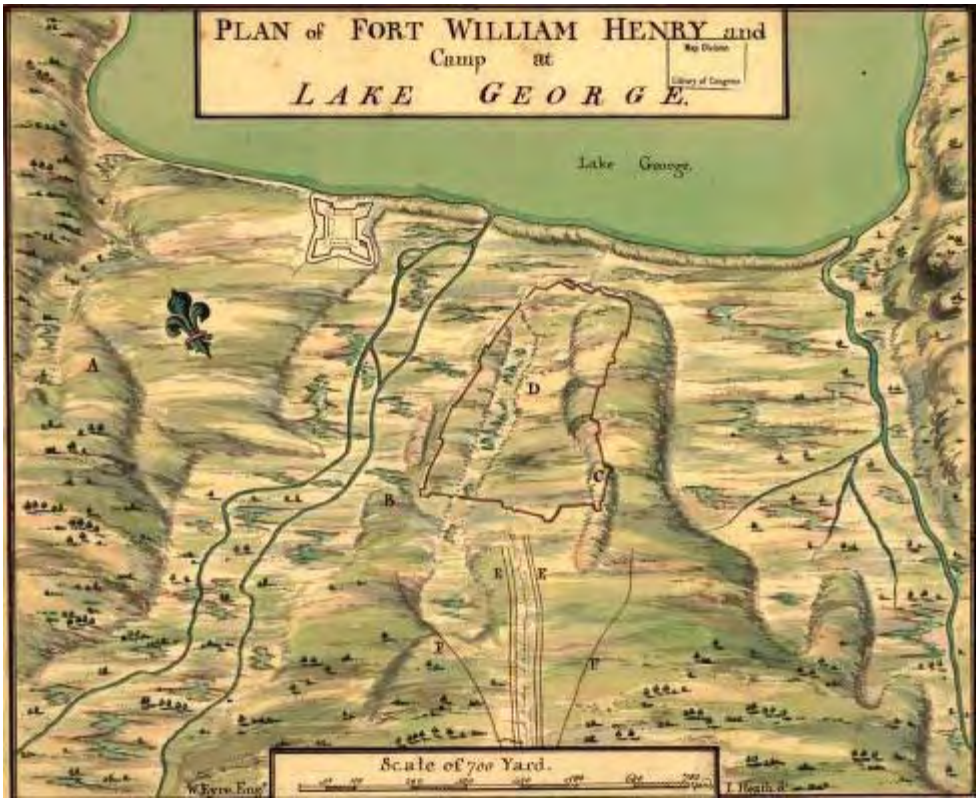

Figure 6.4. William Eyre and Joseph Heath, "Plan of Fort William Henry and Camp at Lake George" (1755?). Library of Congress, Geography and Map Division.

Maps that can be characterized as "battle plans," often overlap the category of fortification maps. Most battles fought during the French and Indian War were of one of two types: formal sieges of fortifications, or small raids conducted primarily by Indians and irregular troops against civilian targets (which might now be termed terrorist attacks). In a few cases, armies were ambushed while on the march to besiege fortifications (as was the case with Braddock in Pennsylvania, and the French general Dieskau in New York). These hit-and-run operations and ambushes, which did not involve the precision maneuvering of regiments and units of troops, did not lend themselves to mapping as well as the more formal sieges. Thus, most of the battle maps of the French and Indian War also depict fortifications. The characteristic feature of battle maps is that they also show the positions and movements of troops on opposing sides. A good example of this type of map, published by Thomas Jefferys, depicts General Abercrombie's effort to take

Fort Ticonderoga (Figure 6.5).[29] A more unusual map of this kind is Samuel Blodget's depiction of a battle fought near lake George, in which the English and Indians under Sir William Johnson "captivated" General Dieskau.[30] This engaging birds-eye view, which can be viewed on the Web site of the Massachusetts Historical Society, combines elements of military cartography with naive art.

Figure 6.5. Thomas Jefferys, *A Plan of the Town and Fort of Carillon* (1768). New York State Library.

The category of "maps of military movement" is something of a catch-all, which includes all maps that were designed to aid the positioning and transportation of military forces. Maps fitting into this category include reconnaissance sketches, route maps, regional topographic maps, and even maps of the entire province showing rivers, roads, and fortifications.

A number of manuscript reconnaissance maps have come down to us from the French and Indian War. Sometimes these are crude sketches drawn by officers on foot or horseback without the aid of surveying or drafting instruments. Such maps are often of particular interest because of their immediacy: they can convey a strong sense of how the war actually unfolded before the eyes of its participants. Even the breathless title of a map by Robert Rogers (of Rogers Rangers) speaks volumes: "S[i]r: This is minuts of the fort at Crown Point and of the redouts built round it; which I took on the mountain to the

west of Crown Point abt. a miles distance."[31] Another type of reconnaissance map is exemplified by a survey drawn around 1760 by Francis Pfister (ca. 1740-1777), a talented but little-known mapmaker. Born in Germany as Franz Joseph Pfister, he was a military engineer in the Sixtieth Royal American Regiment, which housed many of the foreign-born cartographers that served in New York. After the conclusion of the war, he maintained his army connections, and grew wealthy by obtaining the carrying rights around Niagara Falls. After the outbreak of the Revolution, he helped organize a battalion of loyalists, and died at the Battle of Bennington.[32]

The map under consideration here is a field survey "taken by the order of His Excelency General Amherst" of "Cannada Creek." This Canada Creek is a tributary that flows into Wood Creek between Fort Stanwix and Lake Oneida, not the better-known Canada Creek, which flows into the Mohawk River further east. Pfister was unusually explicit about how he surveyed this carefully drawn map: "All the turns are taken with an Instrument [probably a surveyor's compass] & the Distances by Paces." Drawn at a scale of 350 "large paces" to an inch, it provides considerable information about the topography along the twisting creek, including such details as swamps, hills, meadows, beaver dams, and an "old Indian hot [i.e. hut]."[33] Pfister's map appears to be the earliest detailed depiction of this particular piece of land. Where they exist, such maps can provide valuable historical information about landscapes that may look very different today.

Some reconnaissance maps are so carefully done that they almost fall into the category of topographical surveys. A good example is a drawing by Capt. James Montresor (the father of the better-known John Montresor), which shows the region between Fort Ticonderoga and Fort Edward. This map, which is available online from the Library of Congress, provides a vivid picture of the roads, streams, fortifications, and troop positions at the time of Montcalm's successful attack on Fort William Henry in 1757 (Figure 6.6).[34]

Figure 6.6. James Gabriel Montresor, [Plan of the Attack on Fort William Henry and Ticonderoga, 1757?]. Library of Congress, Geography and Map Division.

Regional topographic maps cover broader areas, and therefore are generally of wider interest. Almost all of them from the French and Indian War cover the area north of Albany, where most of the fighting took place. An informative map of this type has been given the descriptive title “Map of the Northern Parts of New York” by the Library of Congress, which has made it available online as part of its American Memory Project.[35] This anonymous map covers both the Mohawk River Valley and the Hudson Valley as far north as Glens Falls. Like most military maps, it is at a standardized scale (2 miles to an inch or 1:126,720), and depicts such things as rivers, fortifications, and roads, as well as such practical information as the locations of rapids and portages. Like some other detailed military maps, it also shows the location of individual houses, along with the names of some homeowners, and other descriptive information (including the number of inhabitants in individual villages).

Many of these maps focused on one or both of the strategic routes from Albany to Oswego, or from Albany to Montreal. A good overview of the Albany-Oswego corridor is provided by a carefully finished, colored manuscript map, which is also available online from the Library of Congress.[36] The polished appearance of this map is somewhat deceptive—as is frequently the case with military maps of this period—since it is not particularly well surveyed or rich in information. It was primarily intended to serve as a route guide, as is indicated by an accompanying table of distances. An impressive number of maps of this corridor were produced during the French and Indian War. The most detailed and carefully drawn of these appears to be an anonymous manuscript map housed at the Clements Library.[37] Others are listed (and some reproduced) in a valuable online project produced by the New York State Museum.[38] A detailed map of this area from the period of the French and Indian War was later engraved by Thomas Kitchin and published in 1772 (Figure 6.7).[39]

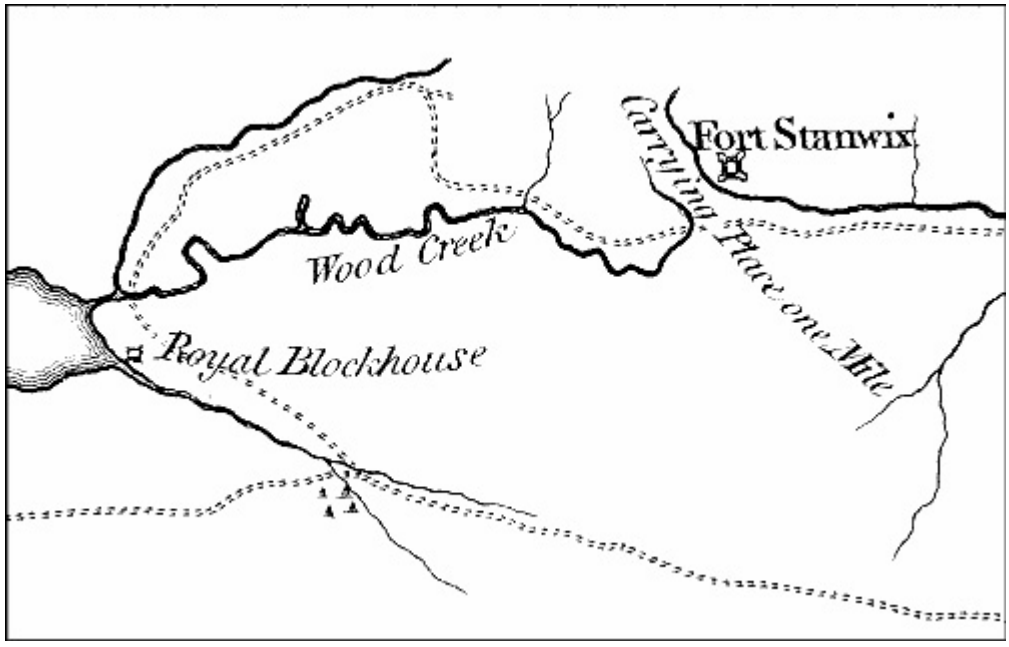

Figure 6.7. Detail from Thomas Kitchen, *Communication between Albany and Oswego* (1772). New York State Library.

Even more numerous are maps covering the Albany-Montreal corridor. Since the French dominated the area north of Fort Ticonderoga at the base of Lake Champlain, the British maps of this corridor in the first part of the French and Indian War often have something of the character of "spy maps." Another important manuscript map comes from Thomas Pownall (1772 - 1805), whom we have already encountered as a reviser of Evans and a commentator on Mitchell. Pownall plays an important role in the history of colonial America, both as a map maker and a politician. He was at various times secretary to the governor of New York, lieutenant governor of New Jersey, and governor of Massachusetts. He is another example of a colonial official who was also a many-faceted man of letters with interests that included geography and maps. After returning to England in 1760, Pownall acted as an advocate of conciliation between Britain and the American colonies throughout the period of the Revolutionary War.[40]

During the early years of the French and Indian War, Pownall was involved in developing plans for cooperation among the colonies for military operations against the French. The map that concerns us here is a fruit of those activities, and bears the title "A Map of the Grand Pass from New York to Montreal Done from Actual Survey (Except where Otherwise Express'd) by Thos Pownall."[41] Drawn in 1756, it was intended to provide a strategic overview of the heavily contested area between Albany and the St. Lawrence River. This map would have been classified "top secret" today, as evidenced by a note on the copy originally owned by the crown at the British Library: "N.B. This is in no other hands except one copy at y Board of Trade." In comparison with anything that preceded it from the British side, Pownall's map provides a remarkably detailed overview of the area. It shows rivers, towns, forts, and portages, as one would expect from a well-done military map. In addition, it carries extensive annotations on such subjects as the quality of the soil.

Also produced in 1756 were several noteworthy manuscript maps of the Hudson River and of Lake George, which have been attributed to Captain Joshua Loring (1716-81). Loring himself is quite an interesting figure. Born in Boston, he established himself as a privateer in the 1740s. He was in British service in New York by 1756, but only in 1757 was he commissioned as a captain in the British navy. In 1759 he commanded the British naval forces on Lakes George and Champlain, and was popularly known as "Commodore Loring," although he had no such official title. A loyalist, he later played a controversial role as superintendent of prisoners during the Revolutionary War, and died as an exile in London.[42]

Loring's surviving maps are finished and detailed charts, which are beautifully colored in a distinctive style (Figure 6.8).[43] Some include soundings, and they depict shoals, rocks, ferries, and riverside towns in considerable detail. Remarkably, Loring's chart of the Hudson River below Albany seems to be the first detailed map of the river made since the Dutch period. As the Hudson was heavily traveled even in the first half of the eighteenth century, it is surprising that the British did not chart it at an earlier date. Loring's chart of the river is also one of the few military maps from the French and Indian War that cover in detail the area south of Albany. However, it is an exception that proves the rule, since the Hudson River was the vital corridor for transporting troops and supplies to the scene of action in northern New York. Although notes on these maps state that they were made by Loring, and they are clearly dated 1756, one has to wonder about

the extent of Loring's role in their creation. They would have required extensive surveying, and they are so polished and professional that they were probably drawn by a military cartographer working under Loring, rather than by Loring himself. A number of characteristics of these maps, such as the use of uniform scales of one mile to an inch and two miles to an inch, stamp them as almost certainly the work of a professionally trained military engineer.

Figure 6.8. Detail of Hudson River near Kingston from Joshua Loring, "A Map of Hudson's River from New York to Albany" (1756). New York State Library.

The British had to wait until they chased the French out of the area around Lake Champlain before undertaking a detailed survey of that body of water. This was supplied in 1762 by another military engineer, William Brasier, who drew a landmark map of the lake, which eventually was revised for publication during the American Revolution (Figure 6.9).[44] Several manuscript copies of this map exist, which is not unusual for military maps of this kind. In the eighteenth century, it was so expensive to engrave and publish maps that the military found it more economical to copy maps by hand than to print multiple copies. Only when the Revolution created widespread interest and demand, did commercial publishers find it worthwhile to publish many of these maps.[45]

Figure 6.9. Detail of William Brasier, “A Survey of Lake Champlain....” (1762). Library of Congress, Geography and Map Division.

The final area that was extensively mapped during and immediately after the French and Indian War was the region around Niagara Falls, including the Niagara River and Fort Niagara. This area was critical for communication between Lake Ontario and Lake Erie, and had previously been mapped by the French. It did not fall into British hands until the end of the war, but in the years immediately following the war, the region was carefully mapped by British military cartographers, including George Demler, Bernard Ratzer, and Francis Pfister.[46].

In addition to maps of regions within New York, the British military also produced maps showing the entire province at different scales. It may be recalled from the previous chapters that Lord Loudoun, the British commander-in-chief who succeeded Braddock, had requested from Cadwallader Colden a map of the Province of New York, which Colden was unable to supply, complaining that he had received “not a farthing” of support from the British government for creating a map of the province.[47] We also have a record of Loudoun’s response, which is described in a letter from Alexander Colden to Cadwallader Colden. Loudoun thanked Colden for the maps he had sent, and reportedly said “he thought Since they would allow you no Sallary for yr Services you was right not to take any further trouble about what you had proposed.” Loudoun also showed Alexander Colden a map of Lake George “from a Survey he had order’d,” which

may have been one of the maps by Joshua Loring discussed above. Finally, Loudoun"also observed on what you mentioned of the loss he has & would be at for want of a good Map of this Province & Said that he was indeavouring to have one made that it would be of little Service to him but would be of use to those who should come after him."[48]

One fruit of Loudoun's commands was undoubtedly the lost map of New York made by Samuel Holland in 1757. This map, which was briefly mentioned in the previous chapter, was expressly "compiled pursuant to the order of the Earl of Loudon."[49]. Although no copy of this map appears to have survived, the nature of Holland's activities can be deduced from a list of maps of British North America, which were in Loudoun's possession in 1757.[50] This list shows, among other things, that Holland and an assistant named Charles Rivez (or Rivers) were engaged in copying maps of British North America. This list also includes several original maps of fortifications and communication routes made by James Montresor and other British engineers during the early years of the war.

Several manuscript maps, which appear to have been in the possession of Loudoun, are now in the Kashnor Collection at the Huntington Library in San Marino, California.[51] Perhaps the most notable work in this collection is "A Map of the Province of New-York & Part of New Jersey" (1757), which was signed by Charles Rivez, but probably reflects the joint work of Holland and Rivez, and very likely resembles or is a copy of the missing Holland map of 1757.[52] This important manuscript map is more than a synthesis of older maps, and it seems to reflect some new surveying by the British Army. It includes extensive information about roads, portages, and fortifications. Beautiful and carefully drawn, it is detailed enough to show some individual houses. It is the first of a series of large-scale maps of New York made by the British in the years immediately prior to the American Revolution. It anticipates, and was probably a source for, the maps published after 1768 by Holland, Montresor, and Sauthier.

After 1757, Holland worked in areas other than New York, and in the same year Loudoun was replaced as Commander-in-Chief of the British forces. Under Loudoun's successors, the British army continued to engage in surveying and mapping in New York. Several maps of New York and surrounding areas were drawn by Francis Pfister, whose survey of Canada Creek was mentioned above (and who also drew plans of fortifications, and later made a highly detailed map of the Niagara River). Pfister's maps of New York were made at several scales, including sixteen miles to an inch (1:1,013,760) and eight miles to an inch (1:506,880).[53] A copy of a version at sixteen miles to an inch is shown here as Figure 6.10. According to information provided on the maps, they were "composed from actual surveys by Major Christie."[54] This Major Christie is probably Gabriel Christie (1722-1799), who was in charge of logistics for the British Army, but nothing is known about any surveys he may have made or (more likely) commanded to be made.[55] Pfister's maps were carefully drawn, and show such expected information as towns, roads, and fortifications. Although none of them were published, they are notable as illustrations of the extent to which military mapping was becoming standardized and beginning to resemble modern topographic mapping—with maps being issued at a variety of standardized scales for different purposes, and with symbols and other conventions that were intelligible to most army officers and to civilian map readers.

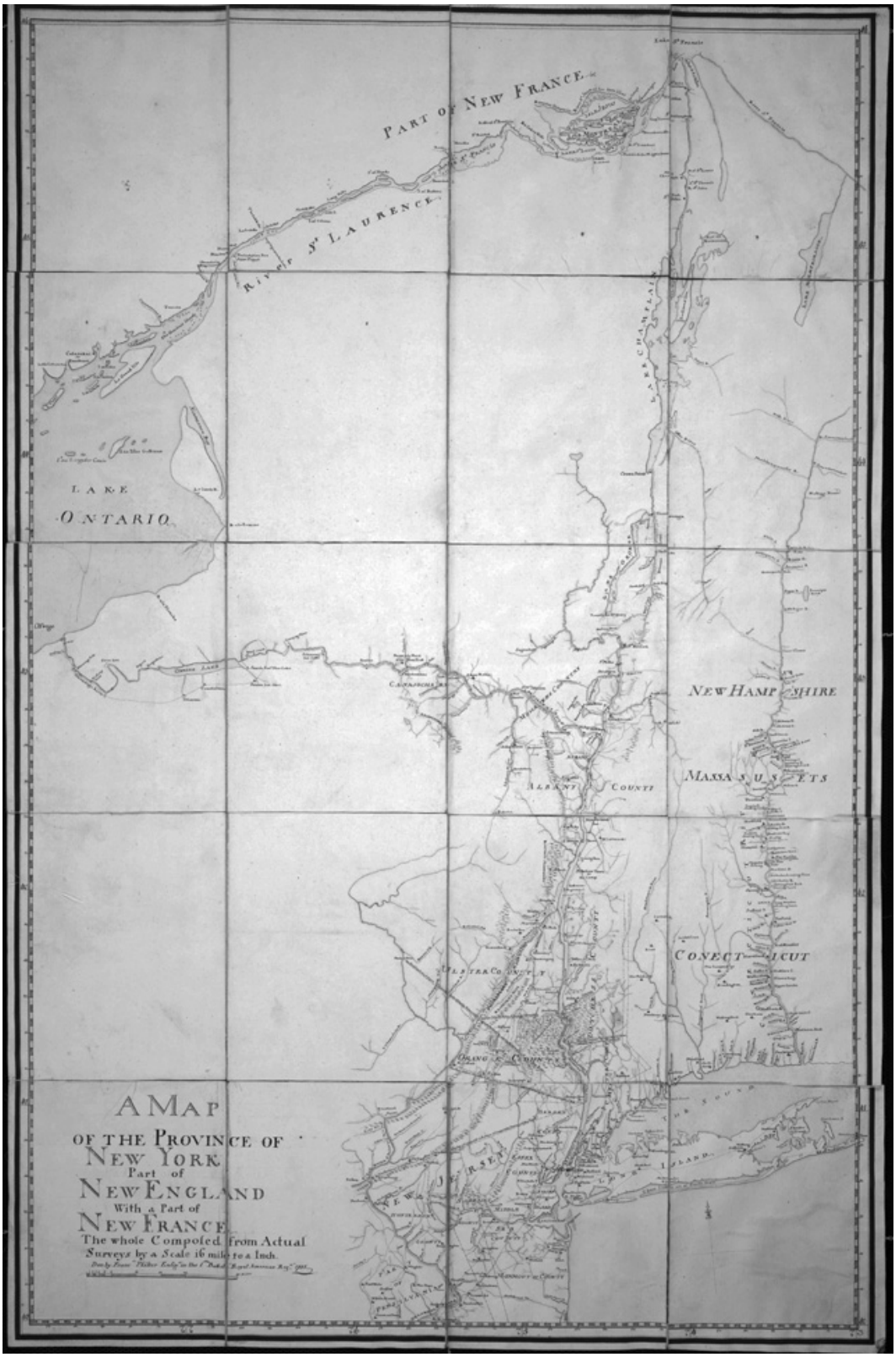
PART OF NEW FRANCE
River S^t LAURENCE
LAKE CHAMPLAIN
LAKE ONTARIO
NEW HAMPSHIRE
MASSACHUSETTS
ALBANY COUNTY
CONECTICUT
A MAP
OF THE PROVINCE OF
NEW YORK
Part of
NEW ENGLAND
With a Part of
NEW FRANCE
The whole Composed from Actual
Surveys by a Scale 16 miles to a Inch.

Figure 6.10. Francis Pfister, “A Map of the Province of New York” (1758). New York State Library.

The culmination of British mapping of New York during the French and Indian War was John Montresor’s *Map of the Province of New York*, which will be discussed in the following section. Although this map was not published until 1775, its manuscript version was completed in 1764, and Montresor clearly stated that it was compiled from surveys made by the British military.

Military and Civilian Surveys, 1764-1775

The years between the end of the French and Indian War and the outbreak of the American Revolution saw the most extensive output of British maps of New York during the colonial period. After the conclusion of the war, British surveyors had time to devote to larger projects, which often had both military and civilian benefits. Although the fighting against the French in North America ended in 1760, it was not until the conclusion of peace in 1763 and the end of Pontiac’s Rebellion that military surveyors were able to turn to broader tasks. Frequently, military surveyors were hired by civilian authorities, such as the Board of Trade or individual colonial governments, to carry out specific projects. The results of their efforts included a number of detailed maps of regions within New York, as well as several classic maps depicting the province as a whole.

The surveys and maps of this period mark the advent of what is often called “scientific mapping” in New York. It is hard to define scientific mapping precisely. Since the Renaissance, European cartography had been dominated by a set of conventions that constitute the core of what is generally considered to be scientific mapping. These include the use of uniform scales, the use of mathematical projections to represent the earth’s curved surface on a flat sheet of paper, the use of uniform symbols to designate topographic features, and the use of longitude and latitude to pinpoint locations. To accomplish these tasks, various surveying techniques were used, some more accurate than others.

After 1750 or thereabouts, the “gold standard” for scientific mapping was the technique known as trigonometric triangulation. The principles underlying triangulation had been known since the Renaissance. They involve the determination of the longitude and latitude of key positions by astronomical observation, the laying out of carefully measured baselines, and the construction of a network of triangles from the baselines using horizontal sighting instruments, such as theodolites and plane tables. Using the principles of trigonometry, it was possible to locate with relative precision specific places caught within this network of triangles. Carrying out surveys in this manner required considerable knowledge of mathematics, as well as large amounts of time and labor. Because of the expense involved in conducting such surveys over large areas, they almost always had to be government funded. As is well known, the first trigonometric survey of an entire country was the survey of France, which was begun by Jean Dominique Cassini (1625-1712) at the end of the seventeenth century. The British did not start to carry out such surveys until the middle of the eighteenth century, and in general Britain lagged

behind France and other continental countries in the training of surveyors and the conduct of surveys.

Thus, the surveyors involved in the mapping of New York at this time were representative of a period of transition between two versions of "scientific" mapping: the critical compilation and evaluation of sources (as practiced by Delisle, Colden, and Evans), and trigonometric triangulation. Several, but by no means all, of the North American surveys conducted in this period made at least some use of triangulation. However, no systematic trigonometric surveys of large areas of New York were conducted by the British at this time. Maps showing the province as a whole were compilations from other maps that were based on partial surveys made by various means, including chain and compass surveys, and route surveys made by measuring distances along roads and rivers. As we will see, the maps made after 1755 generally were based on more extensive and detailed surveys than their predecessors, but they were not fundamentally different in kind. Many of the maps drawn at this time have a polished and finished look, which can be quite misleading: they are often carefully lettered and beautifully colored, but they are not always as accurate as less elegant productions.

There does not appear to have been much systematic planning guiding the British surveyors in the years following the conclusion of the French and Indian War. As mentioned above, the British army was instructed to coordinate its surveying activities with the Board of Trade and with the individual colonial governments. But, although there was a good deal of cooperation on specific projects, no massive effort was made to survey New York, and there is remarkably little documentation of the activities that lay behind the most important maps produced during these years. Only on rare occasions have bits of information come down to us that illuminate the interactions between the players on this cartographic field. Thus, we learn that in 1766, Cadwallader Colden asked John Montresor to take with him to England a publication Colden had written "to vindicate my character from the Calumnies so publicly and industriously propagated" against him at the time of the Stamp Act.[56]

Most of the professional surveyors regarded each other as rivals, and rarely had good things to say about each other.[57] The prickly John Montresor was the most outspoken. On one occasion he put together a "memorandum of British folly," which was a list of men "not having any good subjects of their own." The list consisted of eight of his fellow engineers, including: "Mynheer Samuel Jan Van Hollandt Surveyor General at 2000 £ per annum Sterling"; "A.B.C.D.E.F—Wallet des Barres Surveyor General Nova Scotia—21 Shillings per diem *Sterling*"; "Van de Brahm Surveyor General to the Southward"; and "Francis Van Phister 700 £ per annum the Niagara carrying Place." "*Quelles folies,*" he concluded.[58] If nothing else, Montresor's list provides some hint as to why these gentlemen rarely communicated with each other.

Figure 6.11. Portrait of John Montresor by John Singleton Copley (ca. 1771). Detroit Institute of Arts. Image Source: Wikipedia Commons.

The person who came closest to playing a coordinating role in these activities was Samuel Holland (1728-1801). As Montresor implied, he was born in the Netherlands and served in the Dutch army before deciding to pursue his career with the British. We have already seen that Holland was involved in military surveys of New York during the French and Indian War. Later, he conducted surveys in Quebec and other parts of Canada. After 1764, he was created Surveyor General of the Northern District, which included all of Canada as well as the other American colonies north of Virginia, and thus

he had some vague supervisory role in coordinating British mapping activities in this area.[59] (John Gerard William De Brahm, who was also mentioned by Montresor in the above quotation, was Holland's counterpart for the southern states.) After his appointment by the Board of Trade to this new position, Holland seems to have regarded himself as responsible to civil authority. As J.B. Harley has pointed out: "Holland's civilian bias is suggested by his wish that a uniform for his surveyors in 1766 should have embossed 'in the front of the Caps … the Emblem & Motto of Trade & Plantations.'"[60] Holland wanted to conduct a systematic survey at a uniform scale of all eastern North America, and the Board agreed with his proposal, but circumstances forced him to take a piecemeal approach, and the project was abandoned with the coming of the Revolution.[61] Holland's most ambitious and systematic venture was a survey of the coasts, which he undertook in conjunction with Des Barres (who was in charge of the hydrography), and which eventually led to the production of *The Atlantic Neptune*, which will be described below. Unfortunately for students of New York history, the coastal survey moved southwards from Nova Scotia and the St. Lawrence, and had only just reached New York at the time of the outbreak of the Revolution. This survey had to be abandoned, and it covered only the parts of New York that were under British control after 1776. The maps published in the *Neptune* after 1776 will be described in the following chapter.

It is important to distinguish between what Holland and other British surveyors in North America were capable of doing (or what they proposed to do), and what they actually did in New York. Holland and his peers were clearly capable of making extensive surveys using triangulation, and of mapping the results using spherical trigonometry. Holland also made measurements of latitude and longitude, which were considerably more accurate than those of Colden and his contemporaries. His estimates of longitude were made using Colden's method of timing the eclipses of the moons of Jupiter, but his results were better because he had more accurate instruments and tables at his disposal. It should be noted that, although the chronometer had already been invented, it was not used for making estimates of longitude in North America prior to the Revolution. (The relatively sophisticated timepieces, which Holland and surveyors like Mason and Dixon used, were for measuring local time, which was also critical for making precise astronomical observations for the measurement of latitude.)[62]

It is not at all certain to what extent these relatively sophisticated cartographic techniques were actually used in New York. The measurements of longitude and latitude that Holland published in the *Philosophical Transactions* of the Royal Society were, with one exception, all for places in Canada and northern New England.[63] The exception, however, is an interesting one, for it reflects the relative sophistication of Holland as a surveyor. In Holland's words:

> It gave me great satisfaction, to have an opportunity of examining BIRD's astronomical quadrant, last year, in New-York province, in determining the latitude of 41˚, for settling the boundary line, between that colony and New Jersey, with the same instrument Mess. Mason and Dixon used for determining the boundary line between Pensylvania and Maryland: on this occasion, Mr. RITTENHOUSE, an esteemed astronomer and ingenious mechanic of Pensylvania, made use of it, and I, of BIRD's; when we never found them to differ more than 17', which surprised that gentleman much,

> to find an instrument of such small dimensions, executed with that accuracy, as to equal so nearly his large zenith instrument, which also is of BIRD's workmanship.[64]

I have been unable to locate any field notes or diagrams which show for certain that any surveying took place in New York at this time using trigonometric triangulation. There is very little published documentation of any kind concerning how the British engineers actually went about their work in New York between 1755 and 1775. It seems clear, however, that they lacked the time, the resources, and the people to do a significant amount of triangulation. Carrying out a trigonometric survey of New York would have been extremely difficult under the best of circumstances, if only because the extensive forests would have made sighting through theodolites impossible without clearing vast numbers of trees.

So how did the British actually go about making their maps during this period? Although little is known about the surveying techniques used by the military engineers in America, we do know from equipment lists that they had at their disposal such instruments as plane tables, sextants, and theodolites. There are indications that triangulation was used in a few specific situations, where it was relatively easy to carry out. These would have been along the coasts, and along large rivers and lakes, where forests would not have encumbered sighting, and where the measurement of distances using chains would have been difficult. Particularly likely candidates for the use of this technique are Holland's surveys of the Hudson River Valley around the Hudson Highlands, and Montresor's maps of New York Harbor.[65] Probably these and similar surveys of specific regions involved the measurement of baselines (probably using chains), and the measurement of angles using plane tables and possibly sometimes optical instruments, such as theodolites. Triangulation using plane tables was probably also used by surveyors making route surveys to fix the locations of nearby landmarks. These practices might be described as "triangulation lite." No evidence has been uncovered showing that maps of large areas of New York were based on networks of interlocking triangles, as would be the case in classical trigonometric triangulation.

What seems to have been done in practice was mostly a more sophisticated form of compilation. The framework of these maps was slightly improved by the more accurate determination of the latitudes of specific places. As near as I can determine, the only longitude actually measured for anywhere in New York prior to the Revolution was for New York City, and this was gradually improved from the reasonably good measurement made by Colden in 1722.[66] The only table of latitudes that I have been able to locate for New York made between 1755 and 1775 was prepared by Governor Tryon in 1774.[67] Individual latitudes can also be taken by measurement from the maps. The few specific latitudes and longitudes that I have so far been able to find were somewhat more accurate by 1775 than they were on maps made around 1755.[68] This framework was fleshed out with materials taken from a variety of sources. The extensive military route surveys made during and after the French and Indian War were an important source of information. Distances on these surveys would have been measured (at best) by the use of chains, but plane tables were probably sometimes used to ascertain the locations of features visible from the roads. This information would have been supplemented by estate surveys, boundary surveys, and special surveys of limited areas made using plane

tables and possibly some triangulation. The strengths and weaknesses of this approach to mapping will become clear as we examine specific examples.

Regional Maps of Areas within New York

It is convenient to divide the British maps produced during these years into two general groups—those that deal with broad regions within New York, and maps showing the province as a whole.

Much of the regional mapping of New York done between 1764 and 1775 was considered in the previous chapter under the headings of property maps and boundary maps.

The largest project undertaken by the British during the interwar years was a systematic survey of North American coasts and harbors. Samuel Holland was in charge of surveying on land, and his colleague J.F.W. Des Barres was responsible for taking soundings and carrying out other operations on shipboard. Des Barres also undertook the publication of these charts during the years just preceding and during the Revolutionary War. This collection of charts, known as *The Atlantic Neptune*, is considered to be one of the masterpieces of eighteenth-century cartography.

The makers of *The Atlantic Neptune* started with Canada and worked their way south. The maps in this series include detailed charts of the Saint Lawrence River, Nova Scotia, Maine, and Massachusetts. As noted above, Holland and Des Barres were just getting to New York when the project had to be abandoned because of the Revolution. Fortunately, at least for the cartographic history of New York, the British occupation of downstate New York allowed some limited coastal surveying to take place during the Revolution. Since these maps were made after 1776, they will be considered in the following chapter.

The British never charted the Hudson River in nearly as much detail as, for example, the charts of the Delaware and the Saint Lawrence rivers that appeared in *The Atlantic Neptune*. However, the need for a detailed map of the Hudson River was filled in part through the efforts of Claude Joseph Sauthier. Sauthier was a prolific mapmaker whose career was described in the previous chapter. His map of the Hudson River does not quite live up to its title: *A Topographical Map of Hudsons River, with the Channels, Depth of Water, Rocks, Shoals, etc. and the Country Adjacent from Sandy Hook, New York to Fort Edward, Also the Communication with Canada by Lake George and Lake Champlain, as High as Fort Chambly on Sorel River* (Figure 6.12).[69] Although it includes some soundings, its scale is too small for it to show shoals and other obstacles in sufficient detail to be of much use to navigators. In this respect, it is inferior to Loring's manuscript map of the Hudson, as can be seen by comparing the two images of the area near Kingston presented here (figures 6.8 and 6.12). Nonetheless, it is still by far the most detailed and accurate map of the Hudson River and Lake Champlain actually published in the eighteenth century. It gives a generally reliable picture of the towns, roads, and major topographic features along the entire corridor between New York City and the Richelieu River. Sauthier's map was published in London in 1776—just in time to help the British plan their ill-fated Saratoga campaign.

Figure 6.12. Detail of Claude Joseph Sauthier, *Topographical Map of Hudsons River*.... (1777). Library of Congress, Geography and Map Division.

This same period saw the publication of several classic maps of New York City and its surroundings. The first of these is by John Montresor (1736-1799), the opinionated British army engineer quoted above. Montresor was of Huguenot extraction, and should not be confused with his father, James Montresor, who was also a British army officer. Montresor was one of the most prolific and capable of the British military engineers in America. Active in both the French and Indian War and the American Revolution, he rose to the rank of Chief Engineer in America. Montresor was the most articulate of the British military cartographers, and his published Journals are an important source of information about the activities of the engineers in the years before and during the Revolution. They also provide an unvarnished eye-witness account of those years from the point of view of an fierce royalist, who was equally critical of the "Rebel Mob," and of most of his superiors and colleagues in the British Army. In addition to making maps, his activities (like those of other army engineers) included building and repairing fortifications, among them Castle William in Boston, and Fort George in New York City.[70]

As has been seen, Montresor drew a number of manuscript maps and sketches of fortifications in and around New York City. His most comprehensive map of the city was published in 1766 as *A Plan of the City of New-York & its Environs*.[71] This map was made under unusual circumstances—at the height of the Stamp Act crisis, when it was

unsafe for any royalist to show his face in New York City. Montresor was not one to mince words—he liked to bandy around phrases like “Sons or Spawn of Liberty” in his journals, and at least one attempt was made to kill him in the streets. Under the circumstances, his surveying had to be done surreptitiously and in disguise. The quality of his map suffered as a result, and he even had to leave out the names of most streets.[72]

In spite of its limitations, Montresor’s map shows considerable detail in the parts of lower Manhattan immediately outside of the city itself, where he was presumably better able to escape the attentions of the rabble mob. It shows in exquisite detail fields, orchards, roads, streams, and topography in the largely undeveloped area between lower Manhattan and what is now Greenwich Village.[73]

Another mapmaker active in and around New York City during these years was Bernard Ratzer, who was a Lieutenant in the Sixtieth Royal American Regiment, where most of the British Engineers were concentrated. Ratzer did most of his surveying in 1767, by which time the Stamp Act Crisis was over, and the violence had died down. Thus, Ratzer was able to carry out his survey more systematically, and could include the names of streets. In areas outside of lower Manhattan the detail is comparable to Montresor’s, but Ratzer’s map covers a much wider area. A version of Ratzer’s survey, published by Jefferys and Faden in 1776, included the lower half of Manhattan, much of what is now Brooklyn, and part of New Jersey, as well as a magnificent view of the city and its harbor. It has been described as “perhaps the finest map of an American city and its environs produced in the eighteenth century.”[74]

Under the heading of maps of specific regions, special notice should go to Guy Johnson’s maps of the Iroquois territories of western New York. Guy Johnson (1740-1788) was the nephew and protégé of the redoubtable Sir William Johnson (1715-1774), Superintendent of Indian Affairs for the British Crown, soldier, power broker, and owner of huge estates near the Mohawk River.[75] Except for Sir William himself, Guy Johnson had had the most extensive knowledge of the Iroquois and their lands of any person in British North America, and he succeeded Sir William as Superintendent of Indian Affairs after 1774. The Johnsons had first-hand knowledge of much of this area, as well as access to all of the relevant maps and documents available to colonial administrators.

Guy Johnson’s first map of this area (1768) bears the self-explanatory title *Map of the Frontiers of the Northern Colonies with the Boundary Line Established between Them and the Indians at the Treaty Held by S. Will Johnson at Ft Stanwix in Novr 1768, Corrected and Improved from the Evans Map, by Guy Johnson Dep. Agt of Ind Affairs*.[76] This map has already been mentioned in the previous chapter as part of the discussion of the role of maps in establishing New York’s boundaries. Its dependence on the Evans’ map is evident at a glance, and includes Evans’ characteristic depiction of just two of the Finger Lakes. The 1768 boundary line alluded to in the title of the map is of great historical importance. Through this line the British attempted to preserve peace with the Indians by setting limits to white settlements west of the Alleghenies. Although this line may have been drawn with the best of intentions toward the Indians, it antagonized would-be settlers and powerful land speculators, such as George Washington—thereby becoming one of the underlying causes of the American Revolution.

Johnson’s map of the Indian Country, drawn in 1771, is a more original and important effort (Figure 6.13).[77] Even as he had copied from it a few years earlier,

Johnson must have been aware of the deficiencies of the Evans' map in depicting western New York. In this later effort, Johnson tried to draw a map incorporating his own much more extensive knowledge. He was largely successful, and he produced a map of the area that was much more accurate and detailed than any previous British map, or than the published French maps by Delisle and Bellin. It is worth noting, however, that in certain areas it is still not as detailed as some of the maps produced by French missionaries in the seventeenth century. By the middle of the eighteenth century the Indians had rightly become wary about allowing explorers and surveyors to tramp around their lands for the purpose of making maps.

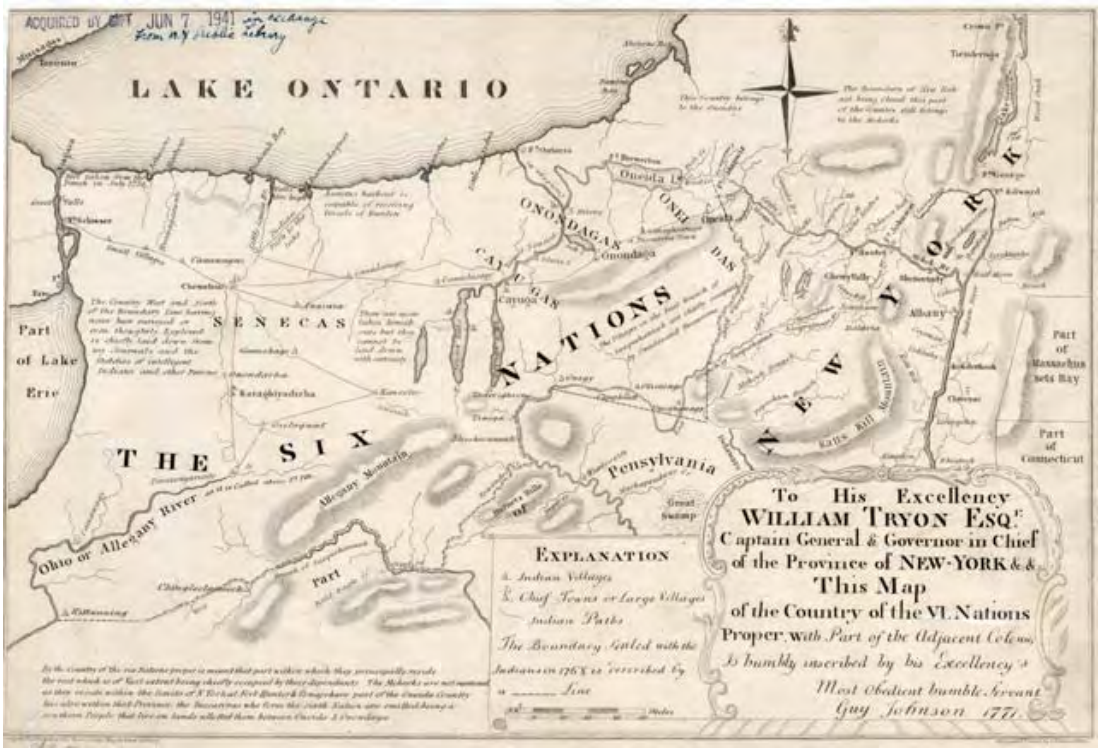

Figure 6.13. Guy Johnson, *Map of the Country of the VI. Nations* (1771). From the American Geographical Society Library at the University of Wisconsin-Milwaukee Libraries.

Guy Johnson's map includes the revealing inscription: "The Country West and North of the Boundary Line [between the British colonies and the Indians] having never been surveyed or even thorghly [*sic*] Explored is chiefly laid down from my Journals and the Sketches of intelligent Indians and other persens." The map provides names and locations of many Iroquois villages, and shows the paths connecting them. It also includes a fairly accurate delineation of the courses of streams and rivers, especially of those flowing into Lake Ontario. It depicts three of the Finger Lakes (one more than Evans), and includes the comment: "There are more lakes hereabouts but they cannot be laid down with certainty."

Maps Showing New York as a Whole

The most useful and widely admired maps produced during these years show the entire Province of New York. All of them have pedigrees that can be traced back to the period between1750-55. To a greater or lesser extent, they all show the influence of the regional maps of Evans, Mitchell, and Jeffreys—as well as the military maps made during the French and Indian War by Pfister and others. However, the maps published after 1763 benefited from additional information and contained numerous corrections derived in part from the regional surveys discussed above.

The first of these to actually achieve publication was Samuel Holland's well-known map of New York and New Jersey. Holland had been, as has been seen, involved since at least 1756 in compiling maps of New York and its neighboring states, and as early as 1757 had produced some kind of map of New York. Several years later, in July 1766, the Board of Trade wrote to Governor Moore that "we are already possessed of a very accurate and useful survey of the Province of New York by Captain Holland and others, in which the most material patents are marked and their boundaries described."[78] In 1767 or 1768 Holland apparently created a new or updated version of this map for the commission that surveyed the boundary between New York and New Jersey.[79] The first printed version of a map of New York and New Jersey attributed to Holland was published by Jefferys, possibly as early as 1768 (Figure 6.14). A detail of this map showing New York-New Jersey boundary appears in chapter 5 of this publication (Figure 5.7).[80]

Figure 6.14. Samuel Holland, *The Provinces of New York, and New Jersey....* [1768?]. Library of Congress, Geography and Map Division.

Although attributed to Holland, the pedigree of this map has been questioned. Thomas Pownall gave it a scathing review:

> A Map of New York and New Jersey, published by T. Jefferys, to which Publication the Name of Capt. Holland is put, without his Knowledge or Consent, is little more than a Copy of those Parts contained in Evans's Map, or if not a Copy, a Compilation from the same Materials on a larger Scale, without any essential Amendment, without scarce a Difference, except in the County of Albany, corrected from a Map of that County

> which Capt. Holland copied for me in 1756, from Draughts of Mr. Bleecker, Deputy Surveyor in that County. The only Parts contained in the Map, thus published by Jefferys, which were surveyed by Capt. Holland are, "the Passage of the Hudson's [Hudson] River through the Highlands," and the Parts on the Banks from Viskill to Croton's [Croton] River, a Distance of about 20 Miles; and even in these Parts the Compiler has omitted to notice that remarkable Pass Martlaer's Rock [opposite West Point]. The Boundary Lines of the great Patents and Manors; of some of the Counties; and some of the new Townships are drawn over this Map in their Squares: But I am not able to collect any Improvement in it either as to Topography or Geography.[81]

Pownall's comments are at least partially correct, but they are also one-sidedly negative. Pownall was a champion of Evans' maps, and he had a bias against Jeffreys (as also seen in his comments on Jefferys' map of New England presented above). This map is clearly a compilation from a number of sources, but the extent to which the compiling was done by Holland himself is uncertain, since his predecessor manuscript maps do not survive. Internal evidence makes it clear that the map was derived in part from Evans, but even Pownall admits that some supplementary surveying was done by Holland. Similarities between this map and Montresor's map of New York (discussed below) also show that Holland drew on military surveys made during the French and Indian War. In addition, it appears that that Holland had a copy of Colden's map of New York, which had also been used by Evans.[82] All of this material could well have been brought together by Holland, but it is also quite possible that it was supplemented by Jefferys. Many maps of New York and elsewhere produced at this time have equally dubious pedigrees.

In any case, Holland's map of New York and New Jersey is much more than a redrafting of Evans' map. A comparison of the two that I have made (using Map Analyst, a computer program that generates displacement vectors) shows that Holland's map is geodetically more accurate than is Evans' map throughout the Hudson and lower Mohawk River valleys. In addition, it is not insignificant that the larger scale of the Holland map allowed for the presentation of much more detail. Holland's work also benefited from the skillful design and engraving of Jefferys, which greatly improved its readability. All in all, it constitutes a major improvement over any previously published map of New York.[83]

The Holland map also had a peculiar career after its initial publication. In June, 1775, it was reissued under Jefferys' name—presumably by Robert Sayer, who acquired most of Jefferys' plates. Although based on the same plate, this new edition involved extensive revisions, including the addition of symbols for individual houses and mills in many areas.[84] The source of this new information is unknown. A few months later, yet another revision appeared bearing the imprint of Sayer and Bennett. Astonishingly, this version bears the information that it was "Drawn by Major Holland, Surveyor General, of the Northern District in America. Corrected and improved, from the original materials, by Governr. Pownall, Member of Parliament, 1776." Thus, a few years after attempting to discredit the map, Pownall himself turned around and published a "corrected and improved" edition, and did so without hesitating to attribute the original version to

Samuel Holland.[85] The Pownall edition used the same plate as the two previous versions, but also included a substantial number of additions and corrections. Several later editions also appeared of this influential map, including a rather crudely engraved German version.

John Montresor's important *Map of the Province of New York* (1775) also has a questionable pedigree (Figure 6.15).[86] This map was printed on two sheets at a scale of 1:320,000, making it—along with Sauthier's "Chorographical" map (discussed in the previous chapter and below)—one of the two most detailed pre-revolutionary maps showing the province as a whole. Montresor apparently made the manuscript version of this map in 1765 at the request of General Gage, but it was not published until 1775.[87] This is probably the map of the Province of New York that Montresor mentioned taking to London for engraving in 1766.[88] The delay of almost ten years before actual publication was not unusual at the time, since the outbreak of the Revolution did much to stimulate demand for maps of the American colonies, and sent publishers rushing to look for suitable materials to print.


LIVINGSTON
LITTLE NINE PARTNERS
BEEKMAN'S PATENT
MANOR of PHILIPSBURG
WEST CHESTER COUNTY
LITCHFIELD
FAIRFIELD COU
NEW
OF
CON
PART
B E R G E N
C O U N T Y
E S S E X
K I N G S C O U N T Y
S U F F
L O N G I S L
Canaan
Cornwall
Litchfield
Goshen
Kent
Woodbury
New Milford
Danbury
Ridgefield
Ripton
Fairfield
Norwalk
Fairfield Bay
Norwalk Isl
Stamford
Horse Neck
Eaton Neck
Huntingdon
Oyster Bay
Crane's Point
Jamaica Bay
Beach
Newark
Elizabeth Town
Bergen
STATEN ISLAND

Figure 6.15. Detail of John Montresor, *Map of the Province of New York* (1775). Library of Congress, Geography and Map Division.

The actual origins of Montresor's map are obscure. Montresor's journals make it clear that he was not directly involved in conducting most of the surveys that underlie this work, and I have so far been unable to locate any discussion of the map by Pownall, Gage, or other contemporary figures in the British military or bureaucratic establishments. In all probability, like Samuel Holland's map of New York and New Jersey, it is primarily a work of compilation, and made use of a variety of published maps and unpublished military surveys. Montresor's depiction of Long Island is clearly derived either from the Jefferys map of New England, or from some common source used by both. There are also many similarities between Montresor's map and the maps of Holland and Evans. In addition, Montresor seems to have made extensive use of unknown military surveys—possibly including those of the mysterious Major Christie, and almost certainly those conducted by (or under the supervision of) Holland. We know that at the same time that he prepared his map of New York, he was engaged in compiling a map of "a great part of N. America done by the Engineers at New York."[89] Much of the topography, of the configuration of rivers, and many details of Montresor's map are different from those of other contemporary maps, and are almost certainly derived from these unknown military surveys.

The most notable feature of Montresor's map is its careful depiction of topography through the use of hachures and shading. Because contour lines were not yet in widespread use, Montresor's depiction of hills and valleys was necessarily crude by modern standards, but it was unusually precise by the standards of his own time. Montresor's topographic shading gives his map an unusual appearance. With some exceptions, almost all of his topography shows elevations as seen from river valleys. Away from the rivers, little topography is shown, and this gives his map the appearance of an elevation model on which most of the higher elevations have been shaved away with a knife or a plane. This tells us something important about the sources Montresor used to compile his map. Evidently he was working with military route surveys that carefully depicted streams, houses, and roads in the more highly developed river valleys, which also would have been particularly important for military communications. The surveyors appear to have made sketches of elevations as seen from below, probably mostly by visual observation, but possibly also supplemented by the use of plane tables. No attempts appear to have been made to measure altitudes systematically.

My analysis of the overall geodetic framework of Montresor's map shows that it is not quite as accurate as those of Holland and Sauthier. On the other hand, it includes many details not found on the maps of his rivals. It is necessary to use some caution in interpreting the detailed information on the Montresor map. It appears to reflect the situation at the time the manuscript of the map was compiled, around 1765. There are a number of dates on the map, the most recent of which is 1759. It does not show the modern boundary between New York and New Jersey, which was established in 1768. And the details on the map—such as roads, houses, and mills—are less numerous than on the 1775 edition of Holland's map, or on Sauthier's large-scale map. Thus, most of the information on Montresor's map appears to reflect an earlier situation than the maps his rivals published after 1775. However, given the vagaries of British map publishing, it

remains possible that the manuscript might have been updated in some respects when it was published. A comparison of Montresor's map with, say, Sauthier's Chorographical map may help reveal the changes that took place in a particular area between 1765 and 1775, but I would not use such comparisons to draw firm conclusions without confirmation from non-cartographic sources.

Montresor's map was widely admired and distributed. It was included in Faden's *North American Atlas*. An updated edition appeared in 1777, and a French edition was published in the same year.[90] George Washington owned a copy, and it was widely consulted by both sides during the Revolutionary War. Because Montresor's map of New York did a relatively good job of depicting roads, steams, and topography, it was particularly valuable for military purposes.

Just before the Revolution, Claude Joseph Sauthier produced two important maps showing colonial New York as a whole. We have already seen that Sauthier was involved in surveying, among other things, the Hudson River and the boundary between New York and Quebec. Unlike Holland and Montresor, Sauthier was not primarily a military surveyor. Later, in 1776-77, he was to serve briefly as a military cartographer for the British, but prior to the Revolution he was employed by Governor Tryon. His career always depended directly on the favors of aristocratic patrons like Tryon and (later) Earl Hugh Percy. Sauthier's dependence helps explain why in an age when fulsome dedications for maps were common, Sauthier outdid all rivals in cringing servility. His most important map bears the remarkable dedication: "To His Excellency Major General William Tryon, Governor of the Province of New York and the Islands thereunto belonging, Colonel of His Majesty's 70th Regt. of Foot, this map undertaken by his order is with his permission most humbly inscribed by His Excellencys most obliged, devoted and obedient servant, Claude Joseph Sauthier."[91]

Both of Sauthier's maps of New York were based on the same manuscript. Since at this time Sauthier was working for civilian rather than military authorities, they reflect different sources and preoccupations than those of Montresor. Sauthier's smaller-scale map was published first (1776), and the title quite explicitly states that it was a contraction of the larger—still unpublished—map (with the addition of New Jersey based on Ratzer's "topographical observations"). Its short title reads *A Map of the Province of New-York, Reduc'd from the Large Drawing of that Province, Compiled from Actual Surveys by Order of His Excellency William Tryon....*[92] This map, which has a scale of about 1:1,000,000, has been much reproduced because it enables one to see at a glance New York as it appeared at the time of the Revolution. Like the larger-scale map from which it is derived, its overall geodetic framework is somewhat more accurate than that of any other map of New York made during the colonial period. In addition to the expected towns, rivers, and major landforms, it shows large landholdings, along with the crucial links between New York and Canada via both Lake Champlain and the Mohawk River. It bears a superficial resemblance to Holland's map of New York and New Jersey, and parts of it seem to have been copied from Holland, but it differs in many details. It was widely used as a reference map during the Revolution, and was pirated by two different German publishers.[93]

The larger map—the one with the fulsome dedication quoted above—is at a scale of 1:322,000 (ten miles to an inch). Its origins were discussed in the previous chapter in the context of property mapping, but it is also notable as one of the two most detailed maps

of colonial New York. It rivals Montresor's map in detail and exceeds it in accuracy, but it is considerably different in purpose. As has been seen, it constituted the culmination of efforts by colonial officials, dating back at least to the beginning of Cadwallader Colden's term as Surveyor General, to produce an accurate map of New York that also would provide detailed information about landholdings. Its purpose is revealed by its complete title: *A Chorographical Map of the Province of New-York in North America, Divided into Counties, Manors, Patents and Townships; exhibiting likewise all the private grants of land made and located in that Province; Compiled from Actual Surveys Deposited in the Patent Office at New York, by Order of His Excellency Major General William Tryon* (Figures 5.5 and 5.6).[94] Thus, its most distinctive feature, reflecting its administrative purpose, is its careful depiction of the boundaries of manors and land grants. But Sauthier's map also shows towns, roads, rivers, and lakes, along with many individual houses, and also mills, which are marked by the asterisk-like symbol that was used for that purpose at the time. Sauthier's treatment of topography is also fairly extensive. Although somewhat impressionistic, it goes well beyond the river valleys shown by Montresor. Although Sauthier's chorographical map was not published until 1779, it appears to have been completed in 1775, and shows land holdings as of that date or a little earlier.

The maps of Holland, Montresor and Sauthier are the culmination of more than a century of British mapping of colonial New York. They provide the best cartographic picture available of New York as a whole immediately prior to the American Revolution. They were made for purposes that were mostly made obsolete by the Revolution, but their relative accuracy and detail make them of great interest to historians. These same qualities also assured that they would have considerable influence on American mapping in the first decades of the Republic.

Chapter 7
Mapping the Revolutionary War in New York

Introduction

Many of the themes discussed in the previous chapter reappear here. Both chapters deal, at least in part, with military maps. The maps discussed here can be grouped into the same broad categories as in the preceding chapter: fortification maps, battle maps, maps of military movement, and topographic maps.

The mapping of the American Revolution is extraordinarily rich and well documented.[1] Many Revolutionary War maps are available on the World Wide Web, particularly from the Geography and Map Division of the Library of Congress. Much of the fighting took place in New York, and consequently much of the cartography of the Revolution depicts locations in the state.[2] Few parts of New York escaped the conflict altogether. Thus, more of the state was mapped during the Revolutionary War than during the French and Indian War. The earliest detailed maps of some parts of the New York date from the time of the American Revolution.

In comparison with French and Indian War, formal sieges of fortifications played a relatively small part in the Revolutionary War. The Revolution was much more a war of movement, with the Americans relying primarily on their ability to maneuver across vast spaces, rather than on trying to control specific positions. Because of their powerful navy, the British were often able to use water transport to move their armies, but they were handicapped by their inability to control permanently large areas of hostile territory, and by the resulting logistical problems. Because logistics and troop movement were so crucial—albeit in different ways—for both sides, detailed reconnaissance maps were relatively more important than they were in the French and Indian War.

Maps undeniably played an important part in the war efforts of both the British and the Americans. Generals like George Washington and Sir Henry Clinton were avid collectors of maps, along with other forms of military intelligence. There has been some debate about just how vital maps were in making military decisions during the Revolution. As will be seen in considering the circumstances in which specific maps were created and used, it is very difficult to pin down the exact role of maps in making particular military decisions, but they were certainly used and prized as intelligence sources.

Another subject that has been widely discussed is the extent to which the various armies had access to cartographic resources.[3] The Americans apparently had little trouble obtaining copies of published British maps, such as Montresor's map of the Province of New York. These important regional maps were created prior to the Revolution, although frequently not published until after 1775. The British made few efforts to restrict their circulation, and most were available to the Americans through map dealers in France or the Netherlands. In terms of wartime map production, the British army in North America had almost twice as many cartographers as the Americans, and produced nearly twice as many maps.[4] The quality of many of the maps produced by the Americans was quite good, but they almost always lacked the polished appearance of the British maps, and the Americans did not have engraving and printing facilities comparable to those of the British. The French expeditionary force came equipped with

excellent map makers, but (because of the relatively small part they played in the fighting) their output was more limited than that of the British or Americans.

It is not obvious how best to present the rich and varied array of maps created during the Revolution. They could be arranged in chronological order. They could also be grouped by geographic region (such as New York City Area, Hudson Valley, Lake Champlain corridor, Mohawk Valley, and western frontier). Instead, I have opted to arrange them by the nationality of their creators, and to subdivide them by region and type of map. Only a small percentage of the available maps can be discussed here. I have chosen examples that are either of outstanding quality, or which typify general trends in mapmaking. References presented in the footnotes should enable researchers interested in particular military events or geographic areas within New York to locate most relevant materials.

British Maps

Maps of Battles and Fortifications

It is convenient to group fortification and battle maps together, since battles often took place in the vicinity of fortifications. Even though sieges of fortifications did not play as large a part in the Revolution as in the French and Indian War, both sides made and collected maps and plans of fortifications—both of their own works and those of their opponents.[5] In the course of the American Revolution, the British produced dozens of maps of fortifications in New York. Often, they also show the surrounding region, and include information about military activities in the vicinity.

The Battle of Long Island (also known as the Battle of Brooklyn), and the battles around New York City that succeeded it, led to a particularly rich harvest of maps. There are good reasons for this. The Battle of Long Island itself was one of the most important battles of the Revolutionary War.[6] It involved larger numbers of troops engaged on both sides than any other battle of the war. It was also a particularly interesting battle for armchair strategists, and the campaign was a success for the forces of His Majesty, which stimulated the creation and publication of celebratory maps by the British.

The stage was set for the Battle of Long Island after the evacuation of Boston in March, 1776, when the British decided to make New York City the center of their operations in North America. In July of that year, they made their initial landing on Staten Island. Their forces were under the command of the Howe brothers—Major General William Howe (1729-1814) and Vice Admiral Richard Howe (1726-1799). William Howe was assisted by two other well-known Major Generals—Sir Henry Clinton (1738-1795) and Lord Charles Cornwallis (1738-1805), both of whom played important parts throughout the Revolution. Clinton and Howe detested each other, and their disagreements affected events in New York until Clinton finally succeeded Howe in 1778. By August 25, 1776, some 22,000 British and Hessian troops were disembarked near Gravesend on the southwestern corner of Long Island to face an army of approximately 19,000 under the command of General Washington.

The Battle of Long Island raises an intriguing question: were maps the key to the British victory? This question has been posed because the British outflanked the Americans by a night march through the little-known Jamaica Pass, which the Americans

had left unguarded. This maneuver depended on good geographical knowledge, but it is not known to what extent that knowledge was derived from maps. Sir William Howe and other British officers would have looked at whatever maps of the area they had available, but we do not know what maps the British commanders consulted before the battle, or even whether this pass was shown on any of them. The flanking maneuver was the brainchild of Clinton, who himself had grown up on Long Island during the 1740s when his father, George, was governor of the province. It is also known that General Clinton visited this pass on a scouting expedition, and that the British troops were guided through the pass by local loyalists. It seems that the British had no lack of local geographical information, and at least one of the engineers attached to the army (George Sproule, who was soon to make a map of the battlefield) was born on Long Island.[7] Most likely, the British decision to use this route derived from the consultation of a variety of intelligence sources, of which maps were only one, and possibly not the most important.[8]

Be that as it may, the British produced some remarkably detailed maps of western Long Island within a few months of their victory. Shortly after the battle, a map was published “from the surveys of Major Holland” showing topography and roads in the area. The depiction of western Long Island on this map closely resembles that on Holland’s earlier map of New York and New Jersey, but it adds the morainal hills in Brooklyn, and shows the route taken by the British army in its flanking maneuver (Figure 7.1).[9] A much more detailed survey of the topography of Brooklyn and the American fortifications was made by George Sproule in September, 1776. The existing copy of his striking map of this area was drawn in 1781, and may incorporate information from later British surveys.[10]

Figure 7.1. Samuel Holland, *The Seat of Action....* (1776). Library of Congress, Geography and Map Division.

Another map that shows the Battle of Long Island in considerable detail was published by J.F.W. Des Barres as part of his *Atlantic Neptune* (Figure 7.2).[11] This remarkable work shows western Long Island with an amount of detail intermediate between the two previously mentioned maps. It nonetheless depicts the topography of the area in much greater detail than any earlier published map, and it probably reflects intensive surveying done in the months following the British victory. Manhattan, Staten Island, parts of Westchester County, and New Jersey are also shown in similar detail. In addition, it depicts New York Harbor and the lower Hudson River, complete with shoals and soundings. This map is a rather odd hybrid. Since the *Atlantic Neptune* was primarily a hydrographic atlas produced for the British Admiralty, the detailed charting of New York Harbor and the Hudson River comes as no surprise. The military information on this map is not what one would expect to find on a nautical chart. Its presence is explained by the fact that Des Barres was allowed to publish his maps for profit.[12]

Evidently, Des Barres thought that the inclusion of these military events would appeal to customers beyond the Admiralty and ship captains. It does not take much imagination to figure out who might have bought this enhanced version of a nautical chart: military officers, public officials, and considerable numbers of armchair strategists or people interested in contemporary affairs.

Figure 7.2. Detail of J.F.W. Des Barres *A Sketch of the Operations of His Majesty's Fleet and Army....* (1776). Library of Congress, Geography and Map Division.

The Battle of Long Island was also depicted on less elaborate maps aimed at a more general audience, which might be unwilling or unable to pay for expensive colored engravings. Many of these also included other military actions in the vicinity of New York City. Maps of this kind appeared in *The Gentleman's Magazine,* and in *The Universal Magazine of Knowledge and Pleasure* . Several similar maps were clearly intended for sale to a wide audience.[13] One of them was even translated into French and published in Paris.[14] A map published by William Faden, which included a narrative of the campaign by General Howe, was apparently hawked as a broadside on the streets of London.[15] Appearing within a few months of the battle, these maps helped to inform the literate European public about events of widespread interest. Although the analogy is not exact, it may be said that in the slower-paced eighteenth century they played a role somewhat similar to newspaper maps or to television news maps today.[16]

Manuscript maps depicting the Battle of Long Island were made throughout the Revolution. The battle was of continuing interest to those studying the course of the war, and also to students of military tactics. British commanders continued to consult these maps in their efforts to explain events, and to justify their own ideas and actions. A case in point is this note added by Henry Clinton to the map drawn by George Sproule in 1781, based on the survey he had made in September 1776: "This map proves that there were no rebel works near the water side of Brooklyn 27 Augt. 76 & consequently S[ir] W[illiam] H[owe] was misinformed & that we might have taken possession at the close of the action and made the Island and all in it ours."[17] Second guessing the officers on both sides of this battle has continued to be a popular occupation, and maps illustrating the battle were also made of it in the nineteenth and twentieth centuries.[18]

The Battle of Long Island was followed by a series of conflicts on Manhattan and in Westchester County. These included the initial British invasion of Manhattan at Kips Bay (September 15), the Battle of Harlem Heights (September 16), The Battle of White Plains (October 28), and the storming of Fort Washington (November 16). After the fall of Fort Washington, the Americans retreated to New Jersey, putting an end to this phase of the war. Most of these actions were recorded in considerable detail on maps, many of which remain unpublished. Only a few examples will be considered here to provide a sense of what is available.

It appears that no contemporary maps were published that show in detail the initial British invasion of Manhattan on September 15, although at least one detailed manuscript map exists.[19] The location of the British landing and some subsequent operations are also shown on several overview maps, such as Des Barres' *Sketch of the Operations of His Majesty's Fleet and Army*, and on William Faden's "broadside" map (both discussed above). However, a number of more detailed maps show the fortifications and battles on upper Manhattan. One of the best is Charles Blaskowitz's carefully drawn plan of the British and American fortifications on upper Manhattan and Long Island near Hell Gate.[20] Blaskowitz had been an assistant to Des Barres in surveying for the *Atlantic Neptune*, and we will see that he produced several other important maps for the British during the revolution.

One of the finest overview maps of the military activities on upper Manhattan was drawn by Claude Joseph Sauthier, and eventually published with some additions in 1777 by William Faden (Figure 7.3). With the coming of the Revolution, Sauthier had left the service of Governor Tryon, and entered into that of the British general Lord Percy, who played an important part in military activities around New York.[21] The Geography and Map Division of the Library of Congress has digitized several states of this map, including the manuscript versions used by Faden.[22] Sauthier also produced several more detailed maps of fortifications in this area, as well as other more general maps of military events around New York—a number of which are also available online from the Library of Congress.

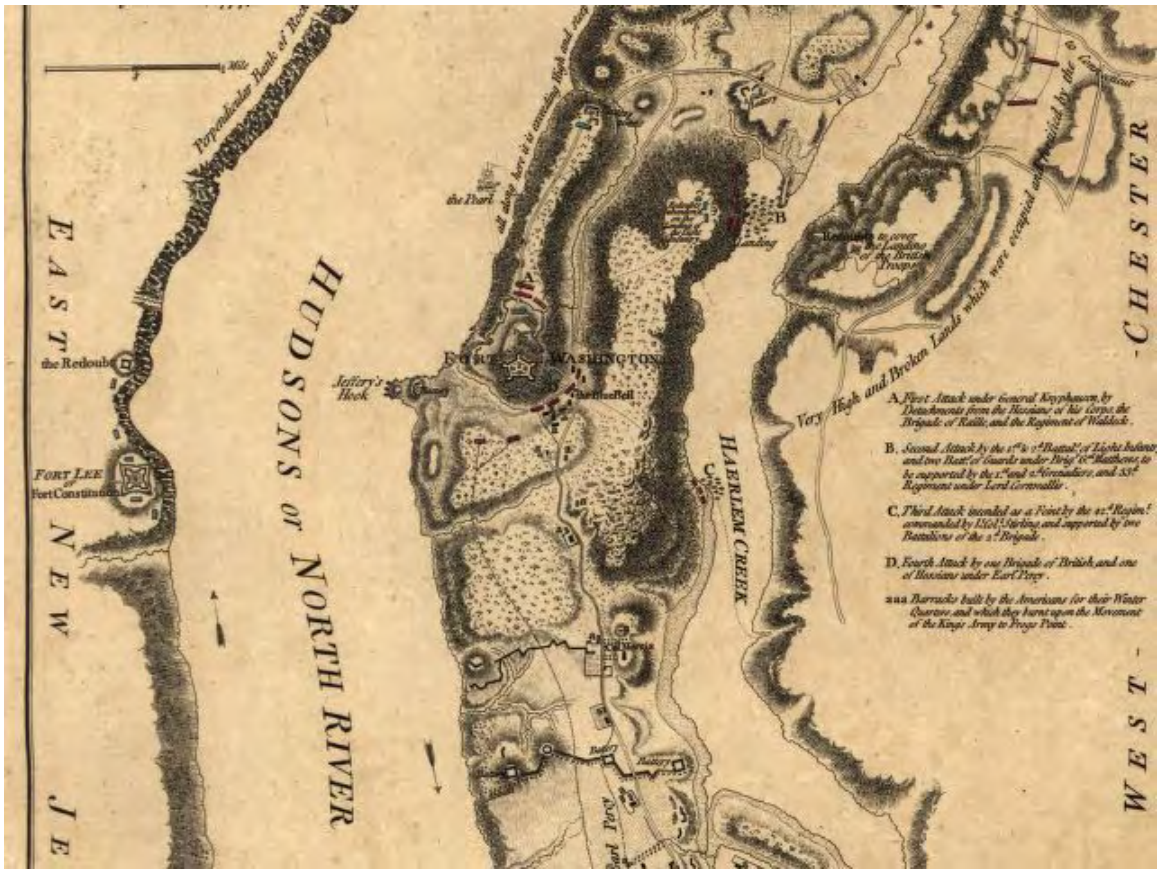

Figure 7.3. Detail of Claude Joseph Sauthier, *A Topographical Map of the Northn. Part of New York Island*.... (1777). Library of Congress, Geography and Map Division.

A large-scale map showing troop positions at the Battle of White Plains was made by Charles Blaskowitz.[23] This cartographer also drew a remarkably detailed map showing the location of the British landing at Throg's Neck (or Frog's Neck, as it was commonly called at the time of the Revolution), and of the route subsequently followed by the British troops to White Plains.[24] This map is especially notable for its careful delineation of the topography of the area, and for the amount of information it conveys about the composition of the British troops taking part in the operation. The productive Sauthier also contributed an excellent overview map, which depicts the actions in Westchester County leading up to the Battle of White Plains, along with the military activities on upper Manhattan and in New Jersey.[25]

The storming of Fort Washington is one of the few operations during the Revolutionary War in which the possession of a fortification map may have played an important part in a military victory. Fort Washington was the American bastion on upper Manhattan, which held up the advance of the British troops after their initial seizure of lower Manhattan in September 1776. On November 2 of that year, an American deserter named William Demont presented Lord Percy with a plan of the fort.[26] How important the plan was to the ultimate success of the British attack later that month is uncertain, but the loss of Fort Washington was a serious blow to the American cause. A number of manuscript maps showing the assault on Fort Washington were made by those engaged

on the British side (a good selection is available from the Web site of the Library of Congress). The only published maps showing the fort were more general in scope, including the maps by Sauthier mentioned in the previous paragraph.

Along with the battles around New York City in 1776, the other momentous military event of the War of Independence in New York was the Saratoga campaign of 1777. This was actually a series of interconnected battles, although the whole is sometimes referred to as "the Battle of Saratoga." This event has been widely recognized by military historians as the turning point of the Revolution—a signal victory, which strengthened American morale and led to the French alliance. From the perspective of the history of cartography, this campaign is also interesting.

There has been a good deal of debate about the British strategy underlying the campaign. In a nutshell, the British planned to divide the colonies along the Hudson River - Lake Champlain axis, and thereby cut off New England from the southern colonies. This classic divide and conquer strategy was designed to disrupt the movement of supplies between the American armies, and to enable the British army to deal with the colonies piecemeal. The campaign was to consist of three parts: Burgoyne's army was to move down the Lake Champlain corridor from Canada to Albany; part of Howe's forces, under the command of Sir Henry Clinton, was to travel up the Hudson River from New York to Albany; and a third contingent under Lieutenant Colonel Barry St. Leger was to march on Albany from Lake Ontario via the Mohawk River. On paper, this strategy makes good sense. The importance of these waterways in shaping the geography and history of New York is a major theme of this book. The British correctly perceived the critical importance of these passageways, and their strategy was based on sound geographical principles.

There has been some discussion about the role of maps in determining this strategy. The decision to make the conquest of New York the centerpiece of British military activities was made in London at the highest levels—ultimately by the king and his closest advisors. King George III happened to be a map enthusiast, and he and his councilors were supplied with numerous fairly detailed maps of New York, including Sauthier's map of the Hudson River, Montresor's map of the Province of New York, and Brasier's map of Lake Champlain.[27] It is not difficult to imagine how a person looking at these maps might arrive at this strategy. However, we do not know precisely what went on in the minds of George III and his advisors, and there were other reasons why they thought this plan would work. They correctly perceived that New York City, with its all-weather port, was a strategic key to the continent. They also thought—and here they were only partially correct—that there were many loyalists in upstate New York, who would come to the aid of the British armies. And they knew from recent experience in the French and Indian War a good deal about the military importance of the waterways leading from Albany to Canada. Almost certainly, all of these considerations, in addition to maps, played a role in their decision.

Nonetheless, in this case there is a real possibility that the British were bemused and misled by their maps. A map, such as Sauthier's depiction of the Hudson River and Lake Champlain, can make military operations in New York appear deceptively easy. Looking at such maps, it is easy to imagine armies being conveyed up the Hudson River and down Lake Champlain, and then marching short distances along roads to a rendezvous with glory in Albany. However, these maps necessarily telescope the immense distances

involved; they do not show the abominable quality of the roads; and they fail to reflect the difficulties created by such obstacles as dense woods or swamps. Even today, the best of maps cannot convey the reality of marching under a hot sun in a wool uniform with a heavy pack, while being periodically soaked with rain and harassed by mosquitoes, horse flies, and other noxious insects. Neither do they show the potential for enemy militia to construct obstacles and harass troops with sniping and ambushes, nor can they depict the difficulties of maintaining fragile supply lines under such trying conditions.

This plays into the ongoing debate over the feasibility of the British strategy. A number of writers have dismissed the British effort to conquer New York and split the colonies as foolish and doomed from the beginning. Others have maintained that it might well have succeeded, and that a British victory could have put an end to the Revolution.[28] This latter school has blamed the British defeat primarily on bad generalship, and they have much evidence to point to: the overconfidence of Burgoyne, combined with his lack of experience in fighting in the American wilderness; Howe's astonishing decision to capture Philadelphia, rather than provide adequate support for Burgoyne in the form of a massive invasion of the Hudson Valley; the excessive caution of Sir Henry Clinton; and the overall incompetence of the alcoholic St. Leger. In my view, it is quite possible that the British, given better leadership, could have at least temporarily conquered Albany and the Hudson Valley.

It is difficult to say what the effect of such a victory might have been. Even if the British had succeeded, they would have found it extremely difficult to maintain a hold on the entire Hudson-Champlain corridor. To disrupt communications effectively between the colonies, numerous garrisons and patrols would have had to been set up, and these would have been vulnerable to being isolated and picked off by a determined enemy. On the other hand, the blow to American morale of such a victory might have been so great that the Rebels might have given up, or at least settled for a negotiated compromise. Because so much of the outcome of a war depends on morale—the willingness of both sides to continue fighting—there is, in my opinion, no telling what the long-term outcome of a hypothetical British victory in the Saratoga campaign might have been.

Doomed or not, the Saratoga campaign led to the production of a number of excellent battle maps. Burgoyne's army was accompanied by skillful mapmakers, who produced several striking plans of the engagements around Saratoga. The British did not publish these maps with the same celebratory gusto as they did maps of the Battle of Long Island, or even the maps associated with Clinton's foray up the Hudson, which will be described below. In striking contrast to the Battle of Long Island, only one map covering this campaign seems to have been published in Great Britain within a year of Burgoyne's defeat.[29] They also reprinted Brasier's 1762 survey of Lake Champlain, and updated it to include information about the defeat of Benedict Arnold's fleet at Valcour Bay in 1776—an event that was only distantly related to this campaign.[30]

However, in 1780 a number of maps were engraved by Faden for Burgoyne's account of his expedition, and these were then later republished in Faden's *Atlas of the Battles of the American Revolution*.[31] A good selection of both manuscript and printed maps of the Saratoga campaign can be found on the American Memory Web site of the Library of Congress. Although primarily of interest to military history buffs, several of them also provide good views of the topography of the areas around the battle sites (Figure 7.4).[32]

Figure 7.4. Anonymous, “Plan of the Position Which the Army under Lt. Genl. Burgoyne Took at Saratoga....” [177?]. Library of Congress, Geography and Map Division.

In part because of its connection with the Saratoga campaign, mention should be made of Fort Ticonderoga, which exchanged hands several times during the Revolutionary War. It was first seized by the Americans in 1775, and then lost to the British in 1777 at the beginning of Burgoyne’s invasion. The Americans regained Ticonderoga after Burgoyne’s surrender, but the British reoccupied it without much opposition in 1780-81, and it was deserted in the final years of the war.[33] In spite of all this military activity, few maps were made of the fort during the Revolution. The British were well equipped with maps of Ticonderoga dating from the French and Indian War, which may partially explain their inactivity in making new maps. The only map of Fort Ticonderoga that appears to have been published in Britain during the Revolution is an adaptation of a map from the period of the French and Indian War, which was modified to show some of the American fortifications built prior to the recapture of the fort in 1777.[34] There is also an important manuscript map by a British officer at the John Carter Brown Library, which shows the fortification shortly after Burgoyne’s successful siege.[35] American and French cartographers also produced plans of the fort, which will be considered later in this chapter.

Two lesser military campaigns were connected with the Saratoga campaign—the attempt of the British under Barry St. Leger to march on Albany via the Mohawk River Valley, and Sir Henry Clinton’s foray up the Hudson River.

Only a single casual sketch appears to have been preserved from the British side depicting St. Leger’s expedition from Oswego to Fort Stanwix.[36] This is fairly typical for the many small raids and campaigns fought by both sides in the Mohawk Valley and nearby areas. Generally speaking, only the larger battles were recorded by mapmakers—if only because people with cartographic skills were unlikely to be attached to small units. The Americans, as we will see, were more active in mapping this campaign.

The lower Hudson River Valley was the most heavily fortified area in the Revolutionary War. Most of these fortifications were constructed in the Hudson Highlands by the Americans, but they were all heavily contested, and the British were quite active in mapping them. Several British maps were drawn of forts Clinton and Montgomery, which guarded the chains that were supposed to prevent the British from sailing up the Hudson. Both of these fortifications were taken by the supporting expedition that was belatedly sent up the river to save Burgoyne's floundering army. Both John Andre and Samuel Holland drew detailed manuscript maps showing the forts and their surroundings.[37] A similar map was drawn by John Hills, and finally published by Faden in 1784.[38] After the collapse of the British efforts to gain control of the Hudson Valley, the Americans turned the tables by capturing two fortifications that the British had built further down the river at Stony Point and Verplank Point. John Hills also drew a map of this event, entitled a *Plan of the Surprise at Stoney Point…*, which was also published by Faden in 1784.[39]

In the final years of the Revolution, the most strategically important of the Hudson River forts was, of course, West Point, which guarded the critical American supply route from New England to the southern colonies. The British famously tried to obtain plans of West Point from Benedict Arnold, and John André's involvement in this effort led to his capture, to his execution, and to the end of his career as a mapmaker. In spite of André's misfortune, manuscript maps at the Clements Library and the Library of Congress show that the British were not completely unsuccessful at obtaining information about West Point. One of these maps, which is conveniently available on the World Wide Web, bears the title, *Sketch of the Rebel Works at West Point as Taken from the Description of Them Given by a Deserter Who Came to Stoney Point, 9th June, 1779*.[40]

Finally, note should be made of the plans of fortifications constructed by the British on Long Island. Central and Eastern Long Island suffered from a particularly unpleasant situation during the Revolutionary War. Long Island was occupied by the British throughout the war, and it was an important agricultural hinterland for their army. But the British hold on it was weaker than on New York City. Much of the population sympathized with the Patriot cause, and the island was subject to raids from Connecticut. In an attempt to maintain and consolidate their hold on this area, the British built several fortifications. Only one of these (Fort Franklin on Lloyd Neck near Huntington) ranks as a major fort. The others can better be described as fortified encampments, several of which were successfully raided by the Americans. Maps have come down to us showing the British encampments at Oyster Bay, Setauket, and Mattituck, as well as the fort at Lloyd Neck.[41] Several of them are the earliest detailed maps of these areas and their surroundings.

Maps of Military Movement

Few good examples of classic "route maps" were produced by the British Army in New York during the Revolutionary War. Such maps were made for the campaigns in New Jersey and the southern states, but are largely lacking in New York because the British relied on water transport in New York for most of their long-distance movements. Some of the overview maps published of the Saratoga campaign, described above, might be considered to be route maps. Probably the best example a route map created by the

British showing events in New York is Sauthier's map summarizing the campaigns in Westchester County and New Jersey following the seizure of Manhattan. This work, which could also be described as a type of battle map, is cited in note 25 above (Figure 7.5). Like many route maps, it has a great deal of white space, and mostly shows what could be mapped from the line of march. In addition, British military officers produced rather sketchy maps of roads on Long Island and in Westchester County, but these can better be described as reconnaissance maps. Better examples of route maps in New York were produced by the American and French armies.

Figure 7.5. Claude Joseph Sauthier, *A Plan of the Operations of the King's Army....* (1777). Library of Congress, Geography and Map Division.

The British produced quite a few reconnaissance maps. These were characteristically produced for areas that the British held loosely or contested periodically. Consequently, they often provide information about places that are not covered in detailed battle maps or military topographic maps. During the Revolutionary War, British reconnaissance maps were most often made for eastern Long Island, Westchester County, and other parts of the lower Hudson Valley. Sometimes they provide information about roads and buildings that cannot be found in any other source.

A number of sketch maps of eastern Long Island fit into this category. One was produced by a Hessian officer, and bears the title “Plan of Long Island in New York Governement Nort [*sic*] America.”[42] It appears to be a tracing of a printed map, but it contains some additional information. Thus, a tavern is shown in the middle of the Pine Barrens of central Suffolk County. This was obviously a matter of considerable strategic importance to soldiers crossing this sparsely inhabited area, but it cannot be found on any other map.

Several of these sketch maps covering areas on eastern Long Island come from the pen of John André, the famous British army officer who was captured and hanged for his role in Benedict Arnold’s treasonous scheme to betray West Point. The most interesting of André’s maps is a sketch of the area around “Cannoe Place” (where the modern Shinnecock Canal is located in Southampton).[43] This is the only British Revolutionary War map that I have been able to locate which shows in detail any part of Long Island’s South Fork, except for its tip. André notes on this map a “commanding height” for the emplacement of guns (Sugarloaf Hill), the location of a “proposed redout,” and a “small Indian settlement” of the Shinnecock tribe. As Sir Henry Clinton’s adjutant general and aide de camp, André was also responsible for maintaining the British Headquarters maps and papers, which are now at the Clements Library at the University of Michigan.

This collection of British headquarters maps at the Clements Library also includes numerous reconnaissance maps for Westchester County and other Hudson Valley areas. A few similar maps are at the Library of Congress, and can be viewed online. These run all the way from hastily sketched road maps, through sketches of military topography, to elaborately detailed maps that show individual houses. Some of them approach in quality the topographic surveys that are described in the following section. Several show houses and even give the names of individual homeowners. An example of one of these more elaborate surveys is shown in Figure 7.6 below.[44]

Figure 7.6. Andrew Skinner, "A Map Containing Part of the Provinces of New York and New Jersey...." (1781). Library of Congress, Geography and Map Division.

Topographic Maps and Nautical Charts

Elaborate topographic maps covering large areas are not usually made by military cartographers during time of war. Prior to the twentieth century, detailed surveying could not be carried out under wartime conditions, and the production of these maps was so time consuming that military map makers were usually called upon to spend their time on more urgent tasks. But the American Revolution provides a partial exception to this generalization. After the British seized New York City in 1776, they produced numerous military surveys of Manhattan and its environs. The British occupation of this area made it safe for the surveyors to do their work, and since they were confined to the vicinity of New York for long periods (especially after Yorktown), they had time on their hands for detailed mapping. Such work was valuable, both for planning the defense of the city against possible attacks by the American and French forces, and also for such mundane purposes as gathering military supplies.

This group of military maps includes the charts of the New York City area published in Des Barres' *The Atlantic Neptune*. As noted in the previous chapter, the extensive and detailed coastal surveying embodied in the *Atlantic Neptune* had to be suspended at the outbreak of the Revolution, just as it was reaching New York. However, the *Neptune*—all of which was published sheet-by-sheet after 1775—includes several charts covering the

New York area. Most of them include detailed topographic mapping of areas well inland from the coast, along with such standard navigational information as soundings and indications of shoals and rocks.[45]

Little of the work reflected on these charts was done prior to the Revolution. Most of the surveying was done by Samuel Holland and other military surveyors after the British occupied New York City in 1776. Several of the charts in *The Atlantic Neptune* were published in multiple editions during the Revolution, which sometimes included additions providing more detail or bringing them up to date. The nautical information on them was of particular importance to the British military, since naval activities in the vicinity of New York were critical for the entire British war effort.

The Des Barres chart showing New York Harbor and the course of the Hudson River as far as Stony Point has already been mentioned in connection with the Battle of Long Island. While this chart showed most of western Long Island and Westchester County, and included military information (evidently to increase sales), it also was much more accurate and detailed than all previous nautical charts of New York Harbor. This chart, published in 1777, does not include a list its sources, which may have included both surveys conducted prior to the outbreak of the Revolution and surveys made during or shortly after the British invasion. A similar chart was published as part of the *Atlantic Neptune* in 1779, although it is restricted to the entrance of New York Harbor and includes somewhat more detailed information for pilots.[46] This chart bears a note stating that it was "composed from surveys and observations of Lieutenants John Knight, John Hunter of the Navy & others." Hunter, at least, was on board Howe's flagship during the invasion of New York, which hints that much of the chart was probably based on surveys done by the British navy in 1776 or shortly thereafter. John Knight was an assistant of Des Barres, who conducted extensive surveys of Long Island Sound during the Revolution, and later became an admiral.[47]

The Atlantic Neptune also included a chart of the Hudson River in the vicinity of Forts Montgomery and Clinton. Published in 1779, it is based on a manuscript map made by Samuel Holland in 1777, and is another example of Des Barres attempting to use a British military victory to boost sales. This chart also extends somewhat the coverage of the Hudson River in *The Atlantic Neptune*.[48]

Several sheets of *The Atlantic Neptune* cover harbors and coastal areas of Westchester County and parts of Long Island. Long Island Sound was critical to British efforts both to secure the valuable agricultural areas on Long Island, as well as to carry out military operations against coastal Connecticut and Rhode Island. One of these charts shows the East River, Hell Gate, and the western portion of Long Island Sound.[49] This medium-scale chart includes extensive soundings, but little information about topography beyond the coastline. Another chart gives more detailed coverage of Oyster Bay, Huntington Harbor, and Hell Gate, including inland areas.[50] A third chart shows the eastern entrance of Long Island Sound, including parts of the north and south forks of Long Island, along with Fishers Island and much of Peconic Bay.[51] This area was particularly important for British efforts towards the end of the Revolution to monitor and disrupt the activities of the French and Americans in the Rhode Island area. The second (1781) edition of this chart is an important source of information about features on the land in these areas.

The coast of New York is not shown in its entirety on any of the above maps. Two small-scale charts in *The Atlantic Neptune* between them do show all of coastal New York, but they are not especially accurate, even considering their small scale and the time when they were published.[52] This reflects the lack of comprehensive surveys from New York to the south prior to the Revolution, and the fact that surveys made during the Revolution covered only limited areas of high military value. This also shows that *The Atlantic Neptune* was in part a commercial production. Although most of the charts in that publication were of remarkably high quality for the time, Des Barres was not above publishing inferior charts when he thought it worthwhile.

Finally, we come to the remarkable large-scale topographic maps of the area around New York City produced by British military surveyors in the years between 1776 and 1783. None of these were published in the eighteenth century, and they are relatively little known. One of the earliest of this group is a survey of Staten Island drawn by Sauthier in 1776 "by Order of His Excellency General Howe, Commander in Chief of His Majesty's forces in North America." Staten Island was the site of the initial British landing preceding the Battle of Long Island, and Howe evidently recognized the value of having a detailed map of the area. It is a very large-scale manuscript map (1 inch to 2,112 feet), which shows such details as individual fields and buildings.[53]

The British also made numerous maps of Manhattan during the period of their occupation. Their makers included such prominent cartographers as Sauthier and Samuel Holland. Augustyn and Cohen have remarked: "As a result of the presence of these surveyors and engineers in the city through the war, New York, which was one of the most poorly mapped American cities before the war, became by its end the most thoroughly mapped urban area of the United States."[54] The most impressive of these maps is an anonymous production usually known the "British Headquarters Map," which shows the entire island of Manhattan at the very large scale of 1:9748 (6.5 miles to an inch). Copies of this map are available at large research libraries in the form of a 22 page facsimile published in 1900 by B.F. Stevens.[55] In addition to the expected roads, fortifications, and houses, it shows the topography of Manhattan in minute detail. This makes it an invaluable resource to researchers who want to know what Manhattan looked like before the extensive infilling and construction that have completely transformed the surface of the island.[56]

A comparable level of detail is available on many manuscript maps produced during the final years of the Revolution covering the boroughs of Brooklyn, Queens, and Richmond (Staten Island), as well as parts of Westchester County. Many of these can be found in the Clinton Collection at the Clements Library; others are scattered among various archives in the United States and Britain.[57] One example of these manuscript maps has been put online by the Library of Congress. Although not as detailed as some, it gives a good idea of their general appearance (Figure 7.7).[58]

Figure 7.7. Detail of "Plan of New York and Staten Islands with Part of Long Island, Survey'd in the Years 1781, & 82" (1782?). Library of Congress, Geography and Map Division.

Especially after Yorktown, the British army was almost completely confined to the area around New York City, and the military engineers had time on their hands. Although mapping provided a kind of relief work for under-employed military surveyors, the existence of these maps also owes much to the cartographic interests of Sir Henry Clinton, the British commander in New York after Howe's resignation. Several of these maps in the Clinton collection at the Clements Library, bear handwritten annotations by Clinton himself. Often they are dedicated to Clinton or expressly "surveyed by order of His Excellency General Sir Henry Clinton K.B. Commander in Chief of His Majesty's Forces &c. &c." Brooklyn received particularly detailed treatment. For example, Andrew Skinner's "Map of the Environs of Brooklyn" is at a scale of 1:7920, which is even more detailed than the Headquarters map of Manhattan.[59] Brooklyn continued to be of depicted in detail in 1781 and 1782 partially because of continuing interest in the Battle of Long Island of 1776. Thus, among the maps produced at this time is a detailed depiction by George Taylor of the Jamaica Pass at a scale of 1:6034.[60] Clinton annotated several of these maps, for he was obsessed with refighting the Battle of Long Island. It is not difficult to understand why: Clinton played an important role in that battle, having managed with great difficulty to persuade the reluctant Howe to engage in the successful flanking maneuver through the Jamaica Pass. As has been seen, some of

these annotations reveal that Clinton bitterly blamed Howe for failing to capture Washington's army, which he thought might have ended the Revolution.[61]

American Maps

American maps of the Revolution generally lack the polish of the detailed topographic maps produced by the British military engineers, and the Americans did not have the facilities to engrave and publish elaborate maps. The total output of manuscript maps by the Americans was also somewhat lower than that of the British.[62] Nonetheless, the Americans produced a respectable number of maps, and overall their quality (in terms of geographic accuracy) is comparable to those of the British. Since the Americans and the British controlled different parts of New York, one can often find the best and most detailed coverage of certain areas on maps made by the Patriot side. In addition, it is always interesting to see maps of contested fortifications or battles made by both sides. In some cases, the only existing maps of certain events come from the Americans. A comprehensive list of almost all of these maps is contained in Guthorn's *American Maps and Map Makers of the Revolution*. Here only the highlights and general trends will be presented.

Maps and Plans of Fortifications

As one would expect, the Americans produced numerous maps and plans showing the fortifications they constructed, attacked, or spied upon. These include maps of fortifications constructed on Long Island and Manhattan prior to the British invasion.[63]

The strategic importance of the Hudson River Valley was recognized at the very beginning of the Revolutionary War by the Americans. As early as 1775, Bernard Romans began building fortifications in the vicinity of West Point.[64] Romans had considerable experience as a map maker, having served as an assistant to Gerhard de Brahm, who was Samuel Holland's counterpart for the southern colonies. Romans was one of the very few British military engineers who took the American side during the Revolution. He is best known for a map of Connecticut that includes Long Island, but his productions also include two maps of the Hudson River near the Hudson Highlands, and several plans of his proposed fortifications.[65] The most detailed plan of Fort Montgomery appears to be the one drawn by Romans' successor, William Smith.[66] Smith was in turn succeeded by Thomas Machin, who drew a remarkably detailed pen-and-ink map of the Hudson Highlands.[67] Machin's map is dedicated to "George Clinton Esq. Governor of the State of New York" (who should not be confused with the numerous other Clintons who played important roles in New York State history, and especially not with the British General Sir Henry Clinton). Machin enjoyed turning the tables on the British by noting on his map that certain structures were "burnt by the British rebels," and designating as the "rebel route" the path the British took when they attacked Stony Point. After the construction of West Point, several maps were produced by French and American cartographers showing that fortification.[68]

Another fortification that played a major part in the Revolutionary War was Ticonderoga, which (as described above) exchanged hands several times. In 1775 it was seized by the Americans, who put its guns to use at the siege of Boston. Its fall in 1777 to

the British under Burgoyne was an embarrassing setback for the Patriots: the British forced them to evacuate Ticonderoga by dragging guns to the top of nearby Sugar Hill, which overlooked the fort, and which the Americans regarded as "unclimbable." As has been mentioned, the British appear not to have created any maps depicting these engagements. On the other hand, the Americans made several maps showing Ticonderoga and its immediate surroundings. One of these was by John Trumbull (1756-1843), who later became famous as a painter of portraits and of patriotic subjects. He visited the fort and drew a map entitled "Ticonderoga & its Dependencies, August 1776," which showed Sugar Hill as "unclimbable."[69] Quite a good map of Ticonderoga at the time of the British siege in 1777 was engraved and published as part of the transcript of the court martial of the American General Arthur St. Clair, who was acquitted of charges arising from the American defeat.[70]

Several maps produced by the Americans are the only visual records of some of the smaller Revolutionary War fortifications. This seems to be the case with Fort Stanwix, which the Americans rebuilt and named Fort Schuyler. The unexpected strength of this fortification was a major reason for the defeat of the St. Leger expedition. The man responsible for rebuilding the fort was Francois de Fleury, a French engineer who volunteered to work with the American army. After the siege, he drew a careful "sketch of Fort Skuyler," which shows both the topography and military actions near the fort.[71]

American spies were active in producing maps of British fortifications on Long Island and elsewhere in the New York City area. Guthorn in *American Maps* lists nine such maps. Benjamin Tallmadge was probably responsible for maps of two small British forts on Long Island—Fort Slongo and Fort St. George, both of which were successfully raided by the Americans. No other maps of these forts seem to exist. One of his maps of Fort St. George, is crudely drawn but accurate, and has considerable artistic appeal.[72]

Battle Maps

Although some of the fortification maps discussed above show the positions of opposing troops, classic "battle maps" were not an American specialty. In the case of the battles around New York City in 1776, the contrast between the British and American output is dramatic. On the American side, only three small and crude woodcut maps were published, all of which bore the same title and appeared in almanacs published in New England.[73] Although this campaign was not one for revolutionaries to celebrate, the lack of more extensive American coverage in this case also reflects the lack of skilled surveyors in the Continental Army at that time, and the primitive state of American map publishing.

There is equally little American coverage of the Saratoga campaign, even though it was arguably their most important victory of the war. The only published American map of any part of this campaign is the one of the area around Fort Ticonderoga (mentioned above), which was prepared for St. Clair's court martial. In addition to fortifications, this map shows enough military activities for it also to be described as a battle map.

Maps of Military Movement

Although American cartographers produced relatively little in the way of fortification or battle maps, they shined in the drafting of route maps. In fact, the overwhelming majority of maps produced by Washington's headquarters were road maps. Most of these were drawn by Robert Erskine (1735-1780), who was appointed Geographer and Surveyor-General to the American Army in 1777. Others were also involved in the production of these maps, especially Erskine's successor, Simeon De Witt (1756-1834), who later became Surveyor General of New York, and will play a starring role in the next chapter. Most of these maps are in the Erskine-De Witt collection at the New York Historical Society. Guthorn lists some 125 maps by Erskine and De Witt in this collection.[74] Most are road maps, and many consist of multiple sheets.

This emphasis on road maps clearly reflects the situation and needs of Washington's army. With his limited forces, Washington had to be nimble and shift his troops around to meet threats from different directions. He also had to avoid entrapment by a superior British force, and to obtain supplies wherever he could find them. Since Britain controlled the seas, land transportation was his only option. All of this explains the need for good road maps. Because of New York's central location between the northern and southern colonies, Washington frequently had his headquarters in the Hudson Valley. For this reason, a high percentage of Erskine's maps show roads in New York, particularly in the strategic corridor just north of the Hudson Highlands linking Connecticut with New Jersey and Pennsylvania.

Most of Erskine's road maps are unpretentious but accurate. We have a good idea of how he went about making them, since he described his procedures in considerable detail to Washington.[75] His preferred method was to measure the roads with chains, and to use a surveyor's compass and a plane table to fix the location of nearby landmarks Most of his maps were made at a standard scale of one mile to an inch. Erskine knew how to use more sophisticated instruments, such as theodolites, for measuring vertical elevations and for making more accurate estimates of the locations of distant objects, but it is uncertain how often he actually used them. One of his maps is proudly labeled "Width of N.R. [North River or Hudson River] at Closter A and B. at Dobbs Ferry measured with a Theodolite."[76] Another of his exercises is an unfinished spherical projection of an area around the New York - New Jersey border.[77] Some of De Witt's maps from this period are explicitly made on a conic projection, which also seems to have been used by Erskine for some of his maps of larger areas. Thus, Erskine's knowledge of cartographic techniques was up-to-date and sophisticated, but for practical reasons he was rarely in a position to do very elaborate mapping.

Regional Maps

Erskine and De Witt produced several topographic maps of larger geographic regions, which bear comparison to the productions of the British military engineers. They were made at a variety of scales throughout the period from 1778 to 1783. One of the reasons why Erskine made a point of using a plane table to ascertain the position of landmarks visible from roads is that he could use these positions to link together his road surveys across broad areas. The resulting maps reveal their origin as collations of road maps very clearly. Roads appear prominently, together with houses along the roads, streams, hills, and other conspicuous landmarks. There is, however, a good deal of white

space in places away from the roads—indicating that little surveying was done in such areas. Many of these maps appear to be at least as accurate as the maps of the region around New York done by the British military surveyors during the Revolution, but they lack the polished appearance and the amount of topographic detail that appears on the British maps.

One of the best examples of Erskine's work is a map of Orange and Rockland Counties, which is available on the Library of Congress Web site (Figure7.8).[78] This regional map is typical of Erskine's work. It was clearly built around a framework of road surveys: the roads are carefully drawn in, with nearby features including fortifications and individual houses shown in detail. The broader topography is sketched in a more generalized fashion.

Figure 7.8. Detail of Robert Erskine, [Map of Orange and Rockland counties area of New York] (manuscript map, [1779]). Library of Congress, Geography and Map Division.

Erskine was involved not only in making his own maps, but in directing and coordinating the activities of others. In this connection, particular mention should be made of the mapping of the Clinton-Sullivan campaign against the Iroquois. This expedition, which took place in 1779, was a destructive retaliatory raid against the Indians. It was intended, at least in part, to put an end to the bloody raids conducted by British Loyalists and their Iroquois allies in the Mohawk Valley and elsewhere. The

Clinton-Sullivan expedition succeeded in burning forty villages and destroying vast amounts of crops in the Iroquois heartland, although it resulted in few deaths on either side. Predictably, it did not have much effect in limiting raids on American frontier settlements, although it created a massive refugee problem for the Iroquois and the British at Fort Niagara. In the long run, the American victory in the Revolution destroyed the political and military position of the Iroquois, and the expedition helped make the Americans more aware of the desirability for farming and settlement of the lands around the Finger Lakes. This set the stage for the rapid westward expansion of New York in the decades following the Revolution.[79]

Whatever else may be said about the campaign, it was well mapped, which in itself was unusual for Revolutionary War activities in western New York. The surveyor of this expedition was Benjamin Lodge, whose first map made for the army was criticized by Erskine as "a most abominably lazy slovenly performance."[80] Lodge evidently took Erskine's criticisms to heart, for his subsequent maps are carefully executed route maps very similar to Erskine's own. Lodge sent his maps back to Washington's headquarters, and they can now be found in the Erskine-De Witt collection at the New York Historical Society.[81] Cartographically speaking, the most spectacular result of the Sullivan-Clinton expedition was an anonymous map based on Lodge's surveys, which was compiled at Washington's headquarters. This is a carefully finished, colored map that closely resembles many of the maps produced for the British headquarters. It shows Indian villages, the movements and encampments of the American forces, several of the Finger Lakes, and some topography. The large amount of white space on the map reveals the extent to which it was made from surveys taken along the route of the armies, as they proceeded along the Susquehanna River, into the Finger Lakes area, and thence to the Genesee River (Figure 7.9).[82]

Figure 7.9. Detail of Anonymous, " Map of Gen. Sullivan's March from Easton to the Senaca & Cayuga Countries" (manuscript map, [1779]). Library of Congress, Geography and Map Division.

French Maps

The French made a variety of contributions to the mapping of New York during the Revolution. Their army played a relatively minor role in the campaigns in New York, although they did produce some maps that are directly associated with their military activities in this area. In addition, French map publishers reprinted a number of British or American maps that depicted the theatre of war in New York, and some French engineers, who served as volunteers in the American army, also drew maps.

French map publishers were remarkably active in republishing maps of British North America from about 1750 through the period of the American Revolution. The production of French maps of North America speeded up noticeably after 1776. Thus, in 1777, French editions appeared of the important regional maps by Mitchell [83], and Jefferys[84], and also of Montresor's maps of the Province of New York and of New York City.[85] Many of these were published in Paris by George-Louis Le Rouge, who specialized in American materials.[86] Some of the maps published in France more directly reflected events of the Revolutionary War. In 1776 Le Rouge republished a British map showing the Battle of Long Island.[87] In 1778, the Dépôt de la marine published a map of New York Harbor based largely on the work of Des Barres.[88] And

in 1777 Brion de la Tour created a map of the North American “theatre of war” showing the events of the Saratoga campaign.[89]

These French editions of British maps are important for two reasons: first, they are indications of the intense French interest in the American Revolution, which led to their intervention at the end of 1777. And they were also significant sources of cartographic information for both the French and the Continental armies in America.

It is debatable whether the maps made by French volunteers working for the Continental Army should be counted as French or American productions. Guthorn treats them as American in his *American Maps*. To further complicate matters, the French language was frequently used during the Revolution by non-French European cartographers, particularly by Germans. Thus, there are a number of maps with French titles in the Clinton collection and elsewhere made by Hessian officers working for the British. One of the most remarkable of these was made by Charles de Gironcourt—one of a number of Hessian officers employed by the British who were born in France or had French ancestors.[90] A few German officers on the American side also wrote in French. And, if this is not confusing enough, it has been estimated that as much as one-third of Rochambeau’s army was made up of native speakers of German.[91] Thus, one needs to be cautious in ascribing anonymous maps in French to French cartographers.

There is, nonetheless, indisputably a significant group of maps made by French cartographers serving in the American army. The map of Fort Stanwix by Francois de Fleury, mentioned above, belongs to this group. A similar situation arises with Michel Capitaine du Chesnoy, an aide to Lafayette. Guthorn lists some 19 maps that he made during the Revolution, although only one of them covers a part of New York.[92] In addition, Chesnoy made a map of American and British positions at Ticonderoga in 1777.[93] Maps of New York can also be found among the works of two other French military engineers working for the Americans: Etienne de Rochefontaine and Jean de Villefranche. Rochefontaine’s maps include a detailed reconnaissance map of the British defenses around New York prepared for Washington and Lafayette 1n 1781.[94] Villefranche drew detailed maps of West Point and the Hudson Highlands.[95]

The only French army on American soil during the Revolutionary War was headed by Jean-Baptiste-Donatien de Vimeur, comte de Rochambeau (1725-1807). The Rochambeau Campaign of 1780-82 is well documented, and many of Rochambeau’s maps have been made available on the Web by the Library of Congress, including his personal atlas. What emerges from this documentation is the extraordinarily systematic and extensive use of maps by Rochambeau and the French army. The Rochambeau collection includes a wide range of French, English, and American published maps of North America. The French were also meticulous in documenting their military activities. Detailed route maps were prepared for the march of the French army from Rhode Island to Yorktown.[96] The Rochambeau atlas at the Library of Congress includes plans of virtually every camp the French army set up during this march, including some in New York.[97]

Still, only a small percentage of these maps depict places in New York. Prior to the Yorktown campaign, Washington and Rochambeau considered attacking the British in New York City. A good deal of reconnoitering was done of the British positions in the vicinity of New York. These activities led to the production of a number of maps of the New York area, ranging from geographical overview maps to highly detailed plans of the

British fortifications at Throg's Neck and on northern Manhattan.[98] This reconnaissance work also led to the production of several maps of the Huntington area on Long Island, including the British fort on Lloyd Neck.[99] These maps testify to effective intelligence work, and doubtless reflect the efforts of both French and American spies and mapmakers. Franco-American collaboration did not always work perfectly. One anonymous map of the Lloyd Neck area carries the plaintive annotation (in French): "Bay to which the American pilots should have led the ships."[100]

One result of all of this intelligence work was that Rochambeau succeeded in convincing Washington to drop his plan to attack the strong and well-fortified British position at New York City, and to undertake the Yorktown campaign instead. Washington did not completely abandon his plan to attack New York until August, 1781, when the French and American armies combined near Dobbs Ferry to reconnoiter the northern defenses of Manhattan. This effort is reflected in a particularly elegant map of the lower Hudson Valley entitled *Position du camp de l'armée combinée a Philipsburg du 6 juillet au 19 aoust* .[101]

The march in late August from Newport, Rhode Island, to Yorktown took Rochambeau's army across the Hudson River at Stony Point and along the west bank of the river before crossing New Jersey to Philadelphia. After the victory at Yorktown, the French army turned around and marched back to Boston. Maps of the French encampments on the return march can be found in the Rochambeau atlas and elsewhere. Particularly noteworthy are those showing the French and American encampments near Peekskill (Figure 7.10).[102]

Figure 7.10. Anonymous, “ Position des Armées amériquaine et françoise....” (manuscript map, [1782]). Library of Congress, Geography and Map Division.

Conclusions

The armies that fought the Revolutionary War built upon the maps of New York that had been made between 1750 and 1775. They added to this pre-existing cartographic knowledge by creating detailed regional and local maps, particularly of the area around New York City and of the Hudson Valley region. Cartography being to some extent a cumulative activity, this provided a foundation for much of the mapping of New York in the decades following independence.

Chapter 8
Mapping an Expanding State, 1784 - 1804

Introduction

The decades following the Revolutionary War saw dramatic growth in the population and economy of New York State. With the fighting over, New York's elite could put away their military maps and concentrate on more peaceful activities, such as land speculation. Before New Yorkers could begin making their fortunes (or going bankrupt) in real estate, a number of problems inherited from the colonial era had to be resolved—including the determination of New York's boundaries, the disposition of land confiscated from Loyalists, and the allotment of New York's greatly expanded public domain (mostly acquired at the expense of the Iroquois).

The Post-Revolutionary Land Rush

In the two decades following the Revolution, New York witnessed a full-scale land rush. A superficial look at New York in 1783 shows a state that had actually receded from its colonial boundaries. Because of wartime destruction, most of the settlements beyond Long Island and the central Hudson Valley had been abandoned. The frontiers of New York appeared to be approximately what they had been at the conclusion of the French and Indian War. But this appearance is deceptive. As is often the case after the conclusion of a war, reconstruction was rapid, and old settlements were quickly repopulated. There was also a huge demand for land from emigrants. Little of this pressure came from overseas: most of it was from land-hungry American farmers seeking to better their lot. Much of this flood of emigrants came from New England, but many also came from the Hudson Valley, and some from New Jersey and Pennsylvania.[1] The story of the expansion of New York following the Revolution has been told in detail elsewhere.[2] Here a brief summary will be presented as background for interpreting the maps of this period.

The flood of immigration into central and western New York is reflected in population statistics. The population of New York State in 1783 has been estimated at around 250,000.[3] At that time, it stood behind Connecticut in total population. According to the U.S. census, New York's population increased to 340,000 in 1790. In 1800, it stood at 589,000; in 1810, at 959,000, surpassing Virginia as the most populous state in the nation. By 1820, the population of New York stood at 1,373, 000; and in 1830 at 1,919,000. This rapid growth both reflected and contributed to the rapid settlement of the central and western portions of the state. In the case of Ontario County, which at that time included most of the western portion of central New York, population increased from 1,075 in 1790 to 42,032 in 1810.[4] Overall, according to Laurence Hauptman, approximately 1000 non-Indians lived in New York west of Seneca Lake in 1790; in 1850, the figure was more than 660,000.[5]

There were several sources of land for settlers in the years following the Revolution. Areas that had been lightly populated prior to the Revolution—such as the shores of Lake Champlain, the Susquehanna River Valley, and the Mohawk River Valley—were reopened for settlement following the conclusion of peace. In addition, a large amount of

property formerly held by Loyalists was put on the market. With the conclusion of peace, new land also became available around the margins of the Adirondacks, and along the St. Lawrence River. Above all, the Iroquois lands in central and western New York were made available for purchase by speculators and land-hungry settlers.

By the 1790s, these activities led to a full-scale speculative boom in undeveloped New York State acreage. Land prices appreciated rapidly in a spiral that bears an uncanny resemblance to the real estate boom of the first decade of the twenty-first century. At the end of the decade, the bubble burst—producing a number of spectacular bankruptcies, as will be seen below.

All of this activity led to a great deal of surveying and mapping.

Maps and Politics: Simeon De Witt and His Associates

A key person in the mapping of New York in the decades following the Revolution was Simeon De Witt (1756-1834), who occupied the strategic position of surveyor general from 1784 until his death fifty years later.[6] De Witt is a sphinx-like figure, who presided quietly over a carnival of land speculation, which was marked by vicious political infighting and various types of fraud and chicanery.

Figure 8.1. Portrait of Simeon De Witt by Ezra Ames. Original at Jane Voorhees Zimmerli Art Museum, Rutgers, the State University of New Jersey, Gift of the Grandchildren of Simeon de Witt. Image from Wikipedia Commons.

There is always a relationship between cartography and politics, but rarely is it as evident as in the mapping of New York in the decades after 1783. During this period, New York's leaders found themselves with millions of acres of land at their disposal, and the need to sell it quickly to pay off Revolutionary War debts. At the same time, the state was split between political factions, including Clintonite Democratic-Republicans, Hamiltonian Federalists, and the followers of Aaron Burr. Later in De Witt's career, "Martling Men" associated with Peter Porter, and later Martin Van Buren's Bucktail Democrats, became important. In spite of these divisions, and the bitter controversies that were sometimes associated with them, there was a remarkable amount of agreement and cooperation on land policy. Not to put too fine a point on it, so much land became

quickly available that anybody with money or a claim to political power could easily obtain a suitable helping of it.

De Witt's primary role was to survey and dispose of this land. As will be seen, he was also involved in a variety of other activities, but he was basically in the business of running a large and active state land office, which among other things sold massive amounts of land taken from former Loyalists and the Iroquois. Anyone in a position like this is certain to be subjected to all kinds of political pressures, and De Witt somehow managed to deal with them in ways that created remarkably little controversy. In the process, he also made important contributions to the mapping of New York.

We previously encountered Simeon De Witt as an assistant to Robert Erskine, whose place as Geographer and Surveyor General of the American army he occupied after Erskine's death in 1780. De Witt was related to General James Clinton (1733-1812), and to governors George Clinton (1739-1812) and De Witt Clinton (1769-1828). He received his initial training as a surveyor from his uncle James Clinton, and acquired advanced knowledge of surveying and cartography through his work with Erskine. De Witt's experience as a military surveyor made him one of the most highly qualified cartographers in America. He belonged to an elite circle, which included such luminaries as David Rittenhouse Thomas Hutchins, and Andrew Ellicott. This group formed part of an interconnected network of surveyors, land speculators, and politicians. He was thus both professionally and politically well connected.

Although De Witt's family connections made him a Democratic-Republican of the Clintonian stamp, this did not prevent him from working hand-in-glove with Federalists, such as John Jay, Gouverneur Morris, and Philip Schuyler. In this respect, his politics resembled those of De Witt Clinton, who (more than populists like George Clinton or Aaron Burr) belonged to the patrician wing of the Democratic-Republican party. This collaboration is most evident in the case of Philip Schuyler, the Revolutionary War hero, who went on to become an important Federalist politician and a major land speculator. Schuyler also happened to be De Witt's predecessor as surveyor general. (The colonial office of surveyor general had been renewed by the legislature in 1781.) De Witt was appointed to this position after Schuyler resigned to become a United States senator. Although Schuyler became a bitter political opponent of George Clinton, he and Simeon De Witt, along with De Witt Clinton, were close allies in a variety of important projects, ranging from relieving the Iroquois of their allegedly "waste and unappropriated" lands to promoting the Erie Canal.[7]

De Witt's role in early republican New York somewhat resembles that played by Cadwallader Colden in the decades before the Revolution. Both of New York's long-term surveyor generals were at the center of cartographic activities for extended periods of time, and their personalities and policies present revealing similarities and differences.

Both Colden and De Witt came from respectable, but non-aristocratic families. Colden was the son of a Presbyterian minister. De Witt was one of one of the fourteen children of a physician, Andries De Witt. Although De Witt's Clintonian relatives were politically powerful, they were only moderately wealthy. Both De Witt and Colden aspired to, and achieved, a considerable degree of gentility. Both had wide-ranging political and intellectual interests and connections. Like Colden, De Witt thought of himself as a man of learning and of scientific talent. Colden's claims to scientific and literary eminence were more substantial than those of De Witt, but De Witt's

accomplishments were not negligible. At least as early as 1790, he was elected a member of the American Philosophical Society on the nomination of David Rittenhouse.[8] He was also a member of the Board of Regents of the University of the State of New York from 1798 until his death, and he was a founder of the Albany Institute of History and Art. His publications include a number of articles on scientific subjects, although none of them could be described as works of genius. They include pieces on the variation of the magnetic needle, on the climate of New York, and on agricultural subjects, such as the rotation of crops. He also happens to have published the first drawing of a Devonian fossil from New York, an ammonite, which he thought was a petrified ram's horn.[9] One of his longer works bears the revealing title *Considerations on the Necessity of Establishing an Agricultural College, and Having More of the Children of Wealthy Citizens Educated for the Profession of Farming*.[10] He also published a small book on *The Elements of Perspective*.[11]

Colden and De Witt also resembled each other in the way they lived. Both were patriarchal family men. De Witt was the father of six children by three wives. Both Colden and De Witt fancied themselves as landed gentry, and played at being gentleman farmers. Both took advantage of their positions to build up substantial amounts of landed wealth, although neither was rapacious by the standards of his time. Unlike Colden, De Witt had a reputation for almost superhuman virtue. His eulogist remarked: "I state it with pride, as one of the brightest traits in his character, that during the half century of his public life, he never purchased a single acre of public lands."[12] While this may be literally true, De Witt found ways to advance both himself and his relatives. He somehow managed to acquire a fine piece of Albany real estate when he made a survey of that city, and at the time of his death he owned 1,932 acres in the vicinity of Ithaca.[13]

De Witt also had no inhibitions about hiring friends and relatives, most notably his cousin, Moses De Witt (1766-94), who was also a surveyor and became a major land speculator in central New York. None of this is intended to suggest that De Witt was larcenous or a hypocrite, but only that he (like Colden) lived at a time when a certain amount of nepotism and profiting from office was regarded as normal and acceptable.

In spite of these external similarities, the two officials had radically different personalities and political styles. Colden was vain, verbose, and confrontational. De Witt's temperament was almost diametrically opposed. Colden's career is easy to follow because he wrote volumes of letters and memoranda. In contrast, De Witt wrote little, and most of what he produced is curiously unrevealing. His letters, even those to close friends and relatives, are formal and impersonal, even by the standards of his time. George Geddes, the son of De Witt's assistant James Geddes, wrote of him: "He was a man of caution, and dealt in facts, and had little or nothing of the extravagant in his nature." [14] In spite of his having been closely involved with politically sensitive matters, De Witt avoided political gossip, and left practically no paper trail expressing his own views and opinions, to the frustration of later historians.

De Witt was so unobtrusive that others took little notice of him. The correspondence and papers of his contemporaries—including Philip Schuyler, Thomas Jefferson, and John Jay—contain few references to him. What little can be found in such sources is either neutral or laudatory. He was almost uniformly described as capable, hard working, unaffected, and honest. Simeon De Witt's work during the Revolutionary War won him the praise of George Washington, who wrote to Jefferson: "I can assure you he is a

modest, sensible, sober, and deserving young Man. Esteemed a very good Mathematician, and well worthy encouragement,…"[15] Ironically, almost the only negative characterization of De Witt by a contemporary is a satirical poem that credited him (falsely) with responsibility for the remarkable collection of classical place names assigned to the townships of the New Military Tract.[16] He seems to have had few personal enemies, which is remarkable in any age, and particularly so in the early years of the American Republic. Alvin Kass has observed that De Witt was the *only* Clintonian civil servant to survive the Bucktail purge of political appointees in 1820.[17] It is little wonder that Jo Margaret Mano, who has studied De Witt's career closely, was led to title a presentation: "Simeon De Witt: Enigmatic Surveyor General, 1784-1834."[18]

This remarkably bland and even personality helped De Witt to pursue a successful career through a period of rapid economic and social change, and of political controversy. In so far as they can be ascertained, De Witt's politics were similar to those of his cousin De Witt Clinton. Only in a few cases, though, did he articulate strong political opinions, or state his opposition to particular people. We know that in 1804 he pressed Joseph Ellicott to support Morgan Lewis for governor against his opponent Aaron Burr, who was anathema to both George and De Witt Clinton.[19] And, late in life, he made a rather detached political observation when he wrote from Ithaca to his deputy in Albany, Bernard S. Van Rensselaer: "Please send up my *Extra Globe* to lay on the table in the Clinton House reading room, where I am sorry to say, political heresy abounds—the old Hotel is the Jackson focus of this place."[20] But that is almost the extent of his visible political comments and activities.

De Witt could go out of his way to avoid controversy. For example, when asked by the state legislature to investigate the desirability of providing relief to settlers forced into debt by declining land prices, he concluded his report with these typically labored and unrevealing words: "Unfortunate, embarrassing and delicate, as are the subjects of this report, the Surveyor-General has thus endeavored, with the aid of all the information he could obtain, to place before the Legislature in a point of view the best calculated, in his opinion, to assist and facilitate their deliberations. The reference being confined to information alone, he has avoided as much as possible expressions that might be construed into an obstruction of opinion relative to what is proper to be done;…"[21] Another example of De Witt's tendency to equivocate comes from one of the American agents of a French company, which had purchased land in New York, who went to De Witt to get his opinion on the disputed boundaries of the large tract of land they had bought: "I perceived that he avoided as much as possible revealing himself in this regard, something which I could only attribute to the fear of compromising himself with our sellers, who are American, while we are foreigners and unable to be either useful for him or harmful."[22]

Nonetheless, De Witt was not completely impartial or apolitical. As both a member and a servant of New York's political establishment, he was immersed in controversial activities, on which he could not avoid taking positions, if only by implication. This could hardly be otherwise, since almost anything that had to do with the buying and selling of state land involved the surveyor general's office. In spite of De Witt's skill at not antagonizing people when dealing with difficult issues, he was nonetheless involved in implementing controversial policies (including the disposition of lands owned by former loyalists, the purchase of land from the Iroquois, and the construction of the Erie

Canal). His opinions on these subjects, although never aggressively stated, were substantially the same as those of George and De Witt Clinton. Like most of his contemporaries, he took it for granted that the Iroquois lands should be acquired for Euro-American settlement. He saw the Erie Canal as an instrument for furthering the progress and power of New York and America. He could be described as an early believer in progress and manifest destiny, and in spite of being a Jeffersonian Democrat, he shared with Federalists and Whigs the belief that the state under enlightened leadership should play a leading role in guiding America's destiny.

His involvement in New York's successful efforts to acquire most of the land belonging to the Iroquois appears particularly dubious today. A revealing example of his handling of Indian affairs is his role in the state's efforts to acquire lands from the Oneidas.[23] Some of these activities, which involved circumventing treaties between the federal government and the Iroquois, were regarded as questionable even in his own day. Although De Witt never actively defended New York's position on this issue, he clearly acquiesced in the position of George Clinton, which was to ignore the federal treaties. Clinton's position was not as flagrant to contemporaries as it seems to us. George Clinton was an advocate of states rights, and had opposed the adoption of the Constitution in the first place. Although Washington and other Federalists believed that the federal treaties superseded state law, Anti-Federalists did not agree. After Thomas Jefferson became president, the federal government ceased questioning New York State's actions.

De Witt's circumspect approach to controversial subjects is also exemplified by a letter he wrote in 1789 to his assistant Abraham Hardenberg regarding a particularly messy political situation involving conflicting claims of settlers and Cayuga Indians: "I suppose you cannot do otherwise with the Canaserago [Kanadasega?] Creek than what you mention—if you keep within the letter of the law & treaty your conduct in other respects must be discretionary and dictated by expediency. Col. Read [?] will I suppose give you all the news Verbatum & Literatum—Therefore I shall not touch on that subject."[24]

De Witt was aided in his efforts to navigate New York's turbulent political waters by the considerable agreement among political factions on issues involving land. After the Revolution, there was no royal government to restrain settlement in western New York, and the Iroquois were so weakened that they could offer little resistance to the flood of white settlers. Most of New York's landed elite (including the Rensselaers, the Schuylers, and the Livingstons) weathered the Revolution with their estates intact, but (continuing a trend that was visible before the Revolution) large landowners increasingly preferred land speculation and selling land outright to settlers over taking on the burdens of managing tenant farmers. New York was financially bankrupted by the Revolution, and its politicians were eager to balance the state budget by selling land and then taxing settlers. Among the small farmers who formed the backbone of the constituency of Republican politicians like eight-term governor George Clinton, there were many who were eager to buy fertile farms from land speculators. The only conspicuous losers in the rush to develop western New York were former Loyalists and Indians.

Establishing New York's Boundaries

Let us now consider how New York's politicians and surveyors actually dealt with the problems of expansion, beginning with defining the boundaries of the state. Establishing clear lines of governmental jurisdiction between New York and other states was an obvious prerequisite for selling and settling the land in many areas. Conflicting claims of ownership based on patents issued by different states inhibited settlement by creating uncertainty and conflict along most of New York's boundaries. This is particularly obvious in the case of Vermont.

As was seen in a previous chapter, conflict between New Hampshire and New York over the disposition of lands in what is now Vermont went back far into the colonial period. By the 1760s, both colonies had issued numerous land patents in the area, and tensions over the possession of tracts of land in modern Vermont sometimes reached the point of violence. In 1764, The Crown attempted to settle these controversies once and for all by establishing New York's eastern boundary with New Hampshire at the Connecticut River. But that decision did not stand because of the continued influx of New Englanders into Vermont, and during the Revolution Vermont set itself up as virtually an independent state under the leadership of Ethan Allen.[25] Finally, in 1789, Governor George Clinton reluctantly acknowledged Vermont's existence as a separate state. Some of the "Vermont Sufferers" (those with invalidated land claims from New York) were eventually resettled on 41,000 acres in Chenango County.[26]

Conflicting land claims also had to be adjudicated with Massachusetts. The boundary between the two states had not been completely settled during the colonial period, and only in 1785 was the modern boundary finally surveyed. Massachusetts also had a long-standing claim to most of what is now western New York. This claim was based on its colonial charter, which in theory extended its western boundary all the way to the Pacific Ocean. New York, on the other hand, claimed all of the lands once ruled by the Iroquois. These conflicting claims were settled in a compromise embodied in the Hartford Convention of 1786. Massachusetts was given the preemption right (the right to buy and sell land from the Indians) in exchange for ceding governmental jurisdiction to New York. The area where Massachusetts exercised its preemption right consisted of about six million acres belonging to the Seneca Nation between Seneca Lake and Lake Erie. In addition, Massachusetts retained the preemption right to some 230,000 acres in an area west of the Catskills known as the "Boston Ten Towns." These lands were quickly sold to speculators, and became the foundations of several huge development projects, whose history will be sketched below.

The boundary between New York and Pennsylvania was surveyed along the 42nd parallel in 1785-86. This survey, which commenced at the intersection of the 42nd parallel and the Delaware River, was carried out by a stellar team headed by David Rittenhouse and Andrew Ellicott for Pennsylvania, and by Philip Schuyler, James Clinton, and Simeon De Witt for New York. For Rittenhouse, this survey must have brought back interesting memories, since he had previously started it in 1774 in the company of Samuel Holland—an effort which had to be abandoned at the outbreak of the Revolution.

The survey was carefully done using up-to-date techniques and instruments, most of which were supplied by Rittenhouse and Ellicott, rather than by De Witt. It involved the measurement by astronomical means of large numbers of latitudes, which were used to correct the survey line for the curvature of the earth. This survey occupies an important

place in the mapping of America. A recent commentator has written: "…the way in which the Pennsylvania- New York boundary was run would become the prototype for nearly all subsequent east-west borders in the United States, including the immense frontier with Canada."[27]

The extensive latitudinal line separating New York and Pennsylvania was particularly important for the future mapping of New York. The survey, which later surveyors have confirmed to be accurate to within one foot per mile, was marked by milestones. These were used as starting points for north-south meridians that were drawn across the state—thus helping to establish a grid of longitudes and latitudes for locations in central and western New York.[28] The results of the boundary survey were certified Oct. 12, 1786.

The last major adjustment in the boundary between the two states was made in 1789-90, when the Erie Triangle was surveyed by Andrew Ellicott (with the assistance of his brother Joseph). The Erie Triangle is a small piece of land nipped off the westernmost part of New York between the 42nd parallel and Lake Erie. It was ceded by New York to the federal government, and then sold by Congress to Pennsylvania to give it access to Lake Erie. Ellicott's survey defined the western boundary of New York, which was drawn on a meridian running through the westernmost end of Lake Ontario. The results of this boundary survey are shown on a map of northern Pennsylvania and western New York made by John Adlum around 1791, which will be discussed later in this chapter.(Figure 8.2).[29]

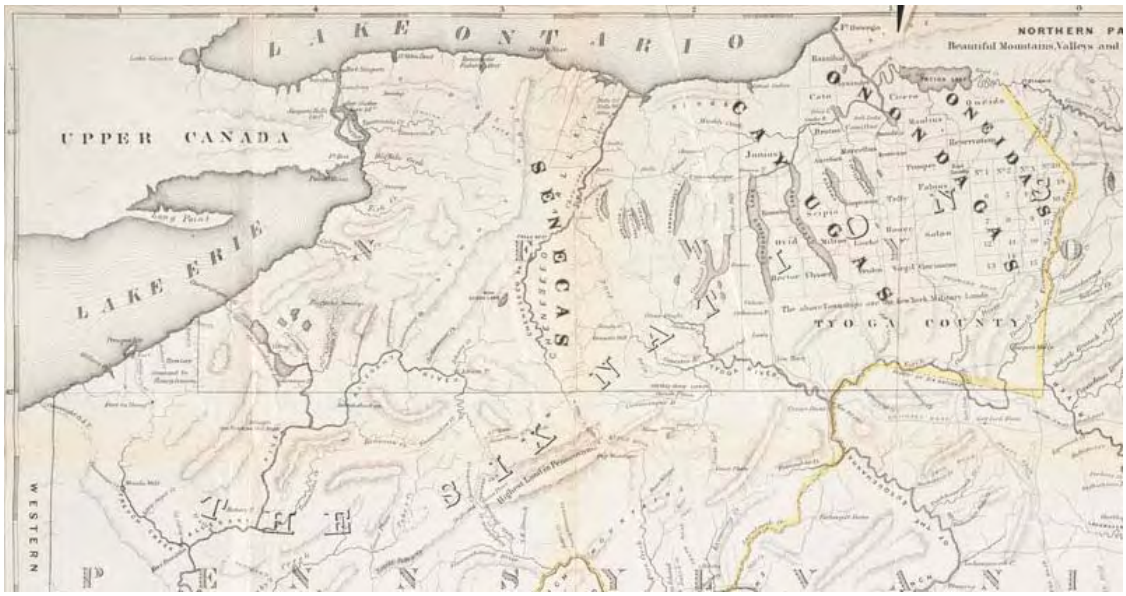

Figure 8.2. John Adlum, Detail of *Map of Part of the State of New York*. Nineteenth-century facsimile of a map originally published around 1790 under a different title. New York State Library.

Dividing the Land

The manner in which New York was divided in the decades following the Revolution is dramatically revealed in small-scale property maps. The best overview of

the large land grants in the state is in an atlas published by J.R. Bien in 1895, which is readily available on the Web.[30] To understand how and why this land was mapped as it was, it is worth quickly reviewing the highlights of the history of its acquisition and subdivision.

Lands Confiscated from the Crown and Loyalists

A massive amount of land in the older parts of New York was made available through the confiscation of properties belonging to the British Crown or to Loyalist landowners. The seizure of these lands was authorized by a law passed in 1779, and their sale went on through at least the first decade of the nineteenth century. It has been estimated that approximately two-thirds of the land in New York was confiscated from the Crown or the Loyalists, and its sale contributed huge sums to the state treasury.[31] There was much controversy and litigation over which estates should be confiscated, and concerning the rights of heirs of former Loyalists, which ultimately led to additional legislation.[32] In the end, some 60 estates were confiscated, including those of such well-known colonial landowners as Gugh Wallace, Philip Skene, the heirs of Sir William Johnson, the Philipses, Oliver DeLancy, John Butler, and Ebenezer Jessup. Some of this land was purchased by former tenants, although much of it was initially acquired by speculators. The final result of this process was the creation of numerous small land holdings, which one historian has somewhat awkwardly described as “the most concrete indication of the social aspects of the American Revolution.”[33] It is telling that this confiscation and redistribution of land was supported by the populist governor George Clinton (himself no mean land speculator), and strongly opposed by manor holders like Robert B. (“the Chancellor”) Livingston and Philip Schuyler, who feared the precedent being set by this seizure of private property.[34] It is equally remarkable that this conflict did not prevent these figures from cooperating a few years later in a variety of land grabbing projects further to the west.

The manner in which the lands of former Loyalists were developed is illustrated by the much-studied example of the property acquired by William Cooper (1754-1809), the founder of Cooperstown and father of James Fenimore Cooper. Much of this land was owned prior to the Revolution by George Croghan (1720-1782), the well-known Indian agent and friend of Sir William Johnson. After considerable maneuvering and intrigue, Cooper purchased this land, and proceeded to gain fame by pioneering ways to sell it to farmers from New England. His technique was to make settlement easy by building infrastructure, such as roads and mills, and by offering land in small parcels and on easy credit. This general approach to promoting settlement and selling land was later followed on a larger scale by other land developers in central and western New York.[35]

Indian Lands

The amount of land made available through the confiscation of crown lands and royalist estates was dwarfed by the acreage that remained in Indian hands west of the old 1763 Proclamation Line. Most of this territory did not remain in their hands for long. The seizure of the Iroquois lands is one of the most controversial episodes in the history of New York. Most of this land was theoretically sold voluntarily by the Indians, but these

sales were often illegal under federal law, and usually involved varying amounts of bribery, coercion, dispensation of alcohol, and other forms of fraud and manipulation. Much has been written about this subject, and there is no need to give a detailed account of it here.[36] While it is easy for us to condemn the manner in which the Indian lands were taken, it should also be noted that there were only about 6000 Iroquois and other Native Americans in western New York. Demographics alone made the loss of most of these lands to European-Americans all but inevitable, and few of New York's leaders at the time seem to have seriously questioned what they were doing. Still, most scholars today agree that, at the very least, the process should have proceeded with more justice and consideration for the Indians.

Military Lands

During the Revolution, New York, like most other states, had obligated itself to provide land as a bounty to former soldiers. Even before the Treaty of Paris (July, 1782), the New York State Legislature had identified a large tract of land in the Finger Lakes area as suitable for this purpose. But there was a small problem with this idea—the land still belonged to the Iroquois. Because of continuing pressure from veterans, the legislature decided in 1786 to allocate them lands around the Adirondacks in northern New York, which became known as the "Old Military Tract." Most of this land was unsuitable for farming, and consequently pressure continued from former soldiers for better land. Finally, New York acquired the territory it had originally intended for the soldiers through treaties with Onondagas (1788) and Cayugas (1789). This land, which amounted to more than 1.5 million acres, became known as the "New Military Tract." It was surveyed between 1789 and 1793 by Moses De Witt and Abraham Hardenbergh under the supervision of Simeon De Witt. The land commissioners ignored almost all of the old Iroquois place names in this area, and substituted classical and literary names. This renaming of conquered lands is a characteristic feature of European and American expansionism.[37] The way in which this land was surveyed will be discussed below.[38]

As was generally the case with military bounty lands after the Revolution, little of the New Military Tract was actually farmed by former soldiers. Usually the soldiers sold their rights to small-scale speculators—sometimes several times over, thereby creating numerous legal conflicts. The speculators ultimately sold the land to a variety of settlers. The majority of the settlers of the New Military Tract came from other parts of New York, rather than from New England, as was the case in much of upstate New York. At least the land did finally end up in the hands of farmers, and the way in which it was acquired and surveyed has had considerable influence on the history of central New York down to the present.[39]

Land Patents

There was a notable shift in land policy following the Revolution. In the 1780s and early 1790s, land was sold to speculators in huge blocks by state legislatures. This practice benefited the states, which desperately needed to raise money to pay off war debts. The land speculators hoped to make a fortune by reselling the land to smaller speculators or directly to farmers. Sometimes they succeeded in unloading their lands at a

profit, although several major speculators went bankrupt. Although old landed families like the Schuylers, Rensselaers, and Livingstons remained influential—and in some cases purchased land in the newly opened areas—no serious attempt was made to extend the manorial system to central or western New York. In order to sell their land, developers found that they had to offer properties on easy terms, and to improve them by building roads, mills, blacksmith shops, taverns, and other necessities. Charles Williamson (1757-1808) even tried to lure settlers to the vicinity of Bath by building a theatre and racetrack. Few pioneers were able or willing to strike out into the wilderness on their own and build their world from scratch. This approach to settling the land was not entirely new. To a certain extent, colonial manor holders like the Livingstons and the Johnsons had attempted to attract tenants by building mills and making other improvements. The basic features of the approach followed after the Revolution had been even more directly anticipated by George Croghan and the Totten and Crossfield group, more than a decade before William Cooper refined and popularized their methods.

The first grants made by the New York State Legislature were on a relatively small scale, and were mostly in northern New York around the fringes of the Adirondacks. A considerable amount of the land involved in the original Totten and Crossfield purchase was redistributed to the remaining (Loyalist) members of that consortium in 1786-87, and these lands appear under the Totten and Crossfield name on maps published in the early nineteenth century. Just to confuse matters, this area was also known as “Jessup’s Purchase.”[40] Other grants were made under a law passed by the legislature in 1781, which gave 500 acres of undeveloped land to each man who enlisted in the army, and included a provision that if enough enlistees joined together to be entitled to 30,500 acres, they could apply for a township seven miles square.

This law was used in 1784, when Zephaniah Platt and others purchased the rights to 33,000 acres around Plattsburg, which had previously been held by the Loyalist Count Charles de Fredenburgh. In 1785, the town of Plattsburgh was formed. This area, which possessed some good farmland and had considerable natural resources, was settled fairly rapidly by emigrants from Vermont and other nearby areas.[41]

New York’s land sales speeded up after the legislature created a land commission in 1784, which was authorized to quickly dispose of New York’s “waste and unappropriated lands.”[42] The land commissioners, who were all high-level state officials, sold off a total of 5,542,170 acres. Predictably, most of these sales were made on easy terms to the politically well connected, including both supporters of Governor Clinton, and Federalists who showed signs of political cooperation.[43] The biggest of these grants was made in 1792 to a consortium headed by Alexander Macomb (1748-1831). Macomb’s Purchase was the largest land grant made by New York State, and ultimately constituted 3,670,000 acres. It included much of the land in and around the Adirondack Mountains and the St. Lawrence River—some twelve percent of the state’s surface area. This ambitious project turned into a disaster for Macomb, who quickly went bankrupt. Ultimately the purchase was broken up and sold to smaller speculators.[44]

Credit for surveying the boundaries of Macomb’s Purchase goes to William Cockburn and his son. We first encountered the ubiquitous William Cockburn as one of the leading surveyors in upstate New York prior to the Revolution, and he and his family continued to play a major role in exploring and surveying well into the nineteenth century. Another important surveyor who was active in this area was Charles C.

Brodhead, who has been credited with producing “the first accurate map of the Black River country.”[45]

Brodhead’s activities in this area included surveying Castorland (also known as Chassani’s Tract or the French Company’s land), which is one of the most interesting of the spinoffs from Macomb’s Purchase. Founded in 1793, and located mostly in Jefferson and Lewis Counties, this project was initially intended to provide a home for aristocrats and others fleeing the French Revolution. The colony was never very successful, but after 1815 it received an infusion of new aristocrats when Joseph Bonaparte and other followers of Napoleon were attracted to the area. The largest of the French landlords in this area, James Le Ray de Chaumont, owned 348,205 acres in 1823, when he transferred his lands to his sons following the usual bankruptcy. Ultimately, most of these notables moved back to France or to other locations in more congenial climates. Still, this enterprise played an important part in the initial development of the area, contributed to a significant French presence to Jefferson and Lewis counties, and provided local historians with entertaining anecdotes about the strange doings of the French aristocrats in the wilderness.[46]

Another immense state land grant was Scriba’s Patent (originally known as the Roosevelt Purchase), which consisted of about 500,000 acres in modern Oswego County. This land was sold to George Scriba (1752-1836) in 1792, and patented by him in 1794. Scriba made extensive efforts to develop the region, but ultimately he too went bankrupt, and his lands were distributed to his creditors. In its general evolution, this tract is typical of many others.[47] Scriba’s Patent was first surveyed by Benjamin Wright, and a manuscript map of his survey can be found at Syracuse University Library.[48]

The largest land grants were sold not by New York, but by Massachusetts under its “preemption right” (right of first purchase from the Indians). These grants were all on land formerly controlled by the Iroquois, and they played a major role in shaping the development of the state. They included all of New York west of Seneca Lake, except for a narrow strip along the Niagara River, along with the 230,400 acres in modern Broome and Tioga Counties known as “The Boston Ten Towns.” The preemption rights to western New York were quickly sold by Massachusetts to Oliver Phelps and Nathaniel Gorham in what became known as the Phelps and Gorham Purchase. The lands involved constituted almost all of New York west of Seneca Lake (about 6,000,000 acres).[49] Title to the land itself was acquired from the Iroquois in a series of treaties, starting with the Treaty of Buffalo Creek in 1788, and culminating in the Treaty of Big Tree in 1797.[50] Only the Buffalo Creek treaty was actually negotiated by Phelps and Gorham, and it gave them control of some 2,500,000 acres, which was mostly located between Seneca Lake and the Genesee River. The company lost control of this area in the middle of 1790, but by the end of 1789 it had managed to sell off 46 townships, mostly in the vicinity of its central settlement at Canandaigua

The owners of the Phelps and Gorham lands pioneered many of the techniques that were later used by land developers elsewhere in New York and the United States. Based in Massachusetts, they were among the earliest users of the rectangular survey system in New York, which hints at its partial derivation from the New England township system. Although they, like other large landholders in this period, labeled these large blocks of land “townships,” they were not governmental units, as they were in New England.

To attract settlers, they planned towns in advance, built roads, and engaged in efforts to recruit settlers from New England. The first survey of the land between the Preemption Line and the Genesee River was done for this company in 1788-89. This survey, which was performed by Hugh Maxwell and others, was done quickly and was not very accurate. As will be seen below, it was soon disputed, and the land had to be resurveyed before a survey was accepted by the state.[51]

This company quickly ran into financial problems, which led to the breakup of its holdings. In 1790, the unsold Phelps and Gorham lands were purchased by Philadelphia financier Robert Morris (1734-1806), along with the purchase right to the remaining Massachusetts preemption lands. In 1792, Morris hired a group of surveyors headed by Andrew Ellicott and Augustus Porter to resurvey the lands he had purchased. This survey revealed substantial errors in the earlier survey done for Phelps and Gorham, especially in the location of its eastern border (which marked the "Preemption Line"). This new survey, which relocated the town of Geneva and part of Sodus Bay to the west of the Preemption Line, was accepted as official by the state in 1795.[52]

Although Morris was one of the wealthiest men in America, he also found that had bit off more land than he could chew. In 1791, he sold the eastern portion of his lands to a group of British investors headed by Sir William Pulteney. The Pulteney Purchase constituted about 1,000,000 non-contiguous acres, mostly between Seneca Lake and Genesee River (what remained of the Phelps-Gorham Purchase). The American agent for the Pulteney Association was Charles Williamson (1757-1808).[53] He is the most important of the publicists who wrote books or pamphlets about the newly opened lands in central and western New York. Several of these works contain maps, which will be discussed below.

The Pulteney sale did not put an end to Robert Morris' financial troubles, and he sold most of the remaining land to the Holland Land Company, except for a strip to the east known as the "Morris Reserve." Even this he was not able to keep for long, and the collapse of his speculations led to the distinguished "financier of the American Revolution" being imprisoned for debt between 1798-1801.

Holland Land Company

The last and largest of the huge swaths of land to be the developed in New York was the 3.3 million acres purchased by the Holland Land Company from Robert Morris.[54] This purchase included most of New York west of the Genesee River, except for the then sizable Indian reservations, and a narrow strip of land along the Niagara River. Like the Pulteney Association, the Holland Land Company was made up of European investors who did not plan to live on the land themselves, but hoped to profit by making improvements and reselling parcels to settlers. The Holland Land Company was one of the more successful and long-lived of these speculative enterprises, although it too confronted considerable financial and political difficulties. Many of the farmers who bought land throughout New York were desperately poor, and could not afford to pay for their farms even when granted credit and a long payment schedule. This situation led to defaults, and to discontent and sporadic rebellion after 1820. Agrarian unrest was a striking feature of New York history around the middle of the nineteenth century, and it

affected both tenant farmers in the Hudson Valley and indebted “free” farmers in western New York.

The American resident agent of the Holland Land Company was Joseph Ellicott (1760-1826), who surveyed this area between 1797 and 1799. After Simeon De Witt (with whom he was associated), Ellicott was the most important figure in the mapping of New York during this period.[55] De Witt made him a deputy surveyor general, and thereby gave official status to his surveys of western New York. De Witt even authorized him to survey the boundary between the Holland Land Company’s lands and the strip of state land along the Niagara River.[56] Joseph Ellicott was a capable surveyor. He received his training from his brother, Andrew Ellicott, who is famous for surveying the layout of Washington, and for his implementation of the rectangular survey system on federal lands. Unlike De Witt, Joseph Ellicott was articulate and communicative, and has left us detailed descriptions of his surveying techniques.[57] He was also an accomplished practitioner of the rectangular survey system. Ellicott’s surveying techniques will be described in greater detail below.

Surveyors and Surveying

The role of land surveyors in the history of this period has been little studied, but they played a major role in the developments described in this chapter. In the early years of the Republic, major land owners and politicians (including George Washington, George Clinton, and Philip Schuyler) were frequently also trained surveyors. Somewhat below them in the social scale, were skilled professionals like Simeon De Witt and Joseph Ellicott. They, in turn, supervised those who actually conducted most of the surveys, including William Cockburn and his sons, Moses De Witt, Abraham Hardenburgh, Charles C. Brodhead, James Geddes, Benjamin Wright, and many lesser lights. All of these individuals played important roles in the well-oiled land grabbing and processing machine.

The older William Cockburn seems to have been the only important surveyor whose career antedated the Revolution. Most were younger men, who often got their start as military surveyors during the Revolution, or were protégés of people like Simeon De Witt or Philip Schuyler. Often they worked at various stages of their careers for both the state government and for major land owners. Sometimes they were also land agents for the tracts that they surveyed. Several of them made small fortunes as lesser land speculators, or went on to play important parts in such activities as surveying the route of the Erie Canal. They were indispensable lesser pillars of New York’s political and economic establishment.

The basic techniques used by surveyors at this time, including Simeon De Witt and Joseph Ellicott, did not differ much from those employed by Cadwallader Colden or James Alexander in the middle of the eighteenth century. Almost all of their surveying was done by chain and compass. De Witt owned a theodolite (which is in the possession of the Albany Institute of History and Art), and he knew about triangulation, but in practice does not seem to have engaged in “scientific mapping.” In 1819, he offered to sell a zenith sector (used mainly for observing latitudes) made by Rittenhouse because he had no use for it beyond his “personal gratification.”[58]

The surveyors under De Witt's supervision, who did most of the actual work of his office, were mostly trained on the job, and had few scientific or mathematical skills. De Witt made no effort to have them correct their maps for the curvature of the earth or for magnetic variation. Instead, he issued very basic instructions on how lots should be surveyed and numbered. These are on the order of: "Whenever it can be conveniently done make the sides of townships North South East and West magnetically."[59] In 1808, De Witt issued printed instructions to his assistants on how to observe variations in the magnetic needle.[60] These instructions, which resemble those of his colonial predecessors, in theory made it possible to determine the actual north-south orientation of individual surveys. His letters also contain occasional admonitions to surveyors on such obvious practical matters as making certain that the lengths of their chains had not changed because of stretching through use.[61]

We know more about the Joseph Ellicott's surveying techniques than those of Simeon De Witt. This is mainly because Ellicott was required to submit detailed reports about his activities to the Holland Land Company. Generally, Ellicott's methods of surveying were similar to De Witt's, but Ellicott was a little more precise and systematic, and his methods were sometimes more advanced. Thus, Ellicott took particular pains to ensure the accuracy of the measurements made by his surveyors. This extended to establishing a standard length for the foot. Even in Ellicott's time, there was no standard for the foot in the United States, and consequently the length of surveyors' chains varied appreciably. He dealt with this problem by constructing what was, in effect, his own standard, and used it to calibrate all of his chains.[62] In addition, Ellicott made certain that the compasses his surveyors used were adjusted so that meridians were based on true north instead of magnetic north, and he periodically checked their measurements by astronomical observations.[63]

Ellicott's most impressive surveying feat was drawing a meridian from the Pennsylvania boundary line to Lake Ontario using astronomical observations and the newly invented surveyor's transit, rather than the usual compass and chain technique. This technique was apparently first used in New York by Andrew Ellicott in his resurvey of the Preemption Line for Robert Morris in 1791.[64] This laborious process required astronomical observations and cutting down trees to obtain a straight line of sight for the transit.

The most important changes made in surveying at this time took the form of simplification and standardization. Crucial in this regard was the widespread adoption of the rectangular survey system.[65] Although not followed with complete consistency, rectangular surveys of one sort or another were characteristic of almost all of the major land developments in New York after 1790. In comparison to the "metes and bounds" used in most colonial surveys, it was relatively difficult to make serious surveying errors using a simple grid of squares or rectangles, and the rectangles could easily be subdivided into smaller parcels. This mitigated the problems of overlapping boundaries and uncertain survey lines that characterized so many earlier surveys.

The rectangular system was ideally suited for the quick sale of large quantities of land, which is the main reason why it also became the cornerstone of the federal land system, which was based on an ordinance passed by congress in 1785. Under both the federal and the New York State systems, land was surveyed into large blocks called "townships." In New York, unlike New England, these townships never became units of

government, although many of them later evolved into “towns” with elected officials. In some cases, as in the New Military Tract, the names of the old townships were often carried over to the new towns, but this was not always the case. In other cases, the original townships were numbered, or their names were simply forgotten over the course of time. This whole situation has understandably led to a good deal of confusion about the relationship between towns and townships in New York.

By 1800 surveyors had ascertained by astronomical means a fair number of reasonably accurate latitudes for New York State. Observations of longitude were still rare. I have found no references to the use of the chronometer to ascertain longitudes in New York prior to 1801, and very few references to longitudes being taken by any method prior to 1806. As late as that year, Simeon De Witt estimated the longitude of Albany by using surveys to calculate its distance from Philadelphia, rather than by making astronomical observations.[66] Even Andrew Ellicott, who had made astronomical determinations of longitudes in Pennsylvania and elsewhere, does not appear to have made any in his surveys of the boundaries between Pennsylvania and New York. This reflects the difficulty of determining longitude by such methods as making observations of the eclipses of the moons of Jupiter—which requires repeated observations, good telescopes, and an accurate chronometer for measuring local time.

This lack of a large number of directly measured longitudes was not as much an obstacle to accurate mapping as might be thought. Since a number of meridians and latitudinal base lines had been established along New York’s boundaries, and the longitudes of a few places had been astronomically determined, it was possible for surveyors to interpolate reasonably accurate longitudes by measuring north-south meridians from established positions. Thus, relative longitudes within the state could be calculated fairly well, even though they were not measured astronomically from a standard meridian, such as Greenwich, Philadelphia, or New York City.

This process is best illustrated by the example of the New York – Pennsylvania boundary. Although the longitudes of the ends of this line were not determined astronomically, they were fairly well known by indirect means. Ellicott connected the survey of the boundary along the 42nd parallel with the meridian of the western boundary of Pennsylvania, the southwest corner of which had been determined astronomically—thus providing, at least in theory, a roundabout measurement for the longitude of the western end of the New York – Pennsylvania boundary. And the distance between Philadelphia (the longitude of which had been repeatedly checked) and the eastern end of the New York boundary line had also been carefully surveyed—starting as early as 1774, when Rittenhouse surveyed the Delaware River between Philadelphia and the starting point of the New York boundary line.[67]

Furthermore, carefully measured lines like the New York - Pennsylvania boundary could be very useful even if their longitudes were not known to perfection. Although the astronomical longitudes of the ends of this line were somewhat uncertain, the relative longitudes of the individual milestones were carefully measured from the starting point of the survey. Consequently, the milestones could be used as starting points for meridians surveyed to the north from the baseline. This is exactly what Andrew Ellicott did in resurveying the Preemption Line for Robert Morris, and which Joseph Ellicott did when he surveyed the eastern boundary of the Holland Purchase. The latitude-longitude grid created by such means was good enough to determine with sufficient precision the

locations of parcels of land within the state, and it was used by De Witt to improve the mapping of New York as a whole.

Use of Field Notes

Another practice widely adopted by surveyors in the 1790s was the use of field notes to describe the general characteristics of the lands they surveyed. Both Joseph Ellicott and Simeon De Witt issued instructions to their surveyors specifying what was to be recorded. De Witt wrote: “All the surveyors are to keep their field books according to the form which will be prescribed and note the quality of the land the chief kind of timber & the lakes creeks and rivers and their directions at crossing them.”[68] Ellicott’s field notes were submitted with his reports to the Holland Land Company, and are readily available on microfilm.[69] The field notes compiled for De Witt were not recorded and maintained so systematically, but many of the field books for the military tract can be found in the De Witt Family papers at Syracuse University. These field notes have been used by environmental historians and geographers to reconstruct old vegetation patterns in upstate New York.[70]

Property Mapping, 1783-1802

All of this surveying produced a rich harvest of hand-drawn property maps, many of which can still be found in the New York State Archives, in the offices of county clerks, in historical societies, and in other repositories.[71] There are literally thousands of them, and most have not been individually cataloged by their owners. Almost all were never published and remain in manuscript. They generally cover small areas of land, which makes them of interest to only a few. But, taken as a group, these maps, along with the field notes that sometimes accompany them, are invaluable resources for students of local history. Although most are too specialized to describe here, a few manuscript maps of larger areas will be singled out to give some idea of the overall trend of developments.

Manuscript Maps

Several maps by Simeon De Witt reveal something about the relationship between colonial property mapping and the early mapping of New York State. In the settled areas of the state, it must have been a formidable challenge for the surveyor general to sort out who owned what. The problems created by the incomplete and imprecise mapping of the colonial era, with its conflicting land ownership claims, were compounded by the confiscations and forced sales of Loyalist lands. Soon after taking office as surveyor general in 1784, De Witt wrote to Jeremiah Rensselaer asking him for permission to copy any maps he had of colonial land patents, as “the papers belonging to the Surveyor General’s office before the war are not to be had.”[72] De Witt had to reconstruct the colonial land holdings, and several of his early manuscript maps are basically copies of pre-Revolutionary property maps. One of these, which is now housed at the library of Congress, shows landholdings in the vicinity of Orange County, and appears to be mainly based on maps made by Cadwallader Colden.[73] De Witt also copied an old map of the Totten and Crossfields Purchase in northern New York.[74] The best known example of

this type of work, which was published later in the nineteenth century, shows the lands between the Mohawk and Delaware rivers. It resembles Sauthier's *Chorographical Map*, and shows property boundaries in this area as they existed just before the Revolution (Figure 8.3).[75] Many of these tracts changed ownership during or shortly after the Revolution. It would be interesting to know what role De Witt's copies played in determining the outcome of litigation over the ownership and boundaries of newly acquired properties, such as those of William Cooper near Cooperstown.

Figure 8.3. Detail of Simeon De Witt**,** *Map of the Head Waters of the Rivers Susquehanna & Delaware* (ca. 1790). New York State Library.

De Witt is not the only person who engaged in this type of mapping. Another example is Gerrit Lansing (1760-1834), who drew "A Map of the Survey and Partition, of Oriskany Otherwise Called Oriskary Patent" (1786).[76] A slightly later map of this same area drawn by Lansing in 1789 shows how this important tract of land on the north side of the Mohawk River was initially subdivided.[77] Like most of these maps, it does not go down to the level of the individual farms that ultimately resulted from the subdivision process. The story behind this map is typical of many. Gerrit Lansing was an officer in the Continental Army who became a surveyor after the conclusion of the war. Much of the land that he surveyed in 1786 had been confiscated in 1784 from the Loyalist DeLancey family, but the Schuylers also had interests in this area antedating the Revolution, and Lansing was employed by them. In 1802, Lansing returned to this area,

bought 400 acres of land, and became an important figure in the early history of the town of Oriskany and of Oneida County.

Oneida County is particularly well represented in the maps of this period—in part because it straddled the pre-Revolutionary "Proclamation Line" of 1763, and also because portions of it had previously been granted to colonial landholders. These years saw the dispossession of the Oneida Indians from most of their land in New York—in spite of their being the only Iroquois tribe allied with the Americans during the Revolution. The location of the Oneida lands made them early targets for takeover. The Oneidas' possessed extensive farmlands easily accessible just to the west of the settled areas along the Mohawk River. In addition, their territory included valuable salt springs near Syracuse, and it controlled the routes later followed by roads and canals leading to western New York and the Great Lakes.[78] The best known, and one of the most revealing, of the maps depicting the Euro-American takeover of these lands is Gideon Fairman's *A Map of Oneida Reservation including the Lands Leased to Peter Smith*.[79] It shows the Oneida reservation as it existed at that time, along with land given by the Oneidas to the Stockbridge Indians, and the land recently acquired by non-Indians laid out in townships with numbered subdivisions.

The extensive mapping of the New Military Tract in central New York, which was done under the supervision of Simeon De Witt, is shown on De Witt's published maps, which will be discussed below. However, additional light on the history and geography of this area can be obtained from the manuscript maps that preceded the printed versions. A spectacular example is "A Map of the Military Lands" by De Witt's assistant, Abraham Hardenbergh, which was probably drawn in 1792. [80] This pen-and-ink map is drawn on a very large scale (two miles to an inch), and includes a minute depiction of the hydrography in the townships and ranges of the military tract. It appears to be a kind of "master map," which may have provided the basis for the smaller-scale maps that were published later. De Witt himself drew "A Map of the Military Tract and Lands Adjacent" (ca. 1792), which is an early draft of a map later published as the "1st sheet" of his map of the State of New York.[81] These drafts were produced over a period of two or three years, and show significant differences in detail.

There has been insufficient research on the manuscript maps of the lands surveyed for the Phelps-Gorham group, for Robert Morris, and for the Pulteney Association. A large number of these maps, all of which are of areas within the original Phelps and Gorham purchase, were made in the years following 1788, and it is easy to confuse them. Because the original survey (done by Hugh Maxwell and others) was widely regarded as defective, the land was quickly resurveyed for Robert Morris by a group headed by Andrew Ellicott and Augustus Porter. The main issue at stake was the location of the eastern boundary of this area. Under Charles Williamson, additional surveying was done. These overlapping surveys need to be carefully described and compared. The printed maps of this area, which will be described below, are difficult to interpret without knowing which surveys they are based on.

Finally, the archives of the Holland Land Company constitute a rich resource for maps of westernmost New York. Most of the contents of the Holland Land Company archives in Amsterdam and elsewhere have been microfilmed by the Holland Land Company Project based at the State University of New York at Fredonia. They are available at the Reed Library at SUNY Fredonia, and at other major research libraries in

New York State. They include color microfiche of many maps and lot survey field books. The maps in this collection is now also available on the Internet.[82]

Printed Property and Regional Maps

In spite of the extensive surveying and selling of land that took place in the two decades following the Revolution, few real estate maps were actually published at this time. This contrasts with the situation during the last half of the nineteenth century, when hucksters printed off large numbers of maps as broadsides to entice buyers. It is not entirely clear why so few real estate promotion maps were published during New York's initial land rush, but one reason is certainly the comparatively great expense of engraving and printing before 1830. There is also some indication that small farmers and other potential immigrants did not make much use of published materials, either in the form of pamphlets or maps. This could reflect the comparatively high cost of printed matter, but it may also be an indication of marginal literacy and map reading skills in these groups. Studies show that immigrants tended to move in groups of related people or communities, and were motivated primarily by letters from relatives, by word of mouth, by verbal promotions of salesmen, or by community leaders, such as clergymen.[83] The extent to which ordinary immigrants actually used maps to guide their steps remains unclear. There is some evidence that these maps were available to potential settlers in such places as libraries (or reading rooms), courthouses, and taverns.[84]

Printed maps were used in at least a few publicity efforts to attract investors or settlers to newly opened lands in central and western New York. The earliest production of this kind appears to be *A Map of the Genesee Lands in the County of Ontario and State of New York According to an Accurate Survey Which Was Made of the Same, 1790*.[85] This map was originally included in a booklet , which was probably published in London for Robert Morris by his agent William Temple Franklin.[86] Both booklet and map were intended to induce British investors to buy lands in the Morris Purchase.[87] This map is based on the earliest survey made for Phelps and Gorham. It provides a reasonably detailed overview of the slice of land between the Pennsylvania border and Lake Ontario, bounded roughly on the east by Seneca Lake, and on the west by the Genesee River. It shows the few settlements existing in 1790, along with lakes and streams, as well as township boundaries. The eastern boundary (the "Preemption Line") is drawn somewhat ambiguously, and the town of Geneva appears to be deliberately misplaced to include it within the Morris Purchase.

A similar map was published in New Haven in 1794.[88] It claimed to be "from an actual survey" by Augustus Porter, who was one of Robert Morris's surveyors along with Andrew Ellicott. This appears to be the first map of this part of western New York designed to attract American investors and probably actual settlers.

Most of the land shown on these maps was acquired by the Pulteney Association, whose enthusiastic American agent was Charles Williamson. Although Williamson was active in developing this area starting in 1792, it was not until the end of the decade that he began publicizing it through pamphlets and maps. Not much is known about the distribution and audience of Williamson's works, which were published in both the United States and Britain.[89] They seem to have been directed not so much at potential farmers, as to smaller land speculators and to potential investors in land development

companies. Williamson's maps were on a smaller scale and covered a wider area than the maps of the Morris Purchase mentioned above. They covered most or all of New York and large parts of neighboring states, and mainly served to locate the Pulteney lands in a regional context. This sequence of maps is conveniently reproduced in Schwartz and Ehrenberg's *The Mapping of America*.[90] The last of these is not a bad overview map of New York and parts of adjacent states.

A similar pattern appears in the maps of the Holland Purchase. The earliest published map of western New York prepared for the use of the Holland Land Company appears to have been engraved in Amsterdam around 1793 or 1794.[91] Joseph Ellicott's earliest maps of the Holland Purchase were also prepared primarily for use in Europe. The most important of these is his *Map of Morris's Purchase or West Geneseo in the State of New York*, which is dated 1800, but actually published in early 1801 (Figure 8.4). This map, which was revised and republished several times, was "respectfully inscribed" to "the Holland Land Company, their general agents Theophilus Cazenove & Paul Busti…."[92] In the words of Cazenove, who was Ellicott's supervisor in New York, the map was intended "to facilitate sales in Europe."[93] Since it was republished and widely distributed in the United States, it must have also been used to lure American investors and settlers. It would almost certainly have been studied by small land speculators interested in buying distant tracts of land, probably by community leaders engaged in investigating new lands in the west for future settlements, and possibly by some individual farmers. It is not difficult to imagine a copy of the map on the wall of the Holland Land Company office in Batavia being used to show potential buyers the location of farms for sale.

Figure 8.4. Joseph Ellicott, *Map of Morris's Purchase or West Geneseo in the State of New York* (1804). Courtesy David Rumsey Collection.

Simeon De Witt's map of the New Military Tract was created for somewhat different reasons. Published in 1793, it bears the title *1st Sheet of De Witt's State-map of New York*.(Figure 8.5).[94] It covers central New York from slightly east of Little Falls on the Mohawk River to the west side of Seneca Lake, and from the Pennsylvania line to Lake Ontario. It is partially based on the surveys of the New Military tract done under De Witt's supervision, but it covers a much larger area. Although it is primarily a property map, it includes hydrography, towns, and Indian reservations. It would obviously have been useful to De Witt in his work as surveyor general, and to anyone buying or selling property in central New York. But, as its title makes clear, De Witt also intended this map to be an installment on his long-delayed map of New York, which did not finally appear until 1802 (and will be discussed below). The township divisions shown on this map were widely copied on other maps published in the final years of the eighteenth century. It is the first detailed and authoritative map covering a large part of central New York.

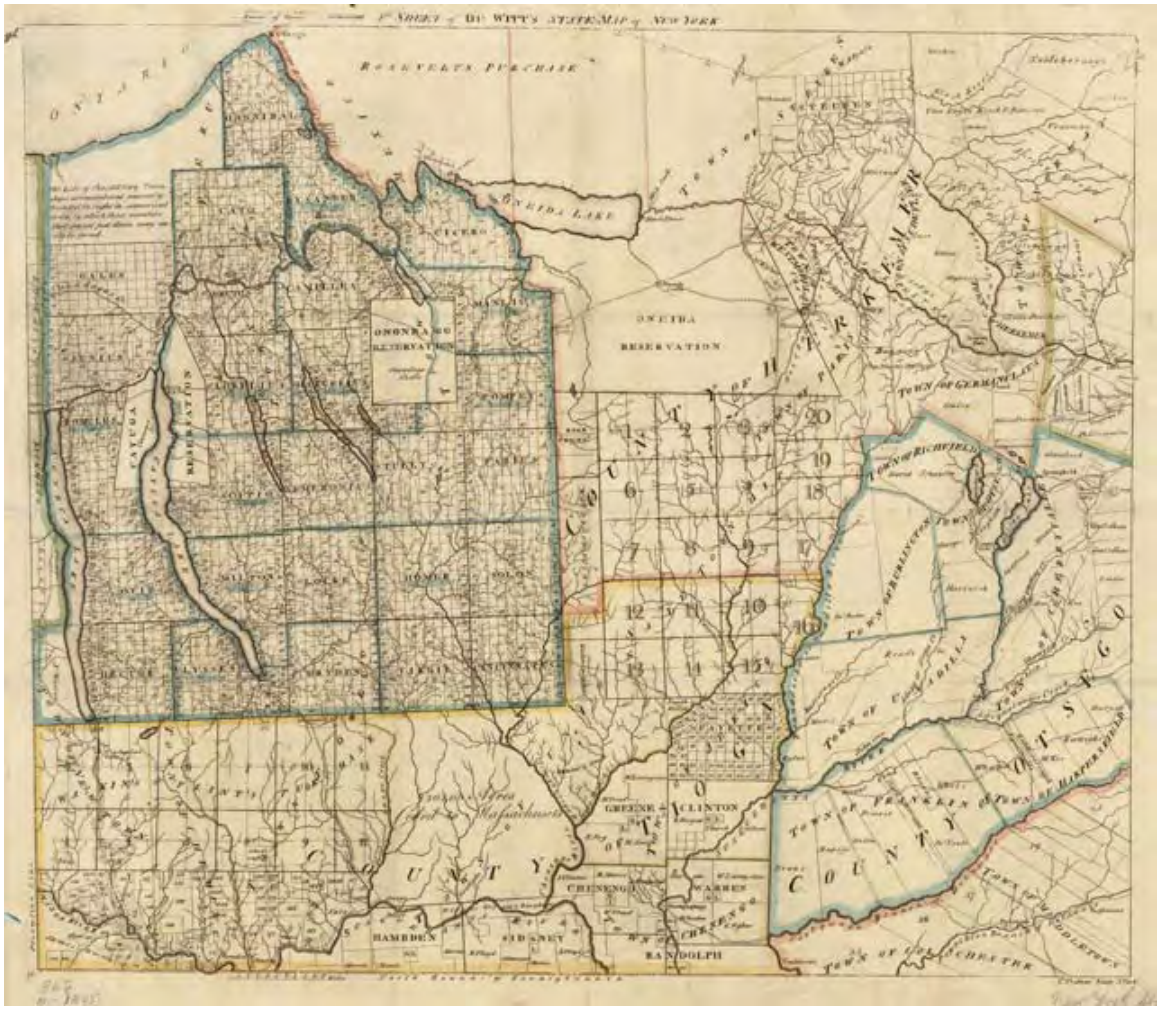

Figure 8.5. Simeon De Witt, *1st Sheet of De Witt's State-map of New York* (1793). New York State Library.

Another important regional map is the previously mentioned *Map Exhibiting a General View of the Roads and Inland Navigation of Pennsylvania and Part of the Adjacent States*, which was published around 1795 by John Adlum and John Wallis (Figure 8.2.[95] Pennsylvania-based surveyor John Adlum (1759-1836) was a major land speculator, who later became known as the "Father of American Viticulture." He was involved in surveying the boundary between New York and Pennsylvania, and had land interests in southern New York. His activities also included surveying the western boundary of the Phelps-Gorham Purchase. This map provides a good overview of existing geographic knowledge of all of New York south of the Mohawk River, except for eastern Long Island. An unusual and telling feature is its use of a prime meridian based on the intersection of the 42nd parallel with the Delaware River—the starting point of the New York – Pennsylvania east-west boundary line. This underlines the difficulty cartographers still had in ascertaining accurate longitudes, and emphasizes the importance of this boundary as a base line for subsequent mapping in New York State. The Adlum map also shows very clearly the Erie Triangle, and displays the location of the Six Nations with a prominence that does not appear on later maps made after settlers actually began to push into western New York

Published Maps of New York State, 1784-1802

In spite of the relatively small number of published maps of specific regions within New York, the output of printed maps showing the state as a whole was fairly substantial by the 1790s. Even though these maps were soon overshadowed by Simeon De Witt's landmark *Map of the State of New York* (1802), they played an important role in determining how New Yorkers conceptualized their state.

The mapping of New York during this period, as is generally the case, cannot be separated completely from regional and national mapping. Geography and maps played an important role in the self-definition of the new nation and of its constituent states, and numerous maps showing the boundaries of both the United States and of individual states were produced shortly after the Revolution, both in this country and in Europe. Maps showing state and national boundaries were important for establishing political identities during these years. Like a map of the United States, the outline of a state, such as New York, constitutes a kind of "logo" or icon, which legitimates the claims to authority of the state government, and (like a flag) serves as a concrete symbol for the tenuous political abstraction known as "the state." Many of these maps were relatively inexpensive and widely circulated. It is significant that they often appeared in geography books, which sought to teach the youth of the new nation patriotic values.[96]

The publication of maps in New York and elsewhere in the nation during these years was limited by the small number of trained cartographers, as well as by the lack of skilled engravers. Many of the maps published in New York were engraved by Peter Rushton Maverick (1755-1811), whose whole family was involved in engraving. Other prominent Mavericks include his sons Peter Maverick (1780-1831) and Samuel Maverick (1789-1845). The two Peter Mavericks are easily confused. The younger Maverick had a large

family, which included several daughters who also contributed (inconspicuously) to the family business, and he trained a number of apprentices, several of whom also became involved in engraving maps.[97]

William Cockburn almost became the first person to publish a separate map of the State of New York. As mentioned in chapter 6, he had earlier produced numerous manuscript maps of colonial New York with extensive cadastral information. In 1780, he updated his 1774 manuscript *Map of the Province of New York*, and added this note at bottom: "Whereas this map has cost the compiler great labour and pains, as well as expence in collecting, reducing, and protracting the different patents in the State of New York; and whereas he proposes to make other improvements and corrections thereon, and publish the same by subscription, it is therefore hoped that the commissioners will not suffer copies of all or any part to be taken from it, but such as are requisit for the present business. State of New York 10th March 1780."[98] In 1783 he revised this map and gave it a new title: "Map of the State of New York."[99] Cockburn was never able to publish this work, and so lost the honor of producing the first printed map of the new state.

That honor went instead to Jedidiah Morse (1761-1826). Morse was a Congregational clergyman and Federalist statesman, who also took an interest in geographic education, and is sometimes known as "the father of American Geography." Morse published a small and simple "Map of the State of New York," in his *American Geography* (London 1794), which appears to be the first map of the state printed after the Revolution.[100] Aside from being the first map of the new state, it is unremarkable, and omits the portion of New York west of the Genesee River.

Most of the early maps showing New York as a whole appeared in atlases or geographic readers. The first atlas published in the United States was Matthew Carey's *American Atlas* (1795).[101] Carey was a Philadelphia map publisher, and his atlas included a map engraved by another Philadelphian, Samuel Lewis (1753 or 4 – 1823), which was entitled *The State of New York Compiled from the Best Authorities*.(Figure 8.6).[102] Lewis's map resembles late colonial maps, but it shows the recently solidified boundaries of the new state, and includes up-to-date information about central and western New York. Among other features, it shows the townships laid out by Simeon De Witt in the New Military Tract, and depicts a road leading across northern New York to Fort Niagara. All in all, it is a creditable performance, which gives an adequate overview of the geography of the new state. It appears to have been widely distributed, and could have been used by potential settlers looking for land to purchase. Carey's atlas cost $5.00 ($6.00 if colored), which would have been too expensive for most people, but it would have been available in schools and libraries. Individual sheets of the atlas sold for as little as twelve and a half cents, which would have made the map within reach of almost everyone.[103]

Figure 8.6. Samuel Lewis, *The State of New York Compiled from the Best Authorities* (1795). Courtesy David Rumsey Collection.

Carey published other editions of his atlas, and a less expensive *American Pocket Atlas* (1796). His maps were also recycled in schoolbook geographies. All of which further increased the circulation of his maps.

Carey's efforts inspired competition, including some from New York publishers. The second atlas published in the United States, which was similar in appearance to Carey's, was published in New York in 1796 by John Reid, and also called *The American Atlas*.[104] It likewise includes a copy of Lewis's map of *The State of New York*.

Possibly the best and most intriguing, and certainly the most detailed, map of New York to appear during the 1790s is the so-called "Ebeling-Sotzmann" map, which was published in 1799.[105] This map was created in Germany, and is the result of the collaboration between a teacher at the Hamburg *Gymnasium*, Christoph Daniel Ebeling, and the Berlin-based engraver and cartographer Daniel Friedrich Sotzmann. Considerable research has been devoted to this collaboration, and it seems likely that Ebeling is primarily responsible for the content of the map, although Sotzmann actually drew it. Ebeling was interested in America, and he devoted himself to writing a multi-volume geography and history of the United States. His map of New York was one of seven maps of American states in a series accompanying that work.

As might be expected, given his geographical situation, Ebeling had a difficult time gathering materials for his map, and went so far as to complain about his difficulties in a letter to Noah Webster: “As to New York I am very much at a loss, as I have not but Gathier’s [Sauthier’s?], Pownall’s, Ratzer’s [?] maps and *one sheet* of De Witt’s. If there is published any more, I should be extremely rejoiced in getting it. Carey’s map I have also, but it is very defective.”[106]

According to Ralph H. Brown, Ebeling indicated elsewhere that the principal sources for his map of New York were De Witt and Abraham Bradley’s 1796 post-road map.[107] Brown correctly observes that Ebeling’s map was a collation, but Ebeling’s scattered statements about his sources should not be accepted at their face value. In fact, Ebeling’s map bears a fairly close overall resemblance Samuel Lewis’s map of New York, which appeared in Matthew Carey’s atlas, although that must be the map Ebeling described as “very defective.” However, Ebeling’s map contains a good deal of additional information, most of which is clearly copied from De Witt’s “1st Sheet”, from Sauthier, and from Pownall’s edition of Samuel Holland’s map. French place names along the shore of Lake Ontario suggest that Ebeling also borrowed from eighteenth century French sources.

It is remarkable that Ebeling’s map is as good as it is. This type of collation from multiple sources often leads to cartographic disasters, especially when the compiler is on another continent. Through careful research, Ebeling somehow managed to select the best sources and to avoid glaring errors. The main peculiarity of the map is its strange mixture of outdated and very recent place names. All things considered, the Ebeling-Sotzmann map is “better” (i.e. more detailed and accurate) than any other map of the state that appeared between 1783 and 1802. It would not be long, however, before it would be surpassed.

Simeon De Witt’s Map of New York State

Many of the above developments were brought together in Simeon De Witt’s landmark *Map of the State of New York* (1802), which is the first highly detailed map of the entire state since Sauthier’s *Chorographical Map* of 1779.[108] De Witt’s map (Figure 8.7) was a long time in the making. As early as 1786, the State Legislature had passed a law instructing the surveyor-general to make a map the state.[109] As previously noted, De Witt’s 1793 map of the New Military Tract (*1st Sheet of De Witt’s State-map of New York*) was intended as the initial installment on this project.

Figure 8.7. Simeon De Witt, *Map of the State of New York* (1802). Library of Congress, Geography and Map Division.

De Witt had great difficulty in gathering materials to complete his map. He had available the surveys he and Erskine had made during the Revolution, the surveys of the Pennsylvania line, and the surveys of the New Military Tract made under his supervision.

He also possessed Ellicott's surveys of the Holland Purchase, and other surveys submitted to his office. He lacked recent maps of the parts of New York settled before 1784, as well as good maps of several thinly settled areas, such as the Adirondacks. We have seen that he made considerable effort to collect and copy colonial maps. He even went so far as to place advertisements in newspapers calling for "those who wish to see lands in which they are interested laid down with the utmost accuracy, to furnish him for that purpose with such surveys as they may have in their possession, or be able to procure," adding that "favors of the same kind from gentlemen who can produce maps of particular towns or other parts of the state, especially of the old settlements, with their improvements, will be thankfully acknowledged."[110]

On several occasions between 1796 and 1800 the legislature passed laws requiring all town supervisors and county clerks to send to the surveyor general's office maps of the areas under their jurisdictions.[111] Evidently, it was difficult to get all of the towns and counties to comply with these laws, which became increasingly specific about penalties and enforcement. Many of these manuscript maps have survived in the New York State Archives, and are themselves valuable sources of information about conditions at the local level in New York at the end of the eighteenth century.[112] These maps sometimes contain details that cannot be found on De Witt's map, or in any other source, but their quality is extremely variable. De Witt himself remarked that some of the maps were "so erroneous as to be of little or no use."[113]

All of these materials found their way into De Witt's map of New York. In terms of technique, it does not mark a radical departure from earlier maps. It is essentially a work of synthesis and compilation, rather than a new creation based on a comprehensive survey. Most of the map is at a scale of 1:245,000, making it the first large-scale map of New York since Sauthier's *Chorographical Map* of 1779. The western portion of the state is shown in an inset at half-scale.

A comparison of De Witt's map with Sauthier's reveals the remarkable changes that had taken place in New York in less than twenty-five years. To begin with, there is much less white space on the De Witt map. Sauthier's map does not show most of what is now central and western New York, which at the outbreak of the Revolution was still controlled by the Iroquois, and mostly closed to white settlement. On Sauthier's map, most of the area taken up by the Catskill and Adirondack Mountains, as well as the lowlands along the St. Lawrence River are also shown as almost completely uninhabited. In other words, Sauthier's map is a faithful reflection of New York on the eve of the Revolution, which still consisted of Long Island, the Hudson River Valley, the lower Mohawk Valley, and the two narrow communication corridors from the Mohawk River to Oswego, and along Lake Champlain to Canada. Sauthier's map also shows Vermont as part of the Province of New York.

The state boundaries shown on De Witt's map are nearly identical with those of modern New York. In addition, a tremendous amount of detail is filled in. The major lakes and rivers of the state are shown in nearly their correct positions. These features reflect the extensive surveying done by De Witt and others to establish the boundary with Pennsylvania, to lay out the New Military Tract in the Finger Lakes Area, and to survey the lands of the Holland Land Company and of other land developers. Even the major lakes and rivers of the Adirondacks are captured surprisingly well, and the outline of Long Island is shown much more accurately than on any previous map. A computer

analysis confirms that on De Witt's map the latitudes and longitudes of individual locations throughout the state are quite accurate.[114] These point locations are consistently close to the modern readings, and much better than those on any colonial map of New York.

In other respects, a comparison of the two maps shows considerable differences, along with a few surprising similarities. As a technical performance, De Witt's map stands on pretty much the same level as that of Sauthier. The quality of the engraving and clarity of lettering on De Witt's map are not quite as good as on the best late eighteenth century British maps, including Sauthier's, but they are nonetheless quite respectable. Both maps are still essentially works of collation, which combine information drawn from previous maps with information from new surveys. In the older areas of New York, De Witt copied extensively from pre-revolutionary maps, including Sauthier's *Chorographical Map*. In the area around the Mohawk River, he still shows some holdings of pre-revolutionary land owners, including Sir William Johnson and George Croghan. However, De Witt's map includes much new information, such as town boundaries, which are carefully delineated. Even in older areas of New York, De Witt's map is vastly superior to Sauthier's in its depiction of roads and other details. None of this is surprising, since De Witt, because of his many years in office, was in a position to gather more information than Sauthier. The improvement of the outline of Long Island on De Witt's map is something of a puzzle, since I have been unable to uncover any evidence that a new survey was made of the island. De Witt was remarkably conscientious. He even traveled around the state to check the accuracy of previous maps, and somehow he managed to put together an improved picture of the overall shape of Long Island.

Predictably, there is a good deal of cadastral information on De Witt's map. Most of the land in central and western New York is shown laid out in "townships." Instead of Indian names, we find those of heroic figures from Greek and Roman antiquity, many of whom still populate the landscape of upstate New York. The New Military Tract included the townships Lysander, Manlius, Pompey, Homer, Solon, Cincinnatus, Scipio, and Brutus, along with some modern heroes of literature, such as Milton, Locke, and Dryden. Those who preferred their republican virtues in more abstract form might seek out their land in northern Herkimer and Lewis counties, where could be found townships celebrating the Puritan values of Unanimity, Frugality, Perseverance, Sobriety, Economy, Regularity, Enterprise, and Industry. These townships belonged to "John Brown's Tract," in the western Adirondacks near the town of Old Forge—an area that remains lightly settled even today.[115]

Although some of these township names existed on paper only, they illustrate the use of maps to impose on the land a kind of fictive reality, which in some (but not all) cases served to guide future developments. Although much of the state was still largely unpopulated, De Witt's map shows several roads going through western and central New York, along with such infant towns as Buffalo (then New Amsterdam), Geneva, Ithaca, Batavia, Bath, Cayuga, Seneca Falls, Plattsburgh, Utica, Massena, and others. The magnitude of the changes in this area between the maps of Sauthier and De Witt is remarkable, even startling.

Particular attention should be paid to the depiction of Indian Reservations on De Witt's Map. By 1802, the vast land holdings of the Iroquois in western New York had

been reduced to scattered reservations, which are shown as basically empty and undeveloped. They are surrounded by the elaborate grid of townships with distinctly un-Indian names.[116]

There is an oddly visionary quality about De Witt's map, and particularly about the parts dealing with central and western New York. Although most of the roads, towns, and property boundaries shown actually existed, they were often embryonic at best, and (as is seen most clearly with property boundaries) some existed only on paper. As will also be seen with De Witt's maps of Albany and New York City, which will be discussed in the next chapter, his maps are to some extent planning instruments: they projected a vision of how he thought the state should develop. To a surprising extent, this vision was realized.

Little is known about the sales and distribution of De Witt's map. We know that he had to borrow from the state $3000 to prepare it for publication.[117] It could not have been purchased by many people. It was advertised for $10 "pasted and colored" or $8.50 "in sheets."[118] This was at a time when unskilled laborers earned less than one dollar per day, and skilled workers (such as carpenters or masons) were lucky to earn two dollars per day. It would be interesting to know exactly who did purchase De Witt's map, and how many copies were sold, but that information is lacking. We can assume that it adorned the walls of some public offices, and those of wealthy land speculators and their agents. We know that the State Legislature distributed copies of the map to other states, and De Witt was required by law to send copies to county clerks and town supervisors.[119] It was advertised extensively for a decade or so after its publication. Probably it was exhibited in such places as libraries, schools, or taverns—although direct evidence for that is lacking. By being displayed in such places, it probably received greater exposure to the general public than would be indicated by its price. Directly or indirectly, it did much to create a kind of social consensus concerning the reality of De Witt's vision of New York State.

In 1804, De Witt published a reduced-scale version of his state map.[120] The engraving of the1804 map is somewhat careless, but it nonetheless looks more like a modern map of New York State than his 1802 map, since all of it is at the same scale (ca. 1:950,000), and no part of the map is contained in an inset. The reason this map looks so familiar is that the outline of New York shown on this map, ungainly though it may be, has become a kind of "logo" for the state. As such, it is instantly recognizable to most New Yorkers, and it appears on official and commercial publications that wish to associate themselves with the state. As noted above, this use of outline maps to represent and in some sense "make real" artificial political creations is widespread in post-Enlightenment cartography, and has been commented upon by a number of scholars. This standardized presentation also makes it easier for us to compare various maps of the state. Colored copies of this map were sold for two dollars, but apparently it was sold only by subscription.[121] In spite of its lower price, it does not appear to have been as widely distributed as its predecessor.

De Witt's 1802 and 1804 maps were extremely influential. Although the information on them quickly became dated, the overall framework produced by De Witt was not significantly improved on for nearly 100 years. We will see that a number of later maps and atlases updated De Witt's work with new information, but none of them were based on extensive new surveys or other sources of information. Although both De Witt and his successors relied primarily on compilation to put together their works, none of the

mapmakers following in his footsteps were able to devote the same amount of time and effort to their maps. Only much later did the expensive “trigonometrical” surveys, mostly conducted by federal agencies like the U.S. Coast Survey and the U.S. Geological Survey, make it possible to construct substantially better maps of the state as a whole.

Chapter 9
Mapping an Expanding Empire State, 1790-1830

Economic and Social Developments, 1790-1830

This chapter overlaps the previous chapter chronologically, and many of the themes discussed here are closely linked with the physical expansion of New York, which was a major subject of the preceding chapter. The extension and rapid settlement of the state increased the demand for roads and canals. Eventually, the growth of population and improvements in transportation infrastructure made possible commercial farming and industrialization, which in turn contributed to further dramatic changes, including the growth of cities. These developments have shaped much of New York's history up to the present. As was the case both earlier and later, maps played an important role in implementing these changes, and they faithfully reflect many of the policies and preoccupations of New York's political and economic elites.

Transportation Maps: Roads, Canals, and Nautical Charts

Along with property, transportation is the second major theme of the mapping of New York State during the early Federal era. This marks a significant departure from the colonial period. Prior to the Revolution, the settled parts of the future state had easy access to water transportation—to the Atlantic Ocean in the case of Long Island, and to the Hudson and Mohawk Rivers for the rest of the colony. Consequently, roads were of relatively little importance, and were used mainly for local transportation. But, as soon as Euro-Americans began to move into central and western New York, it was recognized that good roads and canals would be essential for the settlement of that part of the state. This led to an early example of the creation of infrastructure for economic development.

The linkage between property mapping and transportation planning and mapping is very close. The same individuals were often involved in both activities. For example, land agents like Charles Williamson and Joseph Ellicott were actively involved in promoting the construction of roads and canals. Peter Schuyler and Peter Porter were among the property magnates and politicians who promoted both turnpikes and canals. And Simeon De Witt, as surveyor general, was heavily involved in developing roads and canals, along with property registration and mapping. On a less lofty level, numerous surveyors were employed surveying roads and canal routes, in addition to mapping property.

Roads

The first manifestation of the post-colonial drive to improve the transportation infrastructure in New York was the movement for road construction. In comparison to the outpouring of literature on canals and railroads, relatively little attention has been paid to the role of roads in the early development of New York State.[1] Referring specifically to turnpikes, geographer D.W. Meinig succinctly summarized our ignorance of this subject: "In some cases it is difficult to discover exact routes; in others it is hard to be sure just how much of a proposed route was actually constructed; in most cases it is impossible to

get much information on the actual condition of the roadway (an important and highly variable factor), and in nearly all there is no really satisfactory measure of the volume of traffic."[2] For the period prior to the beginning of the turnpike movement (about 1797), even less is known about the state of the roads.

Nonetheless, road building was a major preoccupation of land developers, and of the state government, in the decades following the Revolution. Immigrants required roads in order to immigrate, and, once settled, they relied on them to obtain supplies and to move their produce to market. To meet their needs, land developers constructed primitive dirt roads on and to their lands. Most of these early roads were ungraded and unpaved. Many were widened Indian paths. Typically, road builders just chopped down trees to make a path wide enough for wheeled vehicles. There were few bridges over streams and rivers. In general, roads were also poorly maintained, and complaints about horrendous road conditions feature prominently in the travel literature of the time. In spite of all of this, roads were essential to the economy.

These primitive roads received particularly heavy use from sleighs in the winter, both by immigrants and by farmers who needed to get their products to the market. Although this is somewhat surprising at first glance, on reflection it seems reasonable, since winter travelers would not have had to deal with mud when the ground was frozen, and the snow would have smoothed out bumps in the primitive roads. Roads would have also been the only means of communication available when rivers and canals were frozen over. A hint concerning the extent to which sleighs were used for transportation is provided by this contemporary description:

> Feb. 28, 1795. —Five hundred emigrant sleighs passed through Albany between sunrise and sunset. It was estimated that 1200 sleighs, freighted with men, women, children and furniture passed through the city in three days, from the east, to settle in the *Genesee Country*—the treaty with Great Britain and with the Six Nations, having dispelled every apprehension of danger.[3]

Primitive roads were built with great speed by land developers. A small network of roads was constructed by Phelps and Gorham in 1789, including a crucial stretch from Fort Stanwix (Rome) through Geneva to Canandaigua and the Genesee River.[4] In the early 1790s, Charles Williamson opened the "Susquehanna Trail," leading from Chesapeake Bay to the Genesee Country.[5] Somewhat later, between 1800 and 1812, Joseph Ellicott supervised the construction of more than 1000 miles of roads in the lands of the Holland Purchase.[6]

The state government became involved at an early date in encouraging the construction of roads. The first legislative action for this purpose was a section of a law passed on February, 25, 1789, the broader purpose of which was to set rules for the disposal of a huge tract of land "purchased" from the Oneida Indians.[7] According to Durrenberger: "By the terms of this measure the commissioners of the land office were given permission to grant not more than 25,000 acres of the Oneida concession as compensation to any person or persons who would undertake to build roads or bridges 'in or toward any part of the lands now belonging to the people of the state.' The finished work was to be inspected by the surveyor general before the grant could be allowed. A similar amount of land was offered for opening a road between the St. Lawrence and Lake Champlain."[8]

To fund the building of roads, the legislature tried a number of other subsidies and funding schemes, including lotteries.[9] By 1800 an extensive network of roads had been constructed in central and western New York. Some were in seemingly unlikely places, including several that passed through the Catskill Mountains from the Hudson River to central New York. Many of these Catskill roads were promoted by cities in the Hudson Valley, which hoped to use them to capture a share of the trade with western New York. Some were also lobbied for by large landowners, who hoped that the roads would increase the value of their properties.[10] A number of these roads can be seen on De Witt's 1802 state map.

Beginning in the late 1790's, the legislature started encouraging private companies to construct and maintain toll roads or "turnpikes" (named after the gates that were raised after a toll was paid). The first turnpike was chartered in 1797, and it was followed by numerous others in quick succession.[11] By 1807, eighty-eight turnpike and bridge companies had been chartered.[12] According to Durrenberger, by 1821 there were 56 bridge companies and 278 turnpike road companies in operation, with a total capital of almost $12,000,000. They were authorized to build about 6000 miles of roads, and had actually completed about 4000.[13] Investment in turnpikes by private individuals became something of a craze, which helped along the rapid growth of the turnpike movement. Although not particularly profitable, investing in turnpikes and toll bridges became an important alternative to land speculation for those who hoped to increase their wealth with little effort.[14]

These are impressive statistics, but they say nothing about the quality of the roads, which has not been studied in detail. Most of the extensive legislation about roads and turnpikes passed by the legislature says little or nothing about how they were to be constructed. Almost certainly, most of the turnpikes were dirt roads, but at least some were graded and surfaced with gravel or crushed rock. The Albany-Schenectady Turnpike, which formed a crucial link between the Mohawk and Hudson rivers, has been cited for its exceptional excellence: its fourteen miles were paved with stone at the cost of $10,000 per mile.[15] Although varying in quality, the turnpikes were an improvement over the more primitive local roads. They were relatively well maintained, and usually had adequate bridges. They were sometimes fenced to keep livestock from straying into nearby fields. This was important, since roads at that time received heavy use from farmers driving their animals to distant markets.

The best of these turnpike roads were paved with macadam, which was the invention of one John McAdam (1756-1836). McAdam was born in Scotland, pursued a business career in New York City between 1770-1783, and subsequently returned to Britain, where he pioneered a method of road construction that involved laying down a waterproof surface of compacted stone and gravel. There were several types of macadam roads, and nothing is known about the quality of those laid down in New York. None of them involved coating the surface with tar or asphalt, which was characteristic of some macadam roads after the end of the nineteenth century. When properly done, gravel macadam worked quite well with wheeled traffic, although it had to be laid down on dry soil. Where the ground was swampy, other alternatives were attempted, such as plank roads, which became something of a fad later in the nineteenth century.[16]

The importance of roads in these years is to some extent reflected in their prominence in maps. Contemporary maps provide us with a good idea of the growth of

the road network, although they say remarkably little about how good the roads were. A few early nineteenth-century maps differentiated between post roads or turnpikes and other roads, but that is the extent of what they tell us about road conditions. For some reason, it did not occur to early nineteenth-century map makers to show the quality of roads. An interesting case in point is John Melish, who in addition to being a leading cartographer, wrote extensively about his travels in New York and elsewhere in the United States. In his book of travels, Melish frequently mentions the condition of roads. Thus, he remarks that the road from New York to Jamaica (Long Island) was the "finest road I had yet seen." A road from the vicinity of Niagara Falls to Batavia was "the worst road I had ever seen." Most roads he describes as either "good" or "indifferent."[17] But he says nothing about whether roads were graded or surfaced, and his maps do not make any effort to differentiate between good and bad roads. Only after the advent of the bicycle and the automobile at the end of the nineteenth century did map makers routinely differentiate between various types of pavements.

Turning to actual maps, we see a rather uneven pattern. There was certainly a need for better road maps. The depiction of the road network on British maps published prior to the Revolution was often unreliable, as the generals of the opposing armies quickly learned. It has already been seen that during the Revolution Erskine and De Witt focused on producing better road maps for the American army. The rapid growth of settlements and roads after the conclusion of peace quickly made all previous road maps obsolete.

It should be kept in mind that almost all regional or state maps were "road maps," in that they usually showed roads. Anyone interested in the development of the road network in a particular place should look at all available maps of an area of interest. A few maps can, however, be singled out because of the particular attention they paid to roads.

The first detailed post-Revolutionary road maps are in Christopher Colles' famous *Survey of the Roads of the United States of America*, which was published in 1789 (Figure 9.1).[18]

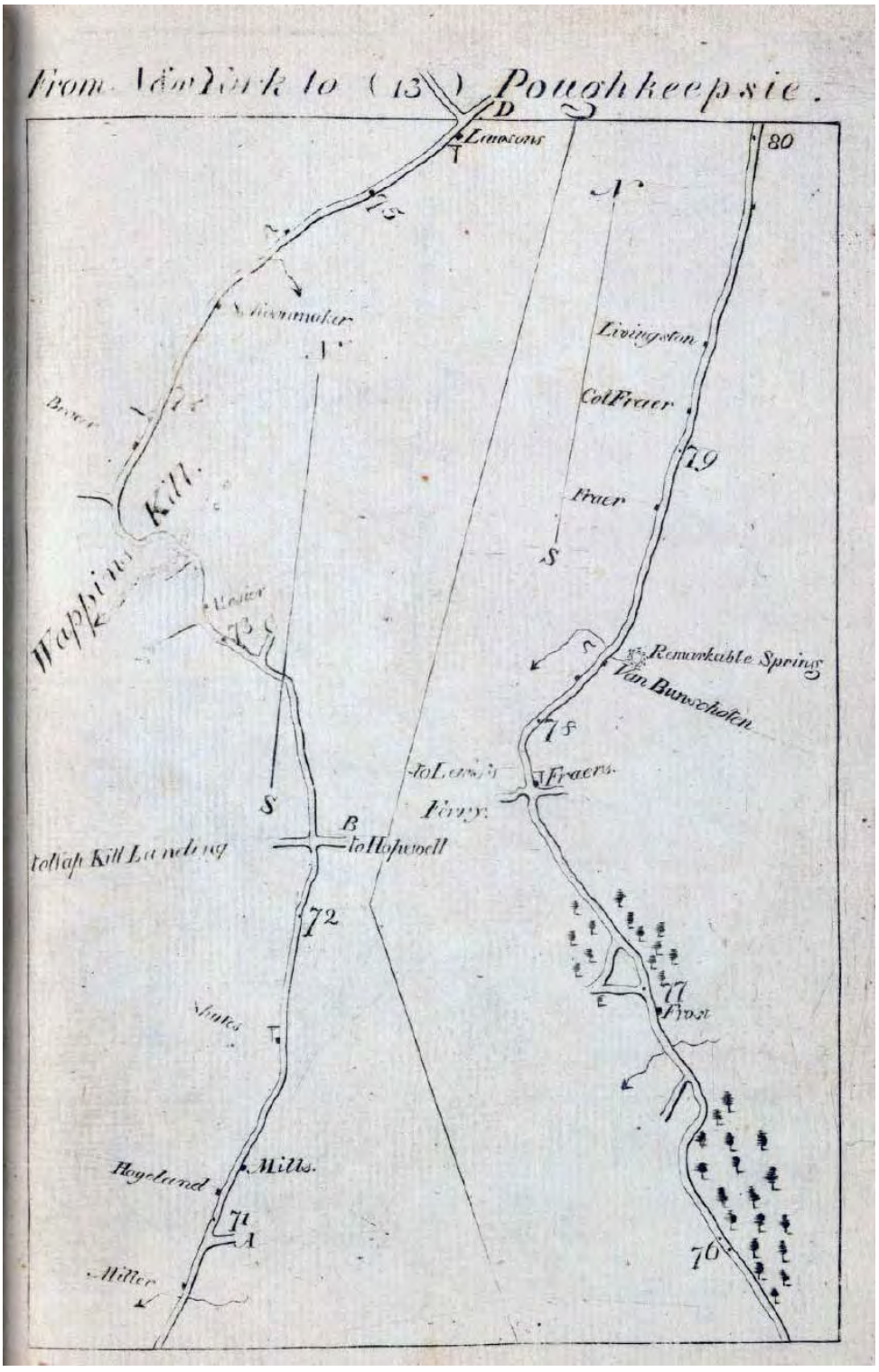

Figure 9.1. Page from Christopher Colles, *Survey of the Roads* (1789). Courtesy David Rumsey Collection.

Colles (1739-1816) was an Irish engineer resident mostly in New York City who promoted a variety of visionary projects, which inevitably failed in part because they

were too far ahead of his time. As W.W. Ristow has shown, Colles' atlas is largely based on maps compiled by Erskine and De Witt during the Revolutionary War, although Colles supplemented this information by the use of a "perambulator," which he designed himself, to measure distances. This measuring device was his variation of a type of wheeled mechanism that had been used at various times since the Renaissance to measure distances by counting the rotations of a wheel. The coverage of Colles' *Survey* is particularly detailed for the area in which the Continental army was most active—the Hudson River Valley and adjoining areas. Colles optimistically claimed that with his maps it would be "impossible" for a traveler to lose his way, and in fact his maps were a great improvement over anything previously published. This work also contains a good deal of useful historical information about such things as the location of mills, taverns, and blacksmith shops. Unfortunately, Colles was unable to find a market for his maps, and his project had to be abandoned unfinished.

Colles used some of the materials from his *Survey of the Roads* in another publication, the *Geographical Ledger*.[19] This work, which also had to be abandoned, is even rarer than the *Survey of the Roads*. Only five sheets of this atlas appeared, but between them they cover all of New York west of the Genesee River. The areas not included in the *Survey of the Roads* were mostly copied from other maps, including Sauthier's *Chorographical Map* of New York, and the road network shown on areas such as Long Island reflects Colles' dependence on these sources.

More of an economic success, but less detailed, was Abraham Bradley's post road map of the United States, which went through three editions, two of which appeared in several states, between 1796 and 1825 (Figure 9.2).[20]

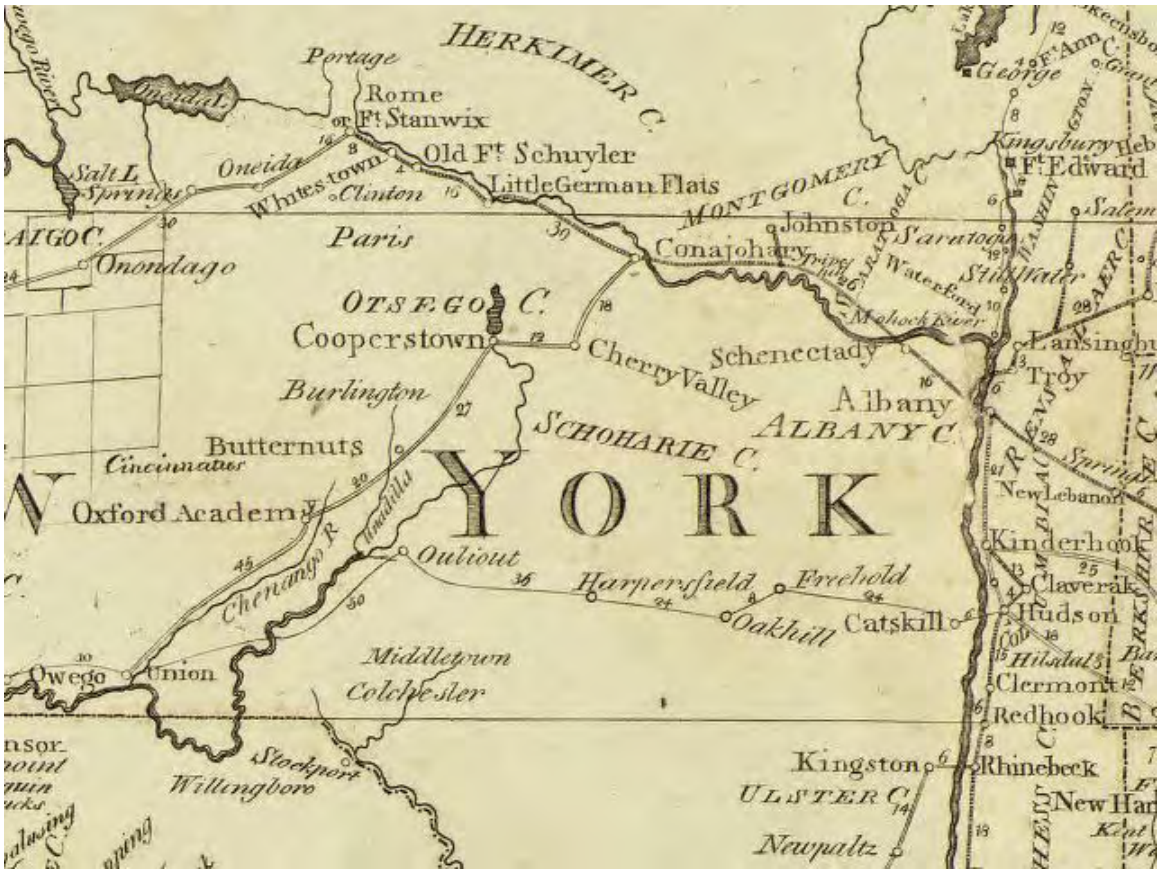

Figure 9.2. Detail from Abraham Bradley, *A Map of the United States Exhibiting Post Roads & Distances* (1796). Library of Congress, Geography and Map Division.

The 1796 edition of this map, which is available online, already shows two post roads reaching north and south of the Finger Lakes and as far west as the Genesee River. The importance of mail service to the isolated settlers in the newly established villages of central New York should not be underestimated. Presumably, these post roads were better than ordinary roads. There does not seem to have been any particular standard that post roads were supposed to meet, but the mail was generally carried on stagecoaches, so it is probably safe to assume that these roads were good enough for stage travel, which is not saying very much considering the horror stories told by coach travelers at the end of the eighteenth century.

The maps of Colles, Bradley, and others should be compared to Simeon De Witt's 1802 map of New York State, which shows a much denser road network. The increase in the number of roads testifies both to De Witt's conscientious work, and to the rapid pace of road construction in the late 1790s.

Because new roads were appearing every year, this feature of De Witt's map was soon outdated. Among the maps that provided information about the development of the road network in subsequent years, particular attention should be paid to a map that appeared in 1809: William McCalpin's *A Map of the State of New York: Compiled from the Latest Authorities: Including the Turnpike Roads Now Granted As Also the Principal Common Roads Connected There With*.[21] As indicated by its subtitle, this map

particularly focuses on the road network. It carefully differentiates between “turnpike roads” and “common roads,” and gives the names of individual turnpikes (which is quite unusual). A note on the map states that it was “intended as well for the student in geography as a directory to the traveler.” All in all, it more closely resembles a modern road map in appearance and function than any other map of New York published during this period.

For the years between 1808 and 1830, the best sources of information about roads are general purpose maps. The maps of Amos Lay, J.H. Eddy, H.S. Tanner, and David Burr are particularly useful in this respect. These and other general purpose maps of New York will be discussed later in this chapter.

Canals

While the researcher interested in the history of roads in New York is faced with a dearth of published information, the student of canals confronts the opposite problem: a flood of written words. This is particularly the case with the Erie Canal, which from the beginning generated a peculiar amount of publicity and excitement. From the time of De Witt Clinton to the present, the Erie Canal has symbolized such things as economic growth, American inventiveness, and the “manifest destiny” of the United States to dominate North America.[22]

There is some justification for this celebration of the Erie Canal. Canals did provide faster and less expensive transportation than turnpikes. They facilitated the settlement of the state, and the growth of New York to a leading position in the economy of the country. It is questionable whether New York would have attained the same position if it had built no canals, and if it depended instead solely on roads and (later) railroads for transportation.

The strategic importance of the route from the Mohawk River to the Great Lakes was recognized even in the colonial period. As early as 1724, Cadwallader Colden, wrote a memorandum pointing to the possibility of capturing the trade of the interior of North America from the French by utilizing a route to the Great Lakes similar to that later followed by the Erie Canal.[23] Colden did not go so far as to propose constructing a canal, but he was among the first to recognize the comparative ease with which the route could be traveled. Readers may recall the map (based on the work of Delisle) that he had printed to accompany this memorial, which marked some of the portages along this route (Figure 4.3).

During the colonial period, the British attempted to implement part of Colden’s strategy by building a fortress and trading post at Oswego on Lake Ontario, which could be reached from the Mohawk River, via Wood Creek, Lake Oneida, and the Oswego River. Later in the colonial period, some work was actually done to improve navigation along this route by constructing small canals and clearing obstacles in Wood Creek.[24]

After the Revolution, with the St. Lawrence River in the hands of the British and with the beginnings of the westward movement, the importance of good water transportation to the west became even more evident.[25] As early as 1785, Christopher Colles published a book, accompanied by a map, proposing construction of a canal from Albany to Great Lakes.[26] The route that Colles proposed followed the colonial route

from the Mohawk River via Lake Oneida to Oswego. As was frequently the case with Colles, he was ahead of his time, and nothing came directly from his proposal.

Similar ideas were taken up a few years later by the Western Inland Lock Navigation Company, which was chartered in 1792. This was a high-powered undertaking. Philip Schuyler was its main sponsor; its shareholders included such important figures as Simeon De Witt, Thomas Eddy, and Elkanah Watson. Later in 1792, Schuyler and others made a systematic exploration of the route from the Mohawk River to Albany, which led the publication of a detailed report and a map (now lost).[27] Shortly thereafter, the company began improving navigation along Wood Creek and the Mohawk River. Most of its work consisted of clearing obstacles and constructing small bypass canals. Although not a financial success, the project significantly improved navigation between Albany and central New York, and the interest generated by it helped stimulate the later construction of the Erie Canal.

The early proposals for the construction of a western canal envisaged its terminus at Oswego on Lake Ontario, with a second canal bypassing Niagara Falls to connect Lake Ontario with Lake Erie. According to Simeon De Witt, Gouvernor Morris in 1803 was the first to propose constructing a canal directly to Lake Erie—a route which De Witt dismissed as impractical and "a romantic thing."[28] As late as 1808, De Witt opposed constructing a canal directly to Lake Erie, but when in that year De Witt was put in charge of surveying the canal route, he asked Joseph Ellicott, who was more familiar with the geography of western New York, for information on the feasibility of the Lake Erie route, which led him to believe that it might be workable.[29]

The actual survey of the route was made by James Geddes (1763-1838), another protégé of De Witt. Geddes' report, which was submitted to De Witt in 1809, determined that the inland route to lake Erie was feasible, and recommended it as preferable to the Lake Ontario route.[30] In 1810 the commissioners, along with Geddes and J.H. Eddy, explored the path of the proposed canal, using surveying instruments called levels to measure elevations along the route. The results were published in 1811 in a report recommending the Lake Erie route. Both the 1809 and 1811 reports included maps by Geddes illustrating details of the proposed route.[31] The first published map showing the entire route appears have been drawn by J.H. Eddy following the 1810 expedition.[32]

Construction of the canal was delayed by political opposition, financial difficulties, and the interposition of the War of 1812. Just before the outbreak of the war, an unsuccessful attempt was made to obtain funding for the canal from the federal government. The war itself demonstrated the importance of improving transportation to the Great Lakes region, and strategic considerations gave a boost to the construction of an all-inland route to Lake Erie.

Canal construction finally began in 1817. The canal was opened in sections, and completed with elaborate celebrations in 1825. These festivities celebrating "the wedding of the waters" were recorded, appropriately enough, by Cadwallader D. Colden, mayor of New York and grandson of the colonial surveyor general who may have been the first to perceive the significance of the canal route for New York's future.[33] Although the extent to which the Erie Canal was responsible for the rise of New York to "Empire State" status is debatable, it was an indubitable success. It quickly paid for its construction costs through tolls, and the cost of long distance shipping dropped

dramatically. The canal had much to do with the rapid growth of agriculture, industry, and population in New York between 1825 and 1850, and with the rise of New York City as the nation's economic capital. It stimulated the construction of a whole network of feeder canals throughout the state, and led to the abandonment of most long-distance turnpikes in New York. Toll roads were largely reduced to the role of feeders for the canal system.

The Erie Canal achieved a kind of iconic status even before its completion. As the first large-scale public works project in the nation, it attracted widespread attention beyond its potential economic benefits. This aspect of the canal contributed to its frequent portrayal in maps, starting well before the canal's construction. J.H. Eddy's 1811 map showing the route of the proposed canal was the first of a long series. Immediately after the authorization of the canal's construction in 1817, the Canal Commissioners published their first official map of the proposed canal.[34] In 1821, they published an updated version of it.[35] Much more detailed maps of the canal were drawn at this time by the engineers, and can be found in several libraries and archives.[36]

The commemorative volume prepared by Cadwallader D, Colden to celebrate the "Wedding of the Waters" in 1825 was embellished by several maps. One of these has been identified by W.W. Ristow as one of the earliest examples of lithography in the United States.[37]

Probably the most spectacular map celebrating the Erie Canal was published by John Ogden Dey in the year of the canal's opening, 1825 (Figure 9.3).[38] Dey reprinted a detailed *Map of the Western Part of the State of New York* drawn by D.H. Vance in 1823, and embellished it with a variety of things, including statistical tables showing the growth of the state since 1800, and several views of landmarks along the route of the canal. Dey also included a geological profile of the route of the Erie Canal, which had previously been published by Amos Eaton.[39] Eaton's profile, which will be described in the following chapter, is one of the first geological maps published of New York State. Dey's fancy map would certainly have made an attractive souvenir for anyone attending one of the numerous celebrations of the completion of the Erie Canal. One copy, now at the New York State Library, was presented to the Marquis de Lafayette on his tour of the United States.

Figure 9.3. John Ogeden Dey's 1825 reworking of D.H. Vance, *Map of the Western Part of the State of New York.* Courtesy David Rumsey Collection.

By the early 1820s, commercial publishers were already starting to include profiles of the canal on their maps of the state. Between 1825 and 1840 a "map and profile" of the Erie Canal was included with monotonous regularity as an inset on popular general-purpose maps of New York.[40] Like the state seal or the outline of the state itself, the Erie Canal had become a kind of cartographic icon. Like the sailing ships on seventeenth-century Dutch maps, the profile of the Erie Canal had become a symbol of pride and power.

Even before the completion of the Erie Canal, New York's planners and engineers had started construction of a network of feeder canals. The first of these secondary canals to be completed was the Champlain Canal, which connected the Hudson River with Lake Champlain and ultimately with the St. Lawrence River. The Oswego Canal connected the Erie Canal with the Lake Ontario, fulfilling the design of New York's earliest canal planners. Other important canals included the Delaware and Hudson (completed 1829), the Black River Canal (completed 1855), the Chenango Canal (1837), and the Genesee Canal. Most mid-nineteenth century maps of New York State show this canal network, along with roads and railroads. By the 1850s the canal network reached its maximum extension, and thereafter the mileage of canals gradually decreased—largely because of competition from railroads. Detailed plans of these canals can often be found in documents published by the state legislature and elsewhere.[41]

Those with particular interest in New York's canals should note that the most detailed canal maps were never published. These are multi-sheet maps produced by the surveyors and engineers of the canals, which often show such things as individual houses, bridges, and the details of locks. Such a map of the Erie Canal, produced by James Geddes, can be found at the New York State Library.[42] Geddes also drew a similar map of the Hudson River - Lake Champlain Canal, which is housed at the Onondaga Historical Society.[43]

Nautical Charts

Although this period saw a shift away from New York's colonial reliance on river and coastal navigation, such traffic continued to be important for the movement of passengers and freight. In the production of nautical charts, we can one again see the familiar pattern of initial reliance on British products, followed by their eventual replacement by more detailed American charts.

In the years immediately following the Revolution, American ship captains continued to rely heavily on *The English Pilot, Fourth Book*.[44] Better charts could be found in Des Barres' *Atlantic Neptune*, but these were expensive and hard to obtain. As we have seen, *The Atlantic Neptune* provided (for the time) extremely good coverage of New York Harbor, the lower Hudson River, the East River, Hell Gate, and parts of Long Island (including Oyster Bay, Huntington Harbor and the East End), although it lacked equally good coverage of most of Long Island Sound, and of the Atlantic Ocean off the South Shore of Long Island.

The need for widely available and reliable charts of New York's harbors and coastlines started to be addressed in the late 1780s by the Boston map makers John Norman, Osgood Carleton, and Matthew Clark.[45] In the years after 1789, these cartographers, who frequently worked in collaboration, produced a series of charts of the Atlantic Coast of North America. Their charts were largely copied from Des Barres, but included some additional information. Those of the New York area were generally part of larger productions, although they sometimes included insets showing New York harbor.

The earliest of these charts that included coastal New York appears to be John Norman's *Chart of the Coast of America from New York to Rhode Island* (1789).[46] This chart, which includes a fair number of soundings, provides a fairly creditable overview of New York Harbor, Long Island Sound, and the waters on the south side of Long Island. Several similar charts were published by Norman and Clark in the following decade—none of which improved greatly over the 1790 chart.

While Americans were attempting to adapt and improve on pre-Revolutionary British charts of the Atlantic Coast, the British were still publishing nautical charts of this area. In 1794, the London-based publishers Laurie and Whittle printed a new chart of the coast of New England and New York, which included considerably improved coverage of the neglected areas around Long Island (Figure 9.4).[47] This chart was attributed to a Captain N.[athaniel] Holland, who has been confused by some scholars with Samuel Holland, the former Surveyor General of the Northern District (who by this time was Surveyor General of Upper Canada). This confusion is probably the result of a deliberate ploy by the publisher, whose sales would have profited if it were thought that the chart was drafted by the most famous British surveyor of North America. In fact, it was compiled mostly from *The Atlantic Neptune* and from unpublished British naval surveys made during the Revolutionary War. Its coverage of the waters around Long Island compares favorably with any chart published prior to 1830.

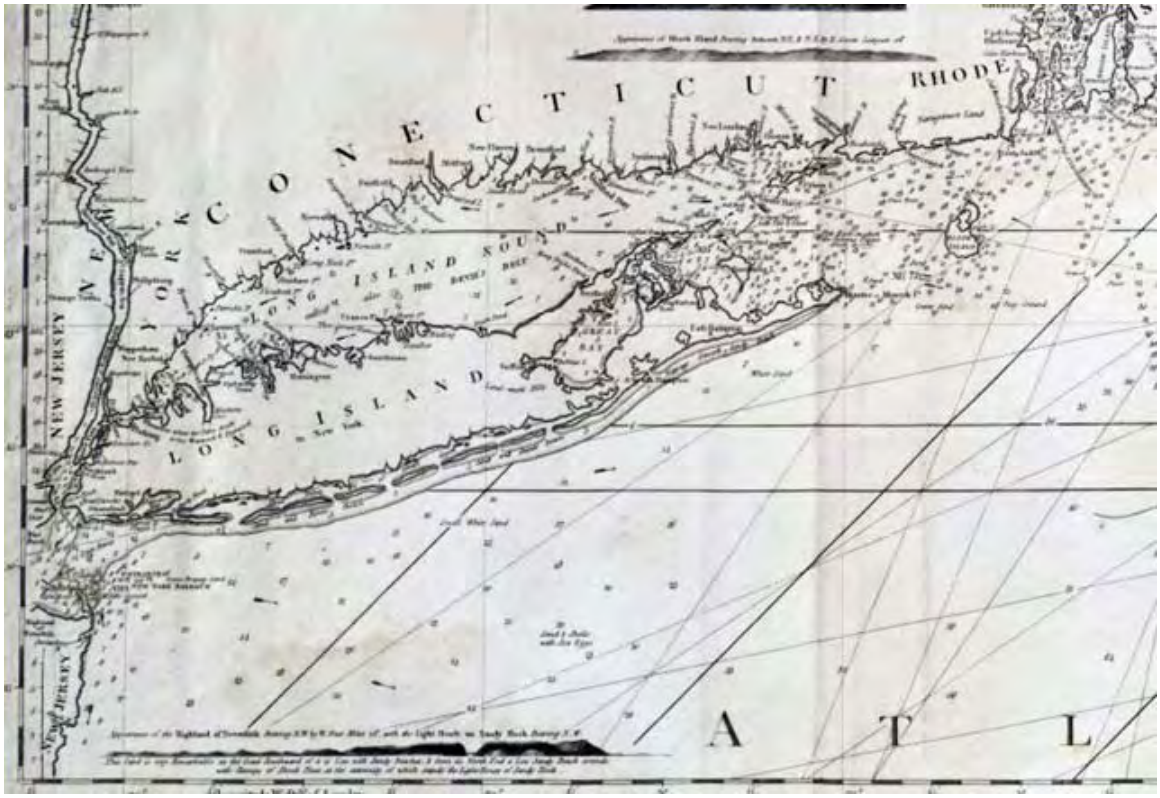

Figure 9.4. Nathaniel Holland, *A New and Correct Chart of the Coast of New England and New York* (1794). Detail showing coast around Long Island. Norman B. Levanthal Map Center, Boston Public Library.

The British published several similar charts in the following years, some of which were intended at least in part for the American market. In 1799, William Heather published a chart that closely resembles the one published a few years earlier by Laurie and Whittle.[48] In the same year, Heather published a similar chart with the revealing title *To the Independent Mariners of America: This Chart of Their Coast from Savannah to Boston is Most Respectfully Dedicated*.[49] Another indication that these charts were marketed in large part to Americans comes from the dedication of the 1809 edition of Nathaniel Holland's chart of the Atlantic Coast, which was "respectfully inscribed to His Excellency Thomas Jefferson, president of the United States of North America, by his most obedient humble servants, Rob[er]t Laurie and Ja[me]s Whittle."[50]

These British and American charts of the late eighteenth and early nineteenth centuries have not received much study. Little is known about the relationships between them, the extent to which they are copied from *The Atlantic Neptune* and other sources, or about the origins of any unpublished surveys that might have been used in their compilation.

In addition to these relatively small-scale regional charts, British and American publishers produced several charts during these years that focused on New York Harbor. The most notable of these appeared in the 1784 and 1794 editions of *The English Pilot, Fourth Book*.[51] These charts are comparable in detail those that previously appeared in

The Atlantic Neptune, and would have been much more accessible to both British and American mariners.

The name most closely associated with the mapping of the waters around New York in the early nineteenth century is that of Edmund March Blunt (1770-1862).[52] Blunt started his career as a printer and publisher of religious and other materials in Newburyport, Massachusetts. In 1796, he published his first nautical book, Capt. Lawrence Furlong's *The American Coast Pilot*, and thereafter focused increasingly on nautical books and charts. Around 1810, he moved to New York City and opened a store on Water Street, which sold nautical charts and instruments. He frequently collaborated with the engraver William Hooker, and published with him several maps of New York City.

Blunt's earliest charts of the waters in the vicinity of New York City area are not particularly impressive. His first effort was to republish a *Chart of Long Island Sound* (1809), which had been originally published by John Cahoone in 1805.[53] This chart included few soundings, and was notably sparing in its depiction of shoreline features. It failed to take advantage of the much better coverage of certain areas in *The Atlantic Neptune*, and it is overall considerably less impressive than the charts published by William Heather or Laurie and Whittle. In spite of its weaknesses, Blunt continued to reissue this chart with minor augmentations as late as 1827. Presumably he was able to sell this chart successfully by charging lower prices than his British competitors, and through his knowledge of the local market.

Another early effort brought Blunt into more direct competition with his British and American rivals. *This is Blunt's New Chart of the North Eastern Coast of North America* (1813).[54] This chart very closely resembles the regional charts published by John Norman, Nathaniel Holland, and others. Its depiction of Long Island is obviously derived from late eighteenth-century British works. Unlike Blunt's chart of Long Island Sound, it also shows the waters off the south coast of Long Island, including soundings and bottom samples in that area.

After 1816, the Blunt firm started to improve its charts by commissioning its own original hydrographic surveys. In 1822, Blunt supplemented his stock with a credible chart of the entrance to New York Harbor, which included at least some new soundings.[55]

Only after 1825 did the firm succeed in producing nautical charts of the New York City area that clearly surpassed the British charts made during or shortly after the Revolutionary War. The new charts published by the Blunt firm were based in part on surveys conducted by Blunt's son, Edmund Blunt (1799-1866). New York Harbor and vicinity received greatly improved coverage in two charts. The first appeared in 1827 under the title *The Harbor of New York*, and includes extensive soundings and other navigational information (Figure 9.5).[56] In 1830 an expanded version of this chart was published under the title *The Harbour of New York with the Coasts of Long Island and New Jersey* (1830).[57]

Figure 9.5. Edmund Blunt, *The Harbour of New York* (1827). Library of Congress, Geography and Map Division**.**

Long Island Sound finally received a careful rendering in 1830 with the younger Edmund Blunt's *Long Island Sound from New York to Montauk Point*.[58] This chart boasts extensive soundings and a detailed depiction of the shoreline.

Edmund Blunt (senior) retired in 1833, announcing that his unceasing labors on behalf of the nautical community had left him "with a constitution broken by exposure and fatigue, and a fortune literally 'cast upon the waters,'…."[59]. Notwithstanding his sufferings, his broken constitution held out until 1862, when he died at the age of ninety-two, leaving behind a prosperous business for his heirs to manage. The careers of two of his sons, Edmund and George William, tell us much about the development of American hydrography in the nineteenth century. Edmund was primarily interested in surveying, and he joined the U.S. Coast Survey in 1832. His name appears on several important Coast Survey charts of the New York area that were published in the 1840s and later.

George William Blunt inherited his father's business skills, and he was primarily responsible for the continuation of the family firm until his death in 1878. The Blunts continued to play a major role in publishing nautical charts and books prior to the Civil War, for it was a long time before the U.S. Coast Survey produced many charts. However, as the Coast Survey increased the number of its publications after 1844, it gradually displaced the Blunts. G.W. Blunt recognized the inevitable and perhaps even welcomed it. He extended the prosperity of his firm by cooperating in many ways with the Coast Survey. Not only was his brother one of the top officials of the Survey, but he became a close personal friend of the second Superintendent of the Survey, Alexander Dallas Bache, who was at its helm from 1844 to 1867. The Blunts became the New York agent for the Coast Survey, and the affairs of the Blunts and the Coast Survey were closely intertwined. Among other things, the Blunts sold navigational instruments to the Survey, and engaged in extensive lobbying on its behalf. Finally, after the Civil War, E.W. Blunt decided to close his business, and he sold the copyright and plates of *The American Coast Pilot* and other publications to the Coast Survey—which is how they came to be published by the U.S. government. Some of these actions would be regard as ethically dubious today, and would probably call down a Congressional investigation, but they do not seem to have raised any eyebrows at the time. For our purposes, they are significant in marking the transition from one era of American map making to another. Private firms, such as the Blunts, simply lacked the resources to engage in extensive original surveying. For new developments in coastal charting, it is necessary to turn to the activities of the Coast Survey itself, which will be done in the next chapter.

Although the Blunt firm dominated the production of nautical charts of the waters around New York in the early nineteenth century, a few other charts were produced that should be mentioned here. Several manuscript charts were drawn of Sag Harbor, which in the early nineteenth century was the second most important port in New York. Most of these can be found in the National Archives, along with the earliest printed map of Sag Harbor.[60] These maps reflect the involvement of the Topographical Bureau of the U.S. Army in the mapping of strategic locations in the first decades of the nineteenth century.

One of the most intriguing nautical charts published in the early nineteenth century is Ephraim Chesebrough's chart of the eastern part of Long Island Sound.[61] For its time, this is an unusually detailed chart, which includes many soundings, reefs, current arrows, and observations on the composition of the sea bed. A note on the map states that it was

"taken by actual surveys of the American squadron in 1811, and the British squadron in 1813 and 1814." It shows the anchorages of British ships during the last years of the war of 1812, and is very similar to a manuscript map at the National Archives, which was supposedly copied from a map by the British fleet under Commander Hardy during the War of 1812.[62]

The inland waters of New York were neglected by the Blunts and other chart makers. No detailed charts of the Hudson River were created during this period, which is surprising given the heavy traffic between New York City and Albany. Not only was the Hudson River New York's chief commercial conduit, but after the steamboat *Clermont* started operation in 1807, it became popular with tourists. One detailed map of the river created during this period deserves special mention, even though it is not primarily a nautical chart. This is Andrew Thompson Goodrich's *Map of the Hudson between Sandy Hook & Sandy Hill: with the Post Road between New York and Albany* (1820).[63] It is a multi-sheet map, which was originally issued in booklet form. As its title implies, it is primarily a road map, but it is quite detailed, and identifies numerous notable buildings and other features. Its depiction of the Hudson River itself might have been of some use to navigators. It includes sparse soundings, and shows islands and other features in the river. It is not so detailed, however, that navigators could have relied on it entirely. They apparently depended mostly on their own acquired knowledge, like Mark Twain's Mississippi River steamboat captains. There appear to have been no detailed nautical charts of Hudson River published before the 1850s, except for those covering New York Harbor and mouth of River. It is possible that continuing fear of British invasion may have discouraged the publication of detailed nautical charts of the Hudson, although there is no direct evidence for this.

Much the same can be said concerning the lakes and rivers of upstate New York. Immediately following the War of 1812, as will be seen below, the U.S. Army made a detailed survey of Lake Champlain, but it was never published. At various times, the British military conducted surveys of Lakes Ontario and Erie, as well as of the St. Lawrence and Niagara Rivers, but the resulting charts exist only in manuscript. Security concerns on both sides of the boundary may have inhibited the publication of charts of these areas, although the high cost of hydrographic surveying and the cost of publication also probably help explain the lack of detailed charting of this region prior to the 1850s.

Military Maps

During the fifty years following the conclusion of the Revolutionary War, military mapping played a much smaller role than it had during the final decades of British rule and the American Revolution. The major military event of this period was the War of 1812, and most of the military mapping of this period was directly or indirectly associated with that war. Although the war itself stimulated the production of some maps, continuing tensions between Britain and the United States, both preceding and following the war, also motivated the production of military maps.

Much of the fighting of the War of 1812 took place along New York's northern frontier, and the British navy was also active in Long Island Sound and around New York Harbor. Many New Yorkers feared that the British might attempt to retake Manhattan, and there was a concern that the enemy might try to revive Burgoyne's strategy of

marching down the Hudson River from Canada to New York City. We now know that the British had no plans to carry out an invasion on this scale, but the apprehensions were real enough. These battles and fears are reflected to some extent in published maps, although the total number of military maps that appeared during the war is fairly small, and most do not show a great deal of detail.

During the war, maps showing either the entire "theatre of war," or specific areas where fighting was concentrated, were published in both the United States and Great Britain. Typically, they showed towns, roads, and some fortifications, along with major geographical features, such as lakes and rivers. In upstate New York, most of the fighting took place along the shores of the Niagara River, and on or near Lakes Ontario and Champlain. For Americans, the most traumatic event in this region was the burning of Buffalo in 1813. The important American victory near Plattsburgh on Lake Champlain in 1814 was the most celebrated.

Some of the best overview maps published during the war are in John Melish's *Military and Topographical Atlas of the United States* (1813).[64] The maps in this volume are essentially civilian maps, and several of them were originally published prior to the war. A few were updated to show the locations of major battles, but none provide us with much information that cannot be found on ordinary civilian maps. Other mapmakers, such as Amos Lay (who is discussed below), also attempted to take advantage of the wartime interest in military events by modifying older maps for the new market.

Battles and fortifications were the primary subjects of detailed military maps produced during or shortly after the war. Most of these originated as manuscript maps, some of which later provided the basis for maps published after the war. Much of the detailed military mapping was done by or for the U.S. Army. The outbreak of war made evident the need for more and better military maps. In an act passed in March, 1813, Congress established the Army Topographical Engineers Corps with a maximum of eight topographical engineers.[65] Colonel Joseph Gardner Swift held the title of Chief Engineer until he retired from the army in 1818 to become Surveyor of the Port of New York.[66]

The army engineers were especially active in and around New York City. In part because of New York's experiences during the Revolutionary War, the inhabitants of the nation's largest port were particularly concerned with protecting their city from invasion. A number of fortifications around New York Harbor had already been erected by the state and federal governments between 1800 and 1812, with the most extensive being constructed after 1808 as tensions rose between the United States and Britain.[67] These fortifications were substantial: according to Stokes, they mounted a total of 284 guns, and required an estimated garrison of 3,700 men.[68]

After the outbreak of the war, attention focused more on protecting the approaches to the city. Additional fortifications were constructed on western Long Island and on upper Manhattan. Quite a few maps were made showing these structures, several of which were more than plans of individual fortifications, and covered large swaths of territory—thereby shedding considerable light on the development of the city. One of the earliest of these regional maps was by Joseph Mangin, a civilian contractor for the army, which was entitled *Plan of the Shore of Long-Island from Wallabout Bay to Red-Hook, 1813*.[69] It is carefully drawn, and covers much of modern Brooklyn. Along with fortifications, it

shows topography, roads, and individual houses. It bears comparison with the maps of the same area made by the British during the Revolution, and reveals some of the changes that had taken place between 1783 and 1813.

A somewhat similar map, covering upper Manhattan, is included in an atlas of 33 manuscript maps compiled by Chief Engineer Joseph Swift. This map, drawn by I.E. Craig and James Renwick, bears the title *Military Topographical Sketch of Harlem Heights and Plain, Exhibiting the Position and Forms of Field Works and Block Houses Which Have Been Constructed in That Neighbourhood for the Defence of the City of New York by General Swift, Chief Engineer*. A good facsimile of this map is available in Stokes' *Iconography of Manhattan Island*. As Stokes remarks, it covers much the same area as a revolutionary war map by Sauthier, and it is interesting to compare the two.[70] The volume compiled by Swift can still be found at the New York Historical Society, and it contains many other maps, plans, and views of fortifications.[71] The most detailed and wide-ranging of these is a map by Lieut. James Gadsen entitled *Plan of Fort Green and Line of Intrenchments from the Wallabout to Gowanus Creek, with a Topographical Sketch of the Country* (1814). This map, which shows the fortifications constructed in Brooklyn to protect New York City from assault, was later published in the widely read *Valentine's Manual* of New York City.[72]

Several interesting military maps of western Long Island were made shortly after the conclusion of peace. One consequence of the war was the recognition that a larger military establishment was needed for the defense of the United States. This led to an increase in the size of the peacetime army, to the construction of numerous fortifications, and to increased mapping. Although the army Topographical Engineers Corps was disbanded in 1815, it was reestablished as the Topographical Bureau in 1816, and has remained in existence under various names ever since. The head of the Army Topographical Bureau from 1818 until his death in 1829 was Isaac Roberdeau, whose name will reappear in various contexts later in this book.

One of the most striking maps of western Long Island made in the immediate aftermath of the War of 1812 was a large-scale survey by Charles Loss, which bears the title: *Topographical Survey of the Western Part of Long Island: Exhibiting the Routes by Which an Ennemy* [*sic*] *May Approach the City of New York from the Atlantic Ocean*.[73] This manuscript map, which was "commenced by order of B. Genl J.G. Swift, October 1818" provides an extraordinarily detailed picture of modern Kings and Queens counties. A careful survey, it could be used for such purposes as studying changes in the shoreline and wetlands of Jamaica Bay. It forms an important link in the sequence of detailed maps of this area, which starts with the maps of Taylor and Skinner during the Revolutionary War, and is continued by the maps of the U.S. Coast Survey in the 1830s. A rather different map produced around this time is James Kearney's *Survey of the Position of Throg's and Wilkins' Points and of the Adjacent Country* (1819).[74] It also contains a good deal of topographic information, but it focuses more closely on the American fortifications constructed in the vicinity of Throg's Neck to defend New York City from attack via Long Island Sound. Drawn at a scale of 12 inches to a mile (1:5,280), it is a classic example of a large-scale fortification map, and comes complete with diagrams showing artillery ranges.

The War of 1812 also left some cartographic traces further east on Long Island. The British fleet under Commodore Sir Thomas Hardy, a distinguished veteran of Trafalgar

and other battles, controlled the waters around eastern Long Island, and effectively established a base on Gardiner's Island in Peconic Bay. The British fleet traded with the locals, and engaged in several small raids, including an unsuccessful attack on Sag Harbor, which was then the leading port on eastern Long Island.[75] A curious map in the National Archives is a tracing made by Henry N. Thompson of the Topographic Engineers with the title *Chart of Part of Long Island Sound Made by the British Squadron und. Comm.re Hardy during the Late War*.[76] One wonders how the Americans got hold of a copy of this detailed nautical chart of the waters around eastern Long Island, which includes many soundings and shows anchorages of the British ships. Thompson's chart, or something very similar, was used as the basis for Ephraim Chesebrough's *A New and Correct Chart of the East End of Long Island Sound*, which was described above in the section on nautical charts.

The military mapping of northern New York during this period follows a similar pattern, with most of the detailed maps actually being produced after the end of the war. A fair number of manuscript maps of individual battles were drawn by participants on both sides, but only a few were published. One that made it into print is Patrick May's map the battle of Sackets Harbor in 1813. It is a crudely drawn, but informative, battle map, which provides extensive information about fortifications, troop positions, the location of ships in the harbor, and other military matters.[77] Another battle map published during the war is a small but carefully drawn map of the Battle of Plattsburgh printed "to accompany B. Tanner's print of MacDonough's victory."[78]

A number of detailed military maps made their way into accounts published shortly after the war. On the American side, the largest collection of published battle plans showing locations in New York appears is contained in an atlas volume accompanying General James Wilkinson's *Memoirs of My Own Times* (1816).[79] This volume includes maps of the area around Niagara Falls, and a map showing the disposition of American troops at Sackett's Harbor. On the British side, there is a similar collection of maps accompanying William James, *A Full and Correct Account of the Military Occurrences of the Late War between Great Britain and the United States of America*.[80]

After the end of the war, the newly reconstituted Army Topographic Bureau did a fair amount of surveying near the border between the United States and Canada. One of the most remarkable maps produced at this time is Richard Delafield's *Plan of Lake Champlain and Lake George and of Their Connection with the River St. Lawrence* (1817).[81] A manuscript map, it appears to be the first detailed map of this area since Brasier's map of Lake Champlain (drawn in 1762, published in 1776). The Topographic Engineers produced a number of even more detailed maps of strategic points and fortifications in this area, all of which can be found at the U.S. National Archives. Typical of this group is a *Sketch of Crown Point with a Plan and Section of the Fort and Other Defenses from Actual Survey by J. Anderson and I. Roberdeau, U.S.T. Engineers, November 18*.[82]

There was little surveying or mapping of roads and waterways in northern New York during the war of 1812. This is somewhat surprising, because wartime logistics were a major problem for both sides, and the expense and slowness of transporting men and material along bad roads to the Canadian border greatly hindered the American war effort. Historian Peter Bernstein quotes from a report by General James Tallmadge, which claimed that it cost $1500 to $2000 to ship a cannon costing $400 to Lake Erie,

and that a barrel of pork ended up costing the government $126.[83] Although some military roads were constructed during the war, I have been unable to locate detailed maps or surveys related to them. Much of the American military effort during the war was badly disorganized, which may partially account for the scarcity of this type of military mapping. The evident problems created for the army by poor transportation and logistics did, however, contribute to the growth of interest in roads and canals on all levels of government after the war.

Changes in the Community of Map Users

The decades following the American Revolution saw a significant expansion in map use. Prior to the middle of the nineteenth century, most maps were too expensive to be widely distributed, or be profitable to publish for a mass market. The high cost of paper and of engraving put limits on their production and limited their use to those who could afford them. Their purchasers were largely military officers, sea captains, wealthy merchants, and aristocrats. Many maps were published in magazines like the *Gentleman's Magazine*, but these too were read largely by the upper classes.

Still, even in the eighteenth century, there was at least some use of maps by the general literate public. Although little research has been done on the subject, it appears that probably the ability to read maps coincided closely with general literacy. Middle class persons, such as clergymen, smaller merchants, and even craftsmen and farmers purchased a significant percentage of the atlases published by major British map publishers, and it seems that a similar pattern was followed in the American colonies.[84]

Less elaborate and expensive maps were sometimes sold as broadsides, and simple maps were occasionally included in popular publications, such as almanacs. Although not much is known about this, it appears that wall maps displayed in public buildings, such as taverns and courthouses, also provided the general public with some exposure to cartographic materials. Maps were also often available in libraries or reading rooms.

This situation gradually began to change after the American Revolution, although it was only after about 1840 that a real mass market for maps developed. As noted in the previous chapter, Martin Brückner has shown that simple maps of the United States and of individual states became important symbols of American identity. Brückner has also demonstrated that the study of geography played an increasingly important part in American education, as exemplified by the widespread use of elementary geography textbooks, such as those of Jedidiah Morse. As new land opened up, the American people became increasingly mobile, which raised the demand for maps showing areas of potential settlement, along with road and transportation maps to guide settlers to their new homes. This is reflected, to a modest extent, in the maps published by Charles Williamson, the Holland Land Company, and other land developers discussed in the previous chapter.

This general rise in geographic literacy and population mobility helped to drive a gradual increase in the publication of maps in the years between 1800 and 1830. In terms of map production, this period was one of transition, which helped prepare the way for the spectacular explosion of commercial cartography in the decades after 1830.

Maps of Towns and Cities, 1784-1830

Although the years around 1800 saw the birth of most of New York's major cities, the population of the state remained overwhelmingly rural in the first decades of the nineteenth century, and except for New York City and Albany, the future metropolises of the Empire State were still small towns. In 1820, only 11.7 percent of the population of the state was made up of city dwellers.[85] In that year, the population of Syracuse was 1,814; Rochester's population was 1,502; and that of Buffalo was 2,095.[86]. Under these circumstances, there was very little demand for printed maps of towns and cities, since most people do not need a map to find their way around a town with 2000 inhabitants.

However, a fair number of manuscript maps of smaller cities and towns in New York were produced. They were usually created for developers and used for planning purposes, or made to identify property owners for such purposes as collecting taxes. They would also have been paraded out to prospective home owners and investors in urban real estate. Doubtless such maps also appealed to property owners as symbolic representations of their power and wealth. Like estate maps, many of these town plans carry the message: "this belongs to me." Typical of such productions are two maps of Cooperstown drawn for William Cooper in 1788 and 1804.[87] A more unusual example of this type of map is Joseph Ellicott's *Map of the Village of New Amsterdam* (later Buffalo), which was prepared for the Holland Land Company in 1804, and shows the original street layout of Buffalo, which followed a radial plan similar to that drawn by Joseph's brother, Andrew Ellicott, for the city of Washington. Joseph Ellicott's plan of "New Amsterdam," as he called the later city of Buffalo, was evidently intended to impress and garner support from investors in the Holland Land Company. The name New Amsterdam never caught on with local settlers, and the map was not published in Ellicott's lifetime. It finally appeared in O'Callaghan's *Documentary History of New York* (1851), and it is now widely available.[88]

Toward the end of this period, a few scattered maps of cities other than Albany and New York were published. The only printed maps of such cities that I have been able to identify are a map of Troy published by John Klein in 1818,[89] a map of Utica by John Fish, published in 1828,[90] and a map of Ogdensburg published in 1830.[91] There may be a few other such maps, but their number is very small in comparison to the flood of municipal maps that appeared after 1830.

Albany

Only New York City, and to a much lesser extent, Albany, had sufficient population to stimulate the production of substantial numbers of printed maps during this period. Albany's population lagged far behind that of the metropolis to the south. In 1800, Albany had only 5,289 inhabitants; in 1820 it was still an overgrown village with a population of 12,000.[92] Despite its small size, Albany has been fairly well mapped throughout its history. As we have seen, even in the colonial era Albany's strategic location gave it great economic and military importance. Because of its strategic significance, several maps of the city were made by military cartographers prior to the Revolution. After the conclusion of peace, Albany's importance as a commercial hub increased with the settlement of western New York and the construction of the Erie Canal, and its prominence was further boosted by becoming the state's capitol in 1797.

During this period, several maps were produced of the city, reflecting both civic pride, and the usefulness of maps for city planning and real estate promotion. None of the maps of Albany produced prior to 1830 seem to have been made primarily to help visitors find their way around the small city.

The first post-Revolutionary maps of Albany were produced by the ubiquitous Simeon De Witt. The earliest was drawn in 1790, but it was not published until 1884.[93] The town revealed on this map still looks very much like the old Dutch city huddled along the Hudson River, which is seen on earlier maps, such as the 1770 plan by Robert Yates. In 1794, De Witt published an expanded version of his map under the title *A Plan of the City of Albany Surveyed at the Request of the Mayor, Aldermen, and Commonality* (Figure 9.6).[94] The title of the map reveals its official character. It was published at a time when Albany was looking forward to becoming the state capitol, and its municipal leaders were envisaging a more grandiose future. It shows an extensive grid of streets, which had not yet been built, reaching back from the river. Albany eventually developed along these general lines, and thus De Witt's map served as a blueprint for the future. In this respect, it anticipates the much later "Commissioner's Map" of New York City, for which De Witt also bears some responsibility, and which is likewise based on a gridiron pattern. This pattern echoes on a small scale the rectangular grid that De Witt imposed on the New Military Tract, and anticipates the widespread use of grids for allocating both urban and rural lands throughout the United States.

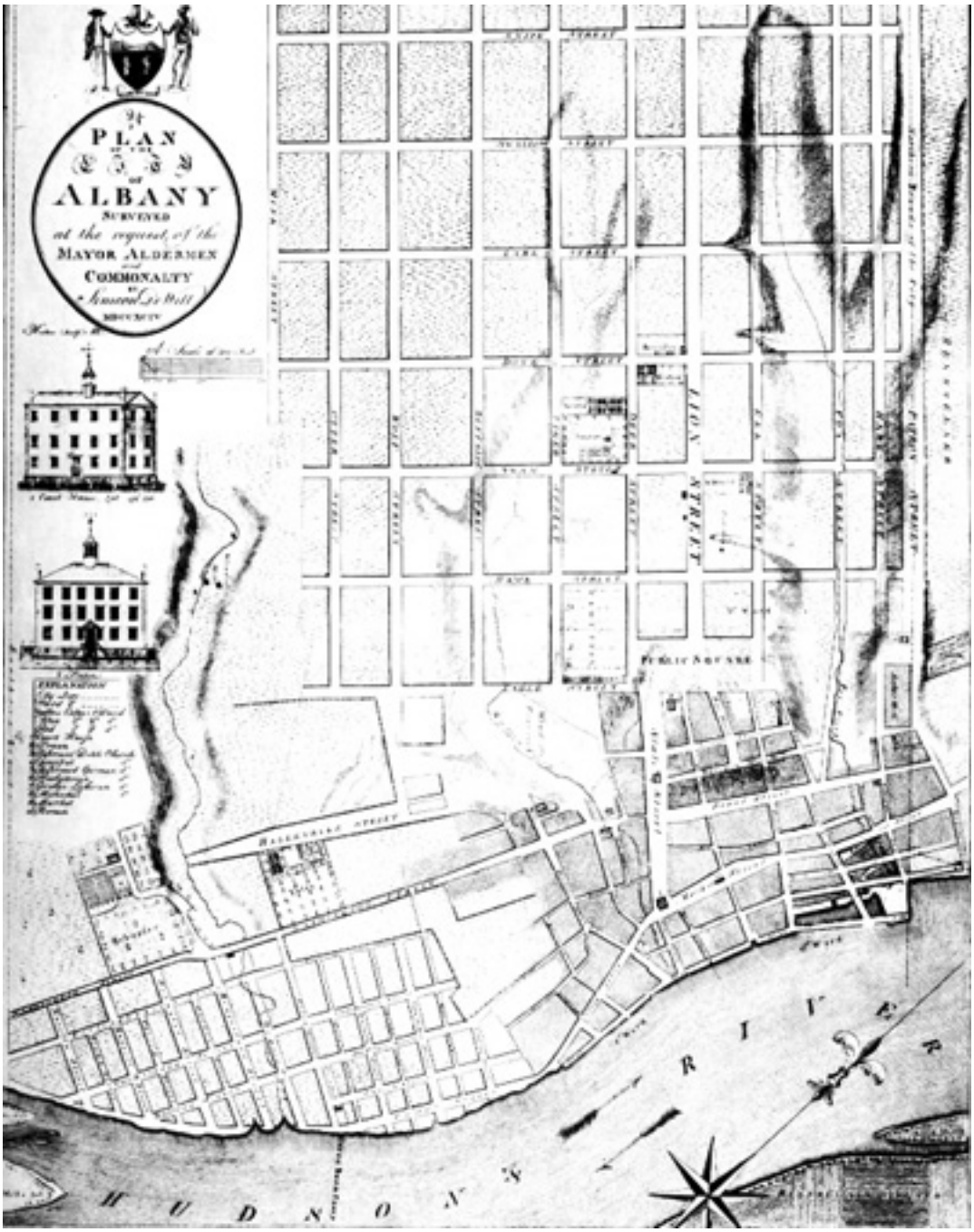

Figure 9.6. Simeon De Witt, *Map of the City of Albany* (1794). New York State Museum.

The next map of Albany to be published appeared in 1818 and bears, significantly, almost exactly the same title as its predecessor: *Map of the City of Albany, Surveyed at the Request of the Mayor, Aldermen, and Commonality*.[95] It was surveyed by one Evert Van Alen, and illustrates Albany's growth—and its growing ambitions—since the appearance of De Witt's map of 1794. Much of De Witt's grid is now filled in with occupied houses, which are shown with numbers. In addition, the grid has been greatly

extended, with ward numbers being added, along with many new streets and unoccupied blocks. An updated version of this map was issued in 1832. At about the same time, similar maps were published by George W. Merchant (1828) and Oliver Steele (1833).[96] All of these maps appear to have been prepared primarily for civic planners and real estate boosters, rather than for use by travelers.

New York City

New York City was already a giant in comparison with other urban centers in the state. In 1800 the population of Manhattan was 60,489. By 1820 it had increased to over 123,000.[97] New York was the only city in the state during the fifty years after the Revolution of sufficient size and stature to generate a market for street maps intended for the use of both residents and visitors.

As was the case for the colonial period, the cartographic history of New York City during the Federal era has been extensively documented by I.N. Stokes and others.[98] Here only the highlights will be summarized.

The earliest map of New York City published after the Revolution appears to be John McComb's *Plan of the City of New York* (1789).[99] This map already illustrates the relative prominence of the metropolis, for it appeared in a city directory, which reveals that visitors and residents already felt the need for a cartographic guide to the growing city. Although not a particularly outstanding map, it served its purpose well. It gives street names, and identifies such features as wharfs and public buildings. It marks the beginning of a parade of maps with a similar purpose, which has continued down to the present. In 1792, the engraver of this map (Cornelius Tiebout) issued an updated edition for William Duncan's *The New-York Directory, and Register*.[100] In 1799, Benjamin Tanner published a similar *Plan of the City of New York*.[101] In 1804 another map with the same title was drawn by one "J.A." and engraved by Peter Maverick.[102] Starting in 1817, William Hooker, an associate of nautical chart producer Edmund Blunt, began publishing guide maps of New York City. Hooker published a number of similar maps, such as *Hooker's New Pocket Plan of the City of New York*.[103] Hooker had several competitors, including Thomas H. Poppleton, Philadelphia publisher Henry Schenk Tanner, and William Chapin, author of a *Plan of the City of New York: for the Use of Strangers* (1831).[104] By 1830, commercial guide maps to New York were being published so frequently that a complete listing would be tedious. A good selection of them is available for viewing on the Web site of the New York Public Library.

More specialized and elaborate maps of the city also started to appear. An early example is a detailed and carefully crafted map of lower Manhattan published in 1797 by Benjamin Taylor as *A New and Accurate Plan of the City of New York*.[105] Only a few copies of this handsome map survive, and it would have adorned the offices of merchants and politicians, rather than been used by the general public. A growing self consciousness of the city's history is revealed in a map published by David Longworth in 1817 with the title *This Actual Map and Comparative Plans Showing 88 years of Growth of the City of New York is Inscribed to the Citizens*.[106] This elaborate map includes as an inset a copy of the James Lyne plan of 1729. Another sign of the increasing complexity and maturity of New York City is revealed by the title of a map that appeared slightly after the end of our period, in 1834: *The Firemen's Guide: a Map of the City of New-York,*

Showing the Fire Districts, Fire Limits, Hydrants, Public Cisterns, Stations of Engines, Hooks & Ladders, Hose Carts, &c.[107]

A particularly important group of New York City maps was concerned with urban planning. By 1800 the Common Council of New York City had come to realize that they needed to plan for the future expansion of the rapidly growing city. Unable to manage the task on their own, they turned to the State Legislature, which appointed a special commission to produce a plan for the growth of the city. This three-person commission consisted of Gouverneur Morris, John Rutherford, and Simeon De Witt. The surveyor general appears to have dominated this commission, which appointed a protégé of his, John Randel, Jr., to conduct a detailed survey of Manhattan Island. The commissioners superimposed upon Randel's maps a gridiron pattern of streets, which largely determined the appearance of present-day New York. Here, too, the influence of De Witt may have been decisive, since he had previously adopted grids, both for his surveys of the New Military Tract and for his plan of Albany. De Witt by no means invented the gridiron plan for cities any more than he invented the rectangular survey, but there can be no doubt that its selection for New York City did much to further its adoption throughout the country. The gridiron plan has been much criticized for its sterility and lack of imagination, but it greatly facilitated the subdivision and sale of lots, which was doubtless the commissioners' main concern. New York City's much celebrated and reviled grid has received continuing attention from historians and urban planners. Two recent books have done much to expand our knowledge of the history of the grid, and of the techniques used by its chief implementer, John Randel. [108].

The commissioners' plan went through several renditions. The first version is a manuscript map produced by Randel in 1811, which has been described as "the single most important document in New York City's development."[109] A published version, which has been widely reproduced, was drawn by William Bridges and engraved by Peter Maverick (Figure 9.7).[110] An updated version of the commissioners' plan was published by Randel in 1821. This is a particularly colorful map, which includes illustrations of Randel's surveying instruments, some of which he invented himself.[111]

Figure 9.7. William Bridges, *This Plan of the City of New York* (1811). Library of Congress, Geography and Map Division.

Also associated with the Manhattan grid is the remarkable series of detailed topographical maps that Randel drafted as part of his efforts to implement the grid on the surface of the island. These maps, which were drawn between 1818 and 1820 at a scale of 100 feet to an inch, show the surface topography of Manhattan with great accuracy and

in extraordinary detail. Along with the British Headquarters Map (briefly described in Chapter 7), the "Randel Farm Maps," as they are called, are the prime source for those who endeavor to understand what Manhattan looked like prior to being smothered with asphalt and buildings. The ninety-two manuscript sheets reside in the Manhattan Borough President's Office, and have never been published in their entirety in paper. Recently the New York City Historical Society has made them available to the public online as a single high-resolution image produced by stitching together the individual sheets.[112]

The large and varied output of maps of New York City in the first decades of the nineteenth century is quite remarkable. It is a testimony both to the rapid growth of the metropolis, and to the importance of maps in shaping its development. Nothing even remotely comparable appeared for other cities in New York until at least the middle of the nineteenth century.

Maps of New York State, 1805-1830

The trickle of maps of New York State published between 1784 -1804 developed into a steady stream in the following decades, although it did not become a torrent until after 1830. The De Witt map was not revised after 1804, but commercial map publishers moved in to fill the demand for updated maps of the state. The quality of these maps varied widely, but several of them notably improved on De Witt in the amount of detailed information they provided. In many cases, little is known about how these maps were produced or marketed, or even about the biographies of their makers.

It is possible to distinguish between small-scale reference maps, which were inexpensive and widely available, and large-scale maps, which aimed to present the most up-to-date and detailed geographic information.

The general reference maps followed a pattern set by the map of New York State by Samuel Lewis, which was first published by Matthew Carey in 1795. Lewis himself continued to revise this map for the next twenty years, and several editions were published in atlases issued by Matthew Carey, Henry Schenk Tanner, Aaron Arrowsmith, and Fielding Lucas.[113] Some of the later editions of this map show substantial revisions, including corrections in the depictions of lakes and rivers, as well as new roads and towns.

Even in the years prior to 1820, Lewis had considerable competition. For example, Carey and Tanner issued similar maps under their own names or those of others. In 1808, William McAlpine published his map of New York, which was previously mentioned because of its careful depiction of roads. In 1813, Horatio Gates Spafford published a map of New York to accompany his *Gazetteer of the State of New York*.[114] A number of similar maps can be found at various libraries and online, but none of them broke new ground and require specific mention.

It is remarkable that a high percentage of these maps were originally published in books, such as atlases, textbooks, and gazetteers. It should be kept in mind that the same maps were often also available as individual sheets. It is striking how many of them were published outside of New York, particularly in Philadelphia, which dominated the

publication of cartographic materials in the United States at the beginning of the nineteenth century.

In the 1820s maps for the general public started to appear in larger quantities, and in greater variety. They typically show towns and county boundaries, along with roads and canals. The more elaborate were brightly colored, and sometimes included insets showing New York City or other details, such as a profile of the Erie Canal. John Ogden Dey's highly embellished *Map of the Western Part of the State of New York* (1825), which was noted above under canal mapping, exemplifies these trends. They are also illustrated by Fielding Lucas' *Geographical, Statistical, and Historical Map of New York*, which first appeared in an atlas published by Carey and Lea in 1822.[115] This moderately detailed map includes a profile of the Erie Canal, along with a fair amount of descriptive information, such as might be found in an encyclopedia or detailed gazetteer. This map was successful enough to be reprinted several times, and it was even copied in a French version of Carey and Lea's atlas.[116]

A number of somewhat similar, but less elaborate, maps were published in this decade. Thus, Edmund Blunt's associate, William Hooker, whose maps of New York City were mentioned above, also published a *Map of the State of New York: with the Latest Improvements* (probably in 1827).[117] J.H. Young produced a *Map of the State of New York* in 1824.[118] And William Williams published *The Tourist's Map of the State of New York* (1828), which is notable for its early and very explicit appeal to the tourist trade.[119] Other maps closely resembling these can be found on the Web site of the New York Public Library and elsewhere. Very similar maps continued to appear through the following decades.

Most of these maps are not especially interesting or innovative, and they often show a monotonous resemblance to each other. They are significant primarily as an indication that a sizable market was developing for inexpensive maps—whose purchasers included students, tourists, and business travelers. And they show that the American map publishing industry was becoming sufficiently robust to meet that demand.

The reader has probably noticed that names like Lucas, Hooker, Maverick, Tanner, and Carey reappear in a various combinations on early nineteenth-century maps—thus revealing the many links between the major figures producing maps of New York, including publishers in Boston, Philadelphia, and Baltimore. This is an indication of under-capitalization and limited resources, and it resembles the ties between such seventeenth-century English map publishers as Seller, Morden, and Daniels, which were described in chapter four of this book.

Turning to more ambitious large-scale maps, we can begin with the remarkable series of maps of New York State produced between 1801 and 1826 by Amos Lay (1765 -1851). Lay was apparently born in Connecticut and spent some time in Vermont, but for most of his life he lived and worked in Albany and New York City.[120]

Lay started his career as a surveyor and land agent. In 1796, he placed advertisements in several Vermont and New Hampshire newspapers as an agent for sale of land in Lower Canada (now Ontario). A few years later, he was involved in surveying land along the St. Lawrence River in Franklin and St. Lawrence counties. In 1821 he wrote that he "had been employed for upwards of twenty-six years in exploring and surveying various parts of the United States, Upper and Lower Canada, and also in compiling and publishing maps,…" [121]

Lay's first cartographic work appeared in 1801, when he co-authored a map of northern New York.[122] A note on the map describes it as "compiled from the latest survey by A. Lay; and drawn by Arthur J. Stansbury." Lay's exact role in the production of this map is unclear. Judging from a description of the map published by his collaborator, Lay did a limited amount of surveying, and relied primarily on compiling information from other surveys.

Drawn at a scale of slightly more than seven miles to an inch, this map covers New York north of the Mohawk and Oswego Rivers. The details on it are rather sparse and uneven. It shows fairly detailed hydrography for most areas, and major towns, but no topography. Its most notable feature is its delineation of the boundaries of recent land grants and purchases. Oddly, it is oriented toward magnetic north "as it was in 1760."

At this point, Amos Lay almost disappeared from view for ten years. He seems to have made his living as a surveyor and land agent, and very likely engaged in land speculation, which was a common pastime for people with his background.

He remerged in 1812, with the publication of a revised version of his *Map of the Northern Part of the State of New York*.[123] This map marks a considerable improvement over the previous edition. Although it is on a slightly smaller scale, its coverage is expanded to include all of New York north of the 42nd parallel (the boundary line with Pennsylvania). It is remarkably detailed, and appears to be carefully drawn and reasonably accurate. Like its predecessor, it focuses on land divisions, but it also shows county boundaries, and includes detailed coverage of roads and hydrography.

Lay showed a good sense of timing in publishing his map, for Simeon De Witt's masterpiece was by now ten years out of date, and it had no real successor. Interest in Lay's map was also boosted by the outbreak of the War of 1812. Lay had apparently learned something about the value of advertising, for he placed many newspaper advertisements for this and his subsequent maps. In January, 1813, Lay (who gave his address as "City Hotel, New York") placed the following advertisement in the New York *Evening Post*:

> LAY'S NEW MAP OF THE STATE OF NEW-YORK
>
> The Subscriber now offers to the Public his New Map of the State of New-York, which is rendered more desirable than any heretofore published by reason of the improvements and additions made thereto, particularly as regards the Western and Northern parts of this State—the bounds of particular Tracts, Towns and Counties, are designated with accuracy from the best information, with the view to accommodate those non-residents who are the proprietors of Lands in the Western District—and for the convenience of the Traveller, the principle Roads and Villages are delineated with accuracy. To those desirous of tracing the active operations of our troops on the Western and Northern frontiers of this State the last season, this Map is to be preferred to any other yet published, because it exhibits with accuracy that part of Upper Canada, situate west of the Niagara River, and North of Lake Ontario and the river St. Lawrence.[124]

Lay reinforced his ad with testimonials from Gouverneur Morris, Robert Troup (agent for the Pulteney Land Company), and David Ogden (head of the Ogden Land Company). This suggests that he had developed or maintained ties with New York's political and economic elite, and particularly with land developers. It is also revealing that his advertisement specifically targeted non-resident land owners, which would have included many who had bought land from the Pulteney and Ogden land companies. He concluded this advertisement with an interesting postscript, which tells us much about the pricing and marketing of maps at this time:

> Subscriptions received at the Book-store of Messrs. Whiting & Watson, Broadway, New-York, where subscribers will be pleased to call for their Maps.
>
> Those Subscribers resident in the country will have their Maps delivered, or sent to some place in their vicinity.
>
> Printers in the adjoining states are respectfully solicited to give this advertisement a place in their papers, and to procure subscriptions. For their services in obtaining subscriptions and collecting the amount they will be entitled to a commission of 20 per cent. and the Maps will be forwarded on applications to Messrs. Whiting & Watson, Broadway.[125]

Lay priced this map at $5.00 "in sheets," $8.50 "mounted and varnished," and $7.00 "portable in books." This pricing structure, which is typical of most of his maps, shows that he was not aiming at a mass market. In 1812, $5.00 would have been about a week's wages for an unskilled laborer. The choice between purchasing the map in folded form for travel or mounted as a wall map was not unusual for large maps at this time.

Lay must have met with some success in his efforts to lure subscribers with information about the War of 1812, for his next production bears the title *A New Correct Map of the Seat of War in Lower Canada: Protracted from Holland's Large Map Compiled from Actual Survey Made by Order of the Provincial Government*.[126] This map was "laid down with many late additions and improvements by Amos Lay," and published in Philadelphia by Lay with J. Webster. Typically detailed and carefully done, it reflects Lay's interest in and knowledge of Canada, and reminds us that Samuel Holland (who played such an important role in mapping colonial New York), pursued his career in Canada after the Revolution. Lay's map was successful enough to be republished by Lay and Webster in 1837.

A few years later, Lay returned to his map of New York, and extended it to include all of the state, and parts of neighboring states (Figure 9.8). Published in 1817, this is another excellent and large map (127 x 127 cm. at a scale of seven miles per inch).[127] As is usually the case with Lay's maps, it includes no information about who engraved or printed it. Although its design and engraving are not especially attractive, it is stuffed with information. By this time, De Witt's map was fifteen years out of date, and Lay's work thus had no rival in terms of timeliness or detail. To boost his sales, Lay obtained an impressive list of endorsements from New York's elite. Among the luminaries endorsing his map were De Witt Clinton, Martin Van Buren, Daniel D. Tompkins (former governor and Vice President), Stephan Van Rensselaer, Joseph Ellicott (agent of the Holland Land Company) and Horatio Gates Spafford (author of a gazetteer of New

York). Conspicuously missing from the list was the sphinx-like Simeon De Witt, who studiously refrained from expressing an opinion on almost everything. It would be interesting to know what he thought of Lay's map.

Figure 9.8. Amos Lay, *Map of the State of New York* (1817). Courtesy David Rumsey Collection.

Lay's 1817 map of the entire state was his greatest success to date. New editions or reprintings were published in 1819, 1820, 1822, 1823, 1824, 1825, 1826, and 1828. At least some of them involved considerable revision. In soliciting subscriptions for the 1822 edition, he permitted himself to boast that his maps "have met with very liberal patronage and encouragement," adding that he was "flattered in the belief, that a perseverance in his present undertaking to promote and extend the general knowledge and improvement of his own country [i.e. New York], and the adjoining provinces, will entitle him to the confidence of the public, and such share of their patronage, as the merit of his labours may deserve." He also hastened to assure potential purchasers "that in a late tour of this state, he has collected and is delineating, from all principal Land Offices

and other correct sources, all the improvements and corrections that will render this Map still more desirable, and that no pains will be spared to make it the most useful and perfect Map of the State of New-York and the country it comprises."[128]

Lay's large map of New York was his final contribution to the cartography of this state. Some time after 1822, he moved both his map shop and residence to New York City. He was involved with several small projects during the 1820s, including the republication of Osgood Carleton's map of Massachusetts and an abortive plan to produce a map of Rhode Island. His final major project was the publication of a large map of the United States.[129]

The detail of Lay's maps makes them of considerable interest to students of local history, since they sometimes contain information that cannot easily be found elsewhere. In addition, his career illustrates the difficulties of being an independent mapmaker in a period when markets and systems of distributing maps were still rudimentary.

The counterpart for southern New York of Lay's early maps of northern New York is a somewhat similar production by another little-known independent mapmaker—William Damerum's *Map of the Southern Part of the State of New York* (1815).[130] This map also updates De Witt's map, and provides us with a good overview of the cultural features of southern New York in 1815.

John Hartshorne Eddy (1783-1817) is another of early nineteenth-century New York's little-known Cartographers.[131] J.H. Eddy was the son of the wealthy merchant and prison reformer Thomas Eddy. In contrast with Amos Lay, he was a child of fortune, but his life was not an easy one, since at the age of twelve he lost his hearing as the result of scarlet fever. Still, his family background assured that he had both the means and the social connections to pursue his intellectual interests. Among other things, his father was a friend and political ally of De Witt Clinton, and Thomas Eddy was an early promoter of the Erie Canal. Given this background, J.H. Eddy, unlike Amos Lay, did not need to engage in extensive advertising and self-promotion to make a living. What he shared with Lay was an intense interest in creating maps. Eddy attended Columbia College, and had wide-ranging intellectual interests, including botany and geology, but he called himself a "geographer" and specialized in the compilation and drawing of maps.

Although there is evidence that Eddy was a capable surveyor, his published maps, like those of Lay and Damerum, were essentially works of compilation. They were engraved and published by others, including the well-known New York firm of Peter and Samuel Maverick, and by H.S. Tanner's firm in Philadelphia. Almost all of his published maps depicted all or part of New York State. Two of them were popular enough to be revised and republished after his death.

Eddy's early maps were regional in focus. His first cartographic project appears to be a map of western New York, which was made at the request of New York State's Canal Commissioners. At that time, the commissioners were William North, De Witt Clinton, Stephan Van Rensselaer, Simeon De Witt, Peter Porter, and Thomas Eddy. In 1810, J.H. Eddy accompanied his father, the other canal commissioners, and several others (including the surveyor James Geddes) on an expedition, which was mentioned briefly above, to explore the route of the proposed canal. Eddy himself recorded some of the events of this expedition in a little known diary, which has never been published.[132]

This expedition led to the publication in 1811 of the *Map of the Western Part of the State of New York: Shewing* [*sic*] *the Route of a Proposed Canal from Lake Erie to the*

Hudson River.[133] Carefully drawn and detailed, it includes a profile of the proposed canal. Published fourteen years before the canal was completed, it is the first of series of maps depicting the route of the Erie Canal. It is remarkable how closely Eddy's map follows the route finally chosen, although of course there are some differences from the route selected in the end, especially west of the Genesee River. This map was followed by two related maps. The first is a detailed *Map of the straights of Niagara from Lake Erie to Lake Ontario*, which would have been useful for planning the western end of the canal.[134] The second, which also seems to have been published for the Canal Commissioners, shows the proposed canal in a broader regional context.[135]

During these years, Eddy was also working on other projects. In 1811, he published an unusual circular map of the area thirty miles around New York.[136] This map was also drawn with great care and attention to detail. It was dedicated to "DeWitt Clinton, Esqr. Mayor of the City of New York … by his respectful friend The Author." Drawn at a scale of three miles to an inch, it differentiates between turnpikes and common roads, and makes a point of showing the locations of taverns, and of the "country seats" of local gentry. It carefully depicts hills and swamps, and shows historical sites, including the location of the Battle of Long Island and the recently constructed monument for Alexander Hamilton. Some of the information on it is slightly quirky: it asserts that the ridge of hills running through Brooklyn and Queens is "properly called the Green Mountains." It gives the longitude of New York (based on the meridians of Washington, Greenwich, and Paris) "as determined by the solar eclipse of 1806."[137]

One can only guess at the uses to which this map was put. Its scale is too small to make it of much use to ordinary tourists visiting New York City, and it does not display New York's street grid. It was doubtless also too expensive for the ordinary traveler. But it was made available as a folding map, designed to fit into a cloth case, and probably intended at least in part to be used by travelers. It was most likely consulted by more wealthy tourists who planned to spend some time visiting the vicinity of New York, and by merchants and other prosperous middle class residents, who had occasion to visit the taverns and "country seats" of notables, as well as to travel for more practical reasons. The New York Public Library has a copy of this map mounted on wooden rollers, which suggests that some of its owners displayed it as a wall map.

Eddy's circular map achieved lasting success. It was reissued several times after his death— in 1826, 1836, 1839 and 1842.[138] Subsequently, it was re-engraved by Colton in 1846.[139] It also inspired several imitations, one of which was published by David H. Burr in 1835.[140] A comparison of Eddy's version with those engraved for Colton and Burr reveals Eddy's superiority as a designer and draftsman over his imitators. In the early twentieth century, Eddy's circular map was praised by I.N. Stokes as "one of the most complete, accurate, and beautiful early engraved maps showing New York and its environs."[141] It continues to be admired for its graphic elegance, remains popular with map collectors, and is still displayed on many walls.

Eddy's most general map was *The State of New York, with Part of Adjacent States*. Completed in 1817, it was published posthumously by James Eastburn and Company in 1818, and reprinted in 1821 (Figure 9.9).[142] It was heavily revised and re-engraved in 1823.[143] In its general outlines, it is resembles many maps of New York that appeared during the nineteenth century. It is distinguished, as one would expect from Eddy, by its design and execution. Carefully drawn and attractive, it sports an image of the seal of

New York. It focuses on county boundaries, roads, and towns—omitting much of the cadastral information that is so prominent on the maps of De Witt and Lay. Designed to fit in a case, it also appears to have been intended to do double duty as a wall map and a guide map for tourists. Although somewhat less detailed than Lay's map, it is more attractive and readable. It seems to have been the most highly regarded map of the state published between 1802 and 1830. It was widely advertised and often referred to during the 1820s, and it was not replaced in public regard until the publication of David Burr's map and atlas of New York State in 1830.

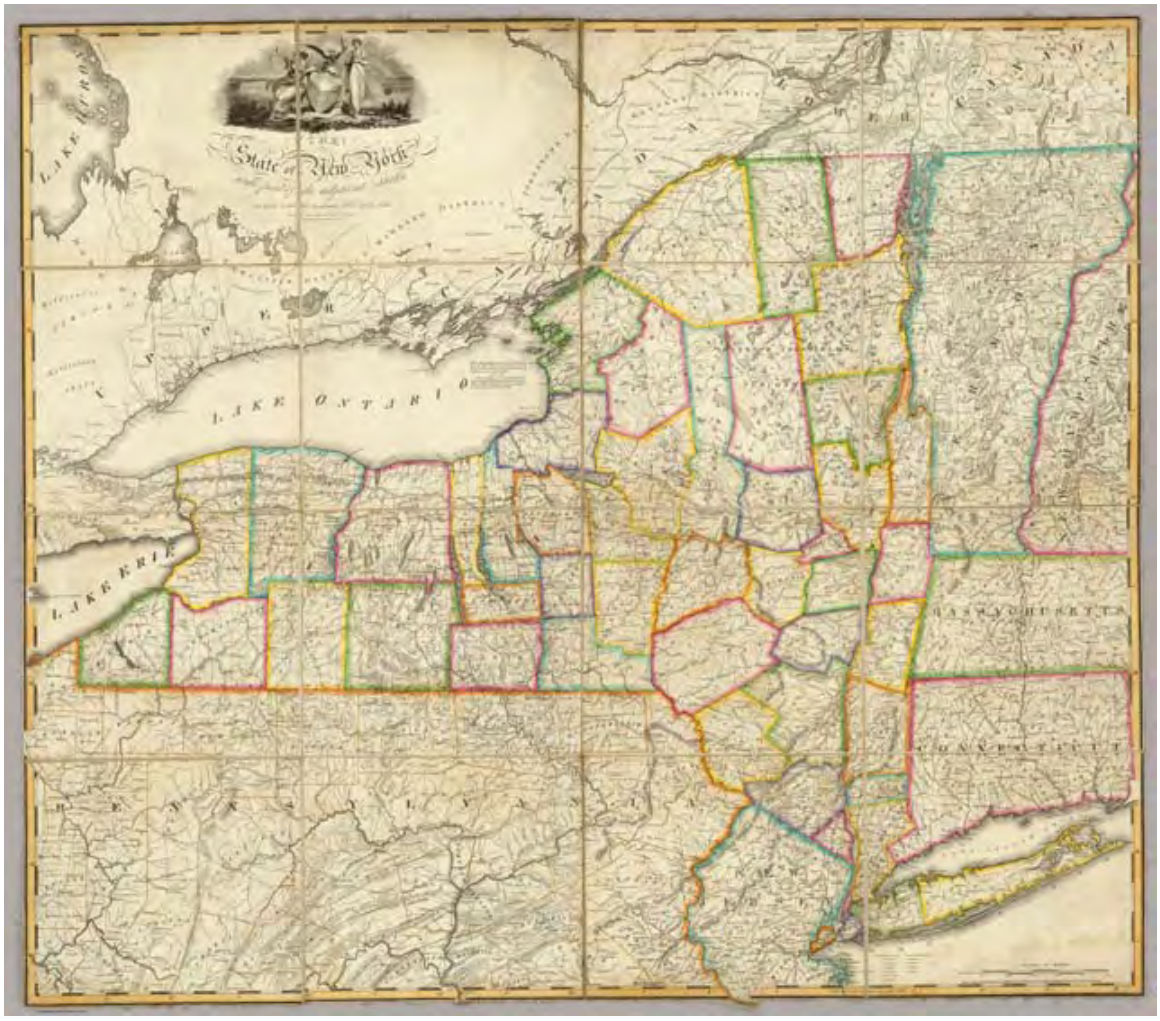

Figure 9.9. J.H. Eddy, *The State of New York* (1818). Courtesy David Rumsey Collection.

New York's First State Atlas

The period covered by this chapter closes with the publication of David H. Burr's map and atlas of New York State (dated 1829, but not actually published until 1830).[144] This work can be viewed, to some extent, as the capstone of many of the developments described in this and the previous chapter. In many respects, the mapping

of New York during the period between 1784 and 1830 was dominated by Simeon De Witt, and Burr's landmark work is the last major cartographic project associated with De Witt. The atlas also embodies several themes that have reoccurred in these chapters, and takes some of these developments forward an additional step.

David H. Burr (1803-1875) began his long career as a cartographer as a protégé of De Witt Clinton. Most of what is known about Burr's life has been described by W.W. Ristow, who appears to be the only person who has written extensively about him.[145] Burr was trained as a lawyer, and joined the New York State Militia in 1824. A year latter he was appointed Governor Clinton's aide-de-camp. Shortly thereafter, he was placed in charge of surveying a portion of a state road through southern New York, and by 1827 he had conceived the idea of creating an atlas of the state.

The Burr atlas seems to have been sparked by a by a brief remark made by De Witt Clinton in his annual address to the legislature in 1827: "An authentic and official map of the state, is a desideratum which ought to be supplied, and this is suggested without any disparagement of the laudable attempts which have been made by individuals for that purpose."[146] In October of that year, seemingly in response to the Governor's request, the State Legislature passed "An Act Providing for the Publication of a Map and Atlas of This State."[147]

This project, which was advocated by Simeon De Witt, did not sail through the legislature without opposition, and there was a good deal of debate about it, although it is difficult to discern through the cryptic notices in the legislative journals exactly what the issues were. Probably the expense of the project was the major concern. It is noteworthy that Amos Lay filed a remonstrance against the project, although we know nothing about the substance of it. It seems likely that Lay either felt that he should be in charge of the project, or that he did not like the idea of a competitor being subsidized with state funds. [148]

By July, 1828, Burr felt confident enough to publish a broadside announcing a "new and elegant map and large atlas of the state of New York."[149]. But it was not until early 1829 that Simeon De Witt made a specific proposal to the legislature spelling out what the map and atlas should look like, and how much it would cost.[150]

The original act authorizing this project specified that the surveyor general was to revise and correct the work prior to publication, and that Burr was to have access free of charge to all state, county, and town offices to gather information for the atlas.[151] The title page of Burr's atlas states that it was "projected and drawn under the superintendence and direction of Simeon De Witt."

Although county atlases had been published in England since the Renaissance, Burr's atlas was only the second state atlas published in the United States (the first was of South Carolina). That a need was felt for such a publication is itself an indication of the increasing population and economic development of the state. The atlas consists of a summary map of the state, along with maps of each county.

The summary map, which was also published separately, was not outstandingly innovative (Figure 9.10). Its overall design resembles that of J.H. Eddy's map of New York State. This is no coincidence, since in a communication to the State Senate, De Witt had noted that Burr's state map was to show, in addition to New York, "the district of the country comprehended by Eddy's map of the state of New-York, and the adjacent parts…."[152]. Burr also appears to have copied many details from the Eddy map,

although Burr's version is not as carefully drawn and engraved. In spite of being somewhat derivative, it is a respectable performance. It uses a heavy but legible typographic style, which is characteristic of Burr's maps, and updates Eddy's map with new villages, roads and town boundaries. In place of Eddy's depiction of much of Pennsylvania, it substitutes profiles of the Erie and Champlain canals.

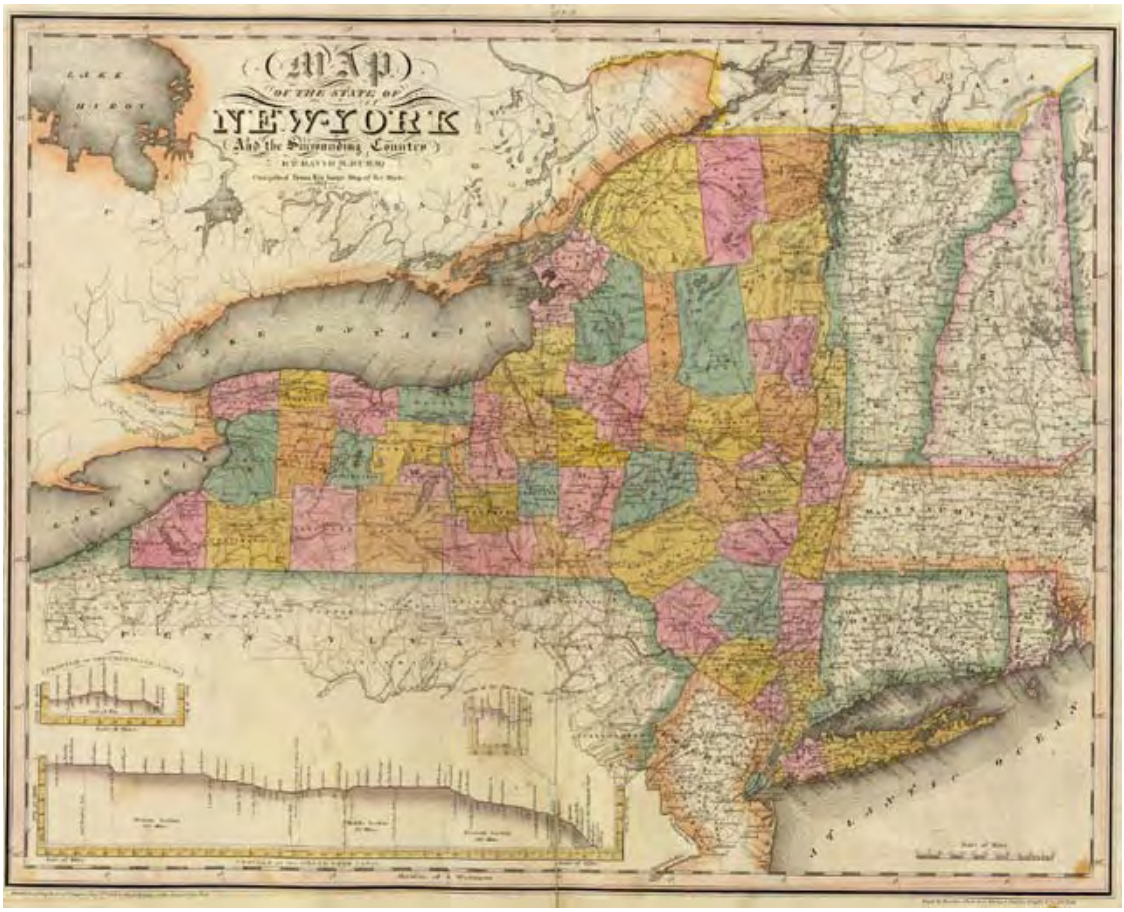

Figure 9.10. David Burr, *Map of the State of New York* (1832). Courtesy David Rumsey Collection.

Burr's map of New York was frequently updated and reprinted through the early 1840s, and it appears to be the most widely used map of the state in period between about 1830 and 1845. It had a complicated publication history, with editions being produced by Burr himself and by Colton, as well as by other publishers. It is not clear to what extent Burr was actually involved in creating many of these editions, but the appearance of this map in a variety of versions and at various scales illustrates the broadening of the commercial market for maps in the 1830s (a topic which will be taken up in another chapter). Burr himself scaled down and drastically revised his state map for publication in two atlases that appeared under his name: the *New Universal Atlas* (1835) and the *American Atlas* (1839).[153] During the 1830s, Burr expanded his activities to the national stage, and became (successively) Topographer to the Post Office and

Geographer to the House of Representatives. He ended his public career as the first surveyor general of Utah Territory.[154]

The county sheets are the most important part of the Burr atlas. A close examination of them shows the continuing influence of De Witt's 1802 map of New York. The major topographic features appear to be derived directly from De Witt, but the Burr atlas includes a great deal of new information, reflecting the rapid development of the state in the intervening quarter century. Canals are shown, and Burr also distinguished carefully between "stage roads" (mostly turnpikes) and "county roads." In addition, he used special symbols to designate "flouring mills," "manufactories," saw mills, forges, and churches. The boundaries of towns are drawn in on each of the county maps. Many of the maps show how the large land purchases in the state were initially divided up into smaller tracts—information that is not readily available elsewhere. In many counties, the Burr atlas shows these initial subdivisions at a stage prior to the allocation of lots to individual settlers (Figure 9.11).[155]

Figure 9.11. Detail of Burr's M*ap of the County of Delaware* (1829). Courtesy David Rumsey Collection.

Burr sent draft copies of his county maps to town clerks and supervisors, asking them to correct errors and add new information. A similar procedure had been followed by Simeon De Witt in creating his 1802 map of the state, and it is significant that the surveyor general (not Burr) was authorized by a close vote to carry out this procedure for the new project.[156] Copies of these corrected maps along with comments by the town supervisors and clerks can still be found in the New York State Archives.[157]

The Burr atlas also had an interesting post-publication history, although it was not as convoluted as that of his map of New York State. There was a little-known 1832 edition

or reprinting, which appears to be nearly identical with the 1829 edition, except for two maps.[158] A very unusual edition was published (possibly by Colton) in 1838. This was a mass-market version in a small format with greatly downscaled county maps, and several maps of cities that do not appear in the original edition. All of the maps in this atlas, except for one, were printed using an unidentified process, which produced white-on-black maps that look remarkably like negative photostats.[159] The most important of the revised editions was prepared in 1839 “for the use of engineers,” and published by Stone and Clark in Ithaca. Evidently it had very limited distribution—probably mostly to state officials. This was an extensively revised and updated version of the original 1829 atlas. It is useful for tracing the growth of railroads and other cultural changes in New York in the preceding decade.[160] Stone and Clark issued another edition “with corrections and improvements” in 1841.[161] This was the last edition of the Burr atlas, although an unsuccessful proposal was presented to the state legislature for a new edition in 1855.[162]

The later editions of the Burr map and atlas take us into the 1830s and beyond, anticipating developments described in later chapters—particularly the appearance of multiple editions of maps for different needs and markets.

In most respects, though, the Burr atlases do not mark a dramatic departure from the past in technique or approach. They can be seen as the culmination of efforts reaching back well into the eighteenth century. Burr used essentially the same method in compiling his atlas that De Witt had used to make his 1802 map of New York, or that Sauthier had used to prepare his pre-revolutionary map of the province. All of these works were created by collating earlier maps, occasionally supplementing them with limited surveys and information gathered from non-cartographic sources. Because such maps were put together from a variety of materials of varying scales, of different dates, and of varying standards of accuracy, it was easy for errors to creep in. Given these circumstances, it is remarkable how good the maps of Sauthier, De Witt, and Burr were. But throughout this period there was an increasing call for more accurate maps based on uniform surveys.

After 1830 mapping by collation was gradually replaced by a new version of “scientific mapping” based on the systematic triangulation of large areas. This technique was seen as a way to remedy the doubtful and uneven quality of earlier maps, and its development will be explored in the following chapters.

Chapter 10
Scientific Mapping in New York before 1860

Introduction

This chapter discusses the development in New York of what became known in the nineteenth and early twentieth centuries as "scientific mapping." As has already been seen, the meaning of this term has changed over time. The various types of scientific mapping all derive from a generalized Western cartographic tradition, which originated in ancient Greece and Rome, and was greatly refined and elaborated in Europe after the Renaissance. Characteristic features of this tradition include the use of a uniform scale, the determination of locations by longitude and latitude, the use of mathematical projections to portray the surface of the globe on a flat sheet of paper, and the use of standardized symbols to represent features on the surface of the earth.

The striving for "accuracy" is characteristic of all types of scientific mapping. The underlying ideal is that a map should somehow resemble a miniature "mirror image" or a photograph of the earth's surface. In the maps we have so far considered, efforts to achieve this ideal focused on the critical evaluation of sources. Efforts were made to determine latitudes (and at least some longitudes) astronomically. Distances between locations were measured by pacing, by the use of chains, or by odometers. Filling in of details was done by eye and hand. Maps of large areas, were usually made by combining maps and reducing them to a uniform scale. In some cases, measurements were adjusted to assure that maps were based on a common projection.

This strategy of putting together maps by collation and introducing corrections as new data came in was reasonably successful. As we have seen, the best maps of New York became progressively more detailed and accurate between 1750 and 1802, and they thus became better at serving the pragmatic and utilitarian purposes for which they were designed. However, this procedure had serious weaknesses. It relied too much on the judgment of the individual mapmaker in selecting and correcting materials. It was often impossible for the cartographer or map user to be certain exactly how accurate a particular detail or location was. There was no easy and systematic way to find and correct errors. If a cartographer wanted to verify a particular detail, he had to check it himself or measure its location himself, or else send out someone he trusted to do the job for him.

As far back as the end of the seventeenth century, it was widely recognized that geometric triangulation was a way to remedy these problems and to produce more accurate maps. In theory, triangulation is simple enough. It involves carefully measuring one or more "baselines," and then using precision optical instruments (such as theodolites or transits) to measure angles from each end of a baseline to known locations. In this way a network of triangles could be established, and, using trigonometry, distances could be measured. The accuracy of distances and locations could be assured by measuring from two baselines and checking for differences in measurements. Specific locations within this network of triangles could then be located by subtrianglation. It is easiest to grasp how this procedure works by looking at an example, such as that shown below in Figure 10.4.

While this procedure was fairly simple in theory, it was not so easy to carry out in practice. It required expensive instruments, considerable time and labor, and practitioners with skill in astronomy and trigonometry. Creating sight lines in heavily forested areas often required erecting towers or chopping down large numbers of trees. The first trigonometrical survey of a large area was started in France at the end of the seventeenth century. By the end of the eighteenth century, similar surveys were underway in Great Britain, Switzerland, parts of Germany, and other European states. Throughout the eighteenth and nineteenth centuries, improvements in instruments along with new developments in astronomy and mathematics slowly raised the standards of these surveys.

The idea of conducting a systematic survey using triangulation in North America was not new. It had been proposed by Samuel Holland in the years following the French and Indian War. The idea was also raised several times in the years between 1784 and 1807, but nothing came of these early proposals. The immensity of the American landscape and its heavy forest cover discouraged efforts at large-scale surveying. Aside from issues of expense, the new nation lacked surveyors with sufficient expertise to conduct surveys according to the best European standards. Only with the immigration of the Swiss surveyor and scientist Ferdinand Rudolf Hassler in 1805 was there anyone in the United States really capable of conducting such a survey, and it was only after 1832 that Hassler was able to begin surveying on a large scale.

Ferdinand Rudolf Hassler and the U.S. Coast Survey

The key figure in the introduction of “scientific mapping” in the United States was Ferdinand Rudolf Hassler (1770-1843).[1] Hassler was born in German-speaking Switzerland, and educated primarily in Bern. The most important influence on Hassler’s career was Johann Georg Tralles, under whom he studied mathematics and geodesy. Hassler worked with Tralles on the survey of Switzerland in the years after 1791—using the most advanced methods of scientific mapping available at that time. In 1805, Hassler immigrated to the United States in part to escape restrictions on scientific activities under the Napoleonic occupation of Switzerland.[2]

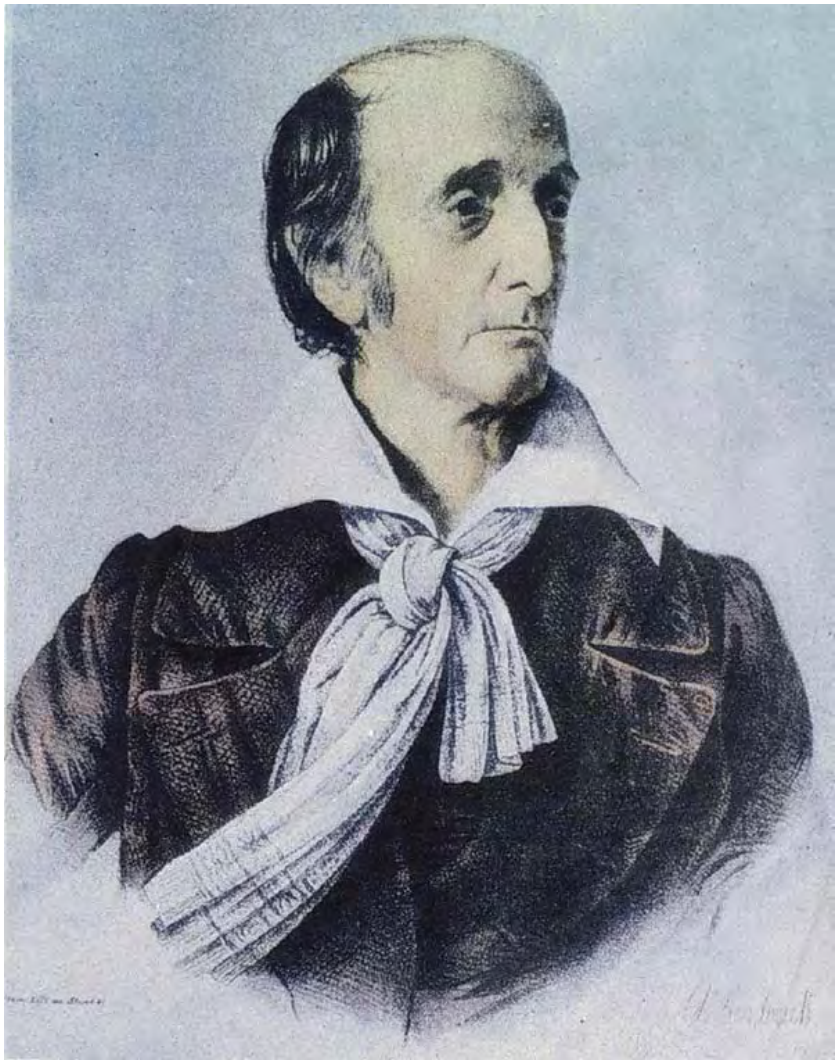

Figure 10.1. Ferdinand Rudolf Hassler. NOAA Central Library.

Hassler's influence on American science goes far beyond the boundaries of New York. He organized the United States Coast Survey, taught surveying to a generation of military engineers at West Point, played a critical role in the establishment of standardized weights and measures in the United States, and generally helped establish professional science in this country.

Although Hassler was a figure of national importance, much of his life was spent in New York, and most of his surveying was done in the vicinity of New York City.

It is no exaggeration to say that Hassler completely outclassed all previous surveyors and geodesists in early nineteenth-century America, including such luminaries as Andrew Ellicott and Simeon De Witt. This will become apparent as we review Hassler's activities.

Almost immediately upon his arrival in the United States, Hassler started looking for a position in which he could employ his skills in astronomy and surveying. In 1806, he was hired by the Corporation of New York to conduct a survey of Manhattan and connect

it through triangulation with Albany. A combination of illness on Hassler's part and a change of administration in New York City caused this project to be abandoned.[3]

As early as the end of 1805, Hassler started attending meetings of the American Philosophical Society in Philadelphia. (He was elected a member on April 17, 1807.) Robert Patterson and John Vaughn brought him to the attention of President Thomas Jefferson, who was also a member of the society. Jefferson was interested in promoting a survey of the coast, and both he and his Swiss Secretary of the Treasury, Albert Gallatin, thought that Hassler might be able to contribute to it. In 1807, on the recommendation of President Jefferson, Congress passed a law authorizing a survey of the coast.[4]

On March 25, 1807, Gallatin issued a circular letter calling for proposals on the best way to implement a coast survey. Hassler's proposal was selected, and he was chosen to head the survey. Following its rapid establishment, the Coast Survey encountered the first of a long series of problems and delays, which plagued it and Hassler for the rest of his life. Initially, the start of Coast Survey operations were delayed by the Embargo and other tensions leading up to the War of 1812.

Between 1809 and 1811 Hassler was employed at West Point and at Union College. At West Point, he taught mathematics and began writing a textbook on analytic trigonometry. Thus, he began the important task of training a new generation in up-to-date methods of surveying, astronomy, and mathematics. At that time, he made a considerable impression on Colonel Joseph Gardner Swift (the first graduate of West Point), who was head of the academy at that time. Swift became a life-long friend and supporter of Hassler, and (as seen in chapter 8), Swift also soon became an important figure in military cartography in his own right.

Finally, in August 1811, Hassler was sent to London to acquire the specialized instruments needed to carry out the survey. Most of these had to be made to order, and Hassler succeeded in acquiring an impressive collection of chronometers, telescopes, micrometers, and (most famously) a two-foot theodolite constructed by the famous London instrument maker Edward Troughton. Hassler's work was delayed by the outbreak of the War of 1812, and he was not able to return to the United States until 1815.

Figure 10.2. Hassler's "Great Theodolite" housed in a tent. NOAA Central Library.

After almost ten years of preparation and frustrating waiting, Hassler was finally able to begin work. He returned to the New York area, measured two baselines in New Jersey and on Western Long Island, and conducted an initial triangulation from them.

After this promising beginning, his work came to an abrupt halt. A storm, which had been brewing in Congress for some time, broke over Hassler's head in 1818. Congressmen and others were frustrated by the lack of concrete results from the Coast Survey, and their frustrations were compounded by Hassler's foreign origins and his peculiar personality. Hassler was conscientious, hard working, and intellectually brilliant, but he could also be vain, confrontational, and eccentric.

The upshot of this situation was that on April 18, 1818, Congress passed a law requiring that only officers of the army and navy could be employed by the survey, which effectively excluded Hassler. The most articulate upholder of the idea that the military was best suited to conduct these surveys was Colonel Isaac Roberdeau, head of the Army Topographic Engineers, who has already been encountered in the previous chapter.[5] Roberdeau maintained that the military engineers not only had the necessary qualifications to carry out a coastal survey, but that an adequate survey could be done less expensively by omitting the difficult large-scale triangulation advocated by Hassler, and

by relying instead on astronomical observations to fix the locations of individual points, and then using them to tie together more limited surveys. Although some surveying of individual harbors was done by the military in the years between 1818 and 1832, it finally became apparent that the army and navy were not in fact able to carry out a comprehensive survey of the coasts.

With the Coast Survey was suspended, Hassler had to look elsewhere for employment. As far as the mapping of New York is concerned, the most important of his activities during the years when the Coast Survey was in suspension was the boundary survey between the United States and British North America (later Canada). This survey came about as a result of the treaty of Ghent, which ended the War of 1812, and set up a mechanism for surveying the disputed boundary between the two countries.[6] Hassler was appointed by President Monroe in 1818 as one of the astronomers on the American side of the survey. His involvement in this project, which lasted only about a year, was limited to resurveying the Canadian boundary with Vermont and New York, which runs along the 45th parallel of latitude.

Hassler's involvement in this seemingly straightforward project speaks volumes about the development of geodesy and surveying in New York. It will be recalled that this line, known as the Collins-Valentine line, had been surveyed by the British shortly before the Revolution. The team of surveyors that originally surveyed this line, which included Claude Joseph Sauthier, was reasonably competent by the standards of the time.

On the new survey, Hassler worked with John Louis Tiarks, a surveyor born and educated in Germany, who represented the British. Hassler and Tiarks discovered that the Collins-Valentine line deviated appreciably from the 45th parallel. Most dramatically, they determined that the 45th parallel at Rouse's Point (on northern Lake Champlain) was nearly one mile further south than had been thought previously, which dismayed the Americans, who had constructed a major fortification on what was now determined to be Canadian soil (Fort Montgomery also known as "Fort Blunder"). In fact, the entire boundary line was shown to wander back and forth across the 45th parallel, thereby complicating boundary negotiations, which were not finally settled until the Webster-Ashburton Treaty was ratified in 1842. The final treaty reaffirmed the original Collins-Valentine line as the boundary between Canada and New York, even though it was not geodetically correct. [7]

The most revealing comments about the techniques used by Hassler and Tiarks come from Andrew Ellicott, who was also a member of the American team on the boundary survey. On July 24, 1819, he wrote to his wife:

> Since I came here, I have had much conversation with my old friend, and astronomical companion S. De Witt, surveyor gen[eral] of this State, who is a man of science, and a good practical astronomer; he informs me, that he spent several days with Mr. Hassler and the British astronomer on the boundary last summer; but could not entirely comprehend the nature of their operations, and (between ourselves), he assured me that as far as he could comprehend them, they appeared better calculated for expense than accuracy.

A week later Ellicott added in another letter to his wife:

> As to our business I can say nothing at present, and candidly confess that I do not yet comprehend the method pursued by the British astronomer and Mr. Hastler [*sic*], it is different from anything I have yet seen or heard of, not more than one observation in ten can possibly be applied to the boundary—those that can are probably good, but their mode of calculation is laborious in the extreme.[8]

These remarks illustrate the huge gulf between Hassler and his American predecessors. As shown in Chapter 8, Andrew Ellicott was arguably the most capable American surveyor of his generation, and Simeon De Witt was not far behind him. The comments by Ellicott and De Witt about the incomprehensibility of Hassler's methods, as well as their unnecessary labor and expense, do much to explain the controversy and difficulties that plagued Hassler throughout his career. If America's elite surveyors took this attitude, it is hardly surprising that congressmen and others without a strong background in astronomy or cartography expressed frustration at the expense and slowness of Hassler's work.

The years between 1820 and 1830 were the most difficult in Hassler's career. He had to scratch and scrabble to earn a meager living for himself and his sizable family. For a while, he taught at an academy in Jamaica, Long Island. He wrote text books on mathematics, and published an important compilation of papers relating to the activities of the Coast Survey.[9] He tried his hand at farming in Jefferson County, and attempted unsuccessfully to find a position teaching at a university. Finally, in 1829, he was reduced to working as gauger in the New York City Custom House.

Hassler's fortunes finally turned around when, in 1830, President Andrew Jackson appointed him U.S. Superintendent of Weights and Measures. Although Jackson is not usually thought of as a patron of intellectual activities, he seems to have liked and respected Hassler, and supported him against opposition on several occasions. In his important role as Superintendent, Hassler did a great deal to standardize weights and measures in the United States. He thereby effectively put an end to such problems as the lack of a uniform standard for the length of the foot, which, as has been seen, had caused difficulties for Joseph Ellicott.

Hassler continued as Superintendent of Weights and Measures until his death in 1844. After 1832, he held this position concurrently with Superintendent of the Coast Survey. The Coast Survey was revived by Congress in that year after much debate, and Jackson was again responsible for reappointing Hassler to his old position. It was in the final years of his life, between 1832 and 1844, that Hassler made his most important contributions to the mapping of New York, and of the nation.

In spite of these successes, Hassler's final years continued to be marked by Congressional investigations and other battles with opponents who complained of the slow pace and high cost of the Coast Survey. Hassler was convinced that his critics were ignorant fools, but his own prickly and eccentric personality continued to undermine his work. A number of amusing stories were in circulation about his strange behavior. One of these, which has been retold repeatedly, is worth telling once again because it is so revealing of Hassler's character. According to this story, sometime around 1836 Hassler got into a dispute about his salary with his superior, Levy Woodbury, Secretary of the

Treasury under Jackson. This disagreement was eventually referred to the president himself, who reportedly had this conversation with Hassler:

> "So, Mr. Hassler, it appears the Secretary and you cannot agree about this matter" remarked Jackson, when Hassler had stated his case in his usual emphatic style. "No, Sir, ve can't." "Well, how much do you really think you ought to have?" "Six thousand dollars, Sir." "Why, Mr. Hassler, that is as much as Mr. Woodbury, my Secretary of the Treasury, himself receives. "Mr. Voodbury!" declared Hassler, rising from his chair, "There are plenty of Voodburys, plenty of Everybodys who can be made the Secretary of the Treasury." "But," he said, pointing his forefinger toward himself, "there is only one, *one* Hassler for the head of the Coast Survey."[10]

Hassler got his raise—once again demonstrating Jackson's support for this unusual bureaucrat.

Coast Survey Mapping in New York, 1832-1844

After his reappointment as Superintendent of the Coast Survey in 1832, Hassler picked up where he had left off in 1818. He returned to New the New York City area, and proceeded to lay out a new base line on Fire Island, which effectively became the starting point for all subsequent work by the Coast Survey (Figure 10.4).

It is worth describing how Hassler went about constructing the Fire Island base line, if only because it illustrates Hassler's fetish for precision. It was laid out on the beach, and reached a length of 4,058.9870 meters. It was carefully measured by using an assemblage of four iron bars, each of which was two meters long. Elaborate precautions were taken to ensure that the bars were lined up straight, and that there was no gap between them. This operation had to be repeated approximately 1800 times. The bars were insulated to prevent their expansion and contraction, and the temperature of the bars at each setup was measured. Hassler and his assistants afterwards calculated the amount of expansion or contraction for each setup.[11]

Figure 10.3. Hassler's Camp on Fire Island. NOAA Central Library.

Hassler's Fire Island baseline was constructed in a more painstaking manner than the two preliminary baselines he had measured in 1817. Once this baseline was measured, he and his assistants used theodolites to create a network of triangles, part of which can be seen in Figure 10.4. The longitudes and latitudes of the points used as vertexes of these triangles were checked astronomically, and the accuracy of the measurements was further checked by trigonometrical measurements from neighboring triangles.

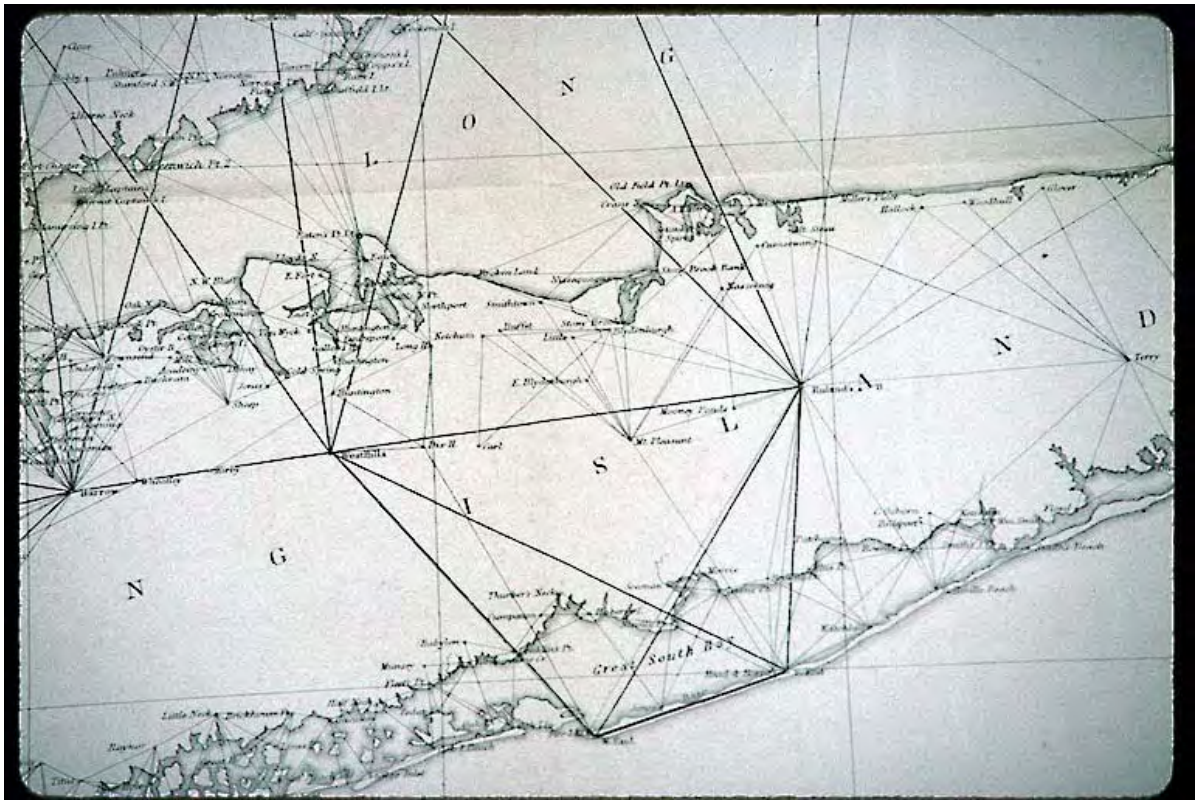

Figure 10.4. Triangulations from Long Island baseline. Coast Survey Annual Report, 1851. Stony Brook University Library.

The overall accuracy of Hassler's surveys is illustrated by his use of triangulation from the Fire Island baseline to recalculate the length of the baselines he had measured in 1817. It was found that "the difference between the measured and computed lengths of these lines was in one case less than a foot, and in the other about four inches; the bases themselves were 5.9 and 4.8 miles long."[12]

Once this network of large triangles (the "preliminary triangulation") had advanced beyond a certain point, Hassler and his assistants started subdividing these triangles into smaller triangles (the "secondary triangulation"). Sometimes these were further subdivided in a tertiary triangulation. Once a sufficiently fine network of triangles was established, his assistants were able to begin detailed mapping using plane tables. Plane tables appear not to have been used extensively in the United States prior to Hassler, although they were occasionally used by British surveyors like Samuel Holland and John Montresor prior to the Revolution. Plane table surveying also operated on the principle of measuring distances by triangulation.

Hassler's obsession with accuracy meant that he had to pay more attention to the problem of map projection. For him, a simple conic projection, such as had been used by Simeon De Witt and others for New York, distorted distances and shapes too much to meet his exacting standards. To decrease these distortions, he invented the more complex polyconic projection, which minimized the distortions, although it did not entirely eliminate them (no projection can). In the final chapter of this book, we will take up the

theme of how New York's mapmakers have struggled to produce ever more accurate projections of the earth's sphere on paper.

Beginning in 1834, Hassler's assistants began producing a series of large-scale topographic maps of coastal areas. The first was drawn by Charles Renard, and covered part of the south shore of Long Island at a scale of 1:10,000. The legislation authorizing the Coast Survey called for mapping areas as much as twenty leagues (sixty miles) from the shore. The rationale for this was that the coastal charts were to serve both for navigation and for the military defense of the coast. Consequently, all parts of Long Island were mapped, as well as many other areas that were well away from navigable waters, including the Hudson River valley. The areas on the immediate coast were mapped at a scale of 1:10,000; those further inland at a scale of 1:20,000.

By Hassler's death in 1844, all of Long Island had been mapped in manuscript, as well as the five boroughs of modern New York City, and much of the lower Hudson River Valley. Later in the nineteenth century, these manuscript surveys were extended to include Lake Champlain and the Hudson River as far north as Albany.

For the limited areas that they cover, these manuscript maps constitute an invaluable resource for historical research. Because most of them were never published, they are relatively little known. For a long time, they were in possession of the Coast Survey and its successor agencies (the U.S. Coast and Geodetic Survey and, most recently, The National Oceanic and Atmospheric Administration or NOAA). Some regional libraries have copies of these maps, which were sold by NOAA. Several years ago, they were transferred from NOAA to the National Archives, where they can now be consulted. Most recently, digital copies of these maps have been made available on the World Wide Web by the Geography Department of the University of Alabama and by other institutions, which should further increase their use.[13]

These maps are of particular interest because of their extraordinary detail and accuracy (Figure 10.5).For many areas, they provide us with the earliest reliable picture of the landscape. They show individual structures (but include the names of very few homeowners). Important buildings, such as churches, factories, and mills are usually identified. Roads are shown in detail, with some effort being made to differentiate between different types of roads (such as paths, county roads, and turnpikes). Hills are depicted, usually by a system of shaded relief. An unusual feature of many of these sheets is that they show different types of land cover. Fields, marshes, and orchards are identified by conventional symbols. On some sheets, efforts were made to differentiate between grasslands, brush, woodlands, and coniferous forests. For example, the Pine Barrens on Long Island are represented by drawings of tiny pine trees.

Figure 10.5. U.S. Coast Survey, manuscript survey sheet T-25 [area around Cold Spring Harbor, Long Island]. Stony Brook University Library.

As might be gathered from the preceding description, these maps can be difficult to interpret. They generally do not present many problems for those familiar with the conventions used on eighteenth and early nineteenth century maps, or who have enough local knowledge to decipher unfamiliar signs. But for students and others without sufficient background, they can be exceedingly difficult to read. In spite of Hassler's fanaticism about precision, he seems to have provided little guidance to his assistants about how to go about sketching the details of their work. The amount and type of information shown varies considerably from sheet to sheet—especially between those made by different surveyors. There are also variations in the symbols used, even for such ordinary things as the depiction of buildings and marshes. For example, on most maps buildings are shown as dark squares or rectangles. On some sheets, however, outbuildings, such as barns, are shown as hollow rectangles.

No field notes were taken by Hassler's surveyors. Hassler thought they were unnecessary because of the detail and accuracy of his surveys, but their lack is felt by researchers looking for information to explain or supplement the maps.

Hassler appears to have issued his first written instructions for surveyors in 1841, and to have prepared the first legend of symbols for the Coast Survey at about the same time. The legend was published in 1844, shortly after his death.[14] By this time, many of these manuscript maps had been completed, and even then this legend does not deal with such subjects as types of vegetation, although it goes into great detail on such

matters as how to depict different types of bridges. Only later in the nineteenth century did the Coast Survey succeed in establishing a more comprehensive system of standardized symbols.

Very few maps were actually published by the Coast Survey during Hassler's lifetime, and they are of small harbors, such as New Haven. However, within a few years of his death, several maps were published based on his surveys and covering parts of New York. The first of these was his famous map of New York Harbor (1844), which was actually in press at the time of Hassler's death.[15] This huge map on six sheets was drawn at a scale of 1:31,000; a single-sheet version was published in 1845 at a scale of 1:80,000.[16]

The map of New York Harbor is widely regarded as Hassler's masterpiece. It is available online, and it is the best expression of how he intended his maps to appear. In addition to New York Harbor, it includes parts of southern Manhattan, Staten Island, New Jersey, and western Long Island. At a scale of 1:31,000, it is detailed enough to include much (but not all) of the information on the manuscript sheets at scales of 1:10,000 and 1:20,000 (see Figure 10.6). This is especially evident in rural areas, which at that time still included most of the modern boroughs of Brooklyn, Queens, and Staten Island. Here individual buildings are shown, along with their surrounding lots. Fields are also depicted, as well as marshes, woodlands, and hills. Urban areas, such as Manhattan, show streets (without names), along with a few other features, especially docks and parks.

Figure 10.6. Detail from Hassler's *New York Harbor* chart (1845). Library of Congress, Geography and Map Division.

As a navigational chart of New York Harbor, Hassler's masterpiece surpasses all of its predecessors. Aside from its outstanding geodetic precision, it is much richer than any previous chart of the harbor in the number of its soundings, and in its depiction of channels, shoals, and other standard navigational features. The favorable reception that this chart received from merchants and navigators was widely seen as a vindication of Hassler's painstaking methods. Hassler's survey was particularly praised for its discovery of "Gedney's Channel," a deeper and straighter entrance to New York Harbor in the vicinity of Sandy Hook.[17]

In the course of the 1840s and 1850s, the Coast Survey published charts showing all of the coastlines and waters around Long Island at a scale of 1:80,000.[18] Several charts of individual harbors and other limited areas were published at larger scales.[19] Even at 1:80,000, these charts were on a large enough scale to include much of the inland detail found on the manuscript maps. However, this detailed topography is only provided for areas within a few miles of the coast. Areas in the center of Long Island were left blank, which means that the extensive information recorded in the manuscript surveys of these areas was never published. This marks the beginning of a trend on Coast Survey charts to exclude inland detail, a trend which accelerated through the nineteenth century—especially after inland mapping was taken over by the United States Geological Survey. Modern nautical charts show only a few features away from the shore, and these are mostly landmarks useful for navigation.

Coast Survey Mapping in New York after Hassler

Hassler's death in 1843 marked an important turning point in the history of the Coast Survey. To the very end, Hassler faced constant battles with Congress to justify the existence of the Coast Survey, and to defend it against charges of excessive expense and snail-like progress. His successor, Alexander Dallas Bache (1806-1867) managed to put the Coast Survey on a firmer footing.[20]

A great-grandson of Benjamin Franklin, Bache was trained as a military engineer at West Point. After 1828, he was appointed professor of natural philosophy at the University of Pennsylvania, and quickly became one of the recognized leaders of American science. Bache not only had the technical skills to lead the Coast Survey, but he also had extensive personal connections, as well as political and administrative skills that Hassler lacked.

Under Bache, the Coast Survey quickly extended its operations to the southern and western shores of the expanding nation. By focusing on geodesy and coastal charting at the expense of mapping inland areas, and by various technical improvements, he was able to increase dramatically the publication of charts, which in turn helped lead to higher appropriations for the Coast Survey. By the late 1840s, the value of Coast Survey charts for maritime commerce was widely recognized. During the Civil War, the Coast Survey under Bache made important contributions to the Union war effort.[21]

As far as New York is concerned, Bache's main contribution was the publication of maps based on surveys previously carried out under Hassler. The most significant new

work done under Bache was a detailed resurvey of New York Harbor, which was conducted in the 1850s. He also extended the production of both manuscript and printed maps of the Hudson River Valley as far north as Albany.[22] The modesty of these contributions is explained by his focus on extending the activities of the survey to the south and the west.

The subsequent history of the Coast Survey in New York can be quickly summarized. In the 1870s and 1880s, the agency (renamed the Coast and Geodetic Survey in 1878) extended its activities to the upper Hudson River and Lake Champlain. Along with the production of charts, this involved a considerable extension of its triangulation network. This network by no means covered all of New York, but (as we shall see), it was extended by other state and federal agencies at the end of the nineteenth century and at the beginning of the twentieth. In the 1870s and 1880s, the Coast Survey and its successor also conducted a new survey of Long Island, which led to a second set of detailed manuscript maps (showing coastal areas only), and a variety of printed charts of the waters around the island. Almost all of these historical published charts are available on the World Wide Web.[23]

There is a direct line of succession from the Coast Survey, through the Coast and Geodetic Survey, to the National Oceanic and Atmospheric Administration (created in 1970). After the creation of the Coast and Geodetic Survey in 1878, the mapping of areas away from the coast was assigned to the United States Geological Survey (USGS), and the Coast and Geodetic Survey was restricted to mapping the coast and maintaining the geodetic framework of the United States (mainly through triangulation until the middle of the twentieth century).[24]

It is generally recognized that the methods introduced by Hassler form the foundation of the later activities of both the USGS and the Coast and Geodetic Survey. Thus, Hassler can truly be said to have laid the foundations of “scientific mapping,” as it was understood in the United States until the middle of the twentieth century.

It may legitimately be asked: what is the significance of this achievement? In my view, it is misleading simply to celebrate Hassler’s accomplishments, and to dismiss his opponents as wrong-headed and unprogressive. Maps should be evaluated in terms of the needs they served and placed in the context of the times in which they were created. This historical approach calls for asking questions like: Why were they created? Who used them? How successful were they in serving their purposes? This approach is implicitly utilitarian, since it assumes that people do not go to the considerable expense in time and money of creating maps without practical reasons for doing so.

In the case of the Coast Survey maps, their creators and advocates were quite explicit about why they thought they should be made. The words “commerce” and “defense” sum up the bulk of their arguments. The supporters of the Coast Survey also used phrases like “the advancement of science,” and suggested that in addition to advancing such obscure sciences as geodesy, the Coast Survey led to useful discoveries in other areas, such as meteorology and oceanography. This argument was frequently tied into patriotic calls for raising national prestige—i.e. calling for Americans to prove that they are at least equal to Europeans in their scientific accomplishments.

On the whole, the advocates of the Coast Survey made their case. Their charts were successful in making coastal navigation safer and more economical, and they were able to gather numerous testimonials in support of their value in that respect. The case for

"defense" is more equivocal than that for "commerce." True, the coastal charts were useful to the North in the Civil War, but the southern states might have regarded them in a different light. The Coast Survey charts outside of the South were never tested for defense purposes by a foreign invasion. Had the United States gone to war with Great Britain in the last half of the nineteenth century, it is not hard to imagine that they might have been more useful to the invaders than to the Americans, who would have had the advantage of being relatively familiar with their own territory. (This is one reason why even today some nations keep their detailed maps secret.)

In terms of advancing science and national prestige, the Coast Survey met with considerable success, although this is hard to measure. Judging from reviews and remarks in foreign scientific journals, American science was regarded with greater respect and appreciation thanks to the activities of people like Hassler and Bache. Certainly, the closely associated activities of Coast Survey and military map makers succeeded in creating a cadre of skilled cartographers in the United States, and in raising the level of scientific activity in this country generally.

Where Hassler's objectives are most open to question is in the matter of land-based topographic mapping. Although this was not the primary objective of the Coast Survey, it was clearly important to Hassler. The effort he devoted to this activity slowed down his work, and much of it was abandoned after his death. Here it can be argued that Hassler was truly "ahead of his time" in that there was not a clear-cut need for detailed topographic mapping in early nineteenth century America. Hassler's critics— who included surveyors like Andrew Ellicott, Isaac Roberdeau, and Simeon De Witt, as well as ignorant congressmen—had a point. Maps like those produced by De Witt and David Burr seem to have served their purposes well. They were sufficiently exact to enable people to find towns and major landholdings, and to get from one place to another by road or river. As long as boundaries met a reasonable standard of exactitude (as defined by the surveyor general's office) they were good enough. Problems could be corrected by additional surveys, or by negotiation, or in court. The press was not full of complaints about problems caused by inadequate mapping in New York. Why, then, spend large amounts of time and money on expensive surveys?

This question was to hang over the mapping of New York for much of the nineteenth century. We will see how it was answered over time, and how eventually precise and detailed topographic mapping came to be perceived as desirable and even necessary.

Special Purpose Maps: Geology, Soils, and Public Health

Scientific mapping in the nineteenth-century involved more than producing geodetically accurate maps using precision instruments and advanced methods of surveying. The new preoccupation with precise measurement in cartography, reflected in the work of the Coast Survey, is related to a broader phenomenon known as "Humboldtian science." As a concept, Humboldtian science (named after its leading practitioner Alexander von Humboldt) is difficult to define, but it is important for understanding the development of cartography in the nineteenth-century. Humboldtian Science was not the result of some kind of scientific revolution, paradigm shift, or epistemic change. Rather, it was more a reconfiguration and change of emphasis in trends that were mostly in place in the eighteenth century. Precise mapping based on careful

observations and record keeping is only one aspect of Humboldtian science. Equally important is the use of statistics to study the geographical relationships between a wide range of natural and human phenomena. We can see this emphasis on interconnectedness and linkage with geography in a number of fields that were prominent in the first half of the nineteenth century, including geodesy, astronomy, geology, meteorology, the study of tides, and the study of the distribution of plants and animals.[25]

Humboldtian science is also connected with the development of so-called "thematic maps." There is no completely satisfactory definition of what is meant by thematic mapping, but it is generally accepted that it involves the portrayal of geographically distributed information that is not readily visible on the surface of the earth (although conventional maps also include certain types of "invisible" information, including borders and boundaries, military movements, and contour lines). Typically, thematic maps focus on the geographical distribution of one particular subject. For purposes of this book, I am considering thematic maps to include geological maps, soil maps, and meteorological maps, as well as maps showing the geographical distribution of such things as plants, animals, religions, and languages. Statistical maps—which show such things as the numerical distribution of diseases, or of census or economic data—are the most undisputed form of thematic mapping.[26]

The earliest examples of thematic maps have been traced back at least as far as the Renaissance. Edmund Halley's world maps showing wind directions and compass deviation, produced around 1700, have often been cited as pioneering examples. But thematic maps did not really start to flourish until the nineteenth century. One reason for their relatively late development is that most thematic maps are closely linked to techniques for the collection and classification of information that were largely developed in the eighteenth and nineteenth centuries. Also, the flourishing of thematic mapping reflected the increasing awareness after 1800, characteristic of Humboldtian science, of the interconnectedness between geography and other disciplines, such as botany and geology. As geographer Arthur Robinson pointed out, the use of maps that show such things as geological or statistical information constitutes a major conceptual revolution in map making.[27]

Several pioneering efforts in thematic mapping took place in New York State.

Disease Mapping

The first thematic map published in New York is also something of an historical outlier. This is Valentine Seaman's pioneering map of yellow fever deaths on what is now the Lower East Side of Manhattan.[28] Seaman, a surgeon at the New York Hospital, believed that yellow fever was caused by "putrid effluvia" associated with the Roosevelt Street Drain on the lower East Side of Manhattan, and he made a map showing the frequency of cases of the disease in its vicinity. Seaman's theory was wrong, since we now know that Yellow Fever is a mosquito-born disease, but his map correctly reflected the association between the disease and standing water.

Remarkably, Seaman's map is thought to be the world's first "spot map" showing the geographical distribution of specific incidences of a disease.[29] It preceded by more than fifty years John Snow's famous maps of the epidemiology of cholera in London, which stimulated the widespread publication of disease maps throughout the world. Other

simple maps showing disease outbreaks in lower Manhattan were published in 1819 and 1821.[30] Later and more elaborate developments in public health mapping of New York will be considered in Chapter 12.

Geological and Soil Maps

Most of the early efforts at thematic mapping in New York took the form of geological and soil maps.[31] Soil mapping and geological mapping originated at about the same time, and were often practiced by the same individuals. Contrary to modern theory, it was generally believed in the early nineteenth century that soil types were mostly determined by underlying rock formations, and early soil classifications were based on the types of rock from which the soils were thought to have been derived. Thus, there was little difference between soil maps and surface geological maps.

Soil and geological maps started to appear in late eighteenth-century Europe. They could not have come into being were it not for the existence of systematic ways of classifying geological formations and soils, which were being developed at that time. The earliest geological and soil maps appear to have been made in France and Germany in the last half of the eighteenth century.[32] Much better known in the English-speaking world is William Smith's pioneering geological map of England and Wales, which was first published in 1815.[33] But by that time the first geological maps of the United States (including New York) had already appeared. The earliest geological map of the United States was published in France by the Comte de Volney in 1803; the first by an American was published by William Maclure in 1809.[34]

New York's most important pioneer in mapping geology and soils was Amos Eaton (1776-1842). Eaton was born in Columbia County, New York, and educated at Williams College. After graduation, he studied law in New York City, and pursued a career as an attorney, surveyor, and land agent in Catskill, New York. The turning point in his career came in 1811, when he was convicted (probably wrongly) of forgery in a land dispute, and spent five years in prison. After his release, he decided to pursue a career as a scientist, and studied biology and geology at Yale. In his later years, he made important contributions to botany and geology, played an important part in science education, and helped found Rensselaer Polytechnic Institute.[35]

Eaton's involvement in geologic mapping began in 1817, when he returned to New York State and was invited by De Witt Clinton to give a series of lectures to the state legislature on the geology of the Erie Canal area. In New York, as in Great Britain, there was a close connection between canal construction and early geological mapping: knowledge of underlying rock formations was necessary to determine the feasibility of building canals, and the investigations associated with canal construction were sources of data for geological maps. Shortly after delivering these lectures, Eaton was hired to conduct geological and soil surveys of Albany and Rensselaer counties.[36] Much of his work was financed by Stephan Van Rensselaer, who served as a kind of patron for him. Eaton went on to conduct a geological survey of the route of the Erie Canal, which included a geological cross-section of the entire corridor from the Atlantic Ocean to Lake Erie.[37]

Eaton's actual maps are of interest mainly to historians of science. His classification of rocks was based on the Wernerian or "Neptunist" system, which posited that most

rocks were formed by the crystallization of minerals in ancient oceans. Eaton's pioneering work and its underlying "Neptunist" theories quickly became obsolete, and no one would today consult his maps for geological information, although they were an impressive achievement for his time, and formed a foundation for later investigations. His early maps took the form of geological profiles (or cross sections), rather than geological maps of horizontally extended areas. As was noted in the previous chapter, his geological profile of the Erie Canal was also published in 1823 as part of D.H. Vance's map of Western New York. Dey's 1825 edition of Vance's map includes a later version of Eaton's profile, which extends as far as the Atlantic Ocean (Figure 10.7).[38] Only in 1830 did he publish a map of showing the surface geology of the entire state.[39]

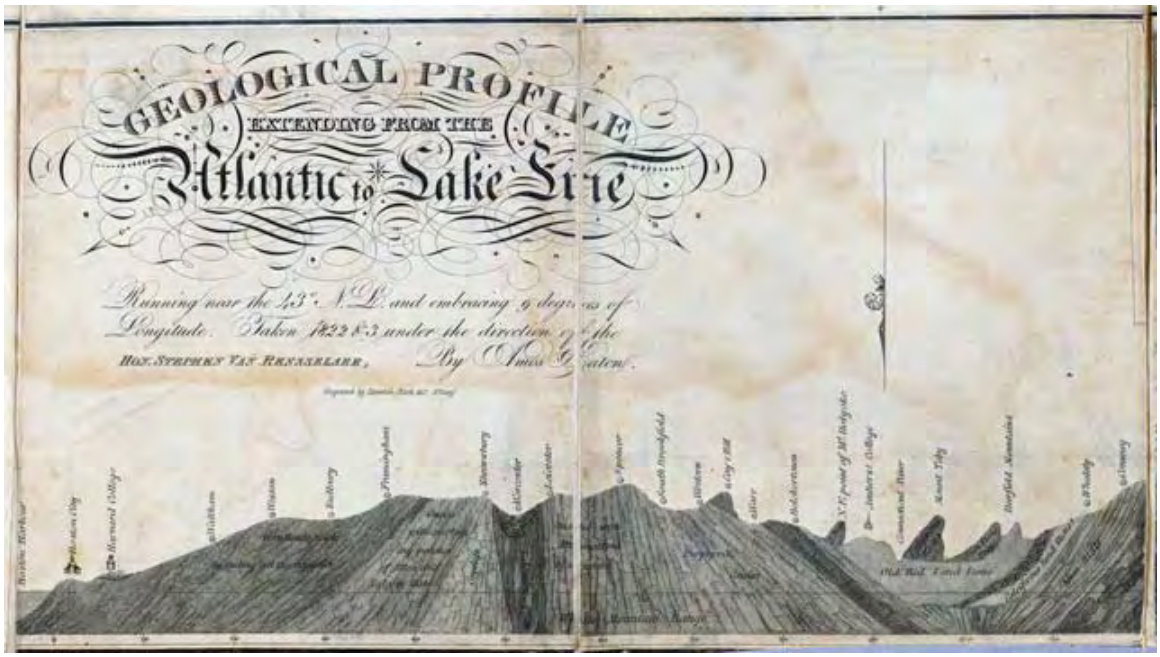

Figure 10.7. Detail of Amos Eaton's Geological Profile of Erie Canal (1825). Courtesy David Rumsey Collection.

The focus of much of the later thematic mapping during this period was the New York Natural History Survey (1836-1894?).[40] This survey was the most ambitious scientific project undertaken by the state in the nineteenth century. Although not the first statewide natural history survey, the New York survey had the reputation of being particularly thorough and well done, and its impact on the development of natural science in nineteenth-century America was appreciable.

The survey was created for a variety of reasons: the advancement of mining and agriculture vied with the more abstract and less utilitarian "advancement of science." The survey included sections on botany, zoology, paleontology, and mineralogy, but as far as cartography is concerned, the sections dealing with geology are of primary importance. In addition to several geological maps, these four volumes include many geological cross-sections, and a number of beautiful panoramic views, which also shed light on New York's landscape in the middle of the nineteenth century. The most important cartographic contributions were made by four individuals: Ebenezer Emmons, W.W.

Mather, Lardner Vanuxem, and James Hall. They were responsible for the geological mapping of the state, which was divided into four parts, all of which were published in 1842-43.[41] Of the four geologists, Emmons, Mather, and Hall were primarily concerned with mapping. Vanuxem concentrated almost entirely on stratigraphy and paleontology.

Ebenezer Emmons (1799-1863) was born in Western Massachusetts, and educated as a physician at Williams College. Later he became interested in geology, which he studied under Amos Eaton at Rensselaer Polytechnic Institute, receiving a degree in 1826. As early as 1824, he had assisted in the preparation of a geological map of Berkshire County (Massachusetts). Later, he worked as zoologist on the Massachusetts Survey from 1830-1833. With the creation of the New York Natural History Survey in 1836, he was named geologist of the Second Geological District, which included most of the Adirondacks. As a geologist, he made major contributions to the "New York system" of Paleozoic stratigraphy, which has had a major influence on the development of American geology.

While working with the survey, Emmons conducted extensive explorations in the Adirondacks. He is credited with naming both the Adirondack and the Taconic Mountains. In the course of his explorations, he also made the first known ascent of Mt. Marcy (1837), which he named for New York State Governor William Learned Marcy. These explorations also led him to become acutely aware of the deficiencies of existing maps of the Adirondack region, where he noted missing or misplaced mountains, rivers, and lakes. Emmons' annual reports and his final report include numerous views and geological profiles, along with some maps (including maps of Clinton and Jefferson counties, which appeared in his final report). His corrections to the topography of the region are reflected in a map that he published of his district in 1842, and in two later geological maps of the state as a whole, which will be discussed below. His mapping of the Adirondack region was widely copied, and he thus made a major contribution to the understanding of the geography of this region.[42]

For those particularly interested in the exploration and mapping of the Adirondacks, mention should also be made of a detailed report submitted by Farrand N. Benedict to the Legislature in 1846 on the route of a proposed railroad through the central Adirondacks from Lake Champlain to Oneida County.[43] Benedict had earlier worked with Emmons, and carried out surveys and measurements of altitudes for him in the Adirondacks.

Emmons' colleague, W.W. [William Williams] Mather (1804-59), was a descendent of Cotton Mather, and, like many early nineteenth-century American cartographers, a West Point graduate. (Prior to the establishment of Rensselaer Polytechnic Institute, West Point was the only institution in the country that taught engineering and surveying.) Mather also had served as "topographical engineer" on the geological survey of the Wisconsin territory, which was headed by the controversial English geologist George W. Featherstonhaugh.[44]

Mather served in the New York State Survey as Geologist of the First District, which included Long Island, the Catskill region, and the Hudson Valley. Although not as actively involved in exploration as Emmons, Mather faced similar problems in mapping his district. He, too, complained about the inadequacy of existing maps as a base for depicting the geology of his region. Mather's major contribution to the mapping of New York was his *Geological Map of Long & Staten Islands with the Environs of New York*, which was published as part of the survey in 1842.[45] As a base for this map, he used a

map of Long Island by J. Calvin Smith (which in turn was based partially on Coast Survey maps).[46] For the upper Hudson Valley, Mather compiled his own topographical base maps from a variety of sources.[47] He did not publish a separate geological map for the Hudson Valley region in his report, although it included numerous geological cross sections and a few maps of small areas.

James Hall (1811-1898) was just beginning his distinguished career as a geologist and paleontologist. Hall was a student of Eaton and Emmons, and he began his work on the survey as an assistant to Emmons. He was later put in charge of the fourth district, which covered western New York, where he made important contributions to unraveling the stratigraphy of that part of the state. In his later career, Hall became New York State paleontologist, and made numerous important contributions to both geology and paleontology, including a revised geological map of the state published in 1894.[48]

Hall's most important contribution to the survey was *A Geological Map of the Middle and Western States* , which appeared in the fourth volume of the report (1843).[49] According to Leighton, "this map has had a powerful influence on the geology of the eastern United States. [It] indicates the phenomenal advance made in stratigraphy since the publication of Eaton's map of the State 12 years before, and Hall's map appears with divisions, a number of which have remained almost as set down, to the present day."[50] In addition, the illustrations in Hall's volume include a bird's-eye view of Niagara Falls and numerous geological cross-sections. Of particular interest, Hall also included a carefully done "Trigonometrical Map of Niagara Falls," which was based on careful surveys he conducted with E.R. Blackwell, and which later was used in studies of the recession of the falls.[51]

The final report of the survey included a geological map of the entire state, which synthesized the material compiled by the four geologists.[52] There was a good deal of wrangling over the contents of this map, which was caused largely by a disagreement between Emmons and his colleagues over the place of the Taconic formations in the New York system.

All of the geologists agreed that their work was made more difficult by the lack of satisfactory general purpose maps to use as base maps for their work. At the beginning of the Natural History Survey, it was thought that the geologists could base their maps on the county maps in the Burr atlas.[53] But in the course of their work the geologists found them so inaccurate that they could not rely on them, and in some cases compiled their own maps, as we have seen in the case of Mather. Accordingly, for the final geological map a special base map was engraved for the Survey, which was then colored in by hand following the directions of the geologists.[54] This base map was engraved by the firm of Sherman and Smith, which included J. Calvin Smith, whose map of lower New York State had previously been used by Mather. Although it did not show relief, this map provided a remarkably good depiction of the lakes and streams of the Adirondacks. Overall, it was still not entirely satisfactory to the geologists, and the need for better topographic maps to serve as base maps for geologic mapping made geologists like James Hall strong advocates for a comprehensive state mapping program in the following decades.

The 1842 geological map resembles modern geological maps of New York much more closely than Eaton's earlier production, and it is an important landmark in the mapping of the state. Emmons modified the map slightly in 1844 to reflect his ideas

about the Taconic system, but otherwise it remained the definitive map of New York's geology until the end of the nineteenth century.

It is significant that no maps showing the distribution of animals or plants were produced by the survey. This is in spite of the fact that the scientists involved with zoology and botany paid considerable attention to the geographical distribution of species, and that vegetation and animal distribution maps were already being produced in Europe. Apparently the scientists working on the New York State Survey were either unaware of the European species distribution maps, or it did not occur to them that this type of map might be useful in their own work. Maps of this kind were still relatively new, and it apparently required some time before American scientists recognized their value.

After the conclusion of the geological portion of the natural history survey in 1842, Emmons was requested by State Legislature to conduct an agricultural survey of New York. The first volume of this survey, published in 1846, includes several panoramic views and two maps. One of the maps was a revised version of the 1842 geological map of New York, which Emmons changed to reflect his views on the place of the Taconic System in the state's geology.[55] Also in this volume was an *Agricultural Map of the State of New York*.[56] This is an early example of a soil map. Emmons divided New York into six districts, which he thought were characterized by broadly different soil types. Emmons characterized soils by the kinds of rocks from which he thought they were derived, and conducted chemical tests to determine soil compositions. He realized that the soils of New York were much more complex than the six basic types that he mapped, but he was not in the position to conduct the detailed surveying necessary to produce a more elaborate map.

Mapping the Croton Aqueduct

The construction of the Croton Aqueduct between 1837 and 1842 was, after the Erie Canal, the state's largest engineering project prior to the Civil War. It assured New York City of an adequate supply of drinkable water, and it was vital for fire protection, thus making it essential for the city's future growth and well being. It brought water from the Croton River on the border between Westchester and Putnam counties to Manhattan through a forty-five mile aqueduct, which required the construction of an extensive system of reservoirs, pipes, tunnels, and bridges. The completion of this project, like that of the Erie Canal, was accompanied by great public festivities, and elicited the production of a variety of maps, ranging from the technical to the celebratory.[57] These can be described as "hydrographic maps," which are a form of thematic maps closely related to geologic maps.

An overview of the Croton Aqueduct system can be obtained from Nathaniel Currier's *Hydrographic Map of the Counties of New-York, Westchester and Putnam: and Also Showing the Line of the Croton Aqueduct*.[58] More specialized is an intriguing map of lower Manhattan, which shows in detail the network of pipes and valves for distributing water from the aqueduct. It was apparently prepared for the Croton Aqueduct Department and lithographed by George Endicott sometime between 1842 and 1845.[59] A number of other specialized maps were created in connection with this project. Most involved land that was being condemned and acquired for reservoirs associated with the

aqueduct, but there were also several cross-sections, which resemble the geological profiles prepared in connection with the Erie Canal.[60] Later in the nineteenth century, New York's water system was expanded to include most of the present network of aqueducts and reservoirs in the Catskill region.

Other Thematic Maps

Very few thematic maps dealing with subjects other than soil, water, or geology were published in New York or elsewhere in the United States prior to the Civil War. This lack is particularly notable in the case of "statistical maps," which show the geographical distribution of data that can also be summarized in tabular form. By the 1840s, statistical maps had become fairly common in Europe, but they were slow to appear in this country.[61] As earlier noted, it required a considerable conceptual shift to conceive of mapping many things that do not actually appear on the surface of the earth, and arguably this applies to statistical abstractions more than to rocks and soils. But this in itself does not seem sufficient to explain the slow appearance of statistical maps in the United States, since Americans quickly recognized the merits of Berghouse and Johnson's groundbreaking *Physical Atlas* (1848), which contains a number of demographic and other statistical maps.

This type of thematic mapping depends on the use of statistical information, which in the early nineteenth century was less widely collected in the United States than in Europe. But some statistics were available, particularly population statistics from the census, so lack of data also does not by itself explain the American slowness to create statistical maps. Remarkably, the first maps based on U.S. census data were published in 1855 in Germany by August Petermann using information from the 1850 census. It should also be noted that the publication of elaborate thematic maps requires sophisticated engraving and lithography, and these arts were also more advanced in Europe than in the United States. Most likely, some combination of these reasons explains the slow development of thematic mapping in the United States. Interestingly enough, a number of maps and atlases published in the United States in the first half of the nineteenth century contained statistics in tabular form—showing an increasing interest in statistical information in general, and also showing the beginnings of the association between maps and statistical information.[62]

The few thematic maps that appeared in the United States during this period were mostly published in books or articles, rather than as separate publications, which makes it difficult to track them down, since such materials do not usually appear in library catalogs. The only thematic maps of New York that I have been able to locate (other than those discussed above) are insets in general-purpose maps. It has already been noted that Amos Eaton's geological cross-section of the Erie Canal was reprinted on Vance's map of western New York. Particularly interesting is the appearance of two thematic maps as insets on J.H. French's important 1859 map of New York State, which will also be discussed in the following chapter.[63] Both of these inset maps were fairly sophisticated productions.

The first of the insets is an unusual hybrid—a geological and land patent map of New York State (Figure 10.8). There is no obvious reason why these two unrelated subjects should appear on the same map, other than that French probably wanted to cram

as much information as he could into a small space. This map was probably derived from a larger map with the same title prepared by or for Robert Pearsall Smith, who was closely associated with J.H. French in publishing maps of New York.[64] This separate map appears never to have been published, but, interestingly, Smith himself announced in 1848 that he was planning to produce a *Physical Atlas* with thematic maps by "Berghaus & Johnston."[65] In any case, the appearance of an up-to-date geological map as an inset on a map intended for the general public is noteworthy, since it shows that there must have been fairly widespread interest in this kind of information. The geological portion of this map was based on the work published by the New York State Survey in 1842.

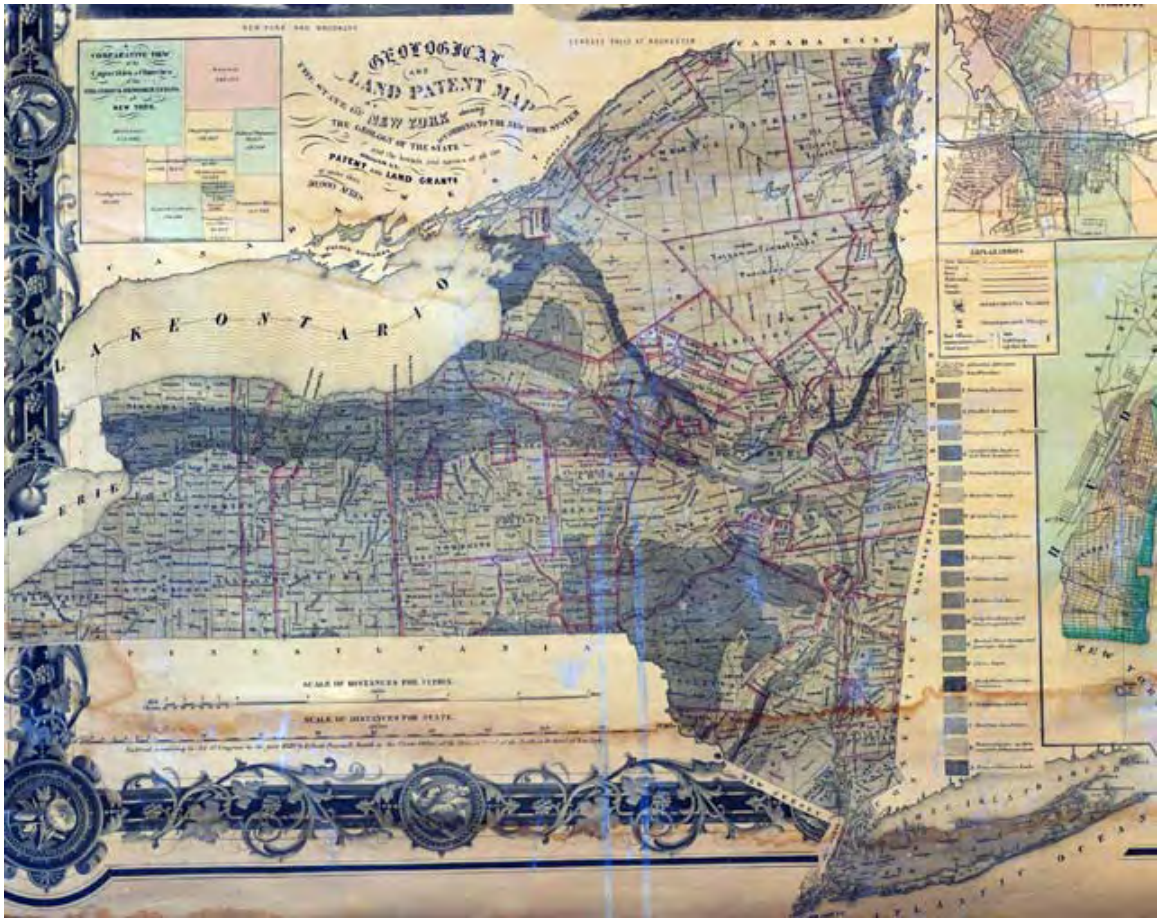

Figure 10.8. Geological and Land Patent Map. Inset from J.H. French, *State of New York* (1860). Courtesy of the David Rumsey Collection.

The other inset on the French map of New York appears to be the first published meteorological map of the state. It bears the title: "Meteorological Map Showing Average Mean Temperature, Depth of Rain, and Direction of Winds at the Several Meteorological Stations Established by the Regents of the University." The study of meteorology was another characteristic form of Humboldtian science, and New York played a pioneering role in establishing this discipline in the United States. The map was drafted by Lorin Blodget, an important figure in early American meteorology, and would obviously have been of practical interest to farmers, among others.[66] It used the technique of

isothermal lines to show regional differences in mean temperatures. The use of isothermal lines had been pioneered by Humboldt in the early nineteenth century, and had started to appear on German and British maps by the 1840s.

Although Blodget's work cannot be described as pioneering in a global context, it is remarkable that it should have been published in New York in 1859. Both of the inset thematic maps on the French map seem to indicate that the conceptual adjustments necessary to read and understand such maps did not pose much a problem to New Yorkers by the time of the Civil War. The ground was already prepared for the reception of large numbers of varied thematic maps later in the nineteenth century.

Chapter 11
Commercial Cartography, 1830-1860

Introduction

Commercial mapping in the thirty years prior to the Civil War does not require extensive discussion here. This is partially because many of developments in New York have already been covered in considerable depth by W.W. Ristow in his book on nineteenth-century commercial cartography, and there is no need to repeat what he has written. It is also true that, with some notable exceptions, the mapping of this period did not break new ground. Much of it took the form of augmentation and elaboration of themes and trends described in chapters eight and nine. Still, the commercial mapping of this period fits into the broader pattern of the development of nineteenth-century cartography. Aside from new developments, some of these maps provide important information for researchers about conditions at the time they were made, and it is interesting to see how they relate to maps that came before and after them.

During these years, the population and economy of New York continued to grow rapidly. The population of the state as a whole increased from about 1.9 million in 1830 to around 3.9 million in 1860.[1] Although agriculture remained the primary occupation of New Yorkers, the percentage of urban population increased during this period to 39.3 percent in 1860.[2] Between 1830 and 1860, the population of New York City increased from 202,589 to 813,669, Buffalo from 8,668 to 81,129, Albany from 24,209 to 62,367, and Rochester from 9,207 to 48,204.[3] This rapid urbanization was accompanied by the growth of commerce and industry, and these years also saw the rapid development the railroad network, which made possible the movement of people and goods at previously unthinkable speeds.

Under these circumstances, the production of maps grew and diversified. The increases in population and wealth created a larger market for maps. Increasing urbanization created a demand for maps of the state's larger cities. The growth of railroads increased mobility, and led to the production of a whole new genre, "railroad maps." Toward the end of this period, especially in the 1850s, we see the birth of several new types of maps to meet the needs of the nation's growing cities (including fire insurance maps and maps of sewage and water supply).

General Purpose Maps

Between 1830 and 1860, the overall output of printed maps expanded dramatically. This was made possible not only because of the increase in demand, but because ways were found to publish maps more cheaply, and to distribute them more efficiently. Some publishers developed new techniques of steel engraving, which made possible larger press runs than engraving on softer copper plates. The widespread use of lithography, which eventually became the predominant means of map publication, also helped map publishers reduce costs.[4] In addition, the cost of paper dropped sharply, thanks to the introduction of wood pulp paper in the 1850s. (The high sulfur content of this paper also made it acidic, which has caused many of these maps to become brown, brittle, and

crumbly, to the dismay of librarians and collectors). Increasing urbanization and improved transportation also made it easier to distribute and sell maps.

At this time, mapping became more of a corporate activity. Independent map makers, like Amos Lay or J.H. Eddy earlier in the nineteenth century, played a smaller role in the overall production of maps. Increasingly, cartographers and engravers became specialists, whose work was published by large companies employing dozens or even hundreds of people. Individual entrepreneurs focused on producing small runs of maps for specialized markets, such as individual towns or counties.

Throughout this period, Philadelphia remained a center of high-quality map publishing in the United States. The most important Philadelphia map publisher after 1830 was Samuel Augustus Mitchell (1792- 1868), who is best known for his atlases.[5] Mitchell also published a series of workmanlike maps of New York State between 1830 and 1860.[6] Several editions of these can be viewed on the Web site of the New York Public Library.[7] Although these maps were frequently updated, they did not change much in their general appearance. They contain no surprises, and show the expected counties, canals, towns, roads, and railroads. They distinguish between turnpikes and "common roads," and include insets showing the major cities of the state.

The decades prior to the Civil War also saw the rapid growth of the J.H. Colton Map Company, which was based in New York City.[8] The patriarch of this company was Joseph Hutchins Colton (1800- 1893). After 1864, his company was headed by his sons G.W. and C.B. Colton. The Colton Company, which many consider to be the nation's premier nineteenth-century map publisher, began its career in 1833 with the publication of an edition of David H. Burr's map of New York.[9] J.H. Colton himself did not draft or engrave maps, and relied on purchasing the copyright from other publishers, or on publishing maps drawn by others. In addition to Burr, prominent cartographers associated with the J.H. Colton Company include J. Calvin Smith and D.G. Johnson.

Although Colton was not trained as a map maker, he showed good judgment in selecting maps for publication, and published many maps that were both accurate and attractive. He used a variety of techniques (sometimes in combination), including copper and steel engraving, as well as lithography. A trademark of Colton maps is their elaborate borders— often showing intertwined fruits, vines, or foliage—which seem to have been produced by some kind of ruling machine or automatic lathe.

Although the J.H. Colton Company and its successors published a wide range of maps and atlases covering the nation and the world, many of its publications focused on New York, especially in its early years. One of the most notable of the early Colton maps is a handsome topographical map of Manhattan and its vicinity, which was published in 1836.[10] This map, which has been extensively described elsewhere, draws heavily on William Bridges 1811 Commisoners' Plan, as well as on the Randel Survey of Manhattan.[11] It was almost certainly drafted by David Burr, and engraved and printed by S. Stiles & Company. In addition to providing a detailed overview of Manhattan's streets and topography, it included numerous vignettes of buildings and monuments, some of which were worked into the elaborate border. Colton's map of Manhattan even included a reproduction of Visscher's seventeenth-century profile of New Amsterdam among its illustrations. In short, it was a celebration of the beauty and growth of New York City, and it doubtless found its place on the walls of numerous drawing rooms and offices in the expanding metropolis.

J.H. Colton & Company published several other maps of the New York City area. In the same celebratory vein, Colton published in 1846 a reworking of J.H. Eddy's map of the country 30 miles around New York (which was discussed in chapter 9).[12] Also noteworthy is a detailed map of Brooklyn, which was engraved by Samuel Stiles and copyrighted 1839. In spite of the copyright date, this map appears to have been first published in 1846, and went through at least two subsequent editions.[13]

The Colton Company was also involved in producing much less elaborate maps of Long Island. Many of these belonged to a series of maps that bore the title *Traveller's* [*sic*] *Map of Long Island*. I have identified editions dated 1843, 1845, 1848, 1850, 1852, 1853, 1857, 1866, 1874, and 1876.[14] The map lives up to its name: a simple folding map, it focuses on towns, roads, and railroads (Figure 11.1). The 1843 edition even lacks the trademark Colton border, and its utilitarian nature contrasts sharply with the elaborate maps Colton produced of Manhattan and vicinity. The *Traveller's Map* is clearly a not-too-distant ancestor of the modern road map.

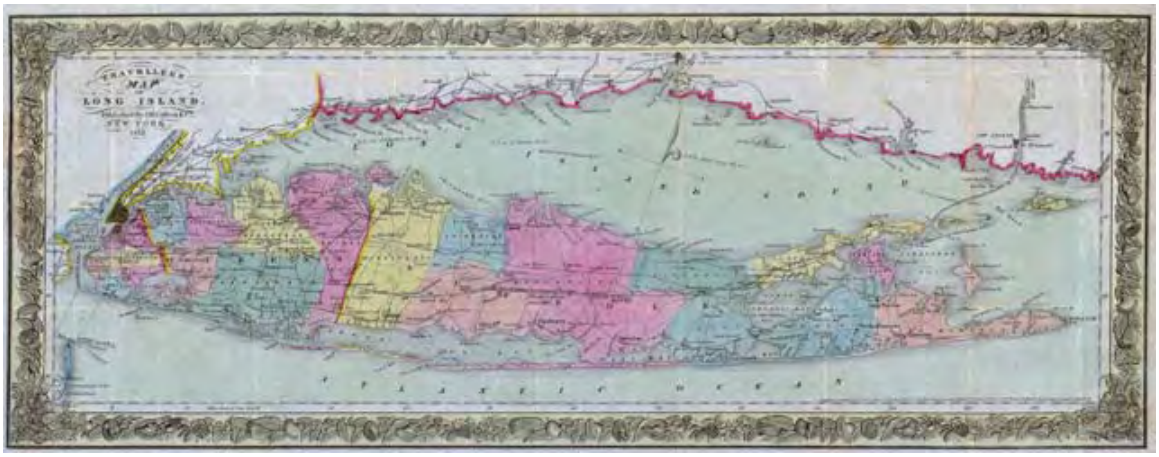

Figure 11.1. J.H. Colton & Co., *Traveller's Map of Long Island* (1857). Library of Congress, Geography and Map Division.

The Colton Company appears to have published few, if any, maps of upstate New York cities or regions prior to the Civil War (with the exception of a few maps showing railroad lines, which will be considered in the following section). The company did, however, publish quite a few maps showing the state as a whole. A number of them bore the title *Colton's Railroad & Township Map of the State of New York*.[15] The Colton Company published "railroad and township" maps for much of the United States. Like the *Traveller's Map of Long Island*, the railroad and township maps were fairly utilitarian productions. They were designed to be used not only by travelers but also for general reference purposes. Some of them included insets showing the street layout of the major towns in New York, and several appeared in atlases. Colton maps of New York State have a peculiarly complicated publication history. Similar maps of the state appeared under several titles, and some of them appeared under the imprint of different publishers, including Johnson and Ward.[16]

In the twenty years before the Civil War, there was some improvement in the accuracy of the best maps of the state, in part because of their use of information collected by government agencies, especially the U.S. Coast Survey and the New York State Natural History Survey. Some of these improvements can be seen in the later editions of D.H. Burr's map and atlas of New York State. In the 1840s and 1850s, the most accurate and up-to-date general purpose maps of the state were created by John Calvin Smith, who usually called himself J. Calvin Smith.[17] Almost nothing is known about Smith, whom we have already encountered through his work with the state Natural History Survey, but he was a prolific mapmaker, who was active from the 1840s through the 1850s. The subjects of his maps range from individual New York counties to maps of the entire United States, and even included the California gold fields. He also published gazetteers of the United States and of the world. He was referred to as a geographer, and was a founding member of the American Geographical and Statistical Society (later the American Geographical Society). He was closely associated with other members of the New York City cartographic establishment, including J.H. Colton, John Disturnell, George Sherman, and Samuel Stiles. Many of Smith's maps were engraved or published by these individuals.

Two of Smith's maps deserve particular notice. The first is his *Map of Long Island with the Environs of New-York and the Southern Part of Connecticut*, which appeared in 1836.[18] This map, which was engraved by Samuel Stiles and published by Colton, went through several editions, which do not differ substantially. At a scale of 1:158,000 (2.5 miles to an inch) it is fairly detailed, and it includes a number of insets showing individual cities. A note on the map unhelpfully states that it was "compiled from various surveys & documents," which probably included unpublished surveys by the U.S. Coast Survey, since the map is considerably more accurate than its predecessors. In addition to such standard information as roads and towns, it shows such things as mills, churches, and toll gates. As we saw in the previous chapter, it served as the base for W.W. Mather's *Geological Map of Long and Staten Islands* (1842)..

Smith also published a *Map of the State of New York*, which first appeared in 1841, and came out in a confusing variety of later editions prior to 1860.[19] At a scale of ca. 1:1,150,000, it is only moderately detailed, but it is geodetically more accurate than earlier maps of the state. It also shows the topography of mountainous regions with considerable accuracy. This is not surprising, because a close examination shows that it to be essentially a reduced-scale version of the *Geological Map of the State of New York*, which the firm of Sherman and Smith published in 1842. This geological map, described in Chapter 10, was prepared for the New York State Natural History Survey, whose geologists had numerous complaints about the quality of existing maps of the state, and who used a new base map drawn by Smith for their work.

During these years, a number of smaller map publishers competed with Colton in the metropolis, and several publishers in Albany were quite active, often specializing in printing maps for projects paid for by the state government. Smaller map publishers also sprang up in cities like Buffalo, Rochester, and Syracuse. Because of the relatively low cost of printing lithographed maps, many of these companies were able to specialize in town and county maps with print runs of 1000 or less. In major urban areas, it was not unusual for specialized maps to be published of real estate subdivisions, and even of cemeteries. Because of considerations of space and tedium, these maps cannot be dealt

with here, but they can be tracked down in local libraries and historical societies, or by using standard reference sources.[20]

Railroad Maps

Most of the general purpose maps described above do not differ much from those published in the 1820s or 1830s. In all cases, you would be likely to see the now familiar outline of the state with the county boundaries drawn in, along with towns, roads, canals, rivers, and possibly some topography. On closer examination, you would almost certainly find on a map from the 1840s or 1850s at least one new feature—railroads. You would also be less likely to find a profile of the Erie Canal, which was almost obligatory on maps of New York published in the 1830s. Some of the more detailed railroad maps from the 1850s come complete with lists of railroad stations, or show in detail the routes of individual railroads. All of this bears witness to their increasing importance in everyday life.[21]

The first railroad in New York was the Mohawk and Hudson, which opened in 1831, and connected Albany with Schenectady. Numerous small railroads were constructed in the next twenty years, including the Saratoga and Schenectady, the Syracuse and Utica, the Long Island Rail-road, the Ithaca and Owego, and the Attica and Buffalo.[22] Many of these short lines were intended to serve as feeders from inland agricultural areas to canals. By 1855, a total of 2,300 miles of railroad had been opened, connecting most parts of the state in a single network. But railroad travel was still not a simple matter because of the numerous competing lines, some of which used different gauges of track. By 1842, it was possible to travel from Albany to Buffalo by train, but this involved using the tracks of seven different companies.

The 1850s saw considerable railroad consolidation. In 1851, the broad-gauge Erie Railroad opened to link the Hudson River with Lake Erie via New York's "Southern Tier" of counties. It was served by a network of broad-gauge feeder lines in central New York. In 1853, Erastus Corning consolidated several small lines into the New York Central, which provided a single route from Buffalo to Albany. By the time of the Civil War, New York had a considerably more extensive railroad network than it has today, although it continued to expand until about 1900.

Maps are a favorite resource for locating old railroad lines and stations, and for tracing the complex evolution of the state's railroad network. Thanks mainly to the efforts of the Library of Congress, a good selection of railroad maps of New York and the rest of the nation is available online.[23]

Most of the maps of this period showing railroads were commercially produced general reference maps made by companies like Mitchell and Colton. Colton's "railroad and township maps," mentioned above, illustrate even through their titles the growing importance of railroads to the general map user. Although these maps show roads as well as railroads, the roads are deemphasized, and only the major roads are shown. A few of the commercially published railroad maps were quite elaborate. One of these is a *Map of the Rail Roads of the State of New York,* published it 1858 by the Buffalo firm of Thomas Pentingale & Behn (Figure 11.2).[24] It lists all of the stations of every railroad line in New York State, and shows the distances between stations. A separate chart shows "connections with other roads." It is also worth noting that beginning in the 1850s, the

office of the New York State Engineer and Surveyor started publishing “official” maps showing the state’s railroads.[25] These appeared on an annual basis in the reports of the State Engineer and Surveyor, and they are useful for tracing the development of New York’s transportation network in the nineteenth and early twentieth centuries.

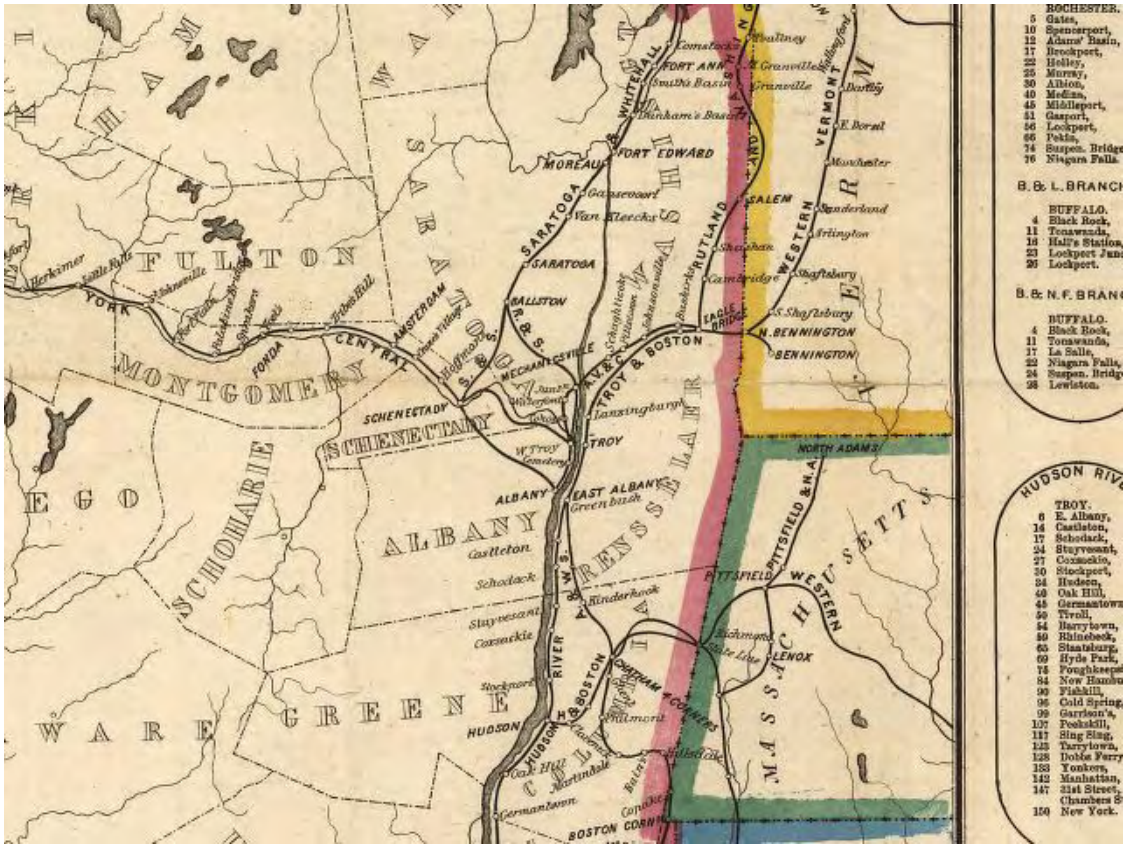

Figure 11.2. Detail of Thomas Pentingale, *Map of the Rail Roads of the State of New York* (1858). Library of Congress, Geography and Map Division.

Prior to the Civil War, few advertising maps were issued by railroads themselves. One of the exceptions was printed for the New York & Erie Railroad by the Colton Company in 1855, and is entitled *Map of New York & Erie Rail Road and its Connections; the Most Direct Route from New York to all Western Cities and Towns*.[26] This map reflects the strenuous efforts made by the railroad, whose route passed through southern New York, to compete with the more northerly New York Central Railroad. It is thoroughly deceptive, since it straightens out the circuitous route of the New York & Erie to make it appear much more direct than it actually was, and neglects to point out that its railroad depot was actually in Newark, New Jersey, rather than in Manhattan. Later in the nineteenth century, such manipulations become common on railroad maps. Starting in the 1850s, a few New York railroads also began issuing land promotion and tourist maps, but, these activities were also more characteristic of the period after the Civil War, and will be discussed in a subsequent chapter.

County Land Ownership Maps

The most innovative productions of commercial map makers during this period were county land ownership maps. These are mostly large, lithographed wall maps of individual counties that show the names of property owners. They made a sudden appearance in New York in the 1850s, owing largely to the entrepreneurial efforts of Robert Pearsall Smith (1827-1898), but they had several antecedents.

It has already been seen that land ownership or cadastral maps were prominent in the cartography of New York from the British colonial period onwards. Cadastral maps of New York published before 1830 usually covered small geographic areas, although some were of regions or even the entire state. Typically, they showed the boundaries of major land holdings, and sometimes they identified the residences of prominent land owners. Unlike the maps under consideration here, they rarely focused on specific counties or displayed the names of large numbers of homeowners.

By 1830, there was a perceived need in New York and elsewhere for separate county maps. The state had become too heavily settled to be displayed in detail on a single sheet. The Burr atlas was in part a response to that need, for it is the first atlas of the state to include individual maps of each county. But these maps did not include the names of property owners, and were on too small a scale to do so.

It is necessary to look outside of New York for other antecedents. Large-scale county maps had been published in Britain since the sixteenth century. By the middle of the eighteenth century many of them had become quite elaborate; some were based on triangulation, and showed such features as hedges and fields. They frequently gave the names of landed gentry, who often subscribed to the maps, and who were sometimes flattered by the inclusion of their coats of arms or by drawings of their manorial halls. In a revealing contrast to the more democratic practice that developed in nineteenth-century America, they did not show the names of individual homeowners.[27]

The most direct antecedents of the New York State county maps came from Pennsylvania. Michael Conzen cites Jason Torrey's *Map of Wayne and Pike Counties, Pennsylvania* (1814) as the first county land ownership map in America. According to Conzen, "the Philadelphia geographer, John Melish, adopted Torrey's map as a model for preparing maps of counties that would contribute to the construction of a new state map of Pennsylvania, more accurate than anything before, which he succeeded in publishing with legislative endorsement in 1822."[28] Because there was not sufficient demand to pay for large, expensive county maps engraved on copper plates, only a few of the individual county maps underlying Melish's Pennsylvania state map were actually published.

At this point Robert Pearsall Smith entered the picture. Smith was another Philadelphian, the son of the socially prominent head of the Library Company of Philadelphia, John Jay Smith. Smith and his father took an interest in the new technique of anastatic printing, a form of lithography that uses zinc plates, and makes it possible to reproduce maps much more quickly and inexpensively than engraving on copper.[29] By 1848, Smith was involved in publishing county maps of the area around Philadelphia.

Shortly after 1850, Smith started to focus his activities on New York State. Several county maps had been made of the state prior to Smith's involvement, but the bulk of the county maps produced in New York in the 1850s were linked to Smith. Ristow chronicles in considerable detail the complex history of Smith's involvement in the creation of

county maps of New York.[30] In a nutshell, Smith saw a business opportunity when the New York State legislature refused to sponsor a systematic survey of the state in 1852 and 1853 (an event that will be discussed in the next chapter). Smith then proposed that the legislature subsidize a project to create an improved map of the state based on a series of high-quality county maps—a project that bears a marked resemblance to the way in which Melish created his 1822 map of Pennsylvania.

In spite of extensive lobbying, Smith never did get any money out of the legislature, but he went ahead with the project anyway. Smith's role in this enterprise was not that of a map maker or even a map publisher. What he did was commission a group of surveyors to make county maps according to his standards and specifications. The actual printing of the maps was farmed out to various publishers, mostly in Philadelphia. Smith's involvement in these maps is generally shown only through an inconspicuous copyright statement. The upshot of this project was that, by 1859, maps had been made of 59 of New York's 60 counties.[31]

County maps are heavily used by local historians and genealogists. Some idea of what they typically look like can be obtained from the example shown below (Figure 11.3). They are becoming increasingly available online, and a good selection can be found at the Web sites of the Library of Congress and of the New York Public Library. But unfortunately it can be difficult to track down maps of specific areas, since there is no comprehensive list of them, and often they are not even cataloged on OCLC. Many county maps can be found at the New York State Library, Cornell University Library, and at other large research libraries in the state. County historical societies and public libraries often have copies of the maps covering their local areas. Some can also be found on the Web sites of local historical societies, genealogical groups, and libraries. Further suggestions for locating these maps can be found in the endnote for this paragraph.[32]

Figure 11. 3. Detail of C. Gates & Son, *Map of Sullivan County, New York* (1856). Library of Congress, Geography and Map Division.

Most of these county maps, especially those associated with R.P. Smith, are similar in appearance. They are all large wall maps, usually approximately three by four feet in size, and vary in scale from 1:63,360 to 1:40,000. They focus on roads, town boundaries, and houses, along with the names of their owners. There is some minimal topography. The margins of the maps often have insets showing home owners and streets in individual towns. They frequently include illustrations of prominent buildings, and some have statistical tables.

The county maps of New York State generally appear to be more carefully done than most nineteenth-century American property maps, which have a reputation for hucksterism and careless work. Many of the maps made of counties in the Middle West are stuffed with pictures showing farm families proudly lined up in front of their houses along with their prize livestock and other possessions, for which illustrations they normally paid a hefty fee. There is relatively little of this type of self-promotion and advertising on the New York maps, although they were sold by subscription, and some illustrations of business establishments were doubtless commissioned as a form of advertising.

In spite of their relatively high standards, these maps should not be taken at their face value. You can never be certain how many of the inhabitants are actually named on one of these maps, although the few studies that have been made indicate a fairly good

correlation with census records. The names on these maps were taken partially from property records in county courthouses, and partially by knocking on doors. The surveyors who created them relied primarily on road surveys made with a compass and a wheelbarrow-like odometer (Figure 11.4). In the process of conducting these surveys, they would knock on doors to obtain the names of homeowners, and try to get them to subscribe to the forthcoming map. Often, poorer homeowners and renters were ignored by the surveyors.

Figure 11.4. Surveyor with Odometer. From Bates Harrington, *How 'Tis Done* (1879).

Other than measuring the roads with compass and odometers, little surveying was done by triangulation or other means. Smith hoped to make his maps more accurate by obtaining precise latitudes and longitudes for the principle towns in each county. He even corresponded with A.D. Bache of the Coast Survey about the best way to do this, and lobbied hard to get funds for this type of geodetic control from the state legislature. But the legislature was unwilling to support this activity, and there is no indication that much of it was done. The best that can be said for these maps is that they were more accurate than the Burr maps, and better than most other contemporary county land maps.

The evidence about who purchased these maps and how they were used is mostly indirect. The county maps were sold by subscription, and about 1000 copies appear to have been a typical print run.[33] Smith tried to get the state to purchase copies for distribution to county offices and school districts, but once again the legislature refused to fund his proposal, even though he had obtained numerous affidavits requesting that it do so. Probably at least a few of these maps were purchased by local government offices and school districts. It is certain that some were purchased by stores and other businesses.

They would have helped businessmen locate their customers, and their considerable curiosity value would have made them eye-catching decorations for taverns and offices. At least some of the maps were purchased by local farmers. Writing in 1864, Smith made the interesting observation that Confederate raiders in Pennsylvania stripped county maps off the walls of farmhouses preceding the Battle of Gettysburg—both to gain geographical intelligence for themselves, and to keep it out of the hands of the Union forces.[34]

Concerning the methods he used to construct his county maps, Smith remarked in a communication he sent to the American Philosophical Society in 1864:

> The field work seems rude to the physicist, engaged in discussing the figure of the earth, and to the chief of a survey of an arc of the meridian. But the results are perfectly satisfactory to the naturalist, the county surveyor, the soldier, and the geologist. The latter finds his canvas ready prepared, and can lay in his picture with comfort and success. When larger areas are to be mapped, the astronomical determinations and trigonometrical adjustments come in place. But the compensations which rectify magnetic work in the field, by skilled hands, carefully plotted afterwards in the office, produce results which favorably compare with the most careful triangulation; and at all events may, if the needs of society call for it, precede, in order of time, just as well as follow, the application of the more accurate methods of the science.[35]

Like all of Smith's remarks in defense of his cartographic methods, this comment should not be accepted at face value. His arguments are very similar to those of Roberdeau and others who questioned the methods of Hassler's Coast Survey. Probably many of Smith's contemporaries would have agreed with him, or at least passively accepted his maps as the best available, but a professional geologist like Hall would certainly not have found his maps "perfectly satisfactory." In the decades following the Civil War, professional cartographers poured scorn upon such maps, and eventually succeeded in convincing the public that something better was needed.

J.H. French's Map and Gazetteer of New York State

Many of the surveyors that Smith recruited for his project went on to become important figures in their own right.[36] One of the most important of these was John Homer French (1824-1888), a school teacher and principal, who was engaged by Smith in 1855. Smith was in charge of resurveying several county maps, which were thought to be inadequate for Smith's project, and (most importantly) he was responsible for compiling a state map and gazetteer, which formed a kind of capstone for the project.

French's map of the *State of New York*, which first appeared in 1859, covers the state at a scale of 1:300,000 (see Figures 11.5 and 10.5).[37] It stands as the last in a succession of state maps at similar scales, which includes the previously discussed works by Sauthier, De Witt, Lay, Eddy, Burr, and J. Calvin Smith. The closest comparison is with David Burr's state map, which was also associated with a project to map New York's counties.

Figure 11.5. John Homer French, *The State of New York* (1859). Courtesy David Rumsey Collection.

"The French map," as it was often called by contemporaries, suffers from many of the problems of its predecessors. It was compiled from the county maps, which were produced at different scales, and lacked adequate geodetic control. Although both Smith and French strived to produce high-quality county maps, there were limits to what they could do with compass and odometer surveys. The best that can be said of the French map is that it was superior to most state maps produced before the Civil War, and it seems to have been adequate for the purposes for which it was intended. As a wall map, it would have been displayed in schools, offices, public places, and some homes. For the modern researcher, it is useful mainly because it presents a detailed picture of roads and town locations as they existed at the time.

Like the county maps, the French map of New York State was embellished with scenic views and other materials in the margins. The most significant of these supplements are the two thematic maps showing the geology and meteorology of the state, which were discussed in the previous chapter. Many earlier state and county maps

included statistical tables, but the meteorological map published by French appears to be the first commercial map of New York State to present statistical information in cartographic form.

As will be seen in the following chapter, French's map was sharply criticized after the Civil War by the advocates of a topographic survey of New York. A study of the displacements on French's map indicates that individual towns and county boundaries were sometimes mislocated by as much as two or three miles.[38]

For historians, probably the most useful thing to come out of the French-Smith project was French's *Gazetteer of the State of New York*.[39] This is the best of several nineteenth-century gazetteers (or geographical dictionaries) of the state. It is still heavily used by researchers, particularly by local historians and genealogists. It can be used together with French's map to locate towns and other localities, and it is particularly useful for identifying places whose names have changed. It also provides information about the history, industries, and notable attractions of many of the places it identifies. Because of its usefulness to researchers, it was reprinted in the twentieth century, and supplementary indexes have been prepared of all of the personal names in it, and of place names left out of the original index. It is now also available on the World Wide Web.[40]

The French-Smith project had a lasting influence on both mapping and history writing in New York. One of French's assistants was Franklin B. Hough (1822 - 1885), who went on to pursue a distinguished career as a naturalist and local historian. French's assistants also included several members of the Beers family, who became leading producers of county atlases after the Civil War. In addition to the county atlases (which will be discussed in a later chapter), the Beers family was involved in publishing county histories. Another person associated with the French-Smith project was the young Jay Gould, who later became infamous as the leading financial manipulator of the gilded age. Gould was responsible for both a map and a history of Delaware County. According to Ristow, Gould gathered information for his history while soliciting subscriptions and collecting information for the production of his map.[41]

This close relationship between the production of county maps and local histories in the years between 1850 and 1914 is worth further comment and study. This era was a golden age for local area studies. The causes of this flowering have not been adequately investigated, but clearly this development owes something to the general interest in history that characterized the nineteenth century. There also appears to have been a wave of nostalgia for the past following the traumas of the Civil War and of rapid industrialization. The residents of rural New York seem to have become sufficiently prosperous and conscious of history to want to memorialize themselves in maps, and also to learn more about their origins.

Another important figure associated with the French-Smith project was Henry Francis Walling (1825-1889). Walling's early work was in Massachusetts and elsewhere in New England, but in the 1850's he produced maps of several counties in New York State, including Kings, Queens, Richmond, Ontario, and Wayne. In 1856, Walling set up a "Map Establishment" in New York City, and eventually he published county maps and state atlases covering much of the United States and parts of Canada. After the Civil War, Walling worked for both the U.S. Coast Survey and the U.S. Geological Survey—thus providing in his person a kind of connecting link between commercial mapping and the

professionalized “scientific mapping” that came to play an increasingly important role in the cartography of New York State and the nation.[42]

The Civil War brought a temporary halt to major mapping projects in New York. Most surveyors and draftsmen worked for the military during the war, and when the mapping of the state resumed after the war, government-sponsored “scientific mapping” was to play a much larger role.

Chapter 12
Scientific and Government Mapping, 1850-1920

Introduction

Most of this chapter deals with attempts to extend to all of New York the type of "scientific mapping" pioneered by the U.S. Coast Survey and described in Chapter 10. The whole process was intensely political, and involved much intrigue in and around the State Legislature. These efforts made little progress until after the Civil War, and New York was not completely triangulated and mapped at a large scale until well into the twentieth century. While these efforts were going on, scientific-minded cartographers also produced the first specialized thematic maps of New York, including geological maps, soil maps, and demographic maps.

Early Attempts to Extend Triangular Survey

The desirability of obtaining improved mapping of New York had long been recognized by many of the state's political leaders, and by much of its cultural elite. In 1827, Dewitt Clinton in his annual message to the legislature remarked: "An authentic and official map of the state is a desideratum which ought to be supplied, and this is suggested without any disparagement of the laudable attempts which have been made by individuals for that purpose."[1] It would be interesting to know exactly what kind of map Clinton had in mind. By this time there was a widespread consensus among those concerned with map-making that surveys based on triangulation were the best way to create accurate maps, but I have been unable to locate any discussion in the late 1820s about conducting such a survey of New York. The only upshot of Clinton's proposal seems to have been the law passed in October of that year, which authorized the creation of David Burr's map and atlas of the state.[2]

Only a few years later, in1830, the first state survey based on triangulation was authorized—Simeon Borden's survey of Massachusetts.[3] This survey was highly regarded in the first part of the nineteenth century, and it had considerable influence on the course of events in New York. The Massachusetts triangulation was reportedly carried out quite well, and it led to the production of a map of the state in 1844.[4] But few detailed maps based on this triangulation were made. The idea behind the Borden survey was that individual counties and private surveyors would use the results of the triangulation to construct more detailed local maps. Prior to 1850, only a few maps of individual Massachusetts counties took advantage of this triangulation. Later in the 1850s, Henry Francis Walling, who was also associated with the French-Smith project in New York, used Borden's triangulation to create maps of many Massachusetts counties, as well as an updated state map.[5] We will see that the idea of relying on private mapmakers to produce county maps using a state-sponsored triangulation as a geodetic framework, was influential in New York until about 1890.

In the 1850s, serious efforts were finally made to undertake a triangulation-based survey of the State of New York. By this time, Long Island and much of southern New York had been triangulated by the U.S. Coast Survey, and a few maps based on Coast Survey data had been published. In 1851, a full-fledged "Proposal for a Trigonometrical

Survey of New-York" was presented to the American Association for the Advancement of Science by Edward B. Hunt of the Army Engineer Corps.[6]. This proposal was modeled on the mapping of the U.S. Coast Survey (for which Hunt had worked), as is clearly revealed by his description:

> The idea of which I have conceived of what a survey of New-York should be, is about the following: Let a base be measured in Western New-York, and made the starting line for a system of primary, secondary and tertiary triangulation, extending towards Pennsylvania and New-England. A connection will be obtained in the Hudson valley with the Coast Survey triangulation, giving the desired verification. Plane tabling should extend, first, over the ground around the cities and large villages, so as soon to furnish good maps of the principle cities and villages, and their vicinities, throughout the State, excepting such as are already covered by the Coast Survey operations. The work should then be extended so as to obtain the elements for complete county maps, to be published in the general order of the population of counties, or per square mile…. In point of accuracy and style, the work should not fall essentially below that of the Coast Survey,…[7]

The arguments that Hunt used to justify this survey are less than overwhelming. He began by asserting that: "The importance of obtaining accurate delineations of the leading geographical features of this country is so obvious, and so generally conceded, that it would be superfluous here to elaborate arguments in its proof."[8] A few paragraphs later, he gave one concrete example of the usefulness of good maps: "How much accurate maps are needed, every one must have felt who has traveled through the common roads of the country…. Millions of miles are needlessly traveled, for the want of proper maps." [9] This may be true, but it is not self-evident that an elaborate survey based on triangulation and plane tabling was necessary to produce satisfactory road maps. Hunt's most heartfelt justification was based on national prestige and patriotism: "Geodesy, topography, hydrography are indispensable handmaids to any geography worthy of a civilized nation."[10] And again: "It is certain that if we are among those nations alive to the power and benefits of the sciences characterizing civilized society, the States of this Union must in turn be surveyed with that nice accuracy which geodesy now demands and furnishes."[11]

Hunt's proposal was backed by the American Association for the Advancement of Science, which appointed a seven-person committee—which included Hunt, and was chaired by none other than Alexander D. Bache (head of the Coast Survey)—to draw up a memorial to submit to the State Legislature.[12] In 1852, the Committee's proposal was duly submitted to the legislature by Governor Washington Hunt (conveniently E.B. Hunt's elder brother).[13] The legislature took no action, and the proposal was resubmitted in 1853 by Governor Hunt's successor, Governor Seymour—again without success. The legislature balked at the expense of the proposal, and some legislators may have been hoping that the federal government would eventually pay to survey the state. This failure to take action provided the opening for Robert Pearsall Smith's project, which was described in the previous chapter. The Smith project was privately funded, but

the resulting maps seemed inadequate to Hunt and those who thought like him. There is an interesting parallel between Governor Clinton's 1827 proposal for an accurate map of the state, which was quickly followed by the production of the Burr map and atlas, and the Hunt proposal, which preceded the French-Smith project.

In 1857, a similar proposal was put forward by a committee of the American Geographical and Statistical Society (later American Geographical Society). This report, which was drafted by a committee chaired by Egbert L. Viele (of whom more later), was also brief and mostly restricted to generalities.[14] It pointed particularly to the need for accurate maps to assess the natural resources of the state. Singling out the New York State Natural History Survey begun in the 1836, it maintained: "While these examinations and explorations have in many instances exhibited extraordinary results, they have failed in a great measure to make those results of practical value, for the want of correct topographical maps, upon which to delineate the geographical formations and mineral deposits."[15] This report led to another memorial to the legislature, which also went nowhere. As we have seen, even efforts to fortify the French-Smith project with accurate measurements of longitudes and latitudes of major cities in the state failed to pass the legislature, although this proposal was endorsed by both the State Engineer and Surveyor, and by the head of the U.S. Coast Survey.[16]

So matters stood until 1875. In the intervening years, nothing was done—first because the Civil War put all non-military mapping activities on hold, and later in part because the cartographic efforts of the federal government were focused on mapping the western states. (This was the period of the famous Wheeler, King, Powell and Hayden surveys.) In addition, after the death of Simeon De Witt in 1834, there was no strong leadership in the New York Surveyor General's office. In 1846, the office of Surveyor General was abolished, and it was replaced by the position of "State Engineer and Surveyor," whose responsibilities included the construction of canals and other activities in addition to mapping. Verplanck Colvin later remarked: "A stupor seems to have fallen upon the surveys of the State from the time of this amalgamation of offices down to the time of the close of the War of the Rebellion."[17] One reason for this "stupor" is that the position of State Surveyor and Engineer was an elected one, and it was occupied by a rapid succession of individuals who were often more adept at politics than at engineering or surveying.

The New York State Survey

Finally, in 1876, the American Geographical Society once again appointed a committee to consider a topographical survey of New York and report back to the Society.[18] This committee was chaired by James Terry Gardiner (1842-1912), a graduate of Yale and of Rensselaer Polytechnic Institute. Gardiner (who, to the confusion of librarians and researchers, spelled his name Gardner for much of his life) was to become a major player in the events of the following decade. Trained as a civil engineer, he had already participated in the California Survey, and had served on the 40th Parallel Survey with his lifelong friend Clarence King. Gardiner's achievements in the western states included the creation of the first map of Yosemite Valley.[19]

The report of this committee is a particularly complete and detailed statement of the case for a statewide topographic mapping program.[20] It was issued under Gardiner's

name, and judging from its date of publication (less than two weeks after the constitution of the committee), it must have been substantially completed before the committee was created—probably for the purpose of rubber stamping a document prepared by Gardiner. Although Gardiner's overall proposal is similar to those made in the 1850s, it is much more convincingly argued. Gardiner maintained that the reason of "primary and pressing importance" for detailed topographic mapping of the state was the need for accurate land assessment as a basis for taxation, and he gave several pages of illustrations to prove his point. His report breathes the attitude of nascent professionalism that was coming to dominate cartography and other aspects of American society at the end of the nineteenth century: "That a survey to be accurate over so large an area must be made by the trigonometric method, is evident to all competent engineers. When this is done, and each property, town, and county is mapped on a perfectly accurate method by disinterested State officers, whose high scientific position, attainments and experience entitle their results to absolute confidence, then, and then only, can each know whether they are paying their proper proportion of taxes."[21]

Gardiner also mentioned the importance of having accurate land boundaries to prevent and settle legal disputes. Here, too, he gave numerous illustrations, and concluded: "We are buying and selling, with solemn form of figures, acres that were never owned, and defining them by objects that perished with our ancestors."[22] His final major justification for a mapping program was public health. This line of argument responded to the increasingly widespread concern about municipal sanitation and water, which became more pronounced after the 1850s, partially in response to growing urbanization. Citing—among other things—reports of the New York City Board of Health, he made the case for topographic mapping as essential for planning public works, particularly those involving sewage disposal and water supply.

This report prompted the passage of a law in 1876 establishing the New York Survey.[23] An unpaid commission was established to oversee it, which consisted of a number of eminent New Yorkers: Ex-Governor Horatio Seymour, Vice President William A. Wheeler, Lieutenant Governor William Dorsheimer, John V.L. Pruyn, Robert S. Hayle, Francis A. Stout, and Frederick L.Olmstead (who soon resigned and was replaced by the surveyor George Geddes). These commissioners promptly chose Gardiner as the Survey's first director.[24].

The new survey had an ambiguous mandate: the law which established it was a two-paragraph item in the appropriations bill of 1876, which allotted $20,000 "for making an accurate trigonometric and topographical survey of the State for the determination of State and county lines," and to locate at least one point in each county for the guidance of local surveyors. This could be interpreted as either authorizing a comprehensive topographic survey of the state, or as authorizing a triangulation similar to the Borden Survey in Massachusetts, which could then be used by local surveyors to construct more accurate maps. Differences in interpretation of this mandate helped create a bizarrely complex situation—replete with personal, institutional, and political rivalries—which lasted until the early 1890s. During this period, as we will see, there were three competing state agencies involved in surveying New York. In addition to the State Survey, these were Verplanck Colvin's Adirondack Survey, and the office of the State Engineer and Surveyor. (The activities of the last two of these agencies will be examined below.) There were also three federal agencies active in surveying New York during parts

of this period—the U.S. Coast Survey, the U.S. Lake Survey, and the United States Geological Survey (USGS). Predictably, the situation turned into something of a circus.

The previously cited 1877 preliminary report of the State Survey castigated existing maps, and asserted the need for triangulation and topographic mapping. The tenor of the report was accurately summarized by a screaming headline in *The New York Times*: "THE STATE SURVEY. FIRST REPORT OF THE BOARD OF COMMISSIONERS—FORTY MILLIONS OF DOLLARS LOST THROUGH IGNORANCE OF THE TOPOGRAPHY OF THE STATE—THE MAPS OF NEW YORK WORSE THAN THOSE OF ANY OTHER CIVILIZED COUNTRY."[25]

Not surprisingly, this report echoed most of the themes of Gardiner's 1876 pamphlet. It emphasized the importance of detailed surveying for railroad and cadastral mapping. It asserted that the best existing maps of the state misplaced towns from one to three miles from their actual locations, and that the location of boundaries and landmarks was uncertain. In his appendix to the report of the commissioners, Gardiner wrote: "If the purpose of maps is to describe truthfully boundary-lines, towns, and topographical features as they actually exist on the earth's surface, then the maps of this state are proved to be false witnesses; and the sooner their character is known and condemned, the earlier may improvement be looked for."[26] The answer to these problems was, at least for Gardiner and the Commissioners of the Survey, obvious: "For these evils we propose the same remedy that other governments have tried with perfect success—a trigonometrical survey."[27] Clearly, they were thinking in terms of triangulation as a preliminary to a state-sponsored program of systematic topographic mapping.

Gardiner's report was widely reported and favorably commented on in such publications as *Science*, the *Scientific American*, *The New York Times*, and *The North American Review*.[28] Reading these periodicals, it is easy to see why Gardiner and other surveyors thought that their arguments for a topographical survey were obvious and generally accepted.

But, in spite of the favorable reviews, even at this early date the State Survey was already in serious political trouble. The events of the 1850s had shown that there was a strong undercurrent of opposition in the State Legislature to funding projects for surveying and mapping, and the legislation of 1876 involved a compromise with these forces. In spite of the widespread and vocal support for the State Survey among the educated elite, many in the legislature did not share this enthusiasm, which helps account for the ambiguous wording of the act constituting the survey.

The storm over the State Survey broke almost immediately. The original authorization of the survey was through an item placed into a general appropriations bill, which had been strongly opposed by the State Controller, one Lucius Robinson, who withheld payment for the survey. Unfortunately for the survey, Robinson was elected governor at the end of 1876. Robinson, a Democrat, was elected on a platform of cutting government expenses to a bare minimum, and he proceeded to take aim at the survey in his message to the legislature on January 2, 1877. Not mincing words, he said:

> Without any application by the people, with no appreciable evil to remedy, with no practical inconvenience in the experience of a hundred years, and at a period of great pecuniary embarrassment, a plan is enacted in an appropriation bill for embarking the State, against the wishes of its people,

> in a work which promises to run through half a century, and to cost an unlimited amount of money. The mode and matter of the enactment are alike objectionable, and I recommend the prompt repeal of that portion of the supply bill.[29]

Governor Robinson's remarks are intriguing, since they apparently articulated attitudes that must have been widespread, although they almost never made it into print. He put into words the thoughts of those in the legislature (and presumably many of their constituents) who did not see the need for a comprehensive survey of the state, and regarded it as a wasteful and expensive project designed to benefit an administrative elite and their wealthy patrons.

In response to the governor's message, the supporters of the survey mustered their forces. *The New York Times* editorialized in its favor, and The Faculty of Columbia College passed a resolution in its support.[30] Most of the other colleges in New York also sent memorials to the State Senate advocating the continuance of the survey.[31] Judging from the editorial in *The New York Times*, the advocates of the survey seem to have done some backtracking around this time, and accepted the interpretation that the law for a "trigonometric and topographical survey of the State" authorized only a triangulation of the state, leaving it to local surveyors to draw the detailed maps. Gardiner himself later conceded that the original mandate of the survey was ambiguous, and agreed (doubtless reluctantly) to carry out the narrower interpretation of his responsibilities.[32]

On the basis of this compromise, efforts to repeal the survey were beaten back, and Governor Robinson finally agreed to sign an appropriations bill for the survey with the understanding that its tasks were to be cut down to a minimum. He explained his views in a memorandum he issued on signing the bill:

> The State survey, as originally proposed, contemplated a work of immense magnitude, of unlimited expense, and of little, if any, practical value to the people who were to pay for it. So long as it presented this appearance, I embraced every proper opportunity of placing upon record my earnest disapproval of it. I am now informed that the visionary and objectionable views originally entertained have been wholly abandoned, and that instead of surveying the whole State, it is proposed simply to fix at small expense a few points which may hereafter be used by any counties, towns or individuals desiring to make surveys for themselves in accordance with the new system. The bill is approved for the reason that it is in harmony with this greatly modified and unobjectionable plan.[33]

Gardiner accepted this limited interpretation of his mandate, although he clearly would have preferred to carry out a full-fledged topographic mapping program. In his annual report for 1879, Gardiner lamented how little he had been able to accomplish because of lack of adequate funding, but nonetheless went on to describe the work he had done in carrying out a triangulation in central New York and along the Hudson River. He reported that he had determined by triangulation the location of fifty-two points in fifteen townships, and added that the "elevations of many important points were determined with

precision, in order that they may be used for future leveling." He reiterated "the principle to which I have so often called attention, that a trigonometrical survey of a thick settled country should be made once and for all, in such a manner as to be readily used base for local surveys of every kind."[34]

By this time, the State Survey was becoming something of a political football. A newspaper article dated April 10, 1877 lamented that, in spite of Governor Robinson's acquiescence to the existence of the Survey, certain unnamed politicians were allegedly plotting to subvert it:

> So long as its existence hung on a thread the politicians, with one or two exceptions, did not concern themselves much about its management. But now that this thread has thickened to a cable, and it appears that a considerable number of assistants must be employed by the director, half a dozen of the most scandalous wirepullers in the Legislature have combined in a scheme to control these appointments in their own interest. Their notion is that the Commissioners and directors must be forced to name subordinates by their dictation or they will break up the whole concern.[35]

Political changes seem to have played a role in enabling Gardiner to continue his work. Robinson was defeated in his bid for reelection in 1879, and was replaced by Republican Alonzo Cornell, who held office from 1880-1882. Cornell appears at least not to have been actively hostile to the survey.

In 1882, another cost-cutting Democrat, Grover Cleveland, was elected governor. Cleveland prided himself on being a watchdog of the public's money—an attitude he carried over to his presidency, where he vetoed more bills than any other U.S. president. Cleveland explained his concerns about the State Survey in a veto message for an item in an 1883 appropriation bill. He began by quoting Governor Robinson's memorandum supporting a minimal Survey. Picking up on this theme, Cleveland remarked:

> That the promoters of this scheme have disappointed the expectations of my predecessor is shown by the fact that since it was made $76,700 have been appropriated, and the item of this year carries it to $92,500, making an aggregate cost of $118,300, while in half the counties of the State nothing has been done. I have approved the appropriation of $15,800 in the bill under consideration with great reluctance, and only for the purpose of providing means to enable the accurate fixing, as was originally proposed, of some point or line in each county for the guidance of local surveyors. With this sum and the remainder of last year's appropriation, I shall insist that this work shall be fully completed.[36]

As will be seen in the next section, Cleveland's wrath extended as well to the Adirondack Survey. Rubbing salt into wounds, he added: "the cost of printing the reports of these surveys has been scandalously large," and summed up that he would not approve of any "similar scheme of indefinite duration and unknown expense."[37] The remark about printing costs was probably aimed primarily at the Adirondack Survey, several of

the volumes of which were heavily illustrated with engravings of various subjects, including some that had nothing to do with surveying.

Cleveland's opposition to the State Survey elicited a strong defense. Gardiner himself sent Cleveland a nineteen page typewritten letter defending the Survey and describing its history.[38] Gardiner enclosed with this letter “memorials from many of the great corporations who are particularly interested in the security of boundaries, and the accuracy of surveys of real estate; from a large number of prominent lawyers of New York, and from the Faculties of Rensselaer Polytechnic Institute, the Union University, the faculty of Columbia College, the Cornell University, Hamilton College, the University of Rochester, and Vassar College, as well as a resolution of the New York Chamber of Commerce.” In addition, the commissioners of the State Survey submitted to Cleveland a six page evaluation and endorsement of Gardiner’s work from C.O. Boutell of the U.S. Coast and Geodetic Survey.[39]

In spite of this impressive outpouring of support, Cleveland was not persuaded. In his annual message on January 1, 1884, he reiterated his opposition to both the Adirondack Survey and the State Survey, and suggested that their duties be transferred to the State Engineer and Surveyor.[40] Later in 1884, Cleveland vetoed all funding for the State Survey. This caused field work to cease, but it did not kill the survey itself. Because the act passed by the legislature constituting the survey said nothing about its duration, the survey could be disbanded only by another legislative act, which did not happen.

Matters did not improve for the State Survey under Cleveland's successor, Governor Hill. In early 1885, a special committee was set up by the State Assembly to investigate the State Survey and the Adirondack Survey, and to report on the advisability of transferring their responsibilities to the office of the State Engineer and Surveyor. This committee, which relied on the testimony of two experts from Columbia College and Union College, issued a report highly favorable to the State Survey, and opposed to increasing the responsibilities of the State Engineer and Surveyor.[41] The report encouraged the legislature to fund the Survey, but Governor Hill vetoed the bill, much to the indignation of Gardiner's numerous supporters, including *The New York Times* and the American Geographical Society.[42]

By this time, the future of the Survey had clearly become a matter of partisan politics, with the Democrats favoring discontinuing the Survey and transferring its functions to the State Engineer and Surveyor. The Democrats claimed that it would be more economical to consolidate the surveys, but their opponents maintained that this transfer was designed to increase the Democrats' opportunities for patronage by moving the survey to an elected office. The only vocal support outside of the state government for this transfer seems to have come from Democratic newspapers, such as *The Brooklyn Eagle*.[43]

The unfunded survey continued to exist on paper, and a final report was published in 1887 (see below). Gardiner and other advocates of the Survey continued to lobby hard to keep it in existence. They called for an investigation of the survey by the U.S. Coast and Geodetic Survey, and received a “full endorsement” from its director (at that time Julius Erasmus Hilgard).[44] Thus armed, they called for a resumption of the survey and funding for the production of detailed topographic maps, but to no avail. Eventually, as will be seen, the Democrats had their way, and the functions of the State Survey were

assigned to the office of the State Engineer and Surveyor, which later worked in cooperation with the USGS to carry out a topographic mapping program for the state.

In spite of political opposition and under funding, the embattled State Survey did achieve significant results. It extended the primary triangulation of New York to include 30 additional counties, ascertained the location of several hundred points, and established the location of a number of meridian lines for the use of local surveyors. The triangulation done by the State Survey was later used by the USGS in its mapping program. The only maps actually published by the Survey are a few sheets showing its triangulation network. The most interesting of these, first published in 1879, bears the title: *The State of New York: Sheet No. 1, Eastern and Central New York*.[45] This map displays Gardiner's ambition to produce high-quality maps of the state. Along with the triangulation network, it includes some place names, boundaries, and topographical features. It was to some extent designed as a work of propaganda for Gardiner's mapping program, as is shown by this revealing note: "This Map represents only those boundaries, points and topographical features whose geographical positions are precisely known by trigonometrical measurement. Locations of lines, towns and topography not found by this method are omitted because they are too uncertain to be accurately shown."

The State Survey also played a significant role in the creation of the State Reservation at Niagara Falls. With some appearance of inconsistency, (given their opposition to the State Survey), Democratic Governors Robinson, Cleveland, and Hill were strong advocates of this reservation, and Republican Governor Cornell opposed it. Robinson called on Gardiner to carry out the surveying and mapping for this project. In 1879, Gardiner worked with Frederick Law Olmstead on the preparation of a *Special Report of the New York State Survey on the Preservation of the Scenery of Niagara Falls*, which accompanied the fourth annual report of the survey.[46] This report was accompanied by several maps, the most interesting of which shows the recession of Niagara Falls between 1842 and 1875.[47] The report was the most important single document leading to the creation of the Niagara Falls Reservation, which was finally established in 1885.[48]

Between 1880 and 1885 Gardiner also played an important role on the New York State Board of Health, which was created in 1880. He was widely consulted by municipalities throughout the state about such matters as water supply, sewage and the drainage of swamps. Although this work does not seem to have led to the production of maps, his knowledge of topography enabled him to make important contributions to these fields of urban planning.

By 1886, Gardiner was finished with his work on the State Survey and the State Board of Health. By this time, both agencies were unfunded because of vetoes by Governor Hill. In spite of his strong qualifications and the backing of "the best and the brightest," Gardiner was unable to muster enough political support to continue his work. On June 16, 1885, he resigned his position, accompanying his resignation with a bitter recapitulation of his political travails.[49] The *New-York Daily Tribune* editorialized on Gardiner's resignation: "Of course every one who understands the subject—and the Governor—knows that his real objection to the survey is that hitherto it has had no connection with politics, and has paid no tribute to the machine. If it had been in the hands of a Democratic State Engineer and Surveyor the bill would have been signed with many thanks to the legislature for doubling its appropriation."[50]

The Tribune's judgment was echoed by most other newspapers, although several Democratic papers, including the *Brooklyn Daily Eagle*, bid Gardiner good riddance. It is worth quoting an excerpt from a vituperative article, probably published in the *Eagle*, if only to show the strength of the political passions surrounding the State Survey:

> It has been both the comedy and reproach of legislation at Albany, for many Winters, that this bureau has begged or schemed its way into appropriation bills, and has exhausted the resources of sycophancy and press and social and quasi theological bulldozing to blandish or coerce Governors into approving of its expensive, interminable and practically useless work....
>
> The position taken by Governors Cleveland and Hill can well be submitted to citizens who read the evasive, abusive and insolent letter of the retiring director printed to-day.... He has the effrontery to talk about the State Engineers and Surveyors of the State as political persons, and of Robinson, Cleveland and Hill, who favored the transfer of this work to those officers, as desirous of putting this work into politics, when his own arts of crawling and other maneuvers to continue himself on the treasury have exceeded all the record in that line known at the State Capital....
>
> The action of Cleveland and Hill in suspending a fancy job finds its vindication in honesty and reason. The State survey which should be taken will be taken, now that the person whose relation to it has been its bane with taxpayers and reformers has gone out from it to an oblivion from which he should never have been raised.[51]

Although there is often some connection between politics and cartography, who would have thought that surveying and map making could arouse such violent controversy? All in all, the termination of the State Survey constituted a stunning setback for the elite professional values represented by Gardiner and his many supporters in the academic and business communities.

Disgusted with politics and institutional rivalries, Gardiner spent the rest of his career in the healthier atmosphere of Gilded Age business, becoming (according to his obituary in *The New York Times*): "Vice President of the coal companies of the Erie Railroad and President of the Mexican Coal and Coke Company, Randolph-Macon Coal Company, and West Kentucky Coal Company."[52]

Gardiner appears not to have contributed to the writing of the final report of the State Survey. This report was published in 1887 by the Board of Commissioners, and it was accompanied by a detailed summary of the survey's activities prepared by Gardiner's assistant, O.S. Wilson. From this we learn that the primary triangulation of the state was about two-thirds completed—in itself the most important single accomplishment of the survey.[53] The extent of this triangulation is shown in maps accompanying the report.

The commissioners obtained for their final report an endorsement from John Wesley Powell, Director of the United States Geological Survey, who pronounced Gardiner's triangulation work "admirably executed." Powell also proposed that future topographic mapping of New York be carried out jointly on a cost-sharing basis between the USGS and the state. He made one important condition concerning this arrangement—namely

that the USGS should have “exclusive control” of the topographic mapping, since he thought that only personnel employed by the USGS had adequate training to carry out work that measured up to the highest standards.[54] We shall see that a similar cost-sharing proposal was adopted in 1892 (although the State Survey was not resurrected to take part in it), and that it has been continued to the present. But before considering these later developments and the resulting maps, we should examine two other surveys that contributed to the topographic mapping of New York in the last half of the nineteenth century.

Verplanck Colvin and the Adirondack Survey

The Adirondack Survey may be the most unusual mapping activity ever funded by New York State. It was basically the creation of Verplanck Colvin (1847-1920), an Albany patrician, who began his career as an attorney in his father’s law office. He was an outdoor enthusiast with a strong interest in natural science. Starting around the conclusion of the Civil War, he became involved in exploring and mapping the Adirondacks. Colvin’s achievements as an explorer in these mountains include the discovery of the source of the Hudson River in Lake Tear of the Clouds. He still has many admirers today—mainly because of his eloquent campaign to preserve the mountains, which played an important part in the establishment of the Adirondack Forest Preserve.[55]

The Adirondack Survey overlapped the State Survey; they shared similar problems, and met a similar fate. But the Adirondack Survey was a much more idiosyncratic production, being almost entirely the work of one man. Although Colvin shared political enemies with the State Survey, he did not have the same widespread academic and professional support.

In 1872 Colvin and his friends managed to convince the legislature to award him $1000 “to aid in completing a survey of the Adirondack wilderness of New York, and a map thereof.”[56] This single paragraph inserted in an appropriations bill became the legal basis for the survey, which continued until 1900. Later activities of the survey were partially funded by the state, but Colvin paid many of its expenses out of his own pocket.

Between 1872 and 1885, Colvin made respectable progress in mapping the Adirondacks. Although he was self-taught, he based his surveys on triangulation, leveling, and other up-to-date methods. He measured the elevations of numerous mountains, and claimed to have discovered over 30 previously unmapped lakes. He carried out a preliminary triangulation of about half of the Adirondacks, and created a large number of reconnaissance maps, many of which went unpublished. The most important results of his work were included in his heavily illustrated annual reports, which were published by the New York State Legislature. They were unusually well written, and in them Colvin described his adventures in the mountains, and promoted the conservation of the Adirondack watershed, along with conveying the results of his surveying.

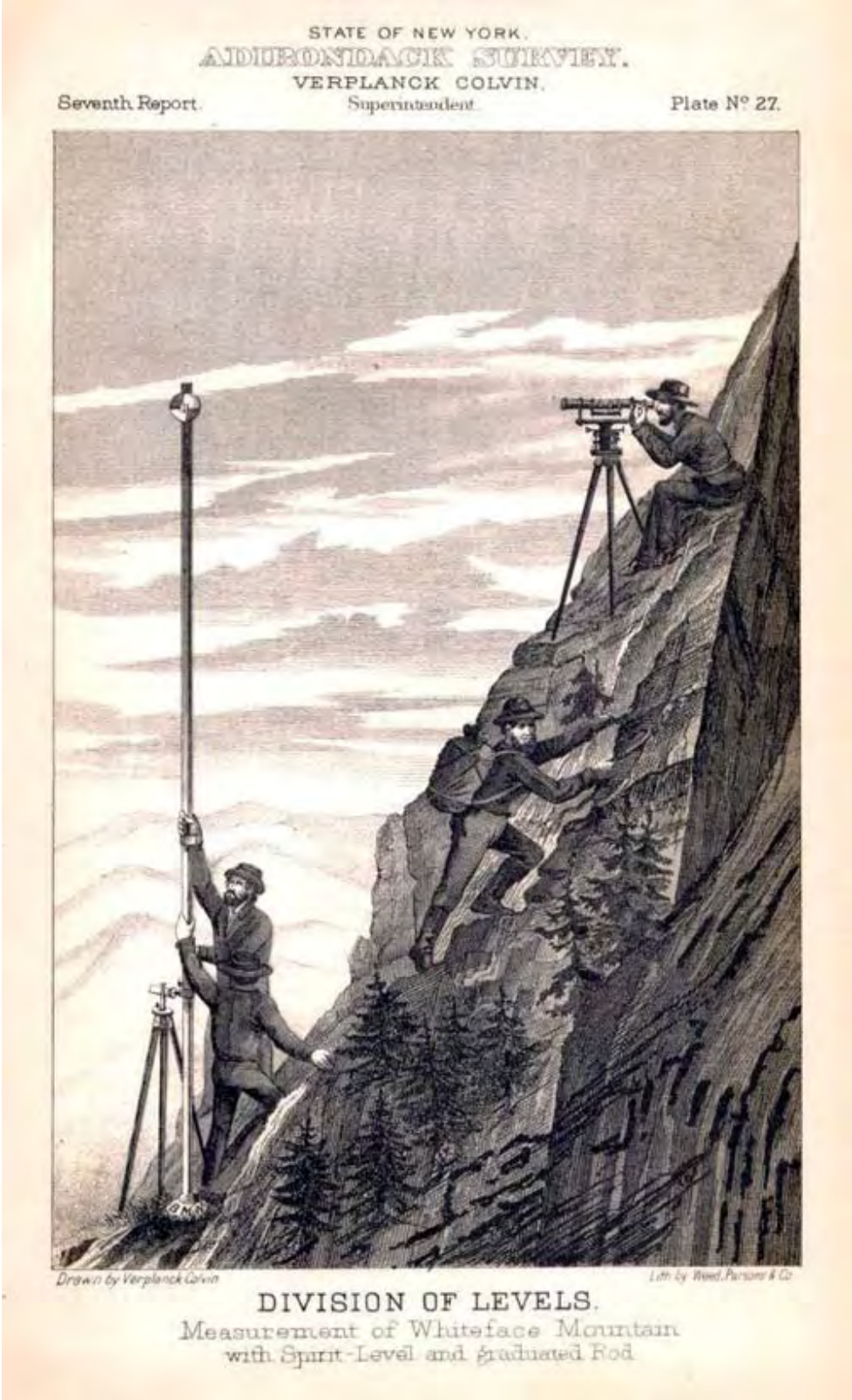

Figure 12.1. Colvin's crew at work on Whiteface Mountain. Adirondack Survey *Seventh Annual Report* (1879). Wikipedia Commons.

Figure 12.2. Verplanck Colvin, Reconnaissance Map of the Upper Ausable Lake. Adirondack Survey *Seventh Annual Report* (1879). New York State Library.

Colvin's early efforts met with widespread support, and were summarized or favorably reported upon in such periodicals as *The New York Times*, *Scientific American*, *Harper's Monthly Magazine*, *American Naturalist*, and *Forest and Stream.*

After these initial successes, Colvin's Adirondack Survey gradually lost credibility and momentum. As with the State Survey, the crisis came to a head in the middle of the 1880s. As we have seen, both surveys were opposed by Governors Robinson, Cleveland, and Hill—mainly because of their expense and their alleged lack of concrete accomplishments. The funding for the Adirondack Survey was completely cut off by Cleveland in 1884, although the survey continued to exist on paper until 1900, and received some occasional funding from the state.

In spite of opposition by Democratic governors, Colvin continued to enjoy considerable political support. In 1883 the Adirondack Survey was given by the legislature the additional responsibility of surveying state lands in the Adirondacks, for which it appropriated $15,000.[57] This was no small matter, since it was not at all clear what lands in the Adirondacks were actually owned by the state. Surveys had been made in the Adirondacks going back to colonial times, but they were often very inaccurate, and boundary markers (which often consisted of slashed trees) were difficult or impossible to locate. This led to a situation in which it was virtually impossible to determine who owned much of the land in the Adirondacks.

Colvin devoted a great deal of effort to straightening out this confused situation. He was remarkably successful in locating old survey lines, and in monumenting them with new markers. Colvin's work resurveying old property boundaries is still used to evaluate and establish land claims in the Adirondacks, and it is probably his most important cartographic legacy to the people of New York.[58]

Thenceforth, Colvin took to calling himself head of the "State Land Survey" (although this title is not mentioned in the enabling legislation), as well as head of the Adirondack Survey. The expansion of the Adirondack Survey to include the State Land Survey (not to be confused with the State Survey) did nothing to increase Colvin's appropriations. In vetoing a bill to pay for printing of the annual report of these agencies in 1885, Governor Hill denied that these entities even existed: "There is no such department in the laws of the State as the State Land Survey, and there is no such official as Superintendent of said Land Survey. If, by this item, it is intended to appropriate money to be expended by the so-called Superintendent of the Adirondack Survey, it is not deemed a wise expenditure."[59] Like Cleveland, Hill favored having the State Engineer and Surveyor take over both the Colvin surveys and the State Survey.

Unlike the State Survey, Colvin's work received little support from professional surveyors or organizations like the American Geographical Association. It seems clear that Colvin's surveying was not highly regarded by either the Coast Survey or the USGS. When Grover Cleveland cut off the funding of both the Adirondack Survey and the State Survey, James T. Gardiner, Director of the State Survey, grumbled to J.W. Powell (head of the USGS) that Cleveland had "a great and well founded prejudice against the Adirondack Survey, … and he is too ignorant to discriminate."[60] The fairly comprehensive overview of surveying activities in New York published by the commissioners of the State Survey in 1887 pointedly made no mention of Colvin's work in the Adirondacks. Neither the State Survey nor (later) the USGS incorporated Colvin's triangulation of the Adirondacks into the maps they published showing the progress of triangulation in New York. Writing in 1895, Henry Gannett of the USGS remarked concerning the Adirondack Survey: "The positions of a few points, numerous elevations, and a few local sketch maps are, so far as the writer is aware, the only contributions which this Survey has made to a knowledge of the geography of the State. It is understood, however, that there is much matter collected by this organization awaiting publication."[61] This coolness toward Colvin's activities does not appear to be simply the result of snobbishness or of professional animosity, since the USGS at this time was able to work quite well with the best self-taught commercial surveyors, including Robert P. Smith and Henry F. Walling.

By 1885, the *New York Times* was editorializing that the Adirondack Survey was "an anomalous and expensive superfluity"—adding that: "The money it costs would be much more usefully spent if added to the fund at the disposal of the director of the State survey, whose competency and efficiency are not disputed."[62]

Nonetheless, Colvin's work should not be dismissed lightly. The best (and apparently only) formal evaluation of his work by professional surveyors is a report on state mapping activities made for the Assembly in 1885. This report—which was prepared by W.P. Trowbridge of Columbia College and W.S. Chaplin of Union College— purported to "have examined critically and in detail the methods employed in the Adirondack survey." Its authors remarked that: "these examinations were begun with

strong prejudices, on our part, against what may be termed the scientific integrity of this survey—prejudices which were produced by an examination of Mr. Colvin's several annual reports." They concluded, however, that the triangulation and other technical work done by Colvin was of high caliber: "it is doubtful whether the survey is excelled in accuracy and detail by any survey of a similar character conducted under similar circumstances."[63]

Balancing these words of praise, Trowbridge and Chaplin complained about the failure of the Adirondack survey to publish many maps, and especially to produce detailed topographic maps. They concluded by recommending "the creation of a commission of not less than three *technical experts* to advise with Mr. Colvin with reference to the execution of final maps, the publication of the results, and the work necessary to complete the survey of the region already covered by his trigonometrical survey; and also as to the best course to be adopted for extending the work into the dense forest region further to the westward of his present operations."[64]

The support that this report gave to the Adirondack Survey was considerably more equivocal than that which it gave to the State Survey. The consultants were almost certainly right in pointing out some major weaknesses in Colvin's work—his failure to publish topographic maps, and his inability to synthesize his detailed surveys to produce publishable maps of large areas. As early as 1875, Colvin himself had complained about the difficulty of topographic surveying in forested areas, and this continued to be a problem for him.[65] Colvin almost certainly would have benefited from expert help with such matters. The proposed commission of experts never came into being, which suggests that Colvin's most serious problem was not so much technical incompetence as an inability to work with colleagues or under the direction of others.

To give Colden his due, it should be acknowledged that he was quite good at analyzing his situation in writing. Probably as an indirect response to the criticisms of this legislative commission, his annual report for 1885 contained a very clear exposition of his methods and of the problems he faced as a surveyor, along with a well thought-out short history of land surveying in New York.[66]

Opposition to Colvin's work became increasingly widespread outside of narrow political and professional circles. This is evident from a flippant (and very unfair) review of Colvin's 1886 annual report in *Forest and Stream*, a publication that earlier had enthusiastically supported Colvin:

> The most unique report of the many that have come to the Legislature this season and been printed at the expense of the State is Verplanck Colvin's Adirondack State Land Survey. This is a sort of perennial state institution that started in 1872 with an appropriation of $1000, has been going on ever since, and is not finished yet, another appropriation being asked from the present Legislature to continue it. The total cost so far has been $71,775. It is the oldest of the State commissions. The maximum amount expended was $17,500 in 1880, and it has been tapering off since, though $15,000 is now asked for.
>
> The report itself is prettily got up and has a lot of pictures of lakes and mountains and Verplanck Colvin surveying them in it. It is about ten inches by six, and two inches thick, bound in blue cloth, and well printed.

> On the outside of the cover is stamped a picture of Verplanck Colvin on the top of a frame observation tower. The name of Verplanck Colvin appears at the top of every other page, and "Verplanck Colvin, superintendent" is printed at the top of pictures of lakes and mountains. Colvin is a handsome young man with a fascinating look that any girl would take to at once. His hair is black and curly, his complexion is dark, his moustache curly, and his black eyes have a sad, yearning expression. He is the whole survey, and the report is a sort of annual story of how he spent the last year in the Adirondacks. Here is a sample of a few days' experiences….
>
> There is more like this. At one place the report tells of the red snow that fell. In another chapter he tells of climbing the mountain and camping out. Interspersed as illustrations are photographs of Indians, tripods, signal stations, and rural inhabitants. There has been a big demand for the book, and no wonder, for it is a story of Adirondack adventure printed at State expense. It is hard to see just where the surveying and official part of it comes in, but, the children of all the farming constituents, to whom country Assemblymen send their copies, read it like a real story book.[67].

In spite of ridicule and opposition, the Adirondack Survey sputtered on for decades. Colvin continued to enjoy substantial support from the legislature, and (unlike Gardiner) he did not give up in disgust. He continued the survey at least on a minimal basis in those years when he could get no funding. In 1887, he published a brief but spirited defense of his activities against the criticisms of Governor Hill.[68]

After 1888, attempts were made to enter into a cooperative agreement between State Land Survey under Colvin and the USGS for the purpose of mapping New York. This proposal was delayed for four years—largely because of the unwillingness of Powell and Gannett to accept conditions that Colvin and his legislative allies wanted to impose.[69] Colden still had considerable support in the legislature, and in 1891 he was backed by the Republican Party for the position of State Engineer and Surveyor, although he was defeated by the Democratic Candidate, Martin Schenck.[70] When a cooperative agreement was finally signed in 1893, it was between the USGS and the State Engineer and Surveyor, who was still Schenck.

An attempt was made by the legislature in 1894 to revive the Adirondack Survey, but it was vetoed by Governor Flower (another Democrat), who tartly noted "the strenuous opposition to the character of the work and the manner of its carrying on."[71] The minimally funded Adirondack Survey continued to exist on paper until 1900, when Governor Roosevelt finally put an end to Colvin's work for the state. Colvin bitterly withdrew from the scene—taking most of his maps and papers with him, which he claimed were his personal property. Many (but not all) of these were later retrieved (or arguably stolen) from Colvin's back porch by an official from the Forest, Fish, and Game Commission, and now repose in the archives of the Department of Environmental Conservation.[72] In 1901, Colvin unsuccessfully filed a claim against the state for $375,241, which he thought was owed for past services.[73]

In spite of the controversies surrounding Colvin's career, he did make important contributions to the mapping of the Adirondacks. He carried out a triangulation of about

two-thirds of the Adirondack area, and his published reports contain many maps of specific places within the Adirondacks, some of which are fairly extensive.[74] He listed in his reports numerous positions he had fixed and elevations he had measured. Many of these locations were identified with bench marks. He also determined the boundaries of old colonial land tracts in the Adirondack area, as well as the boundaries of towns and counties. What he did not do is produce a detailed map of the Adirondack region as a whole. As early as 1875, he had announced his intention to produce a topographic map of the entire region at a scale of 1:63,360, but he never came anywhere near to accomplishing that goal.[75]

Colvin's surveys did contribute—to an extent that has never adequately been investigated—to the many detailed maps of the Adirondack region published by others between 1870 and 1900. Some of these were drafted by private individuals, such as William Watson Ely (d. 1879) and Seneca Ray Stoddard (1843-1917), who were responding to the demand for maps for the tourist trade, which was fast becoming a mainstay of the Adirondack economy.[76] It has been asserted by one qualified observer that Stoddard "quickly adopted the revised information gleaned from Colvin's surveys of the 1870s."[77] In the 1881 edition of his *Adirondacks Illustrated*, Stoddard gave explicit thanks to Colvin for information on "portions of the Lower Saranac Lake, the Mud Pond region, Beaver Lake and a section of Beaver River and for valuable table of altitudes."[78] Aside from his purely cartographic contributions to such maps, Colvin contributed indirectly to their very existence because of the publicity he gave to the Adirondack Region as a tourist destination, and through his annual reports, his public lectures, and the articles he wrote for popular journals.

Colvin played an even less visible role in the production of maps of the Adirondack region by state agencies. Colvin played an important part—which was acknowledged by both contemporary and recent observers—in raising support for the creation of both the New York State Forest Reserve in 1885, and for the creation of the Adirondack Park in 1892. The agencies administering these lands needed detailed land use and land ownership maps, which they created from various sources. None of these maps explicitly acknowledged Colvin as a source of geographic information, although a few of them contained vague statements, such as that they were "compiled from the official maps and field notes on file in the state departments at Albany." It is nonetheless certain that Colvin's maps were used extensively in creating these works, since (prior to the involvement of the USGS in this area in the 1ate 1890s) no one else had produced detailed surveys of most of the Adirondacks. Rivalry between the Adirondack Survey and other state agencies (especially the office of the State Engineer and Surveyor) explains the lack of an explicit acknowledgement of Colvin's contribution to the creation of these maps.[79]

The first of this important series of Adirondack maps published by the state appeared in 1884. The most detailed of them was prepared for the Forest Commission by the office of the State Engineer and Surveyor, and covered the Adirondack Region in twenty sheets at a scale of one mile to an inch. A rare and little known map, it bears the title *Map of the Adirondack Wilderness and Adjoining Territory*.[80] In the same year, the Forest Commission published a reduced-scale version of this map (which appeared in its annual report), and a *Map of the Adirondack Plateau Showing the Position & Condition of Existing Forests*.[81] These served as prototypes for a whole sequence of maps of the

Adirondack region. The 1890 edition was the first official map to use the famous “blue line” to show the boundaries of the proposed Adirondack State Park, although Colvin had produced maps marking the Forest Reserve with a blue line much earlier.[82] A series of large-scale wall maps showing the Adirondack Park commenced in 1893 with a: *Map of the Adirondack Forest and Adjoining Territory Compiled from the Official Maps and Field Notes on File in the State Departments in Albany*.[83] The most recent (1993) version of this map is available online.[84]

It is difficult to determine why the Adirondack Survey failed to produce detailed maps covering larger areas, or why Colvin’s work came under so much criticism. Lack of funding from the state and professional rivalries are doubtless part of the explanation. There can be no doubt that over the years the Adirondack Survey did an immense amount of work. In addition to published works, Colvin left behind a quantity of unpublished field books and manuscript maps, most of which are now in the possession of the New York State Dept. of Environmental Conservation. These records include more than 500 unpublished maps—many of which include contour lines and show triangulation stations.[85] They reflect careful surveying of numerous specific areas, and they were certainly much more accurate than anything which preceded them. The map shown in Figure 12.3 is typical of these unpublished works. It is a pity that Colvin was unable to synthesize this material to produce a more substantial legacy of printed maps.

Figure 12.3. Verplanck Colvin, “Survey of the Hudson River, Sheet 1” (manuscript map, ca. 1880). New York State Archives.

The Adirondack Survey was so much a personal creation that it reflects both the strengths and weaknesses of Colvin’s personality. It probably owed its long existence to

Colvin's abilities as a writer and a lobbyist, and to his (and his family's) legislative connections, as well as to his considerable skills as a surveyor and mapmaker. But he seems to have lacked judgment, the ability to set priorities, to work with superiors and colleagues, and to synthesize his work in a usable form. Probably these personal weaknesses, more than under funding or political opposition, account for his failure to produce a more impressive collection of published maps.

The U.S. Lake Survey

Another organization that contributed to the surveying of New York in the last half of the nineteenth century was the little-known U.S. Lake Survey. The Lake Survey was established by Congress in 1841 specifically to survey the Great Lakes. This task would seem to have fallen within the purview of the U.S. Coast Survey, but it will be recalled that the head of the Coast Survey at that time, F.R. Hassler, was under constant attack in Congress. Evidently as a way of expressing its displeasure with Hassler, Congress created this new agency and put it under the jurisdiction of the rival U.S. Army Corps of Topographical Engineers. The Lake Survey carried out its mission using triangulation and other techniques very similar to those used by the Coast Survey, and it can be credited with producing the first reliable charts of the Great Lakes. It continued in existence until 1970, when (along with the U.S. Coast and Geodetic Survey) it was brought under the jurisdiction of the National Oceanic and Atmospheric Administration (NOAA).[86]

Most of the initial activities of the Lake Survey took place on the western portion of the Great Lakes. In 1853 its first chart of Lake Erie was published. Only after the Civil War did it begin comprehensive surveying of the St. Lawrence River, Lake Ontario, the Niagara River, and the eastern end of Lake Erie. The agency completed its survey of Lake Ontario in 1875 and of Lake Erie in 1877.[87] The resulting charts show shorelines, but little inland detail. Of particular importance for the mapping of New York, the Lake Survey extended its triangulation network along the shores of lakes Erie and Ontario—thereby making an important contribution to constructing the framework for the future detailed mapping of New York. Henry Gannett, who was so critical of Colvin, remarked that "the character of the geodetic work of this organization [the Lake Survey] is high."[88]

Revival of the Office of State Engineer and Surveyor and Its Cooperation with the USGS

The Office of the State Engineer and Surveyor showed little interest in being involved with trigonometric surveying or detailed mapping projects prior to about 1880. Its primary activities in the decades immediately following the Civil War involved the construction and regulation of canals and railroads. As late as 1879, the incumbent State Engineer (Horatio Seymour) recommended that the State Survey, rather than his own agency, should conduct a survey by triangulation to remeasure the boundary between New York and Pennsylvania.[89]

After 1880, with both the State Survey and the Adirondack Survey under fire, interest revived in transferring their functions to the Office of the State Engineer and

Surveyor. Seymour proposed in his annual report for 1883 that this be done, and the idea was taken up by Governor Cleveland in his message to the legislature the following January.[90] This proposal was successfully resisted by Gardiner's allies in the legislature and the press. *The New York Times*, summarized the case against the transfer as follows:

> The trouble is that, as the official existence of Mr. Seymour himself demonstrates, the election of a State Engineer and Surveyor on a general ticket tends to put into the office a man who knows more about conventions than he does about surveying. When any work is undertaken, like the State Survey, which calls for a high degree of scientific exactness and professional skill, the official skill is unequal to it, and the better way to get it done is to appoint scientific engineers to do it, instead of letting the official engineers supervise what they are presumably incompetent to conduct.[91]

The position of State Engineer and Surveyor remained an elected one (with two year terms) until 1924, but the office nonetheless gradually became more involved in mapping. In 1883 the State Engineer's office produced a map of the Niagara Reservation (poaching on Gardiner's territory), and in 1884 (as previously noted) it became involved in producing maps of the Adirondacks for the Forest Commission.[92] In 1885, Governor Hill again proposed to abolish the State Survey and the Adirondack Survey, and have their functions performed by the Office of State Engineer and Surveyor.[93] This idea was considered by a committee of the State Assembly, which recommended against it.[94] But it was revived by the State Controller Chapin in 1887 as part of a plan to save the state money by consolidating offices—a proposal which this time was supported by *The New York Times*.[95]

The struggle over control of the state's mapping activities took a new turn with the entry of the USGS onto the scene in 1888. The early years of USGS mapping in New York are described very well in the article published in 1895 by Henry Gannett (1846-1914), which as already been cited.[96] Gannett was a major figure in the USGS, which was organized in 1879, mainly through the consolidation of the various federal surveys active in the West. Gannett had lobbied for the creation of the USGS, and he was appointed by John Wesley Powell as its Chief Geographer. Beginning in 1882, the USGS under Powell and Gannett undertook an ambitious program to map the entire nation in scales of 1:125,000 and 1:62:500.[97] From the beginning, there had been some discussion about a cooperative program between the USGS and a state agency (initially the State Survey) to map New York State, but because of the rivalries and turbulent politics surrounding mapping in New York, it was a number of years before anything actually happened.

The way Gannett presented the matter, virtually nothing had been done to create scientific maps of New York until the USGS came onto the scene:

> Prior to 1888 there were no maps of any part of the state which were worthy the name. The only map of the State in existence, known as the French map, was made by private parties, was compiled mainly from

> subdivisional [*sic*] surveys made a century ago, and from traverses of the roads and railroads. It is little more than a diagram of roads. This was published on a scale of 1:300,000, that is, about 4 3/4 miles to an inch, and practically represents all that was known of the State.[98]

Gannett's harsh judgment resembles that of James Gardiner and other professional cartographers, but it ignores or downplays the contributions of the Coast Survey, the State Survey, the Adirondack Survey, and even J.H. French. In evaluating such statements, it should be kept in mind that Gannett had a vested interest in the promotion of his own agency, and in the production of topographic maps. It is true that his judgment has been mostly vindicated by time, and few today would deny that detailed topographic maps are useful and worth the expense. But this does not mean that the opponents of Gannett and those who thought like him were fools, or that maps like the French Map were not useful in their time. Much of the history of cartography of America has been written by professional surveyors and mapmakers who favored "scientific mapping," or by scholars sympathetic to their viewpoint. This is cartographic history written by the victors, and its celebration of scientific progress sometimes obscures what actually happened and why.

In 1888, the USGS began mapping quadrangles in New York at a scale of 1:62:500 (or one mile to an inch). Maps at this scale are often referred to as "fifteen minute maps," because each side covers 15 minutes (or one fourth of a degree) of the earth's surface. They are also referred to as "topographic maps," since they were the first widely available maps in the United States to show topography by means of contour lines. USGS topographic mapping of New York began in the vicinity of New York City, and between 1888 and1891, some 4,159 square miles were covered—mostly in the metropolitan area and in the lower Hudson Valley. Figure 12.4 shows a portion of one of these early fifteen minute maps.

Figure 12.4. Detail of USGS 15' Carmel Sheet (1893). Courtesy David Rumsey Collection.

The creation of topographic maps of New York received a considerable boost when, in 1893, a cooperative agreement was finally signed between the USGS and the New York State Engineer and Surveyor.[99] Under this arrangement, the state and the federal governments agreed to split the cost of surveying and mapping in New York. This idea was not a new one. As early as 1880, Clarence King (then head of the USGS) had corresponded with New York State geologist James Hall about the possibility of a cooperative mapping program.[100] As previously noted, this agreement came about only after the failure of negotiations between Powell and Colvin. Powell found himself unable to work with Colvin and his allies in the legislature. It seems that both Powell and Colvin basically wanted to control the operation, and that Powell finally found the State Engineer and Surveyor to be more compliant.

Both Colvin and Gardiner must have been mortified by this arrangement, which each had sought for the agency under his direction. After the agreement with the office of the State Engineer and Surveyor was concluded, Gardiner placed in his scrapbook an undated clipping from the *Albany Argus* announcing the agreement, scribbling on it: “Such is fame! Keep this!”[101]

The new arrangement was successful, and surprisingly uncontroversial. A reading of the cooperative agreement shows that the USGS was left in almost complete control of the actual process of surveying and mapping—thus laying to rest concerns about the ability of the State Engineer and Surveyor to carry out the work. New York’s role was

restricted mainly to helping set priorities for areas to be mapped, and to making corrections of the work done by USGS surveyors. New York benefited by paying only half of the cost of surveying the maps, and the USGS took care of their publication. This cost sharing arrangement has continued in one form or another to the present day. By 1903, detailed topographic mapping covered about 64 percent of the state.[102] It was not until the end of the 1920s that New York completely mapped at a scale of 1:62,500.[103]

We know a good deal about how these 15 minute maps were constructed, thanks in part to Gannett, who also wrote the first *Manual of Topographic Methods* for the USGS.[104] The methods employed were similar to those of the Coast Survey. After the initial primary triangulation, draft quadrangle maps were made using a plane table. A great deal of emphasis was placed on finding the exact location of numerous points, such as hill tops, church steeples, and cross roads. Some of these were marked by the well-known "bench marks," which are still used in many state and federal surveys today. Bench marks answered the need for property surveyors and others to be able to locate the precise location of the lines of their own surveys.[105]

The most characteristic feature of these maps is the use of elevation contour lines, which were generally spaced at twenty feet apart. Users of early topographic maps should be aware that the contour lines only approximate the actual topography. As described by Gannett, there is a certain lack of precision in the way the lines were drawn. As Gannett put it: "Heights for the location of contour lines are measured by a variety of means dependent upon the accuracy with which they are desired."[106] The means for measuring elevations included the use of an instrument called the Wye level, vertical triangulation, and the use of barometers. Here is how Gannett describes the final stage of drawing a map using a plane table:

> When the locations and height measurements upon a sheet have been completed, all these data are assembled upon one sheet, and then taken in hand by the most experienced sketcher in the party, usually its chief, who goes over the sheet, occupying all points which seem desirable, and sketches the natural and artificial features, referring them for position, size and shape to these located points and height measurements. Since the positions are scattered over the sheet, usually with a dozen or more on each square inch, there is little room for error in the sketching.[107]

Several things can be said about the procedures described by Gannett. The first is that they did succeed in giving a more faithful, detailed, and reliable portrait of the land than anything done by previous map makers. The second is that these maps by no means provide a mirror image or a replica of the landscape in miniature, in spite of some of the rhetoric used by Gannett and other advocates of topographic mapping. It is clear, even from Gannett's description, that there was a considerable amount of subjectivity involved in the creation of these maps. Items were included or excluded by the mapmaker depending on his personal judgment of their importance, which may or may not be the same as our own. The desire to produce quick results led to the introduction of various types of errors on some maps. The sketching of contour lines, probably more than any other operation, involved a good deal of estimation and guesswork. Often, considerable

differences can be detected when one compares the contour lines on one of these old fifteen minute maps with those on a modern USGS map, although it should be noted that the accuracy of contour mapping gradually improved after 1890.[108]

In spite of their limitations, the old fifteen minute maps are much used for historical research. They show roads, houses (but not the names of their owners), streams, rivers, mines, and various other features, including, of course, topography. Their detail and relative accuracy accounts for much of their appeal and use. Researchers wanting to know the location of old roads or houses can be reasonably certain that they were actually located where they were shown on these maps. They are popular with those who want to locate old mines or railroads, or to get some idea of the layout of a town 100 years ago. Some of the uses of these maps are less obvious. For example, geologists use them to locate streams and hills that have been bulldozed or covered up by recent development.

Maps in the fifteen minute series can be found in many large libraries and historical societies. Almost all of them are also available online.[109]

Mapping for Specialized Purposes

In chapter 10 the origins of thematic mapping were briefly reviewed, and some of the few thematic maps of New York that were published prior to the Civil War were described. In the second half of the nineteenth century, thematic mapping became more widespread—both in New York and throughout the nation. Advances in such areas as geology, soil science, public health, and demography—as well as in statistics—went hand in the hand with the creation of increasingly sophisticated and numerous thematic maps. Generally speaking, thematic mapping in New York, as elsewhere in the United States, still reflected developments in Europe.

Geological Maps

The decades immediately following 1890 saw the extensive publication of geological maps by both state and federal agencies.[110] Detailed geological mapping requires reasonably good topographic mapping to use as a base, and the increasing production of 15 minute maps made this available. The production of geological maps was part of the mandate of the USGS, and actually preceded the decision to produce topographic maps by that agency.

The best known geological map product begun by the USGS in the decades before the First World War is the *Geologic Atlas of the United States*, which is a set of 227 folios published between 1894 and 1945. The maps in this series are at a scale of 1:62,500, and are based on the USGS topographic maps produced at that scale. These portfolios are available in many large research libraries, and online from Texas A&M University.[111] Only a small number of the folios in this series cover parts of New York State, with individual folios for Niagara (1913), Watkins Glen – Catatonk (1909), New York City (1902), and several areas on New York's borders with New Jersey and Pennsylvania. An example of this type of map is shown as Figure 12.5. Many more geologic maps covering parts of New York State were produced by the New York State Geological Survey, and are listed in online catalogs and databases.[112]

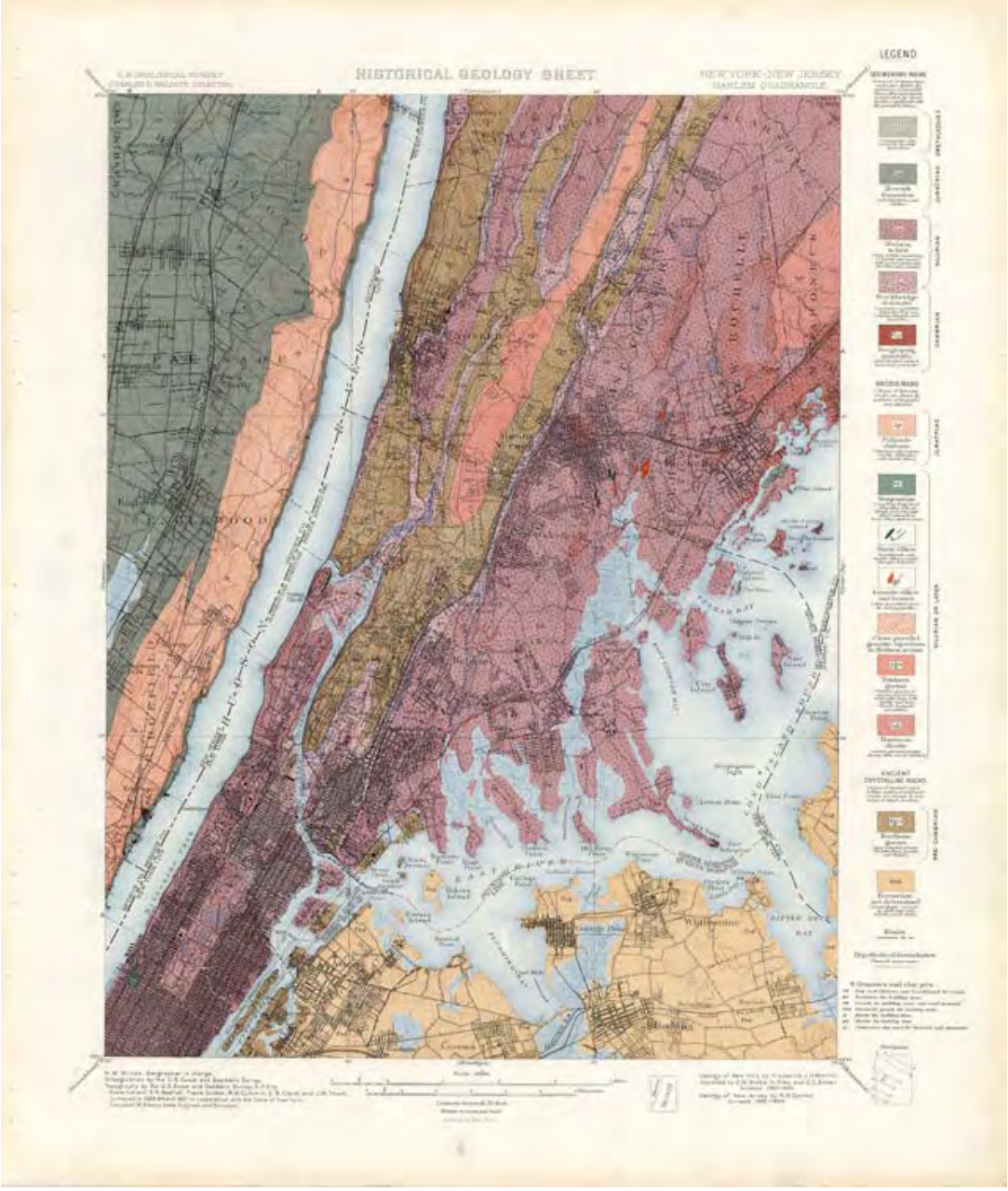

Figure 12.5**.** *Historical Geology Sheet, New York-New Jersey Harlem Quadrangle* from Folio 83 *Geologic Atlas of the United States* (1902) Courtesy Texas A&M University Libraries.

A new geological map of the entire state of New York was published in its preliminary form in 1892, and in a widely distributed edition in 1894.[113] This is sometimes known as the Hall-McGee map, since James Hall supervised its creation and W.J. (William John) McGee drafted it. This was the first substantially new geological map of New York State since 1842, and it is remarkable that Hall was involved in the production of both maps, which are separated by more than 50 years. This map was a cooperative project between New York State Museum and the United States Geological

Survey. The USGS was responsible for producing the base map and for publishing the geological map. W.J. McGee, a distinguished geologist and ethnologist, was employed by the USGS. A revised version of this map was authored by state geologist Frederick James Hamilton Merrill and published in 1901.[114] Later geological maps of New York are basically revisions of the Merrill map.

Soil Maps

We have seen that a small number of soil maps appeared in New York State in the first half of the nineteenth century. These early soil maps were based almost completely on the geology of underlying rocks, and consequently were quite different in concept from modern soil maps. Modern ideas concerning the origin and nature of soils originated in Russia in the 1870s, and were further developed in Western Europe and the United States in the first decades of the twentieth century. Soil maps published prior to about 1930 reflect this changing situation, and consequently, depending on date of publication, they are more-or-less different in content and approach from recent soil maps.[115]

Soil maps started to appear in quantity after organization of the Division of Soils in U.S. Dept. of Agriculture in 1899. This organization became the Bureau of Soils in 1901, which in 1927 became part of the Bureau of Chemistry and Soils. These name changes are reflected on the soil surveys, and are important for locating them in library catalogs.

The earliest modern soil map in New York State covered the Westfield area in Chautauqua County. Between 1901 and 1905 a total of eight soil maps were produced, only two of which covered entire counties (1903 soil map of Long Island, which covered Nassau and Suffolk Counties). After 1905, most soil maps covered entire counties, and a cooperative arrangement was made between Cornell Agricultural College and the federal Bureau of Chemistry and Soils.[116] Between 1905 and 1920, an additional twenty-five counties were mapped.

These early soil maps resemble geological maps in some respects. They also use USGS topographic maps as a base, and both soil and geologic maps are notably colorful. As we have seen, soil maps and surficial geologic maps have a common historical origin, and surficial geology and soils are , in fact, frequently related. The categories used by geologists and soil scientists are often quite different, however, and it is an interesting exercise to compare a soil map with a surface geological map of a particular area.

Soil surveys are an underutilized resource, but they have many applications in addition to farming. They can be useful for regional planning, land assessment, flood control, and environmental evaluations. For many of these uses, researchers will want to use the most modern soil maps available, but the older editions can also be revealing. This is particularly the case for those who are studying the relationship between soils and human activities, especially in areas that are now heavily urbanized. It should be noted that these early soil maps were almost always accompanied by booklets, which often provide useful information about environmental conditions in the areas covered by the maps.

Modern soil surveys look quite different from these early soil surveys. Recent soil surveys take the form of booklets containing black and white aerial photographs, which are marked up to show the distribution of soil types. Although more detailed and precise than the older soil maps, they are a lot less colorful and attractive. Because modern soil

survey booklets display their information on a large number of discontinuous and visually unappealing photographs, they are not as useful for obtaining an overview of the distribution of soil types over large areas as the older maps. This often makes the older soil maps better for such purposes as public display and classroom instruction.

Locating old soil maps can be difficult. Usually they are not cataloged separately by libraries. If they are cataloged at all, they often have to be tracked down by looking for the booklet in which they were published—they can usually be found in catalogs by looking under "soil survey" and the name of a particular county. Large research libraries usually have at least a partial collection of soil surveys. Stony Brook University has made available on the World Wide Web a list of its fairly extensive collection of New York State soil maps.[117]

Maps Concerned with Municipal Services and Public Health

A considerable number of maps were produced during this period on such subjects as water supply, fire protection, public health, and parks. Most of these, which can broadly be described as "thematic maps," were produced for individual cities. A small amount of this type of mapping was done prior to the Civil War, as was seen in Chapter 10, but it really took off after the end of that conflict. Its rise was largely a consequence of the rapid growth of cities, and of the attendant need for such things as improved sewerage, garbage disposal, drainage, and water supply. Predictably, most of the mapping of this type was done on behalf of the state's (and the nation's) largest city. Even though it was not until later in the nineteenth century that the germ theory of disease was developed, by the middle of the century progressive municipal planners and reformers recognized the relationship between public health and such things as sanitation, clean water, drainage, and the maintenance of open spaces.[118]

The most prominent person engaged in producing maps to improve living conditions in New York after the middle of the nineteenth century was Egbert Ludovicus Viele (1825-1902). He was earlier mentioned in passing as advocating a topographic survey of the state in the 1850s. Viele was trained as a military engineer at West Point, but resigned his commission in 1853. In 1855, he was appointed State Engineer of New Jersey, where he was in charge of a topographical survey of that state. During the Civil War, he returned to military duty, and held the rank of Brigadier General. Both in military and civilian life, Viel was well aware of the importance of good sanitation for the maintenance of health and life. A fairly prolific author, he published several books and pamphlets advocating improved public sanitation. After the war, the primary focus of his activities was New York City.[119]

For our purposes, Viele is most important for the engineering maps he produced of Manhattan Island. As early as 1856, he was appointed Chief Engineer of Central Park, and drew up a plan for the park even before the involvement of Olmsted and Vaux.[120] Like other reformers of his time, Viele regarded parks as "the lungs of the city," and important for public health. Later in the 1850s, and again after the Civil War, he was involved in producing detailed drainage maps of Manhattan, which are still consulted by architects and engineers. He also helped with the planning for New York's first subways.

Viele's most important contribution to the mapping of Manhattan is a topographical map, which among other things shows the original streams and marshes on the island,

which had been built over or were in the process of being built over. The first version of this appeared in 1865, and bears the title *Topographical Map of the City of New York: Showing Original Water Courses and Made Land*.[121] An expanded version appeared in 1874 under the title *Topographical Atlas of the City of New York*.[122]

These handsome maps, which were constructed partially from surveys and partially from old maps, show all of the former lakes, streams, swamps and landfills underlying the streets and buildings of Manhattan. They are of interest not only to map collectors and historians, but are still used by engineers and architects, who sometimes refer to them collectively as the "Water Map." Builders need to know exactly what is underlying their structures, since such things as underground streams can still flood basements and cause foundations to settle. The importance of this mapping has been noted in several recent articles and on Web sites.[123]

Some surveying and mapping for municipal services occurred elsewhere in New York State during this period, although none of it was as spectacular as Viele's "Water Map" of New York City. It was noted earlier in this chapter that James Terry Gardiner worked for the New York State Board of Health as well as the State Survey. Gardiner's work for the Board of Health involved a good deal of surveying for such matters as draining swamps and construction of sewers. He often served as a consultant on these matters, and carried on an extensive correspondence with civil engineers throughout the state. Some fairly simple maps dealing with sewerage and water supply for individual upstate towns were produced by the Board of Health. They can be found in the New York State Legislative Documents, although none of them are of more than local interest.[124]

Statistical Maps

As previously noted, the classical "thematic map" is a statistical map showing the geographical distribution of such things as health or census statistics. Such information can also be displayed by numbers in tabular form, and often also by such graphic means as pie charts and bar graphs. Statistical maps are commonplace today, but they only slowly gained acceptance in the United States in the decades between the Civil War and the First World War.

Almost all of the thematic maps of New York discussed so far are not of this type. Even the early disease maps mentioned in chapter 10 of this publication do not quite qualify as statistical maps, since they show the locations of individual occurrences of diseases, rather than grouping the cases into numeric aggregates and mapping their spatial distribution. Statistical maps may make use of a number of techniques, including isolines, gradient tints, clustered dots, and graduated circles. The best known and most common statistical maps today represent numerical data by geographic categories, such as wards, census tracts, or counties. These are known as *choropleth* maps, and use different colors or techniques such as shading or cross hatching to represent different concentrations of data in various areas. We see choropleth maps so often today mainly because they are easy to churn out using GIS and other computer technology. Another type of statistical map known as the *isarithmic* map, which organizes data using contour lines, was frequently used prior to the first world war. These maps (and their cousins *dasymetric* maps) are more difficult to construct than choropleth maps, but can often present data with fewer areal geographic distortions.

It appears that the first statistical map of New York State showing population distribution was published in 1865, and was based on the state census of that year.[125] Although many conceptually similar maps had appeared in Europe prior to that date (and even a few in the United States), this map is still a somewhat isolated precursor. It was only after the U.S. Census Bureau began publishing statistical maps in quantity for the 1870 census that such maps became widespread in the United States.[126] Indeed, throughout the period prior to the First World War most statistical mapping published in the United States was done by the federal government. Only a small number of maps of New York were published by state agencies or private organizations.

Those interested in the statistical mapping of New York State should pay careful attention to the publications of the U.S. Census Office in the decades after 1870. Although most of these census maps cover all of the United States, or at least the states east of the Mississippi River, they show county-level data for New York State, and they are usually the only statistical maps available that do this. The earliest in this series of Census Bureau publications is entitled *Statistical Atlas of the United States Based on the Results of the Ninth Census, 1870....*[127]. It is available on the World Wide Web, and includes a variety of thematic maps. They show such things as geology, rainfall, temperature, woodlands, and croplands. The maps showing such things as population statistics and disease distribution are mostly isarithmic. They differ from modern census maps in that they are not based on political units, but rather than on statistical concentrations per square mile. They include such subjects as distribution of foreign population; various diseases, such as malaria; distribution of “colored population”; distribution of wealth; literacy; and birth rate. This volume also includes a good deal of statistical data in the form of bar charts and pie graphs—making it a kind of *tour de force* of ways of visually presenting statistical information, and reminding us of the close relationship between statistical cartography and other forms of visual representation of numerical data.

Figure 12.6. Detail *of Distribution of Wealth* map from 1870 Census Atlas. Courtesy David Rumsey Collection.

Similar volumes were published for the censuses of 1880, 1890, and 1900. The Census Office at that time resided in the Interior Department, and was presided over by Henry Gannett, whom we have already met wearing a different hat as head of the USGS's topographical mapping division. These volumes follow the same general pattern set by the 1870 census, although there is some increase in the number and variety of the maps. All three of these volumes are available online from the David Rumsey Collection.[128] The 1900 volume is especially notable for its relatively detailed maps showing rates of epidemic diseases at the county level in New York and neighboring states.

It is no coincidence that the Census Office took an interest in epidemiological maps after 1870. There was much interest in this subject, since it was during the last decades of the nineteenth century that the germ theory of disease was finally established, especially through the publication in 1890 by Robert Koch of his famous postulates. This fit in quite nicely with ongoing concerns about urban health and sanitation.

In the long period between the Civil War and World War I, remarkably few statistical maps were published on the state and local levels in New York. The long list of maps published in New York State legislative documents during these years includes only a few maps showing the distribution of disease in several locations, along with some unremarkable meteorological and crop distribution maps.

The most spectacular statistical maps produced in New York during this period were made by the Tenement House Committee of the Charity Organization of the City of New York. This organization, which played an important role in publicizing the dire conditions of tenement life, produced a series of detailed demographic and

epidemiological maps of small areas in Manhattan. They had long titles like: “Map showing over-crowding of buildings on lots and consequent lack of light and air space also the prevalence of tuberculosis, typhoid fever, scarlet fever and diphtheria in the tenement house district bounded by 11th Avenue, 6th Avenue, West 17th Street, West 14th Street.”[129]. These maps remain in manuscript and can be viewed at the New York Historical Society. Two overview maps drawn for this committee by F.E. Pierce were published in *Harper’s Weekly*, and are available on the World Wide Web. This publication includes two maps on one sheet bearing the titles: *Map of City of New York Showing Densities of Population in the Several Sanitary Districts, June 1, 1894* -- No. 2. *Map of City of New York Showing the distribution of Principal Nationalities by Sanitary Districts* (Figure 12.7).[130]

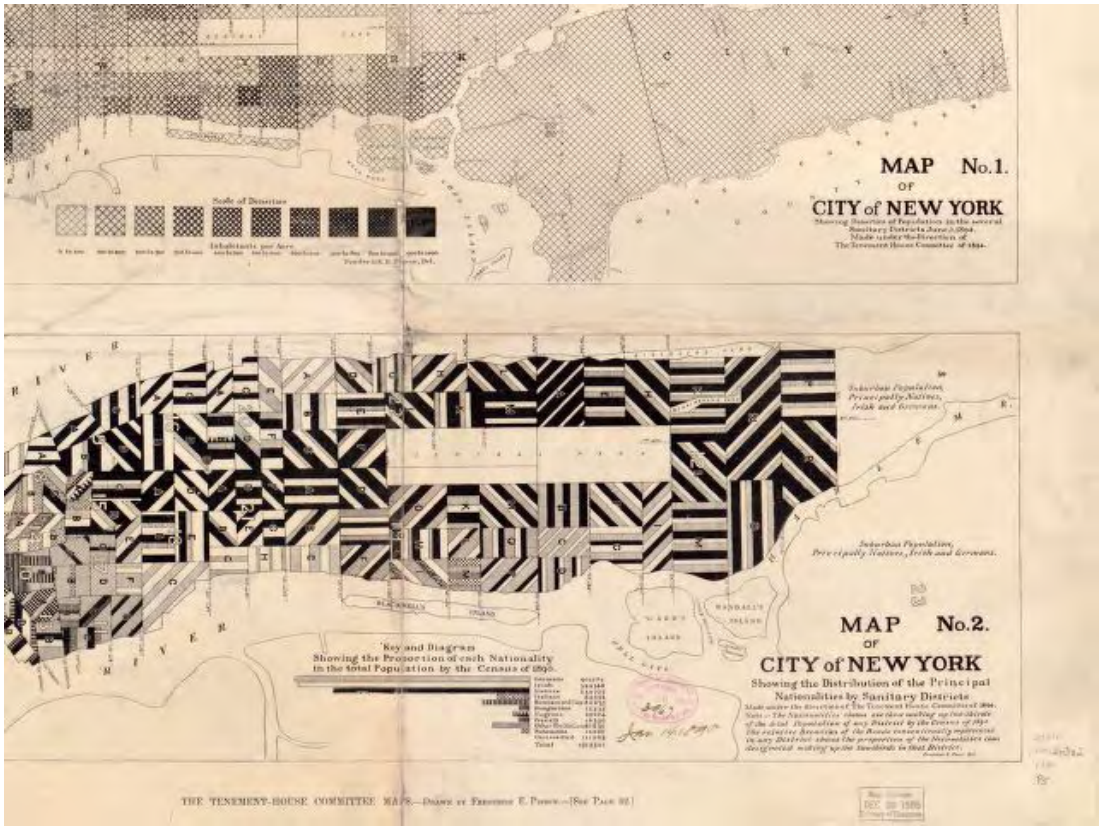

Figure 12.7. Large detail of F.E. Pierce’s maps of the City of New York for the Tenement House Committee. Library of Congress, Geography and Map Division.

Chapter 13
Commercial Cartography, 1860-1920

Introduction

The last half of the nineteenth century saw the continuation and expansion of many of the trends in commercial cartography that had begun in the period between 1840 and 1860. The continued growth of the state's economy and population assured a growing demand for up-to-date maps of the state, its cities, and its transportation network. Map publishers competed with each other to lower costs and produce a greater variety of maps to meet the demand from specialized markets. New technologies facilitated the production of large runs of inexpensive maps. As was earlier the case, commercial map makers were usually unable to meet the expense of extensive new surveys, and depended largely on compilation from government sources.

By the latter part of the nineteenth century, publishers responded to changing conditions by producing several new types of maps. The advent of the bicycle and the automobile stimulated the production of new varieties of road maps. There was a steep rise in the production of maps for advertising purposes, such as maps touting tourist attractions or new real estate developments. Property maps also became more elaborate, and several types of property maps became prominent for the first time, including real estate atlases, bird's-eye views, and fire insurance atlases.

In almost all of these trends, New York mirrored the rest of the nation. Since most of these developments have been described in works that are national in scope, there is no need to go into extensive detail in describing them in New York.

General Purpose State and City Maps

As was seen in the previous chapter, very slow progress was made by government agencies in the last half of the nineteenth century in mapping the state. Most of the maps published by state agencies that covered all of New York show the canal and railroad networks, or focus on specific engineering or public health projects.

Under these circumstances, the demand for general purpose state and city maps was met almost exclusively by commercial map publishers. Most of their maps resembled those that their predecessors published in the 1840s and 1850s, and are also not dramatically different from modern city and state maps.

The mass production of maps lowered their cost, but also affected their quality. After the Civil War, lithography almost entirely displaced copperplate engraving in the production of maps. Toward the end of this period, even less expensive processes, such as photolithography and wax engraving (which was the dominant form of map printing in the United States between 1870 and 1930) came to the fore.[1] Because of the development of new techniques of color printing, such as chromolithography), most maps were no longer colored by hand. Many of those published during these years have rather garish colors—in part because of the use of newly developed aniline dyes. The widespread use of acidic wood pulp paper meant that many maps produced after 1850 are today much more fragile than their predecessors printed on rag paper. In general, most

maps produced in this period are considered to be aesthetically inferior to earlier maps, and they do not command high prices from map collectors.

At the beginning of this period, the New York City based Colton Map Company remained the most important map publisher in the country. The output of the Colton Company gradually diminished, and its last major publications appeared in the early 1890s. Other map publishers with a national scope came to the fore at the end of the nineteenth century and the beginning of the twentieth. The best-known is Chicago-based Rand McNally (founded 1868), which in its early years focused on publishing railroad maps. One of its typical early efforts, published in 1884, is *Rand, McNally & Co.'s New Railroad, County, and Township Map of New York: Showing Every Railroad Station and Post Office in the State*.[2] Starting around the turn of the century, Rand McNally also published numerous street maps of the New York City area.[3]

Rand McNally's major competitors included the George F. Cram Company in New York City (founded 1867), and the Buffalo-based Matthews-Northrup Company (founded around 1878). They were later joined by two other New York City based companies: General Drafting Company (founded 1909) and C.S. Hammond & Co. (founded 1901). All of these companies published maps of New York State or areas within it, as well as of many other parts of the country.[4]

Many of the city and county maps of New York in this period were produced by regional publishers. Almost nothing has been written about most of these companies. One of the larger was the Drew, Allis Company, which published maps of the City of Rochester at frequent intervals between 1878 and 1908. In spite of its national scope, Matthews, Northrup & Co. was also a prolific regional publisher of maps of Buffalo and vicinity during approximately the same period. Andrew Boyd & Sons played a similar (but more modest) role in the Syracuse area. Many smaller publishers were also active. Their maps can be useful to local historians for tracing the growth of cities and counties, and of street networks. They can be tracked down in local libraries and historical societies, or searched out on OCLC by using geographical names as key words.

In addition, publishers of county atlases (particularly members of the Beers family, which will be discussed below), also produced many county and regional maps.

A number of representative maps of New York State from this period are available on the World Wide Web. *Asher & Adams' New York and Part of Ontario,* published in 1871, is typical of the commercially published maps of the state in the post Civil War period.[5] It is a fairly small map at a scale of about 1:1,275,000, and was designed to accompany a gazetteer. Counties are colored in bright hues, rivers and towns are shown, and there is a good depiction of the railroad network, including individual stations. A more ambitious undertaking, published in 1896, is *Bridgman's New Rail Road & Township Map of New York*.[6] Garishly colored and awkwardly put together, it is a truly ugly map. But it is at a large enough scale (1:320,000) to include quite a lot of useful detail, including the "township" (town) boundaries mentioned in its title. It sports a drawing of the state capitol building, and includes numerous inset maps, among them: a map comparing the areas of New York State and England, a "condensed gazetteer of counties," a chart showing the population growth of New York State over time, a map of Congressional districts, a geological map of the state, a hypsometric map, and a climatological map.

Although most of the numerous city and state maps of New York published in this period are not especially noteworthy, there are some outstanding exceptions. The most important of these are in very large format, and are not at present available online or otherwise easily accessible. Several of the most notable cartographic products of this period were published by Julius Bien, but since they took the form of atlases, they will be considered below. Other significant maps of New York City published prior to 1909 are described by Stokes in his *Iconography of Manhattan Island*.

One of the most spectacular maps of the metropolitan area ever published is Louis A. Risse's *General Map of New York City* (1900), the printed version of which is available online from the New York Public Library.[7] The manuscript original of this highly detailed map, which shows all boroughs of the newly consolidated city, reportedly measured twenty-seven by thirty-one feet, and won a Grand Prize at the Paris Exposition of 1900. The published version, reduced to a scale of 1:21,000, measures a mere 263 x 225 cm. (104 x 89 inches). Even the smaller version is a kind of cartographic *tour de force*, which shows in detail both the topography and the street grid of greater New York.

The last half of the nineteenth century also saw the publication of several significant regional maps. Prior to the detailed mapping of large portions of the state by the USGS after 1900, privately produced maps continued to provide important new information for many areas. Mention was made in the previous chapter of the maps of the Adirondacks made by Seneca Ray Stoddard and others, which drew in part on the quasi-public surveys of Verplanck Colvin. New York's other leading forested resort area, the Catskills, was also the scene of significant cartographic activity. A map of the Catskills published in 1879 by Arnold Guyot is particularly noteworthy, since it played an important role in solidifying in the public mind the boundaries and place names of this rather amorphous region.[8] In certain respects the cartographic history of the Catskills parallels that of the Adirondacks. The last decades of the nineteenth century saw an outpouring of maps aimed at the tourist market (some of which will be discussed below). Somewhat later, the Catskills became the scene of efforts to tap its water supply for New York City and to conserve its forested areas. This led to the publication of a modest number of specialized maps by New York State and City commissions concerned with such matters.[9]

Transportation Maps: Railroad, Bicycle, and Automotive

During the first decades following the Civil War, transportation maps resembled those published in the 1840s and 1850s. Most general purpose maps showed roads, canals, and railroads, with railroads becoming increasingly prominent. There is nothing especially notable about most of these maps, except that they are useful for locating old railroads and for studying New York's expanding transportation network. They still made little effort to differentiate between various types of roads. Continuing competition with railroads caused toll roads and plank roads to gradually disappear, both from maps and from the surface of the land. A good sampling of transportation maps from this period can be found at the Web site of the Library of Congress.[10]

Railroads themselves were major map producers at this time, although they usually relied on commercial publishers to do the actual printing of their maps. Route surveys made for purposes of railroad construction are among the most detailed maps available for some areas of New York, although they remain in manuscript form.[11] Railroads

also distributed to the public maps showing their routes and connections. So dominant was the railroad as a means of transportation in this period that railroad companies also played a major role in issuing land promotion and tourist advertising maps. These will be discussed later in this chapter.[12]

In addition to commercial maps, those interested in studying the expansion of New York's transportation network should check the annual reports of the State Engineer and Surveyor, and those of other state agencies, which were published in the New York State Assembly and Senate Documents. These reports frequently contain authoritative and updated maps showing canals and roads in the state. The maps in these reports are often more reliable than commercial road and railroad maps. Several early examples of railroad maps produced by the New York State Engineer and Surveyor are in the railroad maps collection on the Library of Congress Web site; later maps can be found at the New York State Library and in other large research collections. The printed New York State documents also contain extensive detailed information about the routes of particular railroads and canals.

Following the advent of the bicycle and the automobile, both of which made their appearance in the 1880s, there was something of a renaissance in the production of road maps. Prior to the end of the nineteenth century, as has been seen, only modest efforts were made on maps to distinguish the quality of roads. The needs of bicyclists and automobile drivers meant that map makers had to pay much more attention to the surfacing of roads and to the nature of the terrain they passed over.

The first automobiles were expensive and unreliable, and consequently bicycles had an earlier impact on road construction. As early as 1880, a national organization, the League of American Wheelmen (LAW), was founded in Boston to promote the sport of bicycling. Starting in the 1880s, bicycling became a popular pastime in the New York metropolitan area. According to road map expert James Akerman, the first road guide for bicyclists may have been Albert B. Barkman's *Road-Book of Long Island*, which was published for the Brooklyn Bicycle Club in 1885.[13] After 1890, bicycling was briefly a craze in the vicinity of New York City, where bicycle excursions became a favorite weekend activity—much to the dismay of some clergymen, who denounced this newfangled way of profaning the Sabbath.[14]

Most bicycle maps appeared in a brief burst between 1885 and 1905. They are particularly interesting in the ways they foreshadow later road maps. Although the automobile existed at this time, it was too much of a luxury item to have much impact on road construction or mapping. Bicycle maps were among the first to differentiate between paved and unpaved roads, since bicycling on an unpaved road is no pleasure. In fact, the first paved roads in the vicinity of New York City were actually bicycle "side paths," which were constructed on the sides of dirt or gravel roads. Sensibly, bicycle maps also frequently provided information about the hilliness of the terrain. Many of them contained information about train stations and accommodations, since bicyclists wanting to escape the city often took their machines with them on the train, and stayed overnight on their weekend expeditions. These maps often included advertising for such things as special bicycle shoes, clothing, and instruction on how to ride a bike—an indication that the bicycling fad was an early manifestation of mass marketing and consumer culture.

Lobbying for paved roads and bicycle paths was a major activity of organizations like the League of American Wheelmen, which in 1891 began publishing *Good Roads*

Magazine. This organization succeeded in getting a "side path law" passed by the New York State Legislature. In 1900, the LAW published a *Progress Map Showing Side Path Construction in the State of New York under the Side Path Law*.[15]

As with many other maps of this time period, libraries and archives have paid relatively little attention to bicycle maps. Many major map collections have at least a few of them, but often they are not cataloged. Bicycle maps were published for most of New York State, although a majority covered some part of the New York Metropolitan Area. Few of the early bicycle maps are available online. One exception is *Colton's Driving & Wheeling Map of the Country Twenty Five Miles North of the City of New York* (1892), which was "particularly intended for the use of sportsmen, wheelmen, and driving parties."[16] More specifically marketed to bicyclists is George H. Walker and Company's 1897 *Cyclists' Road Map of the Hudson River District, New York*.[17] Both of these maps mark cycling routes in red. Almost all of these routes were not paved roads or side paths, but rather dirt or gravel roads which were deemed in good enough condition for cyclists.

Starting around 1900, the automobile became increasingly important as a means of transportation. By that year, about 8000 cars were registered in the United States.[18] The American Automobile Association was founded in 1902, but as late as 1910 only one in 196 Americans owned a car. Only after the introduction of the Model-T Ford in 1909 did automobile use really take off.

The increasing use of the automobile was crucial for the development of a network of paved roads. As late as 1900, a "good road" or an "improved road" was graded and possibly surfaced with gravel or macadam. Macadam roads, of which there were several types, were rock or gravel roads, often with a waterproof surface. At the end of the nineteenth-century, several improvements were made in the construction of these roads, including the use of the steamroller.[19]

It was soon discovered that macadam roads, although adequate for wagons and carriages, were quickly destroyed by automobile tires, which led to a demand for paved roads. Both asphalt and concrete roads made their first appearance in Europe around the middle of the nineteenth century, but only after 1900 do we begin to hear of "bituminous macadam" or asphalt roads in New York. There were several types of asphalt in use at the beginning of the twentieth-century. A similar form of pavement involved the application of tar to macadam (this "tar macadam" is the origin of the word "tarmac" for airport runways). Concrete road construction did not become common in New York until around the First World War.

The development of the network of paved roads was a slow process. Although New York had one of the most active road building programs in the country, along with a high percentage of the nation's registered autos, as late as 1906 it had only constructed a spotty network of "improved roads" (still mostly paved with gravel) in the vicinity of major cities. After the introduction of the Model T Ford in 1909, automobile ownership and road construction began rolling along at a faster pace. By 1914 New York had 5,718 miles of macadam roads, along with 3,169 miles of "bituminous macadam" or asphalt roads.[20]

Prior to the First World War, a number of familiar names started publishing road maps, including, Rand McNally, C.S. Hammond, and the American Automobile Association. Other maps, not specifically marketed to automobile drivers, also included

more information useful to motorists. Thus, the 1912 edition of Stoddard's *Map of the Adirondacks* made an effort to distinguish between "state highways and important roads generally," "ordinary country roads," and "wilderness roads." It also showed "distances in miles and tenths of miles by approved auto routes from New York City." Reflecting the limitations of underpowered early motor cars, it marked "difficult hills" with arrows pointing uphill.[21]

The appearance and quality of these early road maps varies considerably.[22] The best were carefully drafted and elegant in appearance—they clearly aimed at a smaller and more affluent market than most later road maps. Because the automobile was not yet a dominant a mode of transportation, many of these maps were targeted at bicycle and railroad users, as well as at drivers. A good example of these fancy maps, which can be viewed on the Web, is R.D. Servoss, *Sectional Road Map of Westchester County*, which appeared in at least four editions between 1895 and 1902 (Figure 13.1).[23] This elaborate multi-page map in booklet form differentiated between "good roads," "fair roads," and "ordinary" roads, but did not spell out what was meant by these categories. It appears that the "good roads" were mostly paved with gravel or macadam. The "fair roads" were unpaved. And the "ordinary roads" were either side streets or unspeakably bad. Servoss' map also showed railroad lines and stations, and indicated relief by hachures. The 1895 edition (but not the 1902 edition) included advertising material aimed at bicyclists; the 1902 edition boasted that it included a "description of scenery, routes, etc." Both editions provided distances from the New York City Hall.

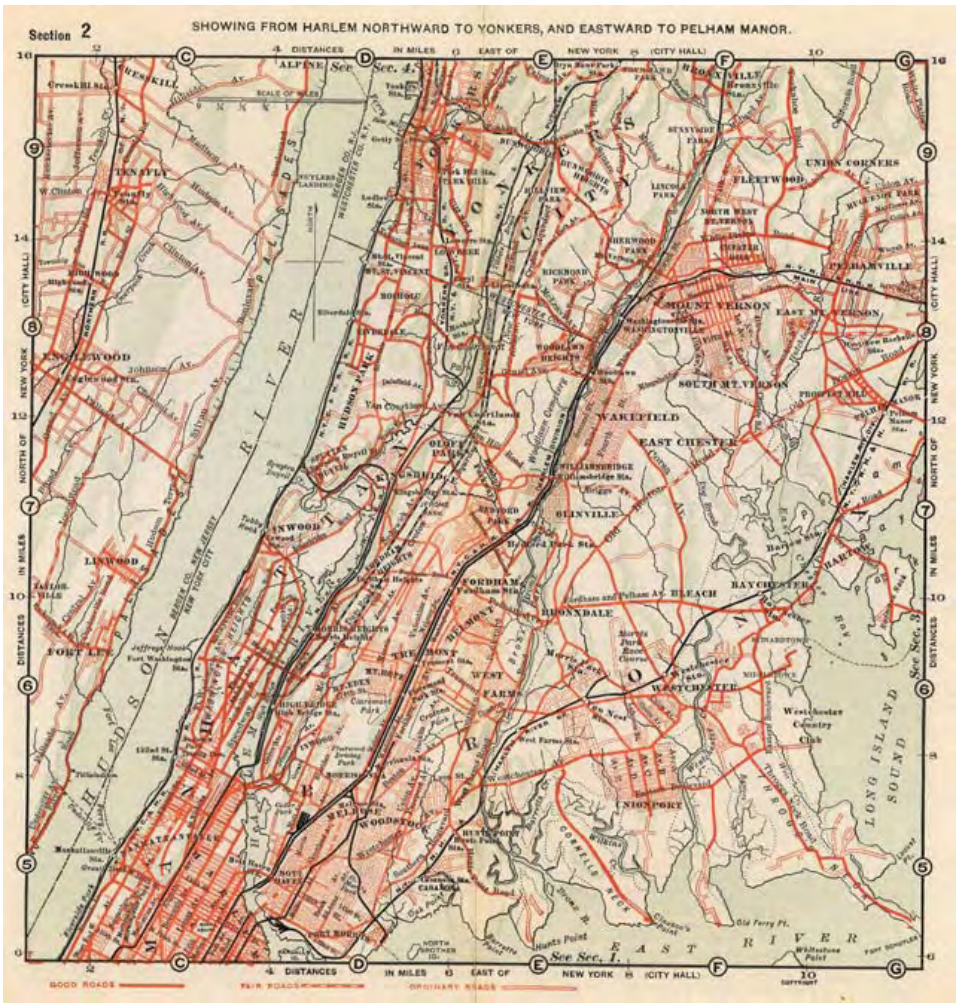

Figure 13.1. Portion of R.D. Servoss, *Sectional Road Map of Westchester County* (1902). Courtesy of David Rumsey Collection.

Not all road maps of this period were so elaborate or carefully crafted. Many were sold cheaply or even given out for free to attract tourists. Some of these maps were even published by railroad companies, which little knew that they were nourishing a viper that would later nearly kill them off. An exuberantly titled example of such a map was published by the Long Island Railroad in 1900: *Cyclists' Paradise and Automobilists' Arcadia: a Guide for Tourists, with an Accurate Map Showing Roads and Cycle Paths of Long Island, with Runs, Hotels, and Time Tables, Sufficient Data to Enable Anyone to "Lay Out a Trip" Intelligently.* [24] This map and its accompanying booklet must have been aimed primarily at bicyclists who wanted to escape the city by train, although maybe the operators of the railroad calculated that "automobilists" would also turn to the railroad after their cars broke down. Even when not published by railroads, it was common for these early road maps to show train stations, which were usually suppressed on the maps distributed by oil companies after 1920.

In the early years of automobile travel, there was no standardized system of marking or signing roads, and consequently it was easy for drivers to lose their way. In response to

this situation, some early road maps took the form of strip maps with explicit driving instructions, such as “proceed 2.4 miles and turn left at the yellow barn.” A work that takes this tendency to an extreme is Gardner S. Chapin’s series of *Photo-Auto Maps*, which was published by Rand McNally & Company. One of these shows the route from New York City to Albany and Saratoga Springs.[25] It is a booklet, which contains nine index maps, along with a series of photographs of landmarks accompanied by driving instructions. For example, there is a photograph of the corner of 72nd street and Broadway in New York City with a caption reading “Turn RIGHT from 72nd Street into Broadway. Next photo, 58th Street, seven-tenths of a mile.” In intention, this map resembles modern GPS units designed for automobiles.

Only after 1920 did road maps routinely differentiate between paved roads and other forms of improved roads. The early 1920s mark the beginning of the golden age of oil company road maps, which will be described in the next chapter.

Property Maps and Atlases

Some of the most notable developments in commercial cartography during the period between the Civil War and the outbreak of World War I were in the area of property mapping. There was a flowering of property maps, which included the development of whole new genres.

County and City Property Atlases

County property atlases were among the most important cartographic developments of the decades following 1870. They were an essentially new and characteristically American product, although they were not without precedents. In some respects, they were anticipated by such works as David Burr’s *Atlas of the State of New York* (1830), which met the need for increasingly detailed maps of the state by adopting the atlas format, and including separate maps of each county. The county atlas took this process of amplification one step further by mapping individual counties in a single volume, and using numerous sheets to cover each county in detail.[26]

County atlases also developed out of the large-scale property maps that proliferated in the 1850s. As has been seen, these wall maps showed individual structures and gave the names of homeowners. As wall maps, they were difficult to transport and took up a great deal of space; they were nonetheless limited in the amount of information they could contain. The county atlases under consideration here basically converted these wall maps into atlas format, which made them more portable and allowed for the inclusion of much more information—which in some cases was almost a necessity, given the growth in population of many counties. Characteristically, county atlases gave the names of individual homeowners, and often showed property boundaries as well. They often included advertising, and sometimes featured illustrations of public buildings and even of the homes and farms of prosperous landowners. The extent to which they displaced single-sheet property maps is dramatic. Richard Stephenson’s list of county land ownership maps in the Library of Congress sites only a few examples of such maps published for New York after the Civil War.[27]

Aside from their format, county property atlases share many characteristics with their predecessors. They were produced by entrepreneurs to make a profit. They were mostly compiled from tax records, with the geography based on government surveying. Because of the expense of surveying, little, if any, original surveying was done for these atlases. They also cannot be depended on to show all of the people living in a particular place: aside from careless errors, they generally do not show the names of renters, or of other people who did not pay property taxes, such as illegal squatters.

County atlases had a mixed reputation at the time they were produced. They were often marketed to individual farmers and other home owners by appealing to their vanity.[28] They also appealed to local patriotism, and merchants paid to have the names of their stores included in the atlases as a form of advertising. Some of these atlases, particularly in the Middle West, were put together very carelessly.

The county atlases of New York appear as a group to have been relatively well done. Many of them were produced by various members of the Beers family (F.W. Beers, D.G. Beers, and J.B. Beers all had their own publishing companies). This family specialized in producing property atlases, sometimes along with local histories.[29] Most of their atlases have little advertising or other signs of blatant huckersterism, although their maps of individual towns usually include business directories. Reasonably accurate, they are known for their bright coloring, which some consider to be crude or garish.

Many of the Beers atlases of New York State can be examined online. On the David Rumsey site, these include F.W. Beers, *Atlas of New York and Vicinity* (1868) and his *Atlas of the Hudson River Valley from New York City to Troy* (1891).[30] About twenty county atlases published by various members of the Beers family have been added by the New York Public Library to its online county atlas collection.[31] There is a good deal of variation among these atlases. One of the most unusual is F.W. Beers *Illustrated Historical Atlas of Erie County* (1880), which includes an impressive collection of engravings of buildings, along with a great deal of personal and business information.[32]

Some publishers of county atlases also produced atlases of individual cities, ranging in size from small municipalities like Auburn and Oswego to New York City. Many of these city atlases also include the names of individual homeowners. Some of them add information useful to insurance companies, such as the materials that buildings are constructed of, and the location of fire hydrants. These volumes are closely akin to fire insurance atlases, which will be considered in the following section.

The most productive years for the publication of county property atlases were the 1870s, but they continued to appear throughout the period prior to the First World War. One of the most prolific publishers of county atlases during this period was Louis H. Everts, who continued to publish atlases of New York counties under the imprint of the Century Map Company in the first two decades of the twentieth century. One of Everts' employees was A.L. Westgard, who later went on to become one of the pioneers of automobile route mapping. Westgard describes in the opening pages of his memoirs the techniques he used to carry out surveys in his early years as a county atlas surveyor. Basically, his practice was little changed from that of county map makers in the 1850's: he relied on a wheelbarrow-like "trundle wheel" (odometer), with a compass and plain table attached, to measure the roads and mark the location of houses along them, stopping along the way to knock on doors and obtain the names of property owners.[33]

Albert Hazen Wright has published a useful *Check List of the County Atlases of New York*. Both county and city atlases are heavily used by (among others) local historians, genealogists, and real estate title searchers. Atlases covering specific regions or places can usually be found in local libraries and historical societies; a large collection of county atlas has been made available on the Web for a fee by a commercial source, and the Library of Congress has begun digitizing its large collection of county atlases.[34]

Fire Insurance Maps

Fire insurance maps and atlases, which also became prominent after the Civil War, filled a more utilitarian need. Rather than appealing to civic pride and being intended for display, these specialized atlases served the needs of fire fighters, realtors, and property insurance companies. Typically, they consist of large-scale maps of urban areas, which convey information about such things as the materials used in the construction of buildings, the location of stairways and exits, and the location of water mains and fire hydrants. Particularly important for historical researchers, they often also identify how buildings were used.[35]

Like many of the maps characteristic of the post Civil War period, the origins of fire insurance maps can be traced back to the 1850s. Although there are some earlier antecedents, The first American atlas embodying the essential characteristics of fire insurance maps appears to have been published by the Perris Company of New York City, starting in 1852.[36]

After the Civil War, this type of map became widespread. In the 1870s and 1880s, the G.M. Hopkins Company published fire insurance atlases of Albany, Buffalo, and other cities in upstate New York.[37] Later in the nineteenth and early twentieth centuries, similar atlases were published for the New York metropolitan area by G.W. Bromley and Company.[38] Between 1902 and 1914, the Century Map Company of Philadelphia, produced a series of fire insurance atlases of many upstate New York counties.[39]

After the 1890s, the Sanborn Map Company (founded in 1866) became the predominant publisher of fire insurance maps. This company, which until recently was based in Pelham New York, produced maps for the entire country—covering a total of about 12,000 towns. Most of their maps date from between 1880 and 1930, and some still being revised. Revisions often took the form of paste-on slips, which were issued in sets at various intervals for different locations. There is no absolutely complete list of the Sanborn maps of New York, although most of them are listed in a guide to the Sanborn maps at the Library of Congress, which is supplemented by an online list published by the University of California at Berkeley.

Most fire insurance maps published after the 1850s had the same general characteristics. They were typically published at a very large scale (often 1:600), and show the footprint of individual buildings. They were usually color coded to show the materials used in construction, and indicated the use of individual buildings and rooms. They also showed the number of stories of buildings, the location of stairwells, and other information of interest to fire insurance companies—such as the location of fire doors, storage tanks and their contents, interior and exterior walls, fire hydrants, and machinery. Figure 13.2 illustrates many of these features.

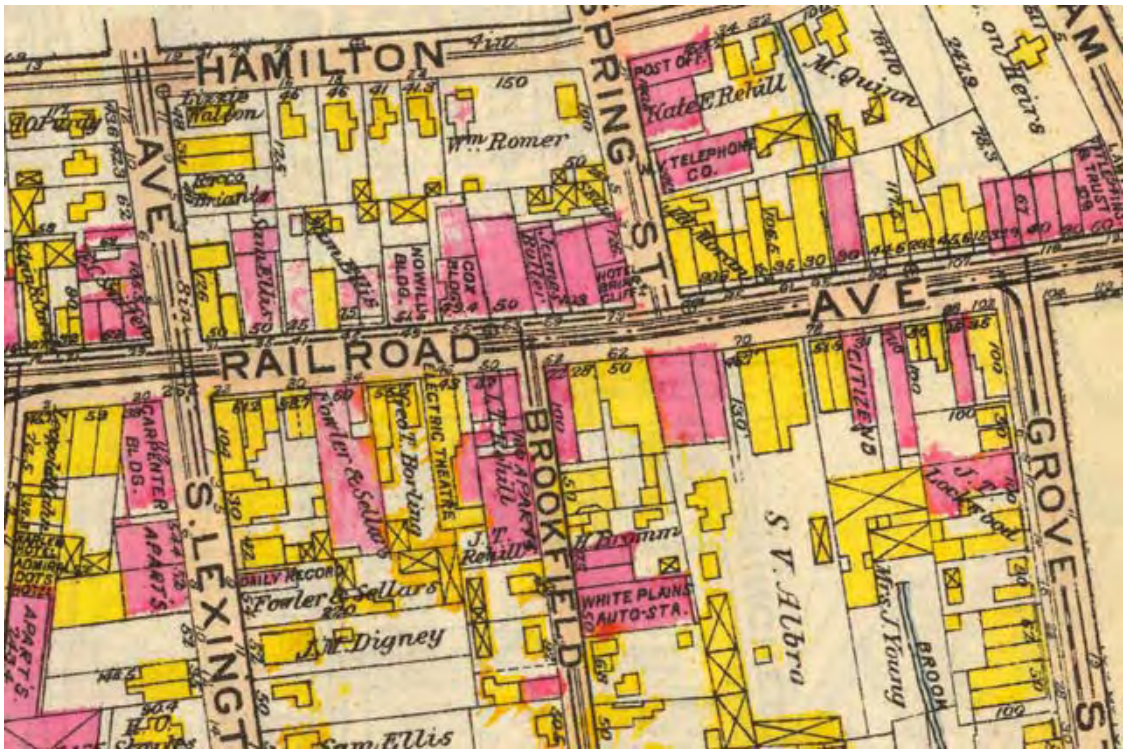

Figure 13.2. Detail showing a portion of White Plains from G.W. Bromley & Co., *Atlas of Westchester County, N.Y.* (1914). Courtesy of David Rumsey Collection.

The detail and comprehensive coverage of fire insurance maps makes them invaluable to researchers. Their heaviest users are probably environmental risk analysts, who use them to ascertain possible hazards from the previous uses of buildings. They are also particular favorites of students of urban history, architecture, and city planning. The fairly complete collection of Sanborn atlases at the Library of Congress is available in both microfilm and digital form from commercial publishers, and can be consulted in one or both of these forms at many large libraries. Some additional maps from the Sanborn Map Company archives are available in a separate microfilm collection (but not online).[41] Unfortunately, these reproductions are in black and white, which makes it impossible to make full use of their color coding. The Library of Congress reportedly has plans to reproduce these atlases online and in color. Many New York City fire insurance atlases by companies other than Sanborn can be found at the New York Public Library's Web site.[42]

Panoramic (Bird's-Eye) Views

Panoramic or bird's-eye views of towns and cities are another characteristic feature of the American cartographic scene in the late nineteenth century. They are related to county property atlases in that both provide detailed information about local landscapes. Both of these cartographic forms reflect an intense interest in local and regional history, which gripped the United States in the decades following the Civil War. This was a

golden age for local area studies. This same period saw the appearance of many county histories—some of which were produced by the same people who published county atlases.

Bird's-eye views exist in one the disputed borderlands of the kingdom of maps, and some scholars have questioned whether they qualify as maps at all. Perspective drawings of towns and cities have a long history going back at least as far as the Middle Ages. As was mentioned above in the chapter on Dutch mapping of New York, this type of map was characteristic of seventeenth-century Holland, and had a close relationship at that time to landscape painting. As seen in that chapter, a variety of maps and drawings of New York were produced by Dutch cartographers in the seventeenth century, ranging from views of Manhattan drawn at a low angle (say, as viewed from Brooklyn heights) to high-angle views of entire regions, such as the Manhatus Map, or the map of Renselaerswyck produced around 1632, both of which can be described as true birds-eye views.

The remarkable revival of this type of map in the nineteenth century owes a good deal to lithography, which made it possible to make a profit by publishing relatively small runs of maps for local markets. As early as the 1840s, there was a proliferation of low-angle pictorial views of towns and landscapes, which resemble drawings made by landscape artists. After 1870 these were supplemented by true birds-eye views, in which towns are drawn from a very high angle, as though seen from a balloon or airplane (see Figure 13.3). This latter form is considered to be more "map-like," in that it displays the grid of streets much as seen on a town map, and even approaches the vertical perspective and consistent scale characteristic of maps in the post-Renaissance Western tradition. It should come as no surprise that makers of birds-eye views frequently used city street maps in constructing their city portraits.

Figure 13.3. H.H. Bailey, *Poughkeepsie, N.Y.* (1874). Library of Congress, Geography and Map Division.

Unlike many of the materials discussed in this chapter, bird's-eye views have been subjected to extensive research. The most important study of this subject is John W. Reps magisterial work, which lists most of the birds-eye views of New York.[43] This is supplemented by several other works, including the catalog of an exhibition of bird's-eye views of the state organized by the New York State Museum, which lists several views not included in Reps' catalog.[44] Bird's-eye views were printed in such small numbers that some views still exist that cannot be found in the above works. I once discovered a previously undescribed birds-eye view in a window of a luncheonette in the town of Riverhead, Long Island.

When people look at these high-angle birds-eye views, they sometimes wonder if they were drawn from balloons, but this is thought not to be the case. Like somewhat similar seventeenth-century views, they were drawn from artists on the ground using aerial perspective. Only at the very end of this period were some birds-eye views created that appear to have made use of aerial photographs.[45]

These pictorial and birds-eye views are thought to be generally reliable sources of information about the appearance of nineteenth-century towns and cities. The towns appear somewhat sanitized and cleaned up, but the layout is generally accurate, and the architecture of buildings is correctly rendered. Industry was a source of pride, particularly to small towns, in nineteenth-century New York, and many of these views show factories

and railroad engines industriously belching smoke. On many views, factories and other notable buildings are shown in drawings around the edge of the main map.

A small number of these views are misleading in that were drawn for real estate promoters to show developments that were never actually constructed.[46] But, generally, they provide valuable information for local historians, and can be used alongside maps and photographs to reconstruct the appearance of nineteenth-century towns.

A remarkable number of these birds-eye views were produced between 1870 and 1920. They exist for many towns in New York, including small ones. They were marketed in much the same way as town and city atlases. Artists would go from one town to another making drawings and obtaining subscriptions for their views. After drawing a view of one town, they would often go to neighboring towns and make use of civic pride and town rivalries to encourage local citizens to commission a view of their own town, so as not to be outdone by their neighbors. Business and property owners often paid extra to be listed in directories or have their buildings separately depicted in marginal vignettes. Chambers of commerce and real estate developers would sometimes purchase and distribute quantities of these views to attract potential settlers.

The Library of Congress has made its extensive collection of town views available on the World Wide Web.[47] This collection includes approximately 175 views of cities and towns in New York. Some 57 of these were created by a single artist, Troy-based Lucien (L.R.) Burleigh.

Advertising Maps

The increasingly low cost of maps made it possible to sell them at a nominal price or even to give them away—thereby making them part of everyday life for most Americans. Although maps had occasionally been given away for advertising purposes as early as the eighteenth century, the widespread distribution of advertising maps essentially began in the second half of the nineteenth century. Maps thus played an important role in creating the emerging culture of consumerism.

Railroads and real estate developers (often working together) played a major role in distributing free or low-cost maps at this time. We have already seen hints of this in the use of maps by railroad companies to lure tourists and potential home buyers along their routes, and in the distribution of bird's-eye views to potential settlers by towns and real estate developers. Some bird's-eye views of towns were actually printed in newspapers as advertisements for real estate developments.

Maps were published in this period to draw people to New York's major tourist attractions. Often, they were published by railroads, and included in promotional brochures. A good example of an inexpensive tourist map produced by a railroad is George H Daniels, *The Central Lake Region of the Adirondack Mountains Reached by the New York Central & Hudson River R.R.* (1900-04).[48] Resorts in the Catskills also used maps to attract business. Starting in the 1870s, Walton Van Loan published a series of maps directed at tourists. For example, in 1879 he published a *Map of All Points of Interest Within Four Miles of the Catskill Mountain House, with Roads and Foot Paths*, and in 1884 a *Bird's-eye View of the Mountain Resorts of New York State, and How to Reach Them*.[49] In 1878, the Office of New York & Albany Day Line Runners

sponsored William Link's elaborate *The Hudson by Daylight Map*.[50] Many maps were published by railroads to draw sightseers to Niagara Falls, and a spate of them were produced by merchants and real estate agents for the Pan-American Exhibition in Buffalo in 1900.

The Long Island Railroad was particularly active in producing advertising maps of various types. In 1884, it published a simple map of Long Island showing the railroad's routes prominently marked in red.[51] In the same year, it published a larger map with the same title, which enthused in large type in the margins: "Buy homes on Long Island! The pleasure ground of New York. 250 miles water front on sea and sound. Swept by ocean breezes. Cool in summer. Warm in winter. The most healthful and delightful climate on the coast. Charming marine views. Sailing and fishing superb. Frequent and fast trains to all points. Cheap fares."[52]

There is a good reason why the Long Island Railroad was so heavily involved in promoting suburban real estate. Long Island has some of the earliest and best-known suburban developments in the country, and access to these new communities was by streetcar and railroad. "The route of the dashing commuter," as the Long Island Railroad later liked to call itself, therefore had a strong financial interest in promoting this trend. Maps emphasizing rail connections were produced by both the railroad and by real estate developers (which often mentioned the proximity of their properties to a railroad station). They are an important source for studying the first phases of suburbanization in the United States.[53]

A strong case can be made that Brooklyn was the first suburb on Long Island, and possibly in the United States.[54] To a certain extent, the settlement that became the nucleus of Brooklyn functioned from the early nineteenth century as a suburb of lower Manhattan. After the Civil War, Brooklyn expanded in a manner that prefigured what later happened in Queens and much of western Long Island. Separate towns, such as Gravesend and Flatbush, were tied together by rail lines, and improved transportation enabled them to become bedroom communities for workers in Manhattan. Many of the new neighborhoods were at first refuges for the wealthy, who later withdrew farther out on the island as they became more crowded. Maps depicting population growth in the New York Area between 1860 and 1920 show what looks like a constantly growing octopus with its arms following subway and rail lines (Figure 13.4).[55] This pattern of development continued until the automobile became the predominant means of urban commuting following the Second World War.

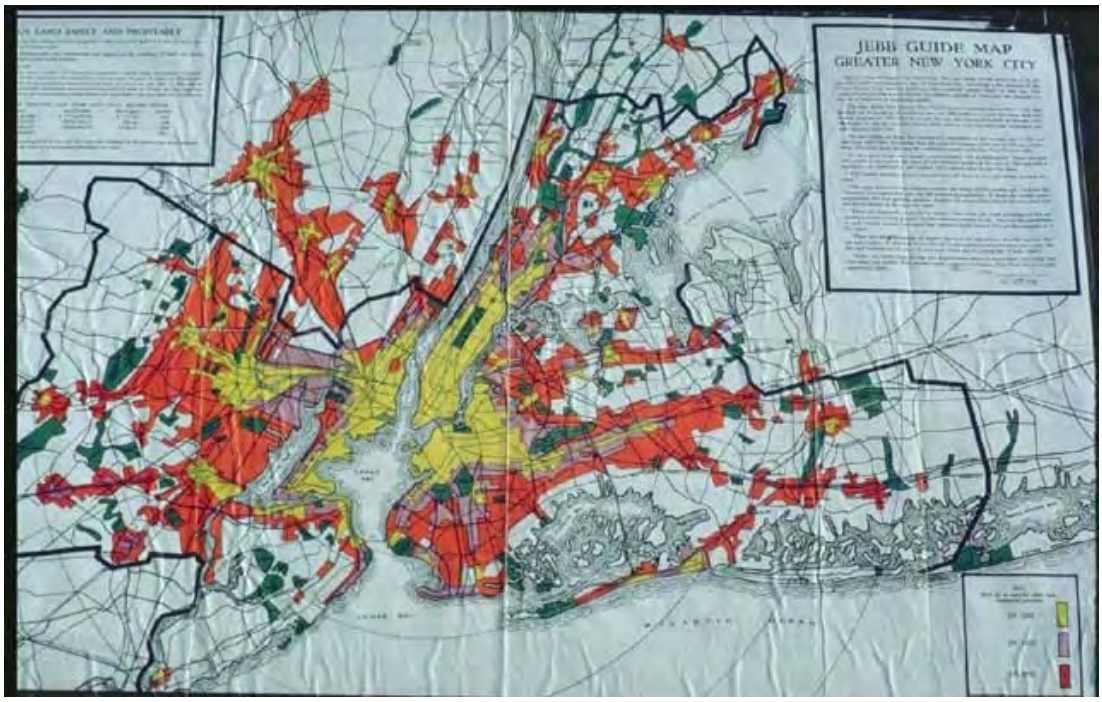

Figure 13.4. Henry I. Jebb, *Jebb Guide Map, Greater New York* (New York: [Jebb?], 1930). Stony Brook University Libraries.

A number of real estate maps shed light on the way suburbanization occurred prior to First World War. Usually, this early railroad and streetcar-based suburbanization is thought of as beginning at the end of the nineteenth century. But in the case of Long Island, one can trace its origins as far back as the 1850s. A very early example of a map touting a railroad-based suburban development, which can be examined on the Web site of the New York Public Library, is a *Map of the Lakeland farms, Near the Villages of Lakeland and Hermanville, on the Long Island Rail Road*.[56] This was published as a broadside, apparently in 1850, to sell land in the vicinity of Lake Ronkonkoma in the Town of Islip. It shows the location of individual parcels of land, which were marketed both to people who wanted to purchase residences, and to would-be small farmers. It included insets showing a view of Lake Ronkonkoma, a map of Long Island, and a view of "Lakeland Hotel, Post Office, and Depot of Long Island R.R." It promised purchasers, as a special bonus, "health, wealth, and domestic happiness to all who desire it." An accompanying text explained the health and financial benefits of this wonderful location, and played up the advantages of being near a railroad depot, including indefinite promises of future corporate support:

> All persons wishing to procure a residence in a beautiful and healthy place with easy access to and from the city of New York and where increasing facilities are now being given by the Long Island Rail Road Company in running an evening train of cars from Brooklyn and returning early in the morning; and it is confidently believed that this company whose stock is now much sought after by capitalists…will in accordance

> with its own interest, continue to give and extend every facility possible to all who purchase Village Lots or Farms on Long Island.

A similar map was published around the same time entitled *The Land of Beulah; 40 miles from New York on the Long Island Railroad, and Within Half a Mile of the Brentwood Depot*.[57]

Such maps became more common after the Civil War. An 1889 map of Massapequa included on its back an advertisement offering to bring out potential buyers from Brooklyn and Queens by rail for only 20 cents (round trip). They were to attend a Decoration Day auction of "1000 elegant lots & plots" constituting the "greatest sale of the century."[58] In 1904, an organization called the Seaside Villa Homes published a crude bird's eye view accompanied with extensive advertising touting a development in the Pine Barrens near Westhampton Beach named "Oceanside" or "The Pines" ("the land being covered with handsome pine trees").[59]

One of the more intriguing of these early real estate promotion maps shows the City of Breslau (now part of Lindenhurst).[60] This map, published in 1870, is another bird's-eye view, with inset illustrations of individual buildings. It shows at a glance that it was designed and built to attract German immigrants. The streets are named after famous Germans, and areas are labeled in German "flowers and vegetables, gardens, farms." Little has been written about Breslau, but it deserves study both as an example of an early suburban development, and for its targeting of a specific ethnic group. For a while, its growth was quite impressive. Writing in 1874, the historian Richard Bayles remarked: "It already has a number of large, handsome buildings, a population of about 1200, with churches, schools, hotels, factories, workshops breweries, lager beer saloons, gin-shops, and all the other usual accessories of a civilized, progressive community."[61]

The best known of the nineteenth-century developments on Long Island is Garden City, which has received a fair amount of study.[62] In spite of the immense wealth put into it by its founder in the years after 1869, and its subsequent reputation as the suburb of the rich and fashionable, Garden City got off to a slow start. The Garden City Corporation issued typical real estate promotion maps praising the advantages of this then rather isolated and arbitrary location. But a map published as late as 1895 could make only the rather feeble boast that "there are already 70 houses, and more in the process of construction."[63]

Although it is tempting to dismiss these transportation and advertising maps as commercial ephemera, the best of them were of reasonably high quality. Because they were so widely distributed, they played an important part in educating ordinary Americans about the geography of their nation and the world, as well as in indoctrinating them in the gospel of consumerism.

State and Regional Atlases

Several state atlases, of varying quality and purpose, were published during this period. They will be reviewed in chronological order.

The first post Civil War atlas of New York State was Asher & Adams, *New Topographical Atlas and Gazetteer of New York*. This is the first atlas of the state to appear since David Burr's atlas, and it is much more of a mass-market undertaking than

its predecessor. Reportedly, it is based on a wall map previously published by Asher & Adams. Three editions exist of this atlas (1869, 1870, 1871).[64] The 1871 edition is available online from the New York Public Library.[65] Stylistically it resembles contemporary county atlases, such as those published by the Beers family. The edition available at the New York Public Library groups several county maps together on a page. These maps show town boundaries, and provide basic information about roads, lakes, rivers, and the location of settlements. It spite of the word "topographical" in the title, only a few elevations are shown by means of crude hachures. The atlas includes a railroad map of New York State, along with a meteorological map and a geological map. For good measure, it sports overview maps of the United States and Europe. Much of it is taken up by a gazetteer of the state and by a lengthy business directory, organized by city.

This atlas is very much a product of its time, and contrasts sharply with the earlier Burr Atlas. The Asher & Adams atlas was clearly designed to be sold cheaply to households as a home reference work. There is nothing very distinguished about its cartography. Much of its profit doubtless came from advertisers who paid to be included it the business directory.

Cartographically much more notable are the productions of Julius and Joseph Rudolf Bien. Julius Bien (1826-1909) was born and trained as a lithographer in Germany, and established himself in New York in 1850. He won numerous awards for his work, which specialized primarily in scientific subjects, and he has been described as the best American cartographer of the nineteenth century.[66] It may be recalled that he published the thematic maps that accompanied the 1870 census. His name often appears as the publisher of many other maps published by federal and New York State governments. In addition to the thematic maps for the 1870, 1880, 1890, and 1900 censuses, he lithographed and published such important works as Audubon art prints, maps of Civil War battlefields, and USGS geological atlases.

Julius Bien worked primarily as a lithographer and a publisher. The little-known Joseph R. Bien (presumably a relative of Julius) called himself a "civil and topographical engineer," and engaged in surveying and drawing maps.

Several atlases produced by the Biens deserve particular mention. In 1891, Joseph R. Bien joined together with New Jersey based surveyor Cornelius Clarkson Vermeule (1858-1950) to create an *Atlas of the Metropolitan District*, which covered New York City, Westchester County, parts of New Jersey, and most of present-day Nassau County).[67] At a scale of two inches per mile (1:31,680), this detailed atlas showed individual street names and other information that you would expect to find on a conventional large-scale map. It is unusual in that it also included extensive topographic information, including contour intervals apparently derived from USGS maps, which was accentuated by subtle shading. The overall quality of this work is apparent in the sample provided in Figure 13.5.

Figure 13.5. Page from Joseph R. Bien, *Atlas of Westchester County* (1893). Courtesy David Rumsey Collection.

In 1893 Joseph R. Bien drafted a closely related *Atlas of Westchester County*.[68] This was an even more detailed work, which showed urban areas at a scale of 1:2,400, and suburban or rural areas at a scale of 1:31,680. The 1:2,400 scale sheets of urban areas included the same type of information contained in typical fire insurance atlases. In this atlas, there were two versions of each of the smaller-scale sheets. One version focused on topographic information, and was similar in appearance to the sheets of the 1891 atlas of the metropolitan district. The second version of these sheets showed houses and home owners in rural areas (much like a county property atlas).

Both of these atlases are remarkable for their graphic design and their overall quality. They contain more information on each sheet than modern topographic maps, and are much more attractive and easy to use. They more closely resemble the best European topographic maps, such as those produced by the Swiss government, than typical American maps.

Equally remarkable, although for somewhat different reasons, is Joseph R. Bien's, *Atlas of the State of New York*, which appeared in two editions in 1894 and 1895.[69] In most respects, this atlas is less detailed than his atlases of the New York Metropolitan Area and Westchester County. All of the state is covered—mostly at a scale of 1:58,000. At this scale, such standard information as roads, towns, railroads, and settlements is included. Some topography is shown on these maps, but relief is only depicted on some sheets, and then by hachures rather than contour lines. The lack of more detailed relief information reflects both the relatively large scale of these maps and the lack of USGS

topographic mapping for most of the state at that time. The major cities of Albany, Buffalo, Syracuse, Rochester, New York, and Brooklyn are shown separately at scales ranging between 1:17,000 and 1:41,500. On these large-scale maps, individual street names are shown.

The Bien atlas includes a page of statistical information for the United States and New York, which is displayed mostly in the form of bar graphs and pie charts. Another page presents four thematic maps of the state prepared by Henry Gannett of the USGS. They show relief, population distribution, rainfall, and temperature.

The most unusual feature of the Bien atlas is its inclusion of extensive information about early land patents and their subdivisions. There is a separate index map showing the location of the original land grants and purchases in the state, and detailed information about the subdivision of these early patents is included on most of the individual maps. These features still make the Bien atlas a useful starting place for research into early land allocations in New York.

The last state atlas of New York produced prior to the First World War is the *New Century Atlas of Counties of the State of New York*, which appeared in two editions dated 1911 and 1912.[70] This appears to be the last major publication of the indefatigable Louis H. Everts (1838-), who pursued a long and complex career publishing county atlases and local histories. As we have seen, he was earlier associated with the detailed fire insurance atlases of upstate New York published by The Century Map Company, and appears also to have had links with the Matthews-Northrup Company, which printed much of his later work.[71] This particular atlas states that Lew J.G. Ogden was in charge of surveys, and that A.C. Stark was chief draughtsman. *The New Century Atlas* is a typical mass market production, which is not particularly noteworthy, and suffers in comparison to the atlases of the Biens or even the detailed county atlases earlier produced by Everts.

Chapter 14

Mapping New York Since 1920

Introduction

While it has always been difficult to disentangle the mapping of New York State from developments on the national and international levels, that has especially been true since the conclusion of the First World War. Even more than in the preceding centuries, cartography in New York has been largely a regional expression of national developments. At the same time, cartography has been dramatically affected by the application of new technologies—including aerial photography, satellite imaging, global positioning systems (GPS), and the use of computers, especially in the form of geographic information systems (GIS).

Aerial Photography and Remote Sensing

Aerial photography was most important technical development affecting mapping in the first half of the twentieth century. It was important not only for its own sake, but because it facilitated the production of topographic and other types of maps.

The earliest experiments with aerial photography date back almost as far as photography itself. The first aerial photographs are thought to have been made from a balloon in France by Felix Tournachon ("Nadar") in 1858. The earliest aerial photographs made in the United States were taken over Boston in 1860 by James Wallace Black. In the following decades, especially during the Civil War, experiments were made with aerial photography using balloons and kites, but the practice was not widespread, even in the first few years after the invention of the airplane.

Only during the First World War, did aerial photography become an important tool for map makers. The war vastly accelerated the development of both airplanes and of aerial photography, which was heavily used for reconnaissance. Since that time, aerial photography and related forms of overhead imaging have blossomed out into a multitude of new technologies and applications to mapping.[1]

Immediately after the war, aerial photography started to be used for civilian purposes. A leading figure in post-war developments was Sherman M. Fairchild (1896-1971) of Oneonta, New York, who invented the Fairchild aerial camera. In 1921, the Fairchild Aerial Camera Corporation made an aerial mosaic of Manhattan from a series of 100 overlapping aerial photographs (Figure 14.1).[2] In 1924, they went on to produce a photomosaic of all five boroughs of New York City.[3] This marked the beginning of systematic high altitude aerial photography in the United States.

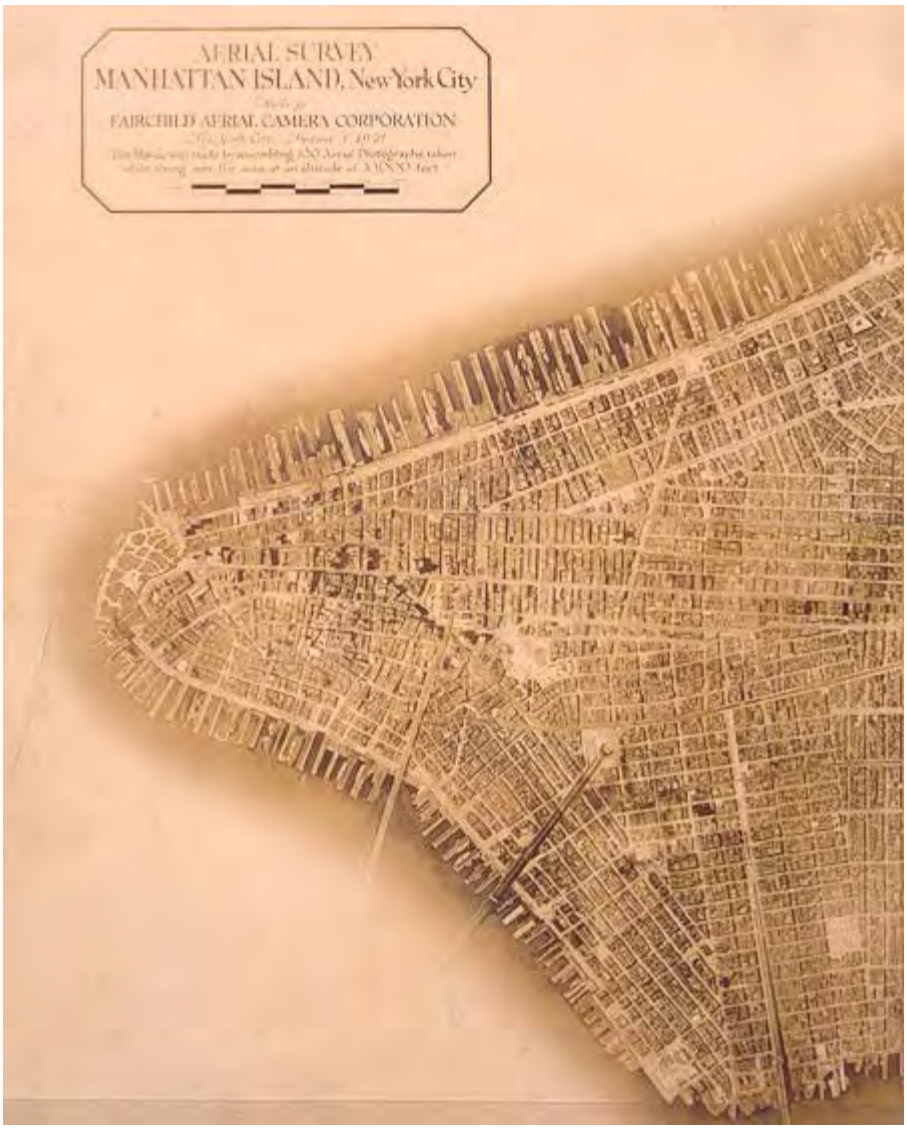

Figure 14.1. Fairchild Aerial Camera Corporation. Detail of photomosaic of Manhattan (1921). Library of Congress, Geography and Map Division.

Aerial photography has a place somewhere in the large and obscure border region of the empire of maps. An aerial photograph is not itself usually considered to be a map (the phrase “cartographic material” was developed in part to accommodate such “map like” things). But the idea of depicting a landscape from above preceded the use of aerial photography, as was seen in our discussion of bird’s-eye views.

As was noted in the discussion of bird’s-eye views, perspective drawings of towns can be either oblique or nearly vertical. The oblique views, which resemble drawings made from the top of a hill, are akin to traditional landscape paintings. The views taken from a nearly vertical perspective, which reveal such things as street patterns, more closely resemble conventional maps.

The same distinction can be made with aerial photographs. Low altitude aerial photos provide detailed views of small areas, often from an oblique perspective, and can

be very useful for students of history and architecture, among others. Aerial photographs taken vertically from an altitude of over 5,000 feet are much more “map like.” In fact, they are often used to correct or construct maps, and modern computer applications frequently overlay information from maps on top of such aerial photographs to produce composite images. For these reasons, the type of high altitude aerial photographs pioneered by Fairchild Aerial Surveys is of particular importance for the history of cartography. After completing its mosaic of Manhattan, this corporation began the aerial mapping of wide swaths of New York State—starting in 1923 with an aerial survey of the New York Metropolitan area.[4]

Contemporary high-altitude aerial photographs are usually “georectified” to give them a uniform scale, to make it possible to mosaic them together, and to overlay them with maps. Raw aerial photographs coming out of a camera typically vary in scale owing to such things as camera tilt, photographs of neighboring areas being taken at slightly different altitudes, lens distortion, and differences in perspective between the center and the edges of a photograph. A good deal of processing by skilled technicians is required to georectify aerial photographs. It is naive to assume that aerial photographs mirror nature in the raw. Like conventional maps, they are highly manipulated representations of geographic “reality.”

The similarities and differences between a conventional map and a high-altitude aerial photograph should be noted. Aerial photographs frequently show things that do not appear on ordinary maps. These include vegetation patterns; some cultural features, often including dirt roads and individual buildings; and features, such as the patterns of old fields, that are not readily visible from the surface of the earth. Some of the more exotic forms of modern aerial photographs, such as color photographs recording infrared wavelengths, show things like the differential growth of vegetation, which no one dreamed of mapping prior to the advent of aerial photography. On the other hand, certain types of information that routinely appear on maps, such as town names or political and administrative boundaries, are not revealed by aerial photographs

Aerial photographs are of great interest to a variety of people, including farmers, environmental analysts, archaeologists, and historians. A whole new discipline, photogrammetry, has developed around the interpretation of aerial photographs and other remotely sensed images.[5] Aerial photos are also used in the updating and construction of topographic maps, and are the basis of modern soil maps. Computer applications that allow aerial photographs to be overlayed with conventional maps, permit users to take advantage of the different types of information contained in both formats. The USGS produces one type of map, known as the “orthophotoquad,” which is based almost entirely on georectified aerial photographs, with some supplementary information added. As we will see, since 2009 orthophotoquads have been the backbone of the nation’s 7.5 minute mapping program.

In New York State, high altitude aerial photography made fairly rapid progress in the 1920s and 1930s. By 1937 approximately 17,000 square miles of the state had been photographed at a variety of scales—mostly for county and other government agencies.[6] Starting in 1938, the U.S. Dept. of Agriculture began a program that led to photographing Suffolk County and most of western New York at a scale of 1:20,000. These detailed black-and-white aerial photographs, which are available from the National Archives, are heavily used by researchers.[7] They are relatively easy to obtain, and go

far enough back in time to reveal details about landscapes that have undergone drastic changes because of suburbanization or for other reasons.

Almost all aerial photography prior to 1950 consisted of black and white images. Color photography became widely used in the following decades, and with it techniques such as multi-spectral imaging, which make possible the production of a wide range of images of things that cannot be seen by the naked eye. The most commonly encountered type of multispectral imaging is near-infrared color photography, which shows rapidly growing vegetation as bright red. Figure 14.2 shows a detail of a high altitude aerial photograph of Saratoga Springs in which well-fertilized golf courses and race tracks stand out in vivid red.[8]

Figure 14.2. High altitude photograph of Saratoga Springs New York (1997). USGS Earth Explorer.

In recent years, both New York State and its county governments have been active in producing high resolution aerial photographs in both black-and-white and in color. Some of this material is available to the general public on the Internet.[9] Most high-altitude photographs taken of the state between 1968 and 1991 are listed in a publication called *Inventory of Aerial Photography and Other Remotely Sensed Imagery of New York State*.[10]

Since about 1960, aerial photography has been supplemented by new kinds of "remotely sensed imagery." *Remote sensing* is a somewhat ambiguous term, which

includes conventional aerial photography, but usually is applied to more exotic forms of image capture, including infra-red aerial photography, satellite imaging, and such recently developed types of imaging as radar and LIDAR (a form of mapping that uses light from lasers). These new technologies are responsible for many striking images of the earth's surface, including crop and forestry assessments in the Hudson Highlands, and images of pollution in Long Island Sound.[11] A wide range of remotely sensed images can be found at Web sites maintained by NASA and the USGS.[12]

A spectacular example of these more exotic types of aerial imagery is shown in Figure 14.3.[13]

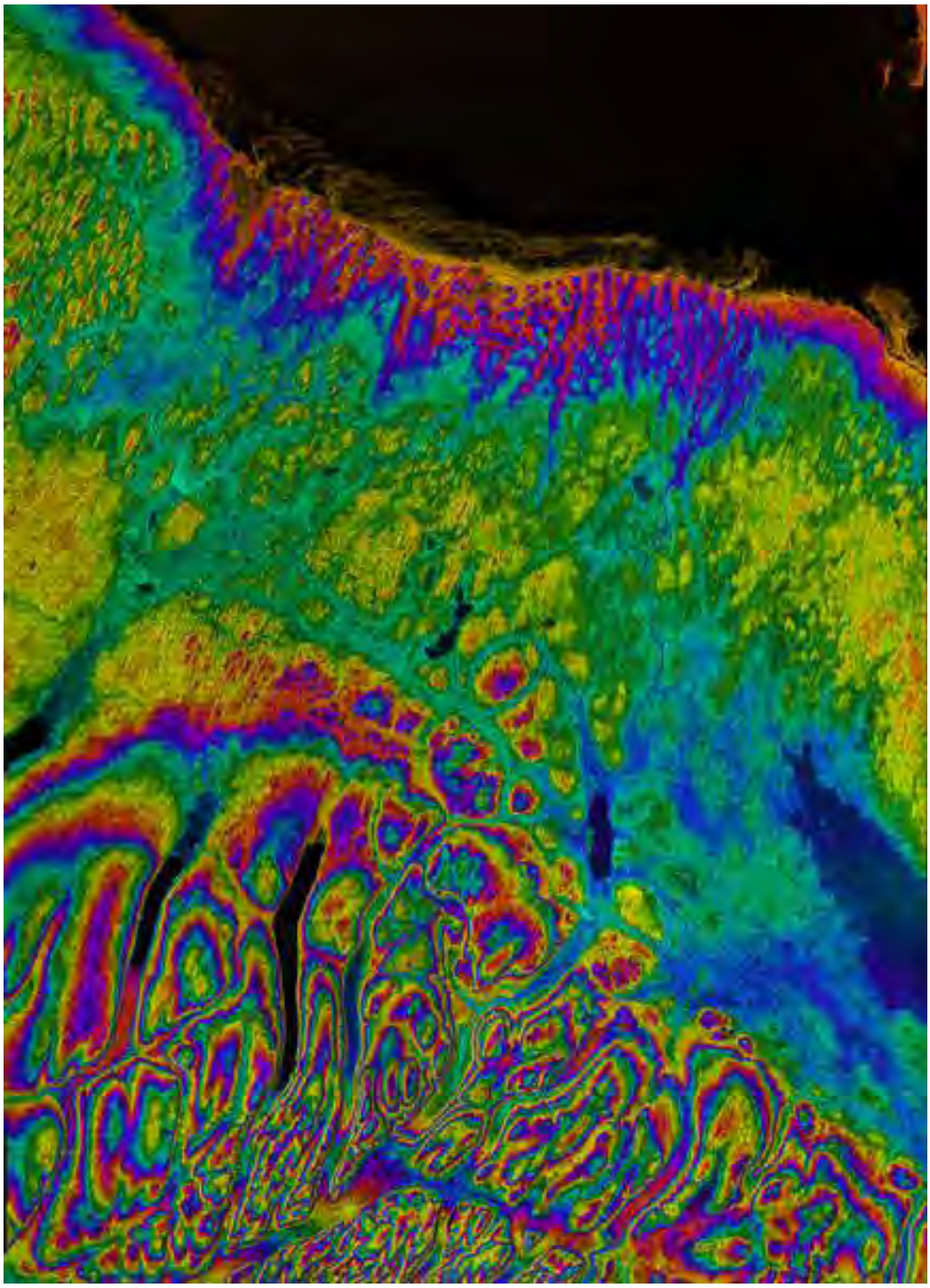

Figure 14.3. *Radar with Color-wrapped Height Fringes, Syracuse and Vicinity, New York State.* NASA Visible Earth.

Most remotely sensed images are digital rasters consisting of pixels, rather than conventional aerial photographs taken on film. As will be seen, these digital images are much like the raster images used in GIS systems, and can be readily incorporated into

computer projects. Even conventional aerial photographs are now mostly taken with digital cameras, and older aerial photographs can easily be scanned for manipulation and viewing by computers. Having photographs in digital form greatly facilitates the process of georectification, and the production of conventional maps from photographic images. Many hybrid products are now available on the Web, such as aerial photographs draped over vector digital elevation models to show relief.[14]

Aeronautical Charts

Before leaving the subject of maps and airplanes, something should be said about the development of aeronautical charts. Modern aeronautical charts are mostly produced by the federal government, and typically cover large multi-state areas, except when they focus on the approaches to individual airports. With the use of electronic navigation systems, aeronautical charts on paper play a secondary role in airplane navigation.

But in the first thirty or forty years after the invention of the airplane, the situation was quite different. The slow speeds and limited range of early aircraft, combined with the fact that navigation was almost entirely by sight, meant that paper navigation charts of relatively small areas were extremely important. Pilots often made very short flights by modern standards, and used landmarks such as roads and railroads for navigation. Prior to the Second World War, and even beyond, there was an appreciable output of various types of aeronautical charts restricted to New York State and areas within the state.[15]

Downstate New York, particularly western Long Island, was a focus of early aviation development. According to Ralph Ehrenberg, in 1911 “The first map designed specifically for air navigation in the United States was issued in the form of a photograph of a molded plaster of paris [*sic*] raised relief model of the western half of Long Island.” [16] Mitchel Field, which was the site of Charles Lindbergh’s departure on his famous flight across the Atlantic Ocean, was a major focus of early aviation activities, and is now the site of the “Cradle of Aviation Museum”[17]

Federal and State Mapping Activities, 1920-1970

Between 1920 and 1970, most of the government mapping in New York State was conducted by the federal government. The state government continued to play an auxiliary role, which was mostly confined to sharing costs and helping to set priorities. In 1926, the office of the State Engineer and Surveyor was abolished, and its functions transferred to the Department of Public Works, but this changed little in the way the state conducted its mapping programs.

The most notable mapping accomplishment in New York during the 1920s was the completion of the program to map the state in 15 minute quadrangles at a scale of 1:62,500.[18] Even before this project was finished, it was widely recognized that these maps would have to be revised. Many of them had been produced between 1893 and 1907, and the cultural information on most of them was outdated. Also, as previously noted, many were produced in considerable haste, and by the 1920s the USGS had come to regard them as insufficiently accurate by the standards of the time.

The 1920s and the 1930s saw the gradual development of more rigorous topographic mapping standards by the USGS and other government agencies. The standards of

geodetic control were improved by the adoption of the North American Datum of 1927 for the measurement of latitudes and longitudes, and in 1929 by the adoption of the National Geodetic Datum for Vertical Control for the measurements of heights. Accuracy of local surveys was improved by the development of the New York State Plane Projection system by the US Coast and Geodetic Survey in the 1930s. Cartographic precision was further facilitated by the use of aerial photographs and photogrammetry. Formal accuracy standards were finally adopted by the USGS in 1941.[19]

In 1938, the New York State Division of State Planning bestirred itself to take a comprehensive look at mapping activities in the state. An advisory committee made up primarily of civil engineers undertook to review and make recommendations on developments under the following headings: topographic maps, air mapping, soil mapping and soil surveys, geologic mapping, and "vegetational" mapping.[20] Predictably, the committee proposed an ambitious expansion of activities in all of these areas. They could hardly have picked a worse time to make such recommendations: with the nation in the midst of the Great Depression and about to enter the Second World War, an expensive new mapping program was unlikely to be funded. Most of the committee's recommendations were eventually implemented, but only in the decades following the war.

The most interesting section of this report deals with the cooperative federal-state topographic mapping program. The committee noted that the state had been completely mapped at a scale of 1:62,500 (the fifteen minute maps), which was the original goal of the cooperative program. However, they added, "a detailed analysis of the quadrangle sheets by the United States Geological Survey indicates that an area of but 3,400 square miles, covering 16 sheets and parts of 12 others can be considered adequately mapped according to present day standards." Expanding on this, they remarked:

> The levels for many quadrangles are inadequate, while others lack spirit level control entirely. Those conditions render 183 quadrangle sheets or parts thereof unreliable for many purposes. All of the area, 31,495 square miles, was mapped 30 or more years ago. In other instances, although the control surveys are adequate, cultural details, such as roads, buildings, railroads, bridges, cities and political boundary lines are in need of revision. Seventy-three quadrangles or parts thereof, covering an area of 14,128 square miles, are in this category. Approximately 62 per cent of this area was mapped prior to 1918.[21]

To remedy this situation, the committee (following the recommendations of the USGS) recommended remapping the state, with 46 sheets "of certain areas" at a scale twice as detailed as the existing 15 minute maps. These sheets, mostly of urban areas, were to be 7.5 minutes on a side, and at a scale of 1:31,000. Most of the remaining 15 minute maps were to be remapped or revised at the 15 minute scale. The entire program was to cost $2,300,000 over a twenty year period, with the cost to be shared by the federal and state governments.[22]

Something approximating this program was put into effect in the years between 1940 and 1985. The process by which this came about was somewhat convoluted, and involved

a good deal of partially secret collaboration between military, intelligence, and civilian mapping agencies.[23]

During the Second World War, most civilian mapping activities were suspended, or were consolidated into those of the Army Map Service (AMS). The AMS produced for defense purposes a fairly large number of 7.5 minute maps of New York. According to Morris Thompson, the mapping of upstate New York was actually the first project undertaken by the AMS in 1940, after it took over his USGS unit, which previously had been engaged in mapping for the Tennessee Valley Authority (TVA). This occurred after the fall of France and before Pearl Harbor, at which time the army was reportedly concerned about a possible Nazi invasion of the East Coast through Canada and poorly mapped upstate New York.[24] Most of these AMS maps were at a scale of 1:31,680, although a few were produced at the now-standard scale of 1:24,000. These military 7.5 minute maps appear to be the first topographic maps of the state in which contour lines were derived from aerial photographs (using "photogrammetry"), rather than by the older and more laborious procedure of "spirit leveling." During the war, the AMS also initiated mapping the nation at an intermediate scale of 1:250,000—a series that was later continued by the USGS.

The USGS resumed its mapping activities after 1945, with some of its output being based on aerial photography and other work done by the AMS during and after the war. The maps produced by the USGS in the late 1940s and 1950s included a large number of 15 minute quadrangles. Some were reprint editions of maps made around 1900, but others were based on recent aerial photography.

Shortly after 1945, The USGS also published a number of 7.5 minute maps at a scale of 1:31,680, each of which covered about one-fourth of the area of an old 15 minute map. The sheets of the 1:31,6800 maps and the 1:62:500 maps are the same size, which makes it easy to confuse maps in the two series if you don't check the scale. The 7.5 minute maps at a scale of about 1:24,000 are printed on larger sheets than the old series, and are easy to distinguish from the 15 minute series. About 1950, the 1:31:460 series was abandoned, and all USGS 7.5 minute maps have since been published on larger sheets at a scale of 1:24,000. A nearly complete listing of the printed editions of 7.5 and 15 minute quadrangle maps has recently been made available by the USGS through its Historical Map Collection portal, along with downloadable digital images of the maps.[25]

Like the revised 15 minute maps, the early post-war 7.5 minute maps were based on aerial photography done between 1940 and the late 1950s. Output was increased during the 1950s in part through the use of increasingly sophisticated photogrammetric techniques, many of which were originally developed for military or intelligence purposes. Starting around 1960 the USGS accelerated its efforts to complete its mapping of all of the United States (except Alaska) at the 7.5 minute scale—a project that was completed with about 55,000 sheets in 1991. Some of the work done around the 1960s involved the use of images obtained from the then top-secret CORONA satellites. The use of this secret information is hinted at in the legends on some of these maps, which coyly state that they were compiled using "aerial photography and other source data." Other military satellite images and technology were undoubtedly used by the USGS throughout the postwar period, although the exact extent of this is unknown, and some of the relevant information is probably still classified.[26]

The 1:24,000 scale 7.5 minute maps are the standard base maps for much of the recent mapping of New York, including digital mapping. It is important for users of these materials to pay attention to when and how individual sheets were produced. They were sometimes published in several editions, but much of the information on them may have been gathered long before the publication date on the map. Thus, the contour lines on some 7.5 minute maps published as late as the 1980s were still based on aerial photographs taken in the 1940s, although buildings and other cultural features were sometimes updated (often by means of overprinting in purple ink, as in Figure 14.4). In rural areas it is not unusual to find a map printed in 1984, bearing the date 1957, but based on an aerial photograph taken in 1948 (as is the case with the Afton, NY quadrangle). This sometimes makes it difficult to ascertain the exact date of individual features. Let the map user beware!

Figure 14.4. *Watertown, N.Y.* 7.5 minute quadrangle map (detail). A fairly typical example of a photorevised map. It was first published in 1959 and photorevised in 1982. According to information on the collar of the map: “Topography by photogrammetric methods from aerial photographs taken 1957 and 1958. Revisions shown in purple and woodland compiled from aerial photography taken 1981 and other [classified?] sources.”

As recently as 1990, paper (analog) maps continued to be the main product of the USGS. New York State (along with the rest of the lower 48 states) was covered by USGS maps at scales of 1:1,000,000, 1:500,000, 1:250,000, 1:100,000, and 1:24,000. Starting around 1970, computer-produced digital maps became increasingly important at the USGS, and the current generation of USGS topographic maps is dramatically different from its analog predecessors. The shift from paper to digital maps at the USGS will be outlined below in the section of this chapter on computer mapping.

More specialized map series covering parts of New York were and are produced by other federal agencies. These include nautical charts published by NOAA, soil maps published by the National Soil Service, thematic maps from the Census Bureau, and geological maps published by the USGS. Information about maps available from the federal government can be obtained from the government information portal at http://www.usa.gov/Topics/Maps.shtml.

New York State relied primarily on the USGS and other federal agencies for most of its maps until the late 1960s. The most dramatic change in state activities occurred in 1967, when responsibility for the state's mapping program was transferred from the Department of Public Works to the Department of Transportation. By this time, the state had entered the Rockefeller era, and large-scale planning and projects by state agencies were the order of the day.

The Cartography Section of the Department of Transportation undertook an ambitious program to expand and update the output of maps of the state. Their plans were summarized in 1968 in a document prepared by Leslie A. Maercklein entitled *The Development of a Statewide Mapping Program and Projection-Grid System*.[27] The primary reason for the revival of mapping by the state is clearly revealed in this publication. Basically, it was the accumulation of massive amounts of information in computerized form by agencies involved in state and regional planning. Much of this information involved such mundane matters as traffic flow on highways, the location of fire hydrants, the availability of emergency services, and the location of power lines and water pipes. It had come to be realized that most of this information has a geographic component, and that it was often difficult to use unless it was accurately mapped.[28]

This realization lies behind much of the development of modern Geographic Information Systems (GIS), but the use of full-fledged GIS was still some years in the future. In the late 1960s, the problem was more how to get this data into a form in which it could be easily identified, manipulated, and (potentially) mapped by computers. The solution to this problem was what is now called *geocoding*—assigning to pieces of information (such as individual fire hydrants) precise latitude-longitude coordinates so that they can be located on a map, or placed on a computer-created map. In Maerklin's words: "It was the need for an accurate up-to-date statewide map series which could be married to a computer-based information system which led the New York State Department of Transportation to develop a comprehensive mapping program based on a mathematically related projection-grid system."[29]

The process of geocoding required bigger changes in the state's mapping system than one might imagine. The best maps available for most places were the 7.5 minute USGS quadrangles. But, as of 1965, they covered only about 80 per cent of the state, and they were not revised quickly enough to include many major changes in cultural information. On top of this, there were small differences in the projection system used in different USGS quads. Prior to 1956, they were all based on a polyconic projection. In that year, the USGS adopted a more precise, but more complex, system, which divided the state up into regions. The new State Coordinate System mapped Long Island using the Lambert Conformal projection, while the rest of the state was divided into three parts and mapped using a transverse Mercator projection with different central meridians for each of the three parts. While this system improved the geodetic accuracy of individual quadrangles, it made it impossible to assemble them into a single map of the state with a

uniform projection. For this reason, the state decided to use a different projection—a version of the Universal Transverse Mercator (UTM) system, based on extending zone 18 of that system across the state.[30] In this way, every quadrangle could be mapped to a single statewide grid.

All of this is fairly technical, and does not affect the everyday map user, although this information is important for those involved in making maps, and it does explain why several projections are found on different 7.5 minute quadrangle maps.

Once these preliminaries were out of the way, the Dept. of Transportation undertook quite an active mapping program. An early production was a 7.5 minute series of so-called "planimetric maps," which are based on USGS topographic maps, but do not include contour lines. This series began in 1966. It focused on cultural features, such as roads and houses. The main reason for this series was that it could be updated more frequently than the USGS maps. For urban areas, these 1:24,000 scale maps were blown up to 1:9,600 scale and street names were added. Starting in 1972, the 1:24,000 scale planimetric maps were supplemented by a "topographic edition," which combined the information from the planimetric maps with contour lines from USGS quads. The Dept. of Transportation also produced several smaller scale products, including: a state atlas (first published in 1980), a four-sheet state map at a scale of 1:250,000 (starting in 1970), and county base maps at scales of 1:62,500 and 1:125,000.[31]

During the years following the Second World War, state and local agencies produced many other maps. These include detailed maps for use mainly by government agencies for such purposes as road construction and forestry management. The more generalized maps for public consumption include a railroad map of the state, and the well-known "I love New York" tourism map. The state tourism map closely resembles oil company road maps, and will be discussed below along with other road maps.

Commercial Cartography

Commercial cartography between 1920 and 1980 developed mostly along lines that had been laid down prior to the First World War. A wide range of maps were published in the twentieth century, including city maps and regional maps. Constraints of space and on the reader's patience make it impossible to give even an overview of most of these productions, which do not differ in major ways from earlier maps of the same kinds. Instead I will focus on property maps, road maps, and atlases, where new developments can be seen.

Property Maps

Following 1920, the production of property maps, which had flourished between 1850 and 1910, dropped sharply. There are a number of reasons for this decline, which was part of a national trend. Even before 1900, elaborate property atlases, such as those published by the Beers family, had lost much of their appeal. They seem to have gone out of fashion as novelty items, and they became harder to produce as the population of rural areas increased.[32] The property atlases produced after 1900 tend to be simple and utilitarian. Some of them increasingly came to resemble modern road atlases, while others catered to real estate agents and insurance companies.

These developments are illustrated by atlases of the New York City area published by the E. Belcher Hyde Company, by Dolph & Stewart, and by the Hagstrom Map Company. The Manhattan-based E. Belcher Hyde Company seems to have first entered the world of property atlas publication in 1877 with a detailed real estate atlas of Passaic County, New Jersey, which came complete with illustrations of buildings and other adornments.[33] Its next major publication appeared more than twenty years later (in 1898-1899), and was a three-volume atlas of Brooklyn, which took the form of a fairly typical fire insurance atlas.[34] About this time the company moved some of its operations to Brooklyn, and there followed in quick succession atlases of the Bronx [35], of Westchester County [36], of the Borough of Queens [37], of Suffolk County [38], Nassau County [39], and of Manhattan.[40] The Hyde atlases of rural areas closely resemble the earlier Beers property atlases; those of New York City were essentially fire insurance and real estate atlases. The Hyde Company did not expand its range of publication significantly after 1910, but it continued to publish new editions and to make frequent revisions of its works, especially those of New York City, through the 1920s. Although the company is still listed as maintaining offices in Manhattan, its last atlas was published in 1929. Like many atlas companies nationwide, it was a victim of the Great Depression.

A different course was followed by the Dolph and Stewart Company, which lacked the nineteenth-century roots of the E. Belcher Hyde Company. Another firm based in New York City, its earliest production appears to be a detailed road map of Westchester County, published in 1926. In the late 1920s, the firm published a variety of maps and atlases—mostly of downstate New York, and of nearby Connecticut and New Jersey. Many of its publications, such as an atlas of Suffolk County published in 1929, showed property owners and estate boundaries, and could be described as a stripped-down and simplified property atlases.[41] With its relatively simple and inexpensive county property maps, this company successfully weathered the Depression. Starting in the late 1930s, it began publishing maps of Florida, although it remained based in New York City until at least the middle of the 1950s. There still exists a very active Dolph Map Company, now based in Fort Lauderdale, which specializes in publishing maps and county road atlases of Florida and nearby states. It appears that the founder of this company moved to Florida, and passed on his business to a new generation, which has established itself in that state.

The Hagstrom Map Company presents a similar picture, although its story does not conclude in Florida. The earliest publication of the Hagstrom Company appears to be *Hagstrom's Map of Lower New York City* (1919).[42] The company quickly developed in the 1920s into a diversified map and atlas publisher specializing in the New York City area. Hagstrom continued to publish through the 1930s, and is today the leading publisher of street maps and atlases of downstate New York. It is worth noting that from the late 1930s to about 1950 the company experimented with showing property owners and boundaries on several of its large-format sheet maps and atlases, including some of the early editions of the well-known Hagstrom atlases.[43] Both the Dolph and the Hagstrom companies had the advantage of not being too specialized in one line of production. Since about 1950, most commercial New York State map publishers have, like Hagstrom, focused on producing regional road maps and atlases.

By 1920 the production of fire insurance atlases was largely in the hands of the Sanborn Map Company, although a few competitors (including the Hyde Company and the G.W. Bromley Company) continued to update their atlases of New York City and some other locations as late as 1940. As mentioned in the previous chapter, the Sanborn Company produced large numbers of maps of even small cities and large towns through the 1920s. It, too, saw its business dwindle after 1930, and it never completely recovered from the Depression, although it continues to update some of its maps in digital form. The Sanborn Company, now a part of DMG Information group, continues to be active in the mapping field, and has diversified its product line and moved into GIS.[44] Sanborn fire insurance maps from the first part of the twentieth century are available from the sources discussed in the previous chapter.

In the last fifty years, property maps have largely been replaced by other products. The users of fire insurance maps rely primarily on computerized data files in non-cartographic form, although fire insurance maps seem to be making a modest comeback in the form of GIS files. Much of the information that used to be included in property maps and atlases is now contained in real estate tax maps. These are usually produced by county governments, and can be found in government offices and some libraries. They are frequently available for purchase either as paper atlases or as digital products.

Road Maps

The most conspicuous type of map for much of the twentieth century, In New York as elsewhere in the United States, was the familiar oil company road map. As we have seen, road maps had an interesting history prior to 1920, but they did not become standardized and ubiquitous until after that date. Basically, the development of road maps depended on the widespread use of automobiles and the paving of roads, which mostly occurred after the First World War. The first law to allocate federal funds to road construction was the Good Roads Act, passed in 1916.[45] According to road map expert James Akerman, “only one in every 196 Americans owned a registered motor vehicle in 1910; by 1920 there was a car for every 11 Americans; by 1930, one car for every four Americans.”[46] These numbers do much to explain why by the late 1920s, the nation was inundated by (mostly) free road maps.

The output of road maps between 1930 and 1970 was astonishing. W.W. Ristow has estimated that in 1964 alone, about 200,000,000 of them were distributed, and that nearly five billion had been printed since 1914.[47] Most were produced for oil companies by the “big three” map publishers: General Drafting Company , H.M. Gousha, and Rand McNally. Similar maps were published for the producers of other automotive products (such as tires), by organizations like the American Automobile Association, and by state agencies concerned with tourism.

Road maps have elicited a good deal of attention from cultural historians and geographers. Because they were so widely distributed, two generations of Americans acquired their basic understanding of what a map is through the experience of reading and using road maps. Of course, this understanding was limited because, like all maps, road maps are selective sources of information.

Most oil company road maps are remarkably similar in their basic features. They are usually attractive and well designed. Predictably, they emphasize roads, towns, and

tourist attractions. The roads are colored, and graded by type, with the major routes heavily emphasized. Since road maps were often used to drive from one town to another, all but the smallest cities and towns are usually shown on them. They usually include a table of distances between major towns, and an alphabetical index of towns keyed to their location on a grid. They often have inset maps of major cities. Parks and other tourist attractions are also heavily emphasized. Parks are frequently highlighted in green, and road maps are likely to contain special tables of tourist attractions.

Some things are suppressed or left off of these maps. Railroads are conspicuously absent from most of them, since it was obviously not in the best interest of oil and automobile companies to encourage the use of their leading competitor. Other omissions are less obvious, but mark a definite change from nineteenth-century general purpose maps. County boundaries are not shown at all on many road maps, or at most they are indicated by faint lines. Prior to 1920, counties were frequently colored in and very conspicuous on general purpose maps. Possibly this change reflects the lessened role of county government in a more mobile age. There is also minimal topography on oil company road maps, presumably because the drivers of powerful modern cars traveling on paved roads do not need to worry as much as their predecessors about climbing mountains or getting stuck in mud. These maps are efficiently designed for their purposes: enabling drivers to navigate roads, motivating them to travel and visit tourist attractions, and encouraging them to use the friendly and efficient services of the oil companies that distributed the maps.

The publishers of road maps were not subtle in pursuing their purposes, which sometimes helps give them a kind of hokey and nostalgic charm, and makes them popular items for collectors of Americana.[48] Their covers invite drivers to “travel the route of friendly service” (with Standard Oil of New York) or “travel in the best circles” (with Tydol Gasoline). Along with advertisements, they are heavily laden with graphics, including scenic landscapes and hackneyed pictures of historic attractions. Their covers often boast images of happy and stylish motorists (invariably white and prosperous looking), who are served by smiling filing station attendants (invariably white and wearing natty uniforms).

Between 1920 and 1975, competing oil companies published dozens of maps of New York. Oil company maps of individual cities and regions within the state are rare, although state road maps almost always included insets showing the New York metropolitan region and major cities. For some reason, Long Island seems to be the only area in New York that was separately mapped on several occasions by oil companies. I happen to have on hand a 1937 Standard Oil of New York map of Long Island, which is a favorite of mine because of its amiable crassness.

The Standard Oil map of Long Island is relatively small (48 x 66 cm.), but includes three separate maps and considerable text on both sides of the sheet.[49] New York City and the western half of Long Island are shown on one side of the map. The other side includes a map of eastern Long Island, and a pictorial map of the entire island entitled “118 miles of Recreation and Romance.” The map is unusual in showing the route of the Long Island Railroad and its individual stations. Not surprisingly, the line depicting the route of the railroad is fainter than the line indicating the least important roads, and no mention of the railroad is made in the legend of the map.

The map's legend ("Motoring on Long Island you will find") appears on both sides of the map, and is remarkable for what it includes and what it excludes. Like almost all road maps from this period, it differentiates between several types of roads—in this case: "Parkways," "First Class Roads (Paved)," "Second Class Roads (Mostly Oiled Gravel)," and "Third Class Roads." It also tells us that "broken lines indicate roads likely to be under construction," and it gives the symbols used to differentiate between towns by approximate population. The most unusual thing about the legend is that it singles out very conspicuously the symbols for golf courses, yacht clubs, public bathing beaches, and flying fields.

The legend was mostly superfluous for map readers, but it sets a tone for interpreting the map. Probably very few users were interested in golf courses, yacht clubs, and flying fields, but the emphasis on these things shows that Long Island was to be thought of as a place of recreation for the sophisticated and well-healed. Sidebars even include alphabetical lists of the golf courses and yacht clubs on the island. Some of the other sidebars are more conventional, including an index of towns, a mileage chart, and a list of state parks. More unusual is a sidebar containing "hints for anglers," and a listing of ferries on Long Island Sound. The inclusion of information about ferries is less surprising than the appearance of railroads, since ferries served to transport motorists to and from Long Island.

For connoisseurs of carto-kitsch, the highlight of this work is the pictorial map, "118 miles of Recreation and Romance" (Figure 14.4) This small map packs in an amazing collection of illustrations of Long Island tourist attractions—most, but not all of which, remain popular today. They include, to name a few: pictures of a man playing golf at Bethpage State Park, the Whaling Museum at Sag Harbor, a man catching flounder off Long Island's North Shore, people is swimsuits liberally strewn along the shoreline, polo players at the International Polo Field, a chimpanzee and a snake at a place called "Jungle Camp" near Farmingdale, Montauk Lighthouse, whales, potatoes, Long Island ducklings, cranberry harvesters, and the State Fish Hatchery near Huntington. In addition to these "highlights," the accompanying text assures us that: "With a little leisure time and a tankful of Mobilgas you can easily discover many other interesting places to go and things to do in this fascinating corner of New York State."

Figure 14.5. Detail of 1937 Standard Oil Company of New York's map of Long Island. Author's collection.

Oil companies ceased to hand out this bonanza of free maps during 1970s. Their demise is attributed to changing economics, particularly the energy crisis in the first part of that decade. The void has been partially filled by commercially published maps that can be purchased in filling stations. In addition, the American Automobile Association continues to provide free road maps to its members, and road maps are available without charge from the tourist bureaus of many state governments.

New York State started to publish its own free road maps in late 1970s—a time coinciding with end of free oil company maps and the launching of the highly successful "I love New York" tourism campaign. These maps closely resemble the older oil company maps, although there are some interesting differences, which have grown more pronounced over the years.

The earlier editions of the *I Love New York Tourism Map* (1977-1985) were published for the Tourism Division of the New York State Department of Commerce by Rand McNally. They closely resemble oil company maps of New York that Rand McNally had published a few years earlier. From both the practical and the aesthetic points of view, they are well designed, reflecting the company's extensive experience in producing this type of map. Here is a description based on the 1984 edition of the "I Love New York" map (Figure 14.6).[50] One side of the map is mostly taken up with a large map of the state. To use space efficiently and increase its scale, Long Island and the New York Metropolitan area are presented at a larger scale and tucked under western New

York. This type of graphic presentation is quite common on maps of New York State, and can be traced back to the early nineteenth century. Because of its awkward shape—with the "thumb" of Long Island and western New York jutting out in opposite directions—it is otherwise impossible to depict New York State on a rectangular sheet of paper without including the space occupied by most of Connecticut, Massachusetts, and Vermont, along with large parts of southern Ontario and Pennsylvania.

Figure 14.6. Detail of **1984** *I Love New York Tourism Map*. Author's collection.

In typical oil company fashion, roads are conspicuously presented in bright colors against a white background. The New York State Thruway is highlighted in gold-orange; other major roads are colored red or green. Towns and cities are identified, and the map is accompanied by a detailed index of populated places. The Catskill and Adirondack parks stand out in light green. Much other information is suppressed. Railroads are not shown at all. Although lakes and rivers appear, mountains are not depicted in relief. The names and boundaries of counties appear in an inconspicuous pale blue, which is also used for the names of rivers and lakes.

A great deal of supplementary material accompanies this map. Since the main purpose of the "I Love New York" map is to attract tourists, rather than to sell gasoline, this material differs somewhat from what you would find on a traditional oil company map. As on oil company maps, there is an index of cities and towns on the "I Love New York" map, along with inset maps of major cities and urban areas, a rather awkwardly constructed distance chart, and a legend. Since both types of maps are designed to lure

travelers out onto the road, extensive tourist information appears on the state road map, as well as on oil company maps. Of course, advertisements for oil companies are omitted on the state map, although the state government itself, along with its agencies and services, are rather subtly advertised. This change can be seen in various differences in layout and presentation.

The 1984 "I Love New York" map is attractively packaged with scenic photographs that appear on the covers of the folded map. The back cover is a photograph of a smiling teen-aged boy peering out from behind a waterfall. The front cover shows a rather ordinary young woman in blue jeans and a red shirt fishing alone at a beautiful lake. These rather understated photographs, which are both attractive and reassuring in their ordinariness, are typical of the relatively low-keyed elegance of the design of the map. The front cover announces in large, bright letters that it is the "I Love New York Tourism Map." The bottom of the cover contains the "I Love New York" logo with its red heart replacing the word *love* and accompanied by the affectionate message: "State of New York, Mario M. Cuomo, Governor; Department of Commerce, William J. Donohue, Commissioner; This map is provided free of charge by the State of New York."

The dominant motif of the supplementary material on this map is an inset map, which appears on both the front and the back sides, showing New York divided into eleven regions, as defined by the Department of Commerce. The names of many of these regions have a boosterish ring to them, reflecting their origins, which are rooted as much in the imaginations of tourism promoters as in any geography. They are: Chautauqua-Allegheny, The Niagara Frontier, The Finger Lakes, 1000 Islands-Seaway, The Adirondacks, Central Leatherstocking, Capital-Saratoga, the Catskills, the Hudson Valley, New York City, and Long Island. Under the banner " New York State: More to see and do than most countries," a good portion of the back of the map is filled up with descriptions of the attractions of these regions. These regional names also correspond to widely distributed booklets, which provide the tourist with more detailed information about each area.

The remainder of the 1984 "I love New York map" is filled up with text boxes containing a variety of information thought to be useful to travelers. These include descriptions of the wealth of opportunities in New York for such varied activities as golf, outlet shopping, camping, and water recreation. There are tables listing historic sites, campgrounds, weather radio stations, and parks. There is a box containing motor vehicle and customs information. Finally, there is a section of "traveler's aids," which briefly lists other publications available from New York government agencies.

While such a publication might be described as somewhat crass and unsubtle, it is well designed and actually quite useful to travelers. The maps are easy to use, and cartographic and non-cartographic materials are woven together to convey the map's twin messages—that New York is a fabulous place to visit, and that the state government is ready, able, and willing to help citizens and tourists alike explore its treasures.

In the more than thirty years since the launching of the "I love New York" campaign, the state has continued to publish similar road maps. Since 1985, the maps have been printed by several publishers, and various state agencies have in one way or another affected their content and design. The result is that the focus of the map has changed somewhat, and the quality of the design has deteriorated. This is evident in the 2008

version of the map, which was published by the Division of Tourism of the New York State Department of Economic Development, and printed by Map Works, Inc.[51]

The main features of the 2008 edition are similar to those of the 1985 edition. They are of the same size, and both maps are dominated by a large road map of the state with a separate inset for Long Island. Both include an index of towns and other places, inset maps of major cities, a map showing New York's regions, lists of parks and campgrounds, and a considerable amount of text showing tourist attractions.

The overall design of the 2008 map, however, is much weaker. This may reflect budget cuts as well as the lack of a single design team with a unified vision of what the map should look like. The front and back portions of the folded map are much less attractive than those on its 1984 counterpart. The front cover simply states "New York State Map" above a large red-hearted "I Love New York" logo. Beneath this is a long, almost illegible, unordered list of New York State attractions printed in faint gray type—a space filler if ever there was one. The bottom of the front panel is a red box containing the message: "Create your own New York State customized brochure. Go to Iloveny.com or call 800/CALL-NYS." This is one of several features on the map pointing to the World Wide Web as a source of travel information—definitely an important change from the map of 1984.

The back cover of the 2008 map is an advertisement for Hannaford Supermarket & Pharmacy. Several other large advertisements for hotels and motels can be found elsewhere on the map. It is probable that these ads are a symptom of shrinking funds for the publication of free maps. In another possible sign of economy, the paper and printing are of poorer quality than on the Rand McNally version.

The most dramatic differences appear in the design of the state map itself, which is not so strongly focused on roads as its predecessor. The most notable change is that individual counties are the most conspicuous thing on this map: they are shown in different colors, and county names appear in the largest type on the map. This is a big difference from twentieth-century oil company road maps, and reverts to a pattern that is often found on nineteenth-century maps. This suggests that local and regional officials had considerable influence on the design of this map. In part because of the background colors of the counties, roads do not stand out as clearly on the modern version of the map as on its predecessor. There is even a gesture toward including railroads on the map, although railroad lines are not shown. A strange symbol squat symbol resembling a fire hydrant appears in various places on the map. On consulting the legend, it turns out that this is the symbol for a passenger rail station (the symbol actually tries to portray a diesel train seen head on). The legend also helpfully informs us: "Note: not all stations are shown downstate and on Long Island." There are a number of other, more subtle design changes on the state map. They all add up to a map that is considerably more "busy," unattractive, and difficult to use.

Aside from the centerpiece map of New York State, there are numerous other changes in the map as a whole. There are more inset maps of relatively small cities like Binghamton, Ithaca, and Elmira—which may be another sign of the influence of local governments (and their representatives in the legislature) on the map. A few things on the new map appear to be improvements. It cuts down on the somewhat overwhelming collection of textual tourist information on the 1984 map, and includes an intercity mileage log, which is easier to read than the earlier version. It leaves out a list of historic

places, but it includes a list of the major airports in the state. The most striking addition to the new version is an inset map of the state showing the location of New York State parks. It is a shaded relief map with hypsometric tints. This display of topography is a marked departure from the road map tradition. The inset map also shows interstate highways in the state, along with railroad lines and stations—thereby indicating clearly that there is more than one way to travel to state parks.

These two versions of the New York State tourism map illustrate many of the reoccurring problems involved in interpreting and comparing maps. They show clearly how the content of a map reflects its intended purpose, which is in turn conditioned by a variety of cultural, political, social, economic, and other factors. It is very difficult to determine exactly how a particular map derived its content, or to isolate it from its socio-cultural context. The two maps under examination here clearly borrowed heavily from previous maps, particularly road maps, and an element of inertia is in their makeup. It is unclear how many people were involved in designing these maps, or who influenced their design decisions. The cost of maps and available technology also played into their shaping. Further, the maps not isolated from the tables and text that surround them—cartographic and non-cartographic elements interact to form a greater whole. Thus, each map exists as an inseparable part of a sometimes indecipherable network of relationships and connections.

It is equally difficult, although not impossible, to make judgments about the quality of maps. Maps made prior to the middle of the nineteenth century can be evaluated, in part, in terms of their geodetic accuracy. This has made it tempting for generations of cartographic historians to speak in terms of "progress" in map making, and I think that this concept has some value if it is restricted to the development of Western cartography, and not treated as some kind of universal metaphysical principle. But in dealing with modern maps, such as the two under consideration here, geodetic accuracy is not much of an issue, although quality of design is. Most people recognize the existence of "good maps" and "bad maps," even though it is often difficult to articulate what makes them so. There seems to be no progress here, and well and poorly designed maps have existed since the beginning of map making. The criteria of differentiation seem to be based partially on aesthetics, and partially on the utility of the maps (how well they fulfill their intended purposes). Based on these criteria, probably most observers would agree that the 1984 "I Love New York Map" is better on the whole than its 2008 counterpart.

Atlases

The publication history of New York State atlases in the twentieth century follows a somewhat different trajectory from that of other cartographic materials. Prior to about 1950, atlas publication followed familiar patterns, and none of them are particularly remarkable. In the last half of the twentieth century, on the other hand, state atlas publication flourished, and many innovative and often highly specialized atlases appeared.

As noted above, the publication of property atlases suffered a sharp decline after 1920, and had practically ceased by 1930. Most of the atlases published between 1920 and 1950 were regional street atlases, such as those produced by the Hagstrom Company for the New York Metropolitan Area, and by Geographica, Map Works, and the Marshal

Penn-York Co. for other parts of the state. The only statewide atlases that were published between 1920 and 1940 were two specialized titles with very limited distribution: an *Atlas of Rural Electric Lines in New York State* (published by the Empire State Gas and Electric Association in 1931), and a *School District Atlas of the State of New York* (published in 1937 by the Board of Regents of the University of the State of New York).[52]

Starting in 1941, F.E. Richards—a small publisher in Phoenix, New York, who specialized in educational materials—published the first of several important thematic atlases of the state: William P. Munger's *Historical Atlas of New York State*.[53] This was followed in 1955 and 1956 by the more elaborate *Lamb's Sectional Atlas of New York State*, which appeared in eleven volumes covering different geographical regions of the state.[54]. Richard's next venture appeared in 1957, and bore the title *Richards Atlas of New York State*.[55] This important atlas, which appeared in a revised edition in 1965, remains the best single source for thematic maps covering the entire state.

This brings us to the period around 1970, when the use of computers started to have a significant impact on the production of maps. The development of digital mapping will be examined in more detail in the following section, and here it will suffice to note that computerized mapping greatly facilitated the production of complex atlases, especially those containing thematic maps. In the following decades, numerous specialized thematic atlases were published, particularly by state agencies and academic presses.

A sampling of titles should give an idea of the variety within this wave of specialized atlases. In 1969, the New York State Office of Planning Coordination published its *Appalachian Region of New York State: An Atlas of Natural and Cultural Resources*.[56] 1970 saw the appearance of Paul R. Baumann's *Water Balance Atlas of New York State*, which was published by the Department of Geography at SUNY Oneonta.[57] A less specialized atlas, published by the State Department of Transportation beginning in 1974, is its rather prosaic *New York State County Atlas*.[58] In 1975, the first edition of the *Solar Energy Atlas for New York State* appeared.[59] In 1979, an *Agricultural Atlas of New York State* was published.[60] 1983 saw the appearance of *New York State: A Socio-Economic Atlas*.[61] In 1984 the *Atlas of New York State Ferns* appeared.[62] In 1988 the first edition of *The Atlas of Breeding Birds in New York State* was hatched.[63] This is by no means a complete list of the thematic atlases of New York published in recent decades.

Another notable event occurred in 1987 with the publication of the first edition of the popular DeLorme *New York State Atlas & Gazetteer*.[64] This is one of a series of state atlases produced by the DeLorme Publishing Company of Yarmouth Maine. Founded in 1976, DeLorme started its remarkably successful career with several paperback atlases of New England States, which served as models for its atlases of other states. These atlases can be described as a kind of hybrid between USGS topographic maps and tourist maps of the "I love New York" variety. At a scale of 1:150,000, the *New York State Atlas and Gazetteer* is sufficiently detailed to show the network of rural roads, as well as to depict topography by means of contour lines. These maps are supplemented by textual information that closely resembles an expanded version of the "I Love New York" map—including an index of place names, along with lists of parks, campgrounds, golf courses, historic sites, and other attractions.

DeLorme clearly found a “sweet spot” in the market. Although its atlases are not sufficiently detailed for hiking or for navigating the street network of major cities, they are very useful for automobile touring and for studying the general geography of the state. For those who need to refer to more detailed maps, each two-page “spread” of the atlas is divided up into 28 sections, each of which corresponds to one USGS 7.5 minute quadrangle. DeLorme atlases are frequently updated, and improved in various ways. Recent editions of Delorme’s *New York State Atlas* feature shaded relief as well as contour lines, and include longitude-latitude grids for use with GPS (Global Positioning Systems). The DeLorme formula has been sufficiently successful to inspire imitation and competition, and somewhat similar products are now available from Jimapco, Hagstrom, and American Map Corporation.

DeLorme has also been a pioneer of digital cartography. Its state atlases are based in part on digital data files available from the USGS. In 1991, DeLorme introduced the highly successful *Street Atlas USA*, which it claims to be the “first consumer CD-ROM mapping product.”[65] More recently, it has developed GPS products, and markets a wide range of digital maps designed for easy use. In spite of its extensive line of computerized products, its paperback state atlases continue to be popular—a strong indication that there will continue to be a place for paper products in the increasingly digital world of cartography.

Digital Mapping, 1970 to the Present

The use of computers to produce and view maps constitutes a major revolution in the history of cartography. Computerization arguably has had a greater impact on map making than any development since the invention of printing. Although computer-based mapping has been widely used for only about forty years, it is possible to distinguish three distinct (although overlapping) phases in the development of digital cartography. The first was the use of computers to produce maps on paper. Next, came the introduction of Geographic Information Systems (GIS) to produce and view maps on computers as well as to make paper maps. Most recently, maps have moved onto the World Wide Web, where a large audience of users can view and sometimes modify them.

The Transition from Paper to Digital Mapping

Although the intellectual roots of computer-based cartography can be traced back for many decades, it was not until the 1950s that researchers began to explore seriously the potential of computers as a tool for map making.[66] Even then, the implementation of automated cartography required considerable improvements in computing power and storage, and the development of new software and hardware (including plotters and printers). Consequently, it was not until the 1970s that the large-scale production of maps by computer became practical and widely adopted.

New York played a pioneering role in computerized mapping through a project known as the New York State Land Use and Natural Information (LUNR) inventory. This ambitious project from the Rockefeller era was conducted between 1968 and the early 1970s by the Center for Aerial Photographic Studies at Cornell University under

contract from the State Office of Planning Coordination. Although it is almost forgotten today, LUNR appears to be New York's only state-wide land use mapping project.

In this project, aerial photographs of the state at a scale of 1:24,000 were divided up into 140,000 cells, each covering one square kilometer. Each cell was then coded according a classification system involving 90 major categories and 40 subcategories of land use. The resulting data was used to produce transparent plastic overlays, which could be placed on top of conventional 7.5 minute maps. These overlays were produced manually, and appear to be the most widely used product of the LUNR project. The data was also keypunched on computer readable forms, which could be analyzed using early database and mapping programs (DATALIST and PLANMAP).[67]

The LUNR Inventory is historically interesting as one of the earliest computerized land use mapping projects. The database it generated received limited use in regional planning projects in the 1970s, but it was not updated after 1974, and is no longer used.[68] Because of the way it was designed, LUNR turned out to be something of a dead end. Its 1 kilometer grid square was not sufficiently detailed for many purposes, and its data was structured in such a way that could not be transferred to more modern GIS systems. The fate of LUNR was shared by several other pioneering projects of the early computer era—reminding us once again that pioneers often end up riddled with arrows or bullets.

Computer produced maps became more common after the middle of the 1970s. The U.S. Bureau of the Census, starting in 1967, developed a more viable form of computer mapping known as the GBF/DIME system (a predecessor of the better-known TIGER software, which was used by the 1990 census). The TIGER software, in turn, is the ancestor of the Census Bureau's present automated mapping system, and of much else in modern GIS.[69]

An early example computer cartography on paper is the *Urban Atlas* series produced by the U.S. Bureau of the Census for the 1970 census.[70] These large, floppy paperback volumes, which can still be found on the shelves of some libraries, display census tract data for major urban areas in the United States. They contain colored maps for twelve categories of data, and include the major urban areas in New York.[71] Like many computer-produced thematic maps, these census maps are *choropleth* maps, which display statistical data in areas with predefined boundaries. Figure 14.7 shows a more recent example of this type of map. The boundary files for such maps are compactly stored as *vector data* (mathematically defined lines, points, and curves), which are used as a framework to display statistical information stored in tables. Although not necessarily the best type of thematic map for many purposes, choropleth maps are so easy to create from computerized data that they have become the most common form of thematic map since the introduction of automated cartography. The 1970s and 1980s saw a profusion of similar maps, many of them produced by regional planning boards and other agencies in New York State. Such maps are now widely available on the World Wide Web from the Census Bureau and other sites.[72]

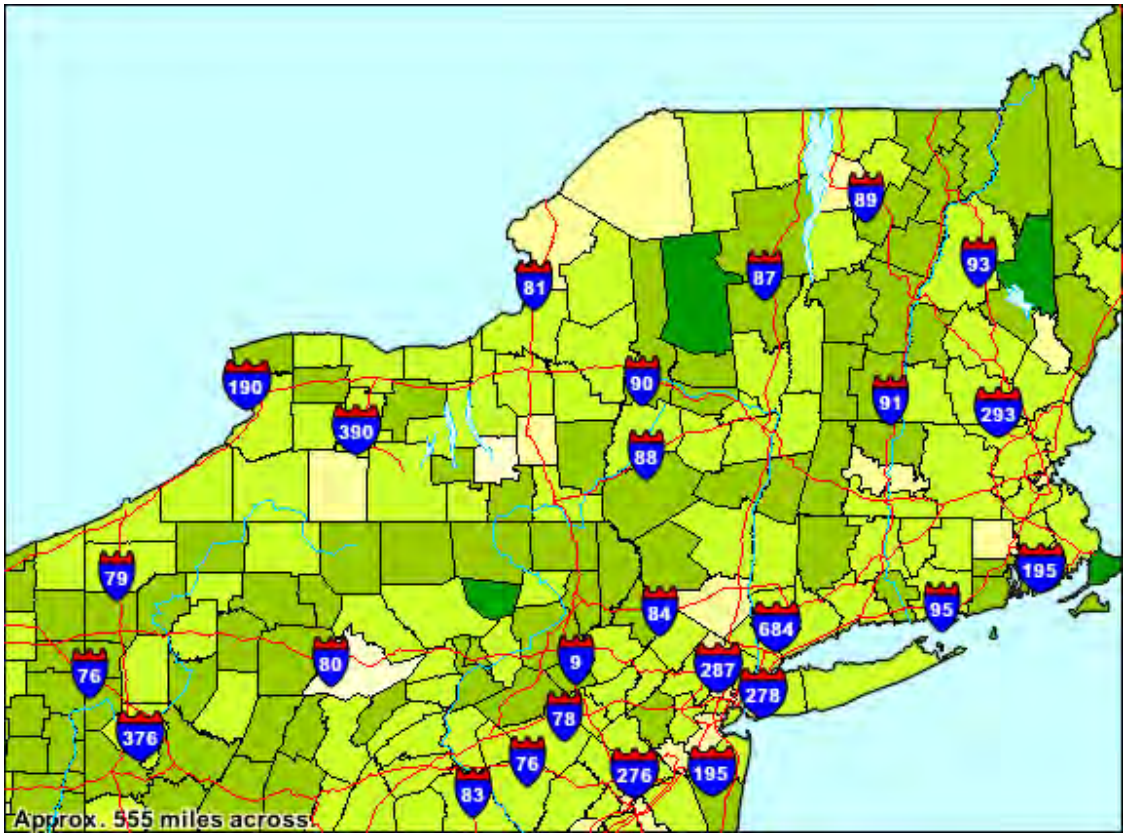

Figure 14.7. An example of a GIS-produced choropleth map. Median age by county in 2009. Produced using U.S. Census Bureau, *American Factfinder*.

Also in the 1970s, the USGS began converting geographic information into digital form.[73] In its early work, most of this data conversion involved the creation of vector files representing such things as contour lines, political boundaries, roads, and hydrography. The best known of these data sets are the Digital Line Graphs (DLGs). They are free, widely available, and popular with users of GIS. In the 1980s and 1990s, there was an increasing amount of digitization by the USGS of maps in the form of *raster* or image data. A raster map is made up of a grid of pixels, much like the image on a television screen or a digital photograph. Raster images require much more computer power and storage space than vector data, which explains in part why they did not become prominent until the computer revolution was well underway. The most widely used of the USGS raster images are digital versions of the familiar topographic quadrangle maps, known as digital raster graphics (DRGs). Also widely used are Digital Elevation Models (DEMs), which are sometimes combined with aerial photographs or other data sets to create three-dimensional maps.

Since the early 1990s, emphasis at the USGS has shifted away from the production of topographic maps on paper to something called “the National Map.” Somewhat confusingly, the National Map is not actually a map (not even a virtual one), but rather a collection of standards for the production of analog and digital maps. According to its official definition,“The National Map is a collaborative effort of the United States Geological Survey (USGS) and other federal, state, and local agencies to improve and

deliver topographic information for the United States."[74] The National Map includes an online atlas, which will be described below. For many users, the most important part of the National Map program is known as "US Topo."[75] Introduced in 2009, these maps are intended to replace the old 7.5 minute quadrangles, and to cover the same geographic areas. Although it is possible to order paper copies from private contractors, they are produced in a purely digital format (GeoPDF) from separate layers of data consisting of orthoimagery, hydrology, contours, roads, and geographic names. They can be downloaded for free, and sections can be printed or used with some computer programs (although they are not intended to replace full-fledged GIS data files). Because they are made up of layers of digital information, they can be updated much more easily and frequently than the old paper map series, and they are scheduled to be revised every three years. The digital format also makes it relatively easy for various agencies and institutions to collaborate in their updating. Coverage of New York State appears to be complet, which makes these GeoPDFs the most current readily available large-scale maps covering the entire the state.

Following in the footsteps of the USGS, the New York State Department of Transportation started to convert its most important map series into raster images, which could be both displayed on a computer screen, and used to produce maps in paper form. Here are some landmarks in this process: the first digital county base map appeared in 1988, the first digital raster quadrangle in1990, the first digital 1:250,000 four-sheet base maps in 1994, and the first digital *New York State Atlas* in1995.[76]

Use of GIS

The spread of cartographic information in digital form was accelerated by the use of relatively powerful and easy-to-use Geographic Information Systems (GIS). The pioneer in commercial GIS was a California-based company known as Environmental Systems Research Institute (ESRI), which was founded in 1969. In 1982, ESRI launched the first commercial GIS program, which was known as ArcInfo.[77] The original ArcInfo ran on mini-computers, and was used primarily by government and private corporations to produce maps on paper. In 1986, a version of ArcInfo was developed that could run on desktop PCs. Since that time, ESRI and its competitors have marketed GIS programs that have become widely used in a variety of settings, including universities, non-profit organizations, and some public libraries and schools.

Since 1990, a great deal of cartographic information has been produced in formats compatible with GIS programs produced by ESRI and others, much of which is publicly available without charge. New York State has two major clearinghouses for this type of data. One is the Cornell University Geospatial Information Repository (CUGIR).[78] Digital data available at CUGIR includes 1:24,000 and 1:250,000 scale quadrangle maps, political boundaries, hydrology, transportation, agricultural districts, and specialized data files for areas of special interest, such as the Adirondacks and the Hudson River Valley. All CUGIR data is free and available to everyone.

The other major repository for state GIS data is the New York State GIS Clearinghouse.[79] This official state clearinghouse is run by the New York State Office of Cyber Security and Critical Infrastructure Coordination (of which more later). The materials there overlap those at CUGIR , but also include free high-resolution digital

orthoimagery (rectified aerial photographs) for most of the state. The New York State GIS Clearinghouse also houses hundreds of other data sets produced by New York State agencies. All of them are available without charge to members of the New York State Data Cooperative, which includes all state agencies, including state colleges and universities. Some of these data sets are freely available to all, but others are restricted, and may require non-clearinghouse members to pay a fee for their use.

Although the GIS programs developed since 1990 are relatively easy to use, they are still sufficiently complicated and specialized that they cannot be said to practical for the casual user. Their use is still largely confined to business, government, and academia. Although free or inexpensive programs are available to view GIS data, until recently the ordinary citizen's experience with GIS has mostly been through paper maps produced from GIS files. This situation has started to change with the introduction of computerized mapping on the World Wide Web.

Maps on the World Wide Web and Other Recent Technological Developments

Since the late 1990s, digital maps have become widely available to Web users—a development that has finally made computer-produced cartography readily available to the computer-using public. To a certain extent, it has even made it possible for ordinary people to participate in the creation or modification of maps, which is truly a new development in the history of cartography. Developments in this area are changing so rapidly that it is hard to keep up to date, since old sites are frequently revised, and new ones appear every month. Although what I say on this subject is certain to be quickly outdated, I will mention a few outstanding sites as an introduction to this subject.

Old Maps on the Web

Readers of this book are already aware that numerous images of historic maps are available on the World Wide Web. Many references have been made to the zoomable, high-resolution images available from such sites as The Library of Congress, the David Rumsey Collection, and the New York Public Library. Many other sites also offer images of maps, and even small institutions may have collections that are uniquely important for specific subjects or regions. Many academic and public libraries, as well as historical societies, have made at least some images of old maps available on the Web, although these vary greatly in quality. Recently a comprehensive gateway or portal site has been developed, which allows users to search the contents of a number of the largest online map collections. Known as Old Maps Online, this site allows users to narrow their searches by both geographic location and date of publication.[80]

Many other resources can be used to look for maps not found Old Maps Online. Sometimes individual items can be located by using search engines, such as Google or OCLC, but many online maps are not turned up by such searches. Another alternative is to look for institutions that maintain lists of links to other sites that have historical maps. The most comprehensive list of map Web sites appears to be "Historical Map Web Sites" maintained by the Perry-Casteñada Library at the University of Texas at Austin.[81] Another useful starting point for those interested in early maps on the Web is the Map History/History of Cartography site, maintained by Tony Campbell, retired map librarian

at the British Library.[82] Many large academic libraries, including several SUNY campuses, have map collections with pages that link to a variety of cartographic resources, often with a regional focus. If all else fails, it may be helpful to check the Web sites of individual institutions that might have maps relevant to your research.

Most of the sites mentioned above specialize in hosting static images of old maps, but much more is available for those who wish to explore the world of interactive online mapping.

Interactive Online GIS Maps

One of the most important recent developments in online mapping is the creation of software that makes it possible to use GIS data interactively on the Web.[83] Many of the most interesting and important sites using this software are national in scope, but some specialize in New York materials. Before going on to describe projects specific to New York State or its subdivisions, some of these national sites should be mentioned because they often contain large amounts of information pertaining to New York State.

A notable example of a user friendly GIS application is the National Map Viewer, which is now part of the collection of materials hosted by the National Map.[84] Although this digital atlas covers the entire country (and even includes some continent-wide information), it allows the user to zoom in to great detail even in small areas. The pull-down menu of map layers makes it possible to create and view maps of numerous subjects, including roads, wetlands, aerial imagery, shaded relief, and hydrography.

For those interested in demographic information, a good place to start is the previously mentioned *American FactFinder* of the U.S. Census Bureau.[85] This site has a number of resources, which allow one to create thematic maps down to the census tract level for any area of the United States. This is a good place to start to obtain information about such things as population, ethnicity, and income for your local neighborhood. *The American FactFinder* is easy to use and comes with excellent tutorials, which provide a good introduction to this software.

Another easily accessible online GIS application comes from David Rumsey.[86] In addition to presenting static images of historical maps, the Rumsey site includes a “GIS browser,” for exploring maps of selected urban areas, including New York City. The Rumsey GIS browser comes in two versions: a “basic browser,” for those unfamiliar with GIS interfaces, and a “professional browser.” The professional browser is one is one of the most interesting and sophisticated GIS programs available on the Internet, and it is well worth exploring, if only to see what such programs can do. One impressive feature of the Rumsey GIS browser is its ability to overlay historical maps with modern maps and aerial photographs. It also has tools that make it possible to compare these maps side by side, or to “blend” images together by changing their opacity. These capabilities are useful for such purposes as examining changes in street patterns or shorelines in an urban area over time. In addition, certain features—such as roads, lakes, and parks—can be turned off or on by the click of a mouse. This site includes many other features, which are all worth investigating.

Turning to sites focusing on New York State, there no longer appears to be an official online GIS application for the state, although formerly the New York State GIS Clearinghouse sponsored a “New York State Interactive Mapping Gateway." This site

allowed users to display and zoom in on a variety of layers, including administrative boundaries, hydrography, roads, digital raster maps, and orthophotoimagery. Unfortunately, it was slow and not very well documented, which made it difficult to use, all of which may explain why it is no longer available.

At present the most comprehensive site focusing primarily on New York State is the *New York Ocean and Great Lakes Atlas*, which is produced by the New York Ocean and Great Lakes Ecosystem Conservation Council.[87] This online atlas delivers much more than its title implies. It includes several hundred data layers, which are nested together, and can be displayed individually or in groups. It includes much more than data about New York's Great Lakes and ocean waters. In addition to showing such expected things as depth contours, eelgrass distribution, and marine mammal habitat around Long Island, it includes extensive information about all areas of the state. Data layers include administrative boundaries, historic places, forest cover in the Adirondacks, campgrounds, surficial geology, and much more.

There are several more specialized online GIS servers focusing on New York State, its sub-regions, or on parts of the state with its neighbors. One of my favorite is *The Color Landform Atlas of New York State*, which has several shaded relief maps, including a wonderful underwater shaded relief map of the Hudson Canyon.[88] An excellent interactive source for mapping census data is "Map New York," which was developed by a team headed by John Logan at the Lewis Mumford Center at the University at Albany.[89] Those interested in demographic maps should also investigate the *Digital Atlas of New York City*.[90] Prepared by Professor William A. Bowen at California State University at Northridge, this atlas includes hundreds of clickable maps derived from 1990 U.S. Census data.

Another specialized site focuses on planning coverage for the New York and New Jersey Highlands area.[91] For those interested in Long Island Sound, the USGS operates a data service with a variety of maps and other information about the Sound.[92] Several county or regional planning associations also make available varying amounts of GIS data. Thus, Erie County has an internet mapping server, which focuses on real estate and land use information.[93] Nassau and Suffolk Counties on Long Island are served by a particularly content-rich online GIS, which focuses on land use and public services, and has recently added historic trolley lines to its collection of resources.[94]

As might be expected, given its wealth and concentration of technological talent, some of the most impressive examples of Web-based GIS projects come from New York City. The city itself maintains a comprehensive GIS site known as NYCityMap.[96] It includes aerial photographs of all five boroughs taken from 1924 to the present, along with city street maps, municipal boundaries, and numerous other data layers. By clicking on individual layers, one can get information on an vast number of subjects, including: the location of schools, police stations, economic development zones, theaters, fire houses, subway stations, senior centers, and snow removal streets. There are also layers for such specialized information as the location of water fountains, bicycle racks, green markets, and immunization walk-in centers. One link even goes to detailed information about the city's rat population, and about the status of the ongoing efforts to reduce it.

Although it is unusually comprehensive and well done, the New York City municipal GIS resembles in its basic approach other GIS projects done by large cities in New York State and elsewhere. Several other projects focusing on New York City are conceptually

more innovative. One of these is the New York Public Library's New York City Historical GIS Project. This project involves digitizing large numbers of old maps from the library's collection, and then georectifying and "warping" them to allow them to be superimposed on top of modern maps—thus enabling viewers to see graphically how specific places have changed through time. This project resembles on a larger scale the previously mentioned work done by David Rumsey in his "GIS Browser." The New York Public Library's project takes this a step further by allowing volunteers on the Web to georectify additional maps in the library's digital collection. As a final step, Web-based volunteers can engage in what Matt Knutzen, director of the project, calls "map tracing." According to Knutzen, "map tracing is preparing *machine readable data* to be harvested, mined, analyzed, mashed, made a part of the semantic web, and related to itself, across time." So far, map tracing has been used mainly to add information about individual buildings—such as the names of owners or types of construction—to maps in property atlases. It will be interesting to see what directions what this "crowd sourcing" of data creation about maps takes in the future.[97]

Another online source with detailed information about New York City is known as the Welikia Project. This is an expansion of Eric W. Sanderson's Mannahatta Project (1999-2009), which is an ambitious effort to reconstruct Manhattan as it appeared in 1609 using historic maps and other materials.[98] Although the Welikia Project is intended to expand Sanderson's work beyond Manhattan to the other boroughs of New York City, almost all of the publicly available information on this site still relates to Manhattan. Here it is possible to explore Manhattan on a block-by-block basis, to obtain information about what was there in 1609, and to compare it with information about the block today through links to yet another New York City Web site, OASIS.[99]

OASIS (New York City Open Space Information System) synthesizes information drawn from a number of sources, including all three interactive GIS sites described above. OASIS is a cooperative venture run by the Center for Urban Research of The Graduate Center of the City University of New York (CUNY). It focuses primarily on land use, open space, environmental, and community resource issues. It includes selected historical map overlays from the New York Public Library, as well as data layers from the Mannahatta Project, which appear not to be available on the Welikia site or elsewhere on the Web. Thus, only on OASIS is it possible to create and display a map of possible marbled salamander habitats on Manhattan in 1609.

GPS, Mashups and More

The world of Internet mapping is expanding and changing so rapidly that it impossible to keep track of all the most recent developments—much less to anticipate what will be forthcoming in the next few years. Nonetheless, it is worth mentioning a few recent trends that are important for map users in New York.

One trend, which is so obvious that it is easy to overlook, is the use of online road maps, which are among the most popular cartographic items available on the Web. Most of these road map applications are national (in some cases worldwide) in scope, and are provided by giant corporations like MapQuest, Yahoo Maps, and Google Maps. They show almost every drivable road in the country, and are frequently used as sources for

printed road maps and driving directions. They are so ubiquitous and easy to use that it is unnecessary to describe them in detail.

Another recent development is the widespread use of global positioning systems (GPS). Originally developed for the military, GPS uses satellite data to ascertain the precise longitude and latitude of any place in the world. It is an extraordinary development, when one considers the struggles that cartographers in earlier times underwent to measure correct longitudes and latitudes. In the world of civilian mapping, GPS was first used by surveyors, who still sometimes carry large GPS units on their backs as they conduct their work. With the advent of digital topographic maps, small handheld GPS units became popular with hikers. As early as the 1980s, automobile manufactures started experimenting with combining GPS with road maps stored on CD-ROM. Automobile route finders—which have gradually become less expensive, easier to use, and more reliable—are now among the most widespread applications of GPS among map users.[100]

The most recent development in consumer-oriented digital mapping is the creation of "mashups." A mashup is a hybrid Web application, which combines information from two or more sources. There are various types of mashups, many of which have nothing to do with maps. For convenience, map mashups can be roughly divided into two kinds: business and personal.

Business mashups are familiar to most users of the World Wide Web, even if they have not heard the word "mashup." They include maps on real estate Web sites, which show the locations of houses for sale, and online maps showing the location of filling stations or restaurants in a particular area. MapQuest, Google Maps, and other providers also make it possible for advertisers to purchase geographically coded links to their maps.

Personal mashups are particularly intriguing. With personal mashups, individuals can add their own information to maps created by others, usually by corporations like Microsoft, Yahoo, or Google. This peculiar partnering between individual computer users and giant corporations makes it possible for people to participate, at least to some extent, in creating their own maps. This is a singular departure in the history of cartography, since previously ordinary people usually have been the passive recipients of maps produced by technical specialists and paid for by government or corporate elites.

Most user-created map mashups are still fairly primitive. The majority of consist of digital pushpins, which a person can place on a map along with a link to a photograph or other piece of information. A simple application of this type can be found on photo sharing sites like Flickr and Panoramo, which allow members to place markers on a map to pinpoint the locations of their photographs.[101] Any user can then search for these geotaged photographs by keywords or geographic area. Thus on these sites, one can retrieve numerous photographs of the Erie Canal, or of birds on Long Island, or call up collections of pictures linked to a particular location on a map. Like several other applications, Flickr and Panoramio allow one to toggle between street maps and aerial images. Although this feature is mainly used by amateur photographers to show off their pictures, it could be used by botanists to map trees in the Adirondacks, or by community activists to display photographs of abandoned buildings in Buffalo. Thus, these applications have potential uses for a wide range of groups, including hobbyists, amateur and professional scientists, and community activists.

More sophisticated mashups come from Google in the form of two related applications: Google Maps and Google Earth.[102] Google Maps is on the surface a relatively conventional travel information Web site, which allows users to zoom in on detailed road maps, relief maps, and aerial images of the earth (satellite images for small-scale views, and aerial photographs for greater detail). It can display a number of other features, including photographs, and articles from the online encyclopedia *Wikipedia*. Many of the photographs are taken by individuals and uploaded through the Panoramio Web site. Google Maps also includes live traffic information for some areas, and large amounts of paid advertising for motels, filling stations, and other commercial establishments. It is also possible for individuals to make additions and corrections on Google Maps using a tool called Google Map Maker, although these have to be approved before they are displayed to the public. Finally, users with sufficient expertise can create their own specialized maps, which can be displayed against the backdrop of Google Maps. Although its basic features are easy to use, the site is sufficiently complicated that books have been written about it, which are useful for those who want to create maps to display on the Web.[103]

Google Earth, which is even more complex and sophisticated, is a free program, that needs to be downloaded and installed on a computer. Somewhat like Google Maps, it is layered like an onion, with varying levels of complexity. For the casual user, Google Earth presents a simple GIS-type interface, which displays various layers of information (such as roads, attractions, and congressional districts) against a background of satellite images and aerial photographs. The Google Earth display can be zoomed in to great detail, down to the level of individual houses in many areas. It has some features that are lacking or less developed in Google Maps, including three-dimensional views of buildings, and visual terrain “fly-throughs.” In Google Earth, it is fairly easy to add digital pushpins to mark places, and to add photographs to the base map for your own use. More sophisticated users can use a simple programming language called KML (or its variant KMZ) to create complex mashups, including vector and raster maps, which can be laid over Google Earth’s background images. Most of these maps created by individuals or organizations must be downloaded from separate Web sites before they can be displayed in Google Earth. Many KML applications can be displayed on both Google Maps and Google Earth, but Google Earth accepts a wider range of add-on maps.[104]

Examples of user-created content can be found in the “Gallery” section of Google Earth, including a number for locations in New York State.[105] One item in the Gallery especially worth exploring comes once again from David Rumsey, who has made part of his collection of historical maps available to users of both Google Maps and Google Earth. Basically, his application allows you to overlay selected historical maps from his collection over the Google background images, and to compare them with modern imagery using a transparency slider. This is a less sophisticated application than the GIS viewer available directly on the David Rumsey site, but it is an interesting example of what can be done with the Google software. This subset of the Rumsey Collection includes a group of maps showing New York City at various dates.

Additional Google Earth overlays can be located by using a Web search browser, such as Google itself (for example, by doing a search combining terms such as "Hudson River" and "KMZ"). A large number of sites with materials relating to New York State can be found in this way, ranging from the comprehensive to the trivial. One of the most

impressive of these is hosted by the New York State Department of Environmental Conservation; it includes (among many other things) maps of hiking trails and the Breeding Birds Atlas. Also noteworthy is Brian Abbott's elaborate New York City Subway Map, as is a grant-funded set of landscape and environmental tours of New York's regions produced by a group of high school and university educators.[106]

New York State Maps in the Twenty-First Century

The dramatic technological changes of recent decades have drastically affected the work of surveyors and map makers in New York. After the flurry of activity in the Rockefeller years, mapping by the state government went into a steep decline. Partially because of budget cuts, but mostly because of GIS and other technological changes, state agencies have nearly ceased to conduct traditional surveying and mapping activities.

These changes were brought into focus by the state's reaction to the terrorist attack on the World Trade Center On Sept. 9, 2001. In September, 2002, the role of coordinating the state's mapping activities was transferred from the Mapping Unit of the Dept. of Transportation to a new agency, which bears the somewhat Orwellian name of the Office of Cyber Security and Critical Infrastructure Coordination (CSCIC).[107] This agency is responsible for the distribution of maps, GIS information, and aerial orthoimagery. It is also involved in protecting against attacks on New York State's computers, and in coordinating with the Dept. of Homeland Security. The CSCIC does continue to sell paper maps in series previously produced by the Dept. of Transportation, but it is not engaged in creating maps, and its cartographic concerns focus almost entirely on GIS and other computer-related activities.

In 2008, the CSCIC issued the first comprehensive assessment of the state's mapping activities since 1968. The emphasis of the new program is revealed clearly by its title, *New York State GIS Strategic Plan.*[108] This document provides a good summary of the strengths and weaknesses of the state's computerized mapping program. It is revealing that many of the problems that beset nineteenth-century mapmakers still continue to rank high on the list of concerns of GIS technicians. The most serious deficiencies identified in the plan have to do with inadequate survey information, including: lack of sufficient elevation data to accurately map flood hazards; inadequately mapped municipal and other administrative boundaries; lack of a statewide mapping system for real estate parcels; and lack of adequate wetlands mapping. The report is also critical of the state's failure to make digital cartographic information readily available in user-friendly form. Thus, the introduction of GIS and computerized mapping clearly has not solved the problems created by inadequate surveying and lack of uniformity in the collection and presentation of cartographic data.

Given the rapid pace of change in mapping technology, it is hazardous to make predictions about the future. It seems certain that almost all mapping done by the state and other government agencies will be done using GIS and other computer-based technologies. Government cartographers, providing they can obtain funding, will have no trouble finding work to do—as the 2008 strategic plan makes clear, there is still a need for more detailed and accurate surveying, as well as for updating and improving maps in digital form. With some degree of confidence, we can expect these things to happen in the future.

Commercial maps will also continue to be produced mostly in digital form. The only maps likely to be drawn by hand are those made by artists, and certain types of novelty maps. Even these are likely to be drawn using computer drafting programs.

In spite of the widespread popularity of digital mapping, some consumers will continue to demand and receive maps in paper—reference atlases, road maps, paperback atlases, topographic maps, and hiking maps are especially likely to continue to remain in print. At the same time, the use of maps on the Web and of route maps on portable computers will almost certainly increase. Whether the new ability of end users to create or modify maps with their own information will have any significant political or social consequences is an open question.

Notes

Chapter 1

1. For spatial understanding as a fundamental category of human thought, see Arthur H. Robinson and Barbara Bartz Petchenik, *The Nature of Maps: Essays toward Understanding Maps and Mapping* (Chicago: University of Chicago Press, 1976), 6-11.

2. Examples of prehistoric maps can be found in Catherine Delano Smith, "Cartography in the Prehistoric Period in the Old World" in Brian Harley and David Woodward, eds., *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, vol. 1 of *The History of Cartography* (Chicago: University of Chicago Press, 1987), 54-101. This volume is now available online at http://www.press.uchicago.edu/books/HOC/HOC_V1/Volume1.html.

3. For background on American Indian maps see: Malcolm G. Lewis, "Maps, Mapmaking, and Map Use by Native North Americans," in David Woodward and Malcolm G. Lewis, eds., *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, vol. 2, bk 3 of *The History of Cartography* (Chicago: University of Chicago Press, 1998), 51-182, http://www.press.uchicago.edu/books/HOC/HOC_V2_B3/HOC_VOLUME2_Book3_chapter4.pdf; Mark Warhus, *Another America: Native American Maps and the History of Our Land* (New York: St. Martin's Press, 1997).

4. An interesting description of early map use by (probably Iroquoian) American Indians comes from Joseph-François Lafitau, *Customs of the American Indians Compared with the Customs of Primitive Times*, trans. and ed. William N. Fenton and Elizabeth L. Moore (2 vols.; Toronto: Champlain Society, 1974-77), 2:130. Lafitau writes: "They go where they wish to go, even in uncharted wildernesses and where no paths are marked. On their return, they have observed everything and trace, grossly, on sheets of bark or on the sand, exact maps on which only the marking of degrees is lacking. They even keep some of these geographical maps in their public treasury to consult them at need." Lafitau does not specify which group of Indians he is talking about, but he served as a missionary to the Iroquois settlement at Caughnawaga near Montreal, and his statements are therefore probably based on his observations of the Iroquois. The references to their keeping maps in a "public treasury" is intriguing, but there is no other evidence for this. Lewis in "Maps, Mapmaking and Map Use," 81, cites Lafitau and suggests that the Iroquois kept maps "possibly at Ononondaga," but he is speculating on the basis of very unsubstantial evidence.

5. Samuel Purchas, *Hakluytus Posthumas, or Purchas His Pilgrims* (Glasgow: J. MacLehose and Sons, 1905-07), 19: 132-33.

6. J. Franklin Jameson, *Narratives of New Netherland, 1609-1664* (1909; reprint, New York: Barnes & Noble, 1967), 149-50.

7. There is a copy of this map in Lewis, "Maps, Mapmaking and Map Use," 75.

8. Reproduced as Figure 27 in Warhus, *Another America*.

9. Guy Johnson, *To His Excellency William Tryon Esqr. Captain General & Governor in Chief of the Province of New York & &, This Map of the Country of the VI. Nations Proper, with Part of the Adjacent Colonies, is Humbly Inscribed by his Excellency's Most Humble Servant*. Facsimile of lost map drawn in 1771; published in

E.B. O'Callaghan, *The Documentary History of the State of New York* (4 vols.; Albany: Gavit, 1851), 4:661.

10. The case for Vikings on Long Island and in New York Harbor has been made by Frederick J. Pohl, *The Viking Settlements of North America* (New York: C.N. Potter, 1972). His argument is based largely on his analysis of the Thorfinn Karlsefeni Saga and on the alleged "Vinland Map" at Yale. There is no archaeological evidence for a Viking presence in New York, and Pohl's speculations have found little scholarly acceptance.

11. Juan de la Cosa, [Portolan World Chart] (manuscript map, 1500). Original at Museo Naval, Madrid. Low or medium resolution images of this map (or chart) are widely available on the World Wide Web; one such image is on the Wikipedia Commons at: http://commons.wikimedia.org/wiki/File:1500_map_by_Juan_de_la_Cosa.jpg. It has been reproduced in many books dealing with European exploration of the New world, including: William P. Cumming, R. A. Skelton, and D. B. Quinn, *The Discovery of North America* (New York: American Heritage Press, 1972), 37; Emerson D. Fite, and Archibald Freeman, *A Book of Old Maps Delineating American History from the Earliest Days down to the Close of the Revolutionary War* (1926; reprint New York: Dover, 1969), 10-12. Two nineteenth-century works are still important for this and other early maps of the East Coast: Henry Harrisse, *The Discovery of North America* (1891; reprint, Amsterdam: N. Israel, 1961), and Justin Winsor, *Narrative and Critical History of America*, 8 vols. (New York: Houghton, Mifflin and Co., 1884-89). A recent online article provides access to much of the recent literature on the La Cosa map. See: Luis A. Robles Macias, "Juan de la Cosa's Projection: A Fresh Analysis of the Earliest Preserved Map of the Americas," *Coordinates*, Series A, no. 9 (May 28, 2010), http://purl.oclc.org/coordinates/a9.htm.

12. Anonymous, [The Cantino Planisphere] (manuscript map, ca. 1502). Original at the Bibliotheca estensa, Modena. A clickable image of this map is available on the Web site of the Biblioteca estense at: http://bibliotecaestense.beniculturali.it/info/img/geo/i-mo-beu-c.g.a.2.html Copies of the Cantino map can be found in: Philip D. Burden, *The Mapping of North America: a List of Printed Maps, 1511-1670* (Rickmansworth, Herts: Raleigh Publications, 1996), pl.VII; Pierluigi Portinaro and Franco Knirsch, *The Cartography of North America 1500-1800* (New York: Facts on File, 1987), pl. II; Seymour I. Schwartz and Ralph E. Ehrenberg, *The Mapping of America* (New York: Abrams, 1980), 19. For an interpretation of this map, see Arne B. Mollander, "The Mystery of the Cantino Map," *The Portolan* 15 (1989):15-25.

13. Copies of these and other early maps of the region are found in the first two volumes of Isaac Newton Phelps Stokes, *The Iconography of Manhattan Island, 1498-1909* (6 vols.; New York: E.H. Dodd, 1915-28); available on the World Wide Web from Columbia University libraries at: http://clio.columbia.edu/catalog/5800727. A good colored copy of the Maggiolo Map is in Paul E. Cohen and Robert T. Augustyn, *Manhattan in Maps, 1527-1995* (New York: Rizzoli, 1997), 17. The most detailed discussion of the maps related to Verrazzano's discoveries is Lawrence C. Wroth, *The Voyages of Giovanni da Verrazzano, 1524-1528* (New Haven: Published for the Pierpoint Morgan Library by Yale University Press, 1970). See also Samuel Eliot Morison, *The European Discovery of America: The Northern Voyages, A.D. 500-1600* (Oxford: Oxford University Press, 1971), 277-325.

14. Maps related to the Gomez voyage are discussed in Stokes, *Iconography*, II, 17-29; W.F. Ganong, *Crucial Maps in the Early Cartography and Place-Nomenclature of the Atlantic Coast of Canada* (Toronto: University of Toronto Press, 1964), 135-79; and Morison, *Northern Voyages*, 326-38. Copies of the Ribero chart and other maps based on Gomez' voyage are contained in all of these works.

15. Morison, *Northern Voyages*, 339-463; Marcel Trudel, *The Beginnings of New France, 1524-1663*, trans. Patricia Claxton (Toronto: McClelland and Stewart, 1973), 25; Justin Winsor, *Cartier to Frontenac, Geographical Discovery in the Interior of North America in its Historical Relations, 1534-1700* (Boston and New York: Houghton, Mifflin, 1894), 31-34.

16. Giacomo di Gastaldi's map is untitled, but usually called *La Nuova Francia*. It appeared in J.B. Ramusio, *Viaggi*, vol. 3 (Venice, 1556).

17. Wroth, *Voyages of Verrazzano*, 205-09.

18. Cumming et. al., *The Discovery of North America*, fig. 340, p. 274.

19. Edward Wright, *A Chart of the World on Mercator's Projection*, in Richard Hakluyt, ed., *The Principall Navigations, Voiages, Traffiques and Discoveries of the English Nation* (London, 1598-1600). This map, based on Molyneux's globe, is sometimes called the "Wright-Molyneux Map." Detail showing North Atlantic region in Cumming et. al., *Discovery of North America*, fig. 269, p. 224.

20. Emanuel Van Meteren, "On Hudson's Voyage," in Jameson, *Narratives of New Netherland*, 6. See also, Donald S. Johnson, *Charting the Sea of Darkness: The Four Voyages of Henry Hudson* (New York: Kodansha, 1993), 133; Cumming, Skelton, and Quinn, *Discovery of North America*, 275.

21. See David Y. Allen, "The So-Called 'Velasco Map': A Case of Forgery?" in *Coordinates*, Series A, no. 5 (Feb. 14, 2006), http://purl.oclc.org/coordinates/a5.htm. Alexander Brown found the map in the Spanish archives at Simancas, and his commentary is in *The Genesis of the United States* (2 vols.; Boston and New York: Houghton Mifflin, 1890), I, 457-61. I.N. Stokes made a careful study of the original map, and satisfied himself that it was authentic. Stokes' analysis is found in, *Iconography*, II, 51-52, 135-36. Good color photographic reproductions of the Velasco map can be found in Stokes, *Iconography*, II, C.Pl 22; Cohen and Augustyn, *Manhattan in Maps*, 20; and Cumming, Skelton, and Quinn, *Discovery of North America*, fig. 326, pp. 266-67.

22. The sources are Emanuel Van Meteren and (more important) Robert Juet, both of which would have been available to a forger in the late nineteenth century. They can most conveniently be found in Jameson, *Narratives of New Netherland*.

23. Samuel de Champlain, "Descripsion des costs, pts., rades, illes de la Nouuele France faict selon son vray meridian" (manuscript map, 1607). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3321p.ct001431. This map was unearthed in the 1880s.

24. Champlain, Samuel de, *Carte geographique de la Nouvelle Franse*, 1612. Zoomable image available from the Newberry Library at http://publications.newberry.org/frontiertoheartland/items/show/269, originally published in his *Les Voyages* (1613). The best study of Champlain as a cartographer is Conrad E. Heidenreich, *Explorations and Mapping of Samuel de Champlain, 1603-1632*, Cartographica Monograph no.17 (Toronto: University of Toronto Press, 1976). Two readable biographies of Champlain with copies of many of his maps are: Samuel Eliot

Morison, *Samuel de Champlain: Father of New France* (Boston and Toronto: Little Brown and Company, 1972); David Hackett Fischer, *Champlain's Dream* (New York: Simon & Schuster, 2008).

25. The history of the publication of Champlain's maps of New France is somewhat confusing. His first map of New France (published in 1612) appeared in the first edition of *Les Voyages*. The second edition of *Les Voyages* was accompanied by a much cruder map, which actually may have been prepared before the map that was published in the first edition. This second map, as will be seen, had a strong influence on seventeenth-century Dutch cartography of the region. Champlain prepared another map in 1616, but it was never completed and not published in his lifetime. It seems to show the Mohawk River and identifies New York as *lieu ou sont les Flamans* (place where the Flemish are). His final map of New France, published in 1632, will be discussed below. All four of these maps are reproduced in Marcel Trudel, *Atlas de la nouvelle France/An Atlas of New France* (Quebec: Presses de l'Universite Laval, 1968).

26. Brûlé's travels are described by Champlain in *Voyages et Descovvertvres faites en la Novvelle France, depuis l'année 1615 iusques à la fin de l'année 1618* (1619;). See also Heidenreich, *Explorations and Mapping of Samuel de Champlain*, 24, 27-28.

27. Oliver A. Rink, *Holland on the Hudson: An Economic and Social History of Dutch New York* (Ithaca: Cornell University Press, 1986), 24-49; Simon Hart, *The Prehistory of the New Netherland Company: Amsterdam Notarial Records of the First Dutch Voyages to the Hudson* ([Amsterdam]: City of Amsterdam Press, 1959).

28. Both of these maps were discovered in the Royal Archives at the Hague by John Romeyn Brodhead in 1841. See his *History of the State of New York* (2 vols.; New York: Harper, 1853-71), 1:755-56, 757-58 (notes G and I). Brodhead had facsimiles made, and published them in *Documents Relative to the Colonial History of New York*. These black-and-white facsimiles are widely available and are reasonably accurate, but for research purposes should be compared to photographs of the original maps.

29. Color photographs of the Block chart can be found in Robert Putnam, *Early Sea Charts* (New York: Abbeville Press, 1983), 92-93, and in Cohen and Augustyn, *Manhattan in Maps*, 22-23. The most detailed study of the Block chart is in Stokes, *Iconography*, II, 68-75. See also F.C. Wieder, *Onderzoek naar de oudste kaarten van de omgeving van New York* (Leiden: E.J. Brill, 1918). A nineteenth century facsimile is available on the World Wide Web from the American Geographical Society Library at http://collections.lib.uwm.edu/u?/agdm,457.

30. On the role of Doetsz, see Kees Zandvliet, "Een Ouderwetse Kaart van Nieuw Nederland door Cornelis Dootz.en Willem Jansz.Blaeu," *Caert thresoor* 1:4 (1982): 57-60.

31. See J.B. Harley, "New England Cartography and the Native Americans" in Emerson W. Baker, ed., *American Beginnings: Exploration, Culture, and Cartography in the Land of Norumbega* (Lincoln: University of Nebraska, 1994), 287-313.

32. For identification of Indian tribes on the Block Chart, see Shirley W. Dunn, *The Mohicans and Their Land, 1609-1730* (Fleischmanns, N.Y.: Purple Mountain Press, 64-80; Charles T. Gehring and William A. Starna, "Dutch and Indians in the Hudson Valley: The Early Period," *Hudson Valley Regional Review* 9:2 (1992), 1-25.

33. [Hessel Geritsz and Cornelis Hendricksen?], ["Second Figurative Map" of New Netherland], (manuscript map, 1616?). See following note for information about reproductions and descriptions of this map.

34. For probable attribution to Geritsz, see Kees Zandvliet, *Mapping for Money: Maps, Plans and Topographic Paintings and Their Role in Dutch Overseas Expansion During the 16th and 17th Centuries* (Amsterdam: Batavian Lion International, 1998), 187. Zandvliet's book also has a good color photograph of the map. The most widely available copy is Brodhead's facsimile in *Documents Relative to the Colonial History of the State of New York*. A small photograph of the entire map is in Donna Merwick, *Possessing Albany, 1630-1710: The Dutch and English Experiences* (Cambridge and New York: Cambridge University Press, 1990), Figure 1.3, p. 17. Another photograph is in Stokes, *Iconography*, II, C. plate 24. Photographs of details are in Dunn, *Mohicans*, 48, 70. The map is described by Stokes, *Iconography*, II, 72-75, 137.

35. Stokes, *Iconography*, II, 73 (note).

36. Champlain, *Voyages et Descovvertvres* (1619), 33; Stokes, *Iconography*, II, 72.

37. Shirley W. Dunn, *The Mohicans and Their Land, 1609-1730* (Fleischmanns, N.Y.: Purple Mountain Press, 1994), 64-80.

38. Translation is adopted with slight modifications from Stokes, *Iconography*, II, 73.

39. This map is reproduced and discussed by Burden, *Mapping of North America*, 239-41 (map no. 194).

40. Champlain, Samuel de, *Carte de la Nouvelle France*, 1632. Available on the World Wide Web from the Norman B. Leventhal Map Center at Boston Public Library at http://maps.bpl.org/id/m8645. Published in the 1632 edition of *Les Voyages*.

41. Translation by Charles Gehring. Quoted in Dean R. Snow, ed., *In Mohawk Country: Early Narratives about a Native People* (Syracuse: Syracuse University Press, 1996), xxi.

42. Stokes, *Iconography*, II, 127; Jameson, *Narratives of New Amsterdam*, 75.

Chapter 2

1. There is a good deal of confusion over the nomenclature of the Dutch Colony that later became New York. Although "Netherlands" is accepted English usage for the Dutch home country, the Dutch called their colony "*Niew Nederlandt*," and their homeland *Nederlandt* (which translates as low country, not low countries). The singular "New Netherland" is used in most of the English-language scholarly literature. When writing in Latin, the Dutch translated *Niew Nederlandt* as *Novvum Belgivm*, as explained in the text below. Originally "Holland" referred to only the two coastal provinces of the Netherlands (North Holland and South Holland).

2. Population figures are from Michael Kammen, *Colonial New York: A History* (Oxford and New York: Oxford University Press, 1996), 38; Rink, *Holland on the Hudson*, 158

3. The New World is the usual English title for De Laet's *De Nieuwe Wereldt ofte Beschrijvinghe van West-Indien*. The map is described and reproduced in Stokes, *Iconography*, II, C. Pl. 31 and 86-88, 141; also in Cohen and Augustyn, *Manhattan in Maps*, 26-27. It is available on the World Wide Web in the online version of

Stokes' *Iconography*, and from the Osher Map Library at the University of Southern Maine as part of its "Cartographic Creation of New England" exhibit at http://www.oshermaps.org/search/zoom.php?no=1714#img0

4. This theory comes from Preston R. Bassett, "A History of Long Island Maps," *Journal of Long Island History* 7 (1967): 1-24.

5. See, David Yehling Allen, *Long Island Maps and Their Makers: Five Centuries of Cartographic History* (Mattituck, N.Y.: Amereon House, 1997), 4. However, John A. Strong points out that the name could reflect close kinship ties between the Long Island Indians and the Mohegan-Pequots in Southern New England. See his *The Algonquian Peoples of Long Island from Earliest Times to 1700* (Interlaken, N.Y.: Empire State Books, 1997), 151.

6. Johan De Laet, "The New World," in J. Franklin Jameson, *Narratives of New Netherland, 1609-1664* (1909; reprint, New York: Barnes & Noble, 1967), 44.

7. Willem Janszoon Blaeu's *Nova Belgica et Anglia Nova*. This map originally appeared in Blaeu's *Theatrum Orbis Terrarum* (Amsterdam, 1635); it was printed in several states. A copy of the 1635 edition is available from the Stony Brook University Library Web site at: http://www.stonybrook.edu/libmap/cap3.htm. A copy dated 1662 is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434501.

8. For Blaeu and the West India Company, see Zandvliet, *Mapping for Money*, esp. 175-80.

9. For example, in Schwartz and Ehrenberg, *Mapping of America*,105.

10. Thanks to Joep M.J. de Koning for providing information on this subject in reply to my question on the listserv MapHist (reply dated 06/05/2000); see also his article, "From Van der Donck to Visscher," *Mercator's World* 5, no. 4 (July/August 2000), http://web.archive.org/web/20030630211837/mercatorsworld.com/article.php3?i=75.

11. The depiction of wildlife on the Blaeu map is analyzed by Wilma B. George, *Animals and Maps* (Berkeley: University of California Press, 1969), 94-98.

12. This is the "Hartger's View," which will be discussed briefly in the third section of this chapter.

13. Kammen, *Colonial New York*, 38.

14. The first published map in this series is *Jan Jansoon, Novi Belgii Novaeque Angliae* (1650/51). A high resolution image of this map is available from the New York State Library, and can be retrieved through the New York State Library/Archives/Museum Catalog at http://nysl.nysed.gov/. Images of several other states of this series can also be found at this site. Most of the maps in this series are described by Tony Campbell, "New Light on the Janson-Visscher Maps of New England," *The Map Collectors Circle* No. 24 (1965). The

15. Jan van Bracht and Gunter Schilder, *Origins of New York* (Zurich: Edition Seefeld, 1988).

16. De Koning, "From Van der Donck to Visscher"; Russell Shorto, *The Island at the Center of the World: The Epic Story of Dutch Manhattan and the Forgotten Colony That Shaped America* (New York: Doubleday, 2004), 224-25.

17. Allen, *Long Island Maps*, 7-9.

18. Adrian Van der Donck, *A Description of the New Netherlands*, trans. Jeremiah Johnson and ed. Thomas F. O'Donnell (Syracuse, N.Y.: Syracuse University Press, 1968), 8-9.

19. Benjamin Schmidt, "Mapping an Empire: Cartographic and Colonial Rivalry in Seventeenth-Century Dutch and English North America," *William and Mary Quarterly*, 3d Series, 54: 3 (July, 1997): 549-578.

20. Joan Vinckeboons, *Pascaert van Nieuw Nederlandt Virginia, ende Nieuw-Engelandt verthonendt alles wat van die landin by See, oft by land is ondect oft Bekent* [1639?]. This and other maps in the Harrisse Collection is attributed by the Library of Congress to Joan Vinckeboons (or Johannes Vingboons), although the attribution is more than doubtful. Vinckeboons played a quasi-official role in the West India Company, and may have been involved in copying or bringing together the maps in the Harrisse Collection. The present map appears to be a copy made after 1660 of a manuscript map dating from about 1630. It is described by Shirley W. Dunn, "Interpreting the Little-Known Minuit maps of c. 1630," *Hudson Valley Regional Review* 9:2 (1992): 26-38; Richard W. Stephenson, "The Henry Harrisse Collection of Publications, Papers, and Maps Pertaining to the Early Exploration of America," *Terrae Incognitae* 16 (1984): 37-55; Stokes, *Iconography*, II, 111-13, 142. For Vinckeboons and the West India Company, see Zandvliet, *Mapping for Money*, esp. 175-86. The map is available online from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3300.ct001068.

21. This cooperative project between the Library of Congress and several Dutch libraries can be found at: http://international.loc.gov/intldl/awkbhtml/awkbhome.html.

22. Attributed to Joan Vinckeboons, *Noort Rivier in Niew Neerlandt* [1639?]; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3300.ct001068 It is also reproduced and described in Cohen and Augustyn, *Manhattan in Maps*, 24-25.

23. Dunn, "Interpreting," 36-37.

24. Dunn, "Interpreting," 37. See also her, *Mohicans and Their Land*, 93-100.

25. Burden, *Mapping of North America*, no. 297.

26. See Burden, *Mapping of North America*, no. 316; Gloria-Gilda Deák, *Picturing America, 1497-1899: Prints, Maps and Drawings Bearing on the New World Discoveries and on the Development of the Territory That Is Now the United States* (2 vols.; Princeton: Princeton University Press, 1988), I, no. 43; Stokes, *Iconography*, II, 154.

27. A copy of a latter state by Doncker is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434084.

28. *Pas caerte van Nieu-Nederland en de Engelsche Virginies van Cabo Cod tot Cabo Canrick*. Copies may be found in Burden, *Mapping of North America*, no. 366; Barbara B. McCorkle, *New England in Early Printed Maps: An Illustrated Carto-Bibliography* (Providence R.I.: John Carter Brown Library, 2001), 29.

29. This Goos chart also bears the title *Pas caerte van Nieu Nederlandt en de Engelsche Virginies van Cabo Cod tot Cabo Canrick*. It appeared in his atlas *DeZee Atlas ofte Water-Wereld* (Amsterdam, 1666). It is also available from the American

Shores Collection at New York Public Library (http://digitalgallery.nypl.org/nypldigital/id?433976).

30. P*askaerte van de Zuijdt en Noordt Revier in Nieu Nederlant, strekende van Cabo Hinloopen tot Rechkewach*. A copy can be found in Cohen and Augustyn, *Manhattan in Maps*, 36-37.

31. This map appeared in the first part of an atlas called *Het Brandende Veen* (The Burning Fen). The peculiar title of the atlas is both a pun on Roggeveen's name and a reference to the practice of burning peat to guide mariners with flames and smoke. Although the atlas was published in 1675, the map may have been drawn much earlier. Stokes, who greatly admired this map, describes it in *Iconography*, II, 157.

32. For background on Roggeveen and his relationship with the West India Company, see Zandvliet, *Mapping for Money*, 183-84.

33. Cornelis Koeman, *Atlantes Neerlandici* (6 vols.; Amsterdam: Theatrum Orbis Terrarum, 1967-71), 4:450-3.

34. See E.B. O'Callaghan, *History of New Netherland; or New York under the Dutch* (2 vols.; 1846; New York: Reprint Company, 1966), 2:334-36. Jacob Alrichs, commander of the wrecked ship, wrote that "we ran aground at a certain place opposite Long Island which is called by the Indians or the bearer of this Sichawach." Gehring notes that this could be either the Carmans or the Connetquot River. See Charles T. Gehring, trans. and ed., Delaware Papers (Dutch Period), vol. 18 of *New York Historical Manuscripts: Dutch* (Baltimore: Genealogical Publishing Co., 1981), 98, 350. O'Callaghan, *History of New Netherland*, 2: 235, incorrectly places the wreck near Fire Island Inlet.

35. Vooght, Claes Janszoon, *Pas-Kaart vande zee kusten van Niew Nederland anders genaamt Niew York: tusschen Renselaars Hoek en de Staaten Hoek* ([Amsterdam?]: Van Keulen, [1687?]). This map was published in JohannesVan Keulen, D*e Nieuwe groote lichtende zee-fakkel*, Part IV. A copy is in Stokes, *Iconography*, II, pl. 57. An online image is available on the World Wide Web from the New York Public Library (http://digitalgallery.nypl.org/nypldigital/id?434502).

36. Stokes has a list of "lost maps, etc." in *Iconography*, II, 161- 66.

37. Edmund B. O'Callaghan, trans. and ed., *Laws and Ordinances of New Netherland, 1638-1674* (Albany, N.Y.: Weed, Parsons, 1868), 9; quoted Charles T. Gehring, *Land Papers* (Baltimore; Genealogical Publishing Co., 1980), viii.

38. Edward T. Price, *Dividing the Land: Early American Beginnings of Our Private Property Mosaic* (Chicago: University of Chicago Press, 1995), 214. For a regional breakdown of this figure, see Jessica Kross, The *Evolution of an American Town: Newtown, New York, 1642-1775* (Philadelphia: Temple University Press, 1983), 13.

39. Merwick, *Possessing Albany*, esp. 163-64, 196-209.

40. Edmund B. O'Callaghan, *The Register of New Netherland, 1626 to 1674* (1865; Baltimore: Genealogical Pub. Co., 1998), 33; cited by John van Zandt Cortelyou, *The Cortelyou Genealogy: A Record of Jaques Corteljou and of Many of His Descendants* (Lincoln, Nebraska: Brown Printing Service, 1942), 14.

41. Gehring, ed., *Land Papers*, 19, 23.

42. Merwick, *Possessing Albany*, 199.

43. On Vingboons and the relationship between cartography and art generally, see Zandvliet, *Mapping for Money*, 210-54. For the relationship between art and cartography in the Netherlands during the seventeenth century, see Svetlana Alpers, "The Mapping Impulse in Dutch Art," in David Woodward, ed., *Art and Cartography: Six Historical Essays* (Chicago and London: University of Chicago Press, 1987), 51-96.

44. [Crijn Fredricx?], *T'Fort Nieuw Amsterdam op de Manhatans* (Amsterdam: J. Hartgers, 1651). See Frans Westra, "Lost and Found: Crijn Fredricx—A New York Founder," *de Halve Maen* 71 (Spring, 1998): 7-16. A nineteenth-century facsimile of this view is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?800041. Copies in: Stokes, *Iconography*, I, pl. 1-a; Schwartz and Ehrenberg, *The Mapping of America*, 105; Deák, *Picturing America*, no. 24 (1:18-19, 2:n.p.).

45. A reconstruction of the plans given to Friedricz is reproduced in Zandvliet, *Mapping for Money*, 198; see also F.C. Wieder, *De Stichting van New York in Juli 1625* ('s'Gravenhage: M.Nijof, 1925).

46. Joep M.J. de Koning, "From Van der Donck to Visscher"; Shorto, *The Island at the Center of the World*, 224-25; for the Vingboons' watercolor see Zandfliet, *Mapping for Money*, 237-38.

47. This is a large manuscript map (22.5 x 70 inches) bearing the title "Rensellaers Wyck." Most of the surveying for the map was done on the spot by Bastiaen Janz Krol. There is a high-resolution scan of this map available from the New York State Library at: http://purl.org/net/nysl/nysdocs/69251903. Aside from this digital image. there is no satisfactory reproduction of the map. A small photograph can be found in Merwick, *Possessing Albany*, 19. Photographs of details of the map are presented in Dunn, *Mohicans and Their Land*, 104-06. There are several nineteenth-century lithographic facsimiles of the map, none of which are very satisfactory. They can be found in: A.J.F. Van Laer, ed., *Van Rensselaer-Bowier Manuscripts, Being the Letters of Kiliaen Van Rensselaer, 1630-1643, and Other Documents Relating to the Colony of Rensselaerswyck* (Albany: University of the State of New York, 1908) with map folded in pocket at back; O'Callaghan, *New Netherland*, between 203 and 205; Moulton's *History of New York*; and in Munsell's *Annals of Albany*. There is a detailed analysis of the map in Merwyck, *Possessing Albany*, 18-24. Dunn, *Mohicans and Their Land*, 100-106, has additional information, mostly relating to Indians.

48. Zandvliet, *Mapping for Money*, 166. Zandvliet's book also includes a photograph of a copy of the map at the Gemeentarchief in Amsterdam.

49. Merwyck, *Possessing Albany*, 20.

50. The most accessible of the three copies is in the Harrisse Collection at the Library of Congress; it has been ascribed (almost certainly incorrectly) to Joan (or Johannes) Vinckeboons (or Vingboons). Its complete title is "Manatvs gelegen op de Noot Riuier" [Manhattan on the North River]. The other copies, which have variant titles, are at the Vatican Library and at the Medicea-Laurencia Library in Florence. The copy at the Library of Congress is available at http://hdl.loc.gov/loc.gmd/g3804n.ct000050. It has also been published as a facsimile by the Library of Congress and in Cohen and Augustyn, *Manhattan in Maps*, 28-31.

The Vatican version is reproduced in Wieder, *Monumenta Cartographica*, pl. 78. The map is described in great detail by Stokes, *Iconography*, II, 181-208. See also: Cohen and Augustyn, *Manhattan in Maps*, 28-31; Dunn, "Interpreting the Little-Known Minuit Maps"; Deák, *Picturing America*, no. 31; Richard W. Stephenson, "The Henry Harrisse Collection of Publications, Papers, and Maps Pertaining to the Early Exploration of America," *Terrae Incognitae*, 16 (1984): 37-55.

51. For the practices of the Vingboons studio, see Zandvliet, *Mapping for Money*, 215-54.

52. There is a good deal about the life of Jacques Corteljou in John Van Zandt Cortelyou, *The Cortelyou Genealogy* (Lincoln, Nebraska: Brown Printing Service, 1942), 15-61.

53. Jasper Dankers, *Journal of Jasper Danckaerts* (New York: Scribners, 1913), 127-28. For Corteljou's intellectual background, see also Brenda Safer, "Jaques Corteljou, the Cartesian: The Connection between René Descartes and Jaques Corteljou," *de Halve Maen* 73 (Winter 2000): 71-76.

54. *Land Papers*, I, no. 214 is one of the few surveys by Corteljou that contains a map, and it Is dated 1681. Land Papers are listed in David E.E. Mix, *Catalogue of Maps and Surveys in the Offices of Secretary of State, State Engineer and Surveyor, and Comptroller, and the New York State Library* (Albany: Charles van Benthuysen, 1859), as well as in New York (State). Secretary's Office, *Calendar of N.Y. Colonial Manuscripts, Indorsed Land Papers; in the Office of the Secretary of State of New York. 1643-1803*, ed. E.B. O'Callaghan (Albany: Weed Parsons & Co., 1864). Circumstances surrounding the production of this map are described by Van Zandt Cortelyou, *Cortelyou Genealogy*, 25.

55. Thomas E. Burke, Jr., *Mohawk Frontier: The Dutch Community of Schenectady, New York, 1661-1710* (Ithaca, N.Y.: Cornell University Press, 1991), 20-21; Van Zandt Cortelyou, *The Cortelyou Genealogy*, 30-31. Also, Ruth Loving Higgins, *Expansion in New York: With Especial Reference to the Eighteenth Century* (Columbus: Ohio State University, 1931),16.

56. As is usual with early maps of Manhattan, the most complete analysis is in Stokes, *Iconography*, II, C. Plate 82 and 209-48. Cohen and Augustyn, *Manhattan in Maps*, 38-41, provide a good summary along with color photographs. Several images of the Castello Plan can be found on the Web, including a zoomable image of Stokes' redraft from the New York Historical Society at https://www.nyhistory.org/web/crossroads/gallery/background_matter/castello_plan_redraft.html

Chapter 3

1. W.J. Eccles, *The Canadian Frontier, 1534-1760* (rev. ed.; Albuquerque: University of New Mexico Press, , 1983), 35-36.

2. For the overall education of the Jesuits see the chapters on the teaching of science, history, and geography in François de Dainville, *L'Education des Jésuites, XVIe-XVIIIe siècles* (rev. ed.; Paris, Éditions de Minuit, 1978). Conrad Heidenreich describes the surveying techniques used by the French Jesuits in North America in "Early French

Exploration in the North American Interior," in John Logan Allen, ed., *North American Exploration* (3 vols.; Lincoln: University of Nebraska Press, 1997), 2:92-93.

3. Pierre Radisson is a case in point. He eventually managed to learn English (of a sort) and produced a valuable narrative of his travels, but his geographical descriptions are almost completely unintelligible. See Pierre Esprit Radisson, *Voyages of Peter Espirit Radisson, Being and* [sic.] *Account of His Travels and Experiences Among the North American Indians, from 1652 to 1684* (1885; reprint, New York: Burt Franklin, 1967). An attempt to disentangle Radisson's travels With the Iroquois can be found in Martin Fournier, *Pierre-Esprit Radisson: Merchant Adventurer, 1636-1710* (Sillery: Septentrion, 2002), 20-79.

4. The full name of this institution is Dépôt des Cartes et Plans de la Marine et des Colonies. Maps from this institution have been partially dispersed. Many can be found in the Bibliothèque historique centrale de la Marine; some are now in the French Bibliothèque nationale; a few are in other libraries or have disappeared. Many of these maps are listed in Henry Harrisse, *Notes pour servier à la bibliographie et à la cartographie de la Nouvelle-France et les pays adjacents, 1545-1700* (Paris: Librairie Tross, 1872). The maps still at the Bibliothèque Historique centrale de la Marine are listed in its online catalog at http://www.culture.gouv.fr/culture/nllefce/fr/rep_ress/ba_00300.htm.

5. It should be noted that the Iroquois were not themselves strongly motivated by a desire to monopolize the fur trade. This widely accepted thesis has been refuted by José António Brandão, *"Your Fyre Shall Burn No More": Iroquois Policy toward New France and Its Native Allies to 1701* (Lincoln: University of Nebraska Press, 1997).

6. Writings by or derived from Father Jogues are an important source of information about both New Netherland and the Mohawks. They can be found in Ruben Gold Thwaites, *The Jesuit Relations and Allied Documents; Travels and Explorations of the Jesuit Missionaries in New France, 1610-1791* (73 vols.; Cleveland: Burrows Brothers Co., 1896-1901). This work is now available online from several sources, including an html version from Creighton University at: http://puffin.creighton.edu/jesuit/relations/. The portions relating to New York are also conveniently excerpted by Snow, *In Mohawk Country*, 14-37, 56-71.

7. A dramatic account of Father Jogues' sufferings at the hands of the Iroquois is given by Francis Parkman, *The Jesuits in North America in the Seventeenth Century* (1867); in Francis Parkman, *France and England in North America*, ed. David Levin (2 vols.; New York: The Library of America, 1983), I, 548-67.

8. Crouse, Nellis M., *Contributions of the Canadian Jesuits to the Geographical Knowledge of New France, 1632-1675* (Ithaca, N.Y.: Cornell Publications Printing Company, 1924), 61.

9. Eccles, *Canadian Frontier*, 56.

10. Conrad E. Heidenreich and Edward H. Dahl, *The French Mapping of North America, 1600-1760* (Tring, Hertfordshire: Map Collector Publications, 1982), 6.

11. Dean R. Snow, *The Iroquois* (Oxford and Cambridge, Mass.: Blackwell, 1994), 124.

12. Daniel K. Richter, *The Ordeal of the Longhouse: The Peoples of the Iroquois League in the Era of European Colonization* (Chapel Hill: University of North Carolina Press, 1992), 217-18.

13. Copies of many of these maps can be found in Louis Charles Karpinski, *Manuscript Maps, Prior to 1800, Relating to America; Photographic Facsimilies Made from Originals in Various Archives in Paris, Spain and Portugal* [s.l., s.n.: 1927-45?] Copies of all or part of the Karpinski collection are in a number of major research libraries in the United States and Canada. This collection is notoriously poorly organized and difficult to use. There is no standard system of numbering the maps, and the many untitled and/or anonymous maps have been differently listed or cataloged by various libraries. The location of the originals of many of these maps has changed since they were listed by Karpinski, and some of them have disappeared. The maps discussed in this chapter are in the "French Series" (6 vols. plus 2 vols of indexes). An online inventory of the Karpinski collection with indexes and useful background information is available from the Huntington Library (San Marino, California) at http://www.oac.cdlib.org/findaid/ark:/13030/tf3m3n99sf. Maps in the Karpinski Collection are cited here by the number assigned by the Huntington Library. Some of these maps are also reproduced in Gabriel Marcel, *Reproductions de cartes et de globes relatifs à le découverte de l'Amerique du XVIe au XVIIIe siècle* (Paris: Leroux, 1893); and in Alphonse Louis Pinart, *Recueil de cartes, plans et vues relatifs aux États-Unis et au Canada, New-York, Boston, Montréal, Québec, Louisbourg, 1651-1731 reproduits d'après les originaux manuscrits et inedits, etc. Exposés à l'occasion du quatrième centenaire de la découverte de l'Amerique* (Paris: n.p., 1893). Several of these manuscript maps can also be found in vol. 4 of Justin Winsor, *Narrative and Critical History of America* (Boston and New York: Houghton Mifflin, 1884-89), and in Winsor's *Cartier to Frontenac: Geographical Discovery in the Interior of North America in its Historical Relations, 1534-1700* (1894; reprinted New York: Cooper Square Publishers, 1970).

14. "Chemin des Iroquois" (Manuscript map). Archives Nationales (Paris), N.N. 173.6; photograph in Karpinski Collection, French Series (Huntington Library Inventory no. 97).

15. Conrad E. Heidenreich, "An Analysis of the 17-th Century Map 'Novvelle France'," *Cartographica* 25:3 (1988): 76-79, 85.

16. Francesco Giuseppe Bressani, *Novae Franciae Accurata Delineatio* (Bologna: n.p., 1657) Only three complete copies of the Bressani map are known to exist. Information about this map and its author can be found in Conrad E. Heidenreich, "Maps Relating to the First Half of the 17th Century and Their Use in Determining the Location of Jesuit Missions in Huronia," *The Cartographer*, 3:2 (December, 1966): 105-108; Louis Cardinal, "Record of an Ideal: Father Francesco Giuseppe Bressani's 1657 Map of New France," *The Portolan* 61 (Winter 2004-2005); Louis Cardinal, "Bressani: 'Io dedico la nuova Francia… I dedicate New France… Franc. Gius. Bressano… Bologna 11th January 1657' Analysis of a Recently Identified Copy of Father Francesco Giuseppe Bressani's Map Including Dedication, Authorship, Place and Date of Printing, Notes," *The Portolan* 76 (Winter, 2009): 33-42. A zoomable image of the Bressani map is available online from the *Gallica* website of the Bibliothèque nationale de France at http://gallica.bnf.fr/ark:/12148/btv1b6700080d/f1.item.langEN.

17. F.J., Bressani, *Breve Relatione* (Macerata, 1653); English translation in Thwaites, *Jesuit Relations*, vols. 38-40.

18. Snow, *In Mohawk Country*, 47-55; Thwaites, *Jesuit Relations* 39:55-83.

19. Crouse, *Contributions of the Canadian Jesuits*, 67. Father Poncet's relation is contained in *Jesuit Relations* 40:119-155 (excerpted in Snow et. al., *In Mohawk Country*, 93-103).

20. Crouse, *Contributions of the Canadian Jesuits*, 68; *Jesuit Relations* 41: 91-95.

21. For later activities of Jesuits, see Crouse, *Contributions of the Canadian Jesuits*, 75-78, and Charles Hawley, *Early Chapters of Seneca History: The Jesuit Mission in Sonnontuan, 1656-1684* (Auburn, N.Y.: [Knapp, Peck & Thompson Printers], 1884, as well as his, *Early Chapters of Cayuga History: Jesuit Missions in Goi-o-guen, 1656-1684*; and his *Account of the Sulpitian Mission among the Emigrant Caygas about Quinte Bay, 1n 1688* (Auburn, N.Y.: s.n., 1879).

22. Anonymous, *Plan des fortes faicts par le Regiment Carignan Salieres sur la Rivière de Richelieu dicte autrement des Iroquois en la Nouvelle France*. This map, which first appeared in the Jesuit Relation of 1664-65, and has frequently been reproduced, can be found in Thwaites, *Jesuit Relations*, vol. 49, facing p. 266, and in Snow, *In Mohawk Country*, 146. A high resolution image is available on the World Wide Web from the Norman B. Leventhal Map Center at the Boston Public Library at http://maps.bpl.org/details_14038/?mtid=268.

23. This multi-sheet map resides in the Bibliothèque historique centrale de la Marine, and is listed in its online catalog as "Recueil 67, pièces 47 à 53." It has been attributed to the Abbé Claude Bernou, and appears to be a reworking of materials from Jolliet and Franquelin. It is reproduced by Pinart and Karpinsiki (Huntington Library Karpinski nos. 486-87); Pinart, *Recueil de cartes*, no. 14. Parkman appears to have seen a version of this map in which all of the pieces were assembled as a single sheet. A copy of this single-sheet version can be found in the Parkman collection at the Harvard Library (no. 3 in the Parkman Collection; it is listed in Harrisse, *Notes*, no. 205). Map is probably that described by Parkman in Appendix I of *La Salle and the Great West*, in Francis Parkman, *France and England in North America* (2 vols), ed. David Levin (New York, The Library of America, 1983), I, 1044. A reduced-scale copy of Parkman's copy with the names and legends transcribed is in Winsor, *Narrative and Critical History of America* 4: 215-17. For comments on the origin and accuracy of this map see Jean Delanglez, "Franquelin, Mapmaker," *Mid-America; an Historical Review* 25 (new series), 14 (1943): 57.

24. [Bernou, Abbé Claude?], [Map of area from Saint Lawrence River south to Albany and Boston], (manuscript map,[1679?]). Original at Bibliothèque historique centrale de la Marine (Recueil 67, no. 48 bis) Reproduced in Karpinski (Huntington Karpinski no. 386a); Pinart, *Recueil de cartes*, no. 14.

25. "Montagnes ou l'on trouve des veines de plomb mais peu abondantes."

26. [Bernou, Abbé Claude?], [Map of area around Lake Ontario] (manuscript map, [1679?]). Original at Bibliothèque historique centrale de la Marine (Recueil 67, no. 48 bis). Reproduced in Karpinski (Huntington Karpinski no. 386b); Pinart, *Recueil de cartes*, no. 15.

27. "Chute haute de 120 toises par ou le lake Erie tombe dans le lac Frontenac." The French toise is approximately six feet; the actual height of Niagara Falls is 184 feet.

28. "Cahihonoüagé lieu ou la pluspars des Iroquois et des loups debarques pur aller en traitte du castor a la Nouvelle York par les chemins marques de double rangs de points."

29. [Jean-Baptiste Louis Franquelin ?], “Le Lac Ontario auec les lieux circonuoisins & particulierement les Cinq Nations Iroquises, L’année 1688” (manuscript map, 1688). Original at Bibliothèque historique centrale de la Marine (Recueil 67, 70) This map is in the Karpinski collection (Huntington Library Karpinski no. 398); described, Harrisse, *Notes*, no. 239. 25. It is based on a similar but less polished map by Father Raffeix with an almost identical title (omitting the date): “Le Lac Ontario avec les lieux corconvoisins et particulierement les Cinq Nations Iroquoises” (Huntington Karpinski no. 28). Original at Bibliothèque Nationale (Paris), http://catalogue.bnf.fr/ark:/12148/cb40739412k/ISBD; Harrisse, *Notes*, no. 237. A third map, which is seriously misleading, bears the title *Pays des Cinq Nations Iroquoises Kenté* (1668); it appears to be an edited and augmented version of one of these maps redrawn for Etienne-Michel Faillon’s *Histoire de la colonie Francaise en Canada* (3 vols.; Villemarie: Bibliothèque Paroissale, 1865-66), III, between pp. 196-97.

30. Robert B. Roberts, *New York’s Forts in the Revolution* (Rutherford, N.J.: Farleigh Dickenson, 1980), 341-43; Kammen, *Colonial New York*, 117.

31. Different lengths have been given for the French league. According to Heidenreich, "Huronia," 115, the Jesuits used a league equivalent to 3.47 English miles. The direct-line distance shown on the map for this portage is, however, approximately 60 miles.

32. Jean-Baptiste Louis Franquelin, “Carte du pays des Irroquois” (manuscript map, [ca. 1688]). Original at Bibliothèque historique centrale de la Marine (Recueil 67, no. 66); Huntington Library Karpinski no. 397; Harrisse, *Notes*, no. 213. Harrisse assigned the date 1679 to this map, which was accepted by the Library of Congress. However, Franquelin was not commissioned as the “King’s Hydrographer at Quebec” until 1686. See M.W. Burke-Gaffney, “Franquelin, Jean-Baptiste-Louis,” *Dictionary of Canadian Biography*, 2: 229. Since this map resembles the other maps produced by Franquelin and Raffeix around 1688, it seems probable that it was made at about the same time. Raffeix also produced a map called *Pays des Iroquois* (Huntington Library Karpinski no. 390).

33. Anonymous, “Carte de la route entre les villages St.-Jacques et la Conception et le lac Ontario” (manuscript map, [ca. 1688]). Original at Bibliothèque historique centrale de la Marine (Recueil 67, no. 68); copy in Huntington Library Karpinski no. 399. An apparently identical copy is at the Bibliothèque Nationale (#B 4044-65). It is also reproduced in Thwaits, *Jesuit Relations*, 51: 293; 55:75. This map has also been reproduced and discussed by George R. Hamell, “Gannagaro State Historic Site: A Current Perspective,” in Nancy Bonvillain, *Studies in Iroquoian Culture*, Occasional Publications in Northeastern Anthropology, No. 6 (Rindge, NH : Dept. of Anthropology, Franklin Pierce College, 1980), 91-107. Hamell believes that it was probably drawn in 1684 by Sieur D’Orvilliers in preparation for an aborted expedition against the Seneca headed by Governor Labarre of Canada. Although D’Orvillier undoubtedly prepared such a map, the polished style of the existing copies resembles that of Franquelin, who may well have reworked D’Orvillier’s map and possibly additional materials at a somewhat later date. The catalog of the Bibliothèque historique centrale de la Marine states that it is “peut-être une carte de Franquelin.”

34. Franquelin, Jean Baptiste Louis, “Carte de l’Amerique Septentrionnale entre les 25 et 65 degrez de latitude et depuis environ les 240 jusquáux 340 de longit.” (manuscript map, 1688). The original at the Bibliothèque historique central de la Marine (Recueil 66,

no. 6). The Library of Congress has a manuscript copy of this map made in 1909 or 1910, which it has made available on the World Wide Web at: http://hdl.loc.gov/loc.gmd/g3300.ct000668.

35. For Franquelin, see Delanglez, "Franquelin, Mapmaker," *Mid-America; an Historical Review* 25 (new series), 14 (1943): 57, and M.W. Burke-Gaffney's article on Franquelin in *The Dictionary of Canadian Biography*, 2:228-31.

36. This map, possibly also by Bourdon, is dated 1666, and entitled "Carte du Canada Occidental jusqu'au Lac Ontario à l'Ouest et au Sud du Canada jusqu'à Orange et le cap Malebarc." A copy of this map is at the National Archives of Canada, and information about its date and possible authorship are derived from its catalog. This is probably the map listed as Recuil 67, no. 56 in the online catalog of the Bibliothèque historique centrale de la Marine under the title *Carte du fleuve St-Laurent, du lac Ontario, de la Nouvelle-Angleterre et du chemin menant aux "Habitations des Iroquois que les troupes du Roy doivent attaquer."* An image of this map is not readily available, although it appears to have been the primary source for a nineteenth-century semi-facsimile map, *Carte Dressée Pour la Campagne de 1666*, which appeared in Faillon's *Histoire de la colonie Francaise en Canada*, vol. III, between pages 124-25. A copy of this map, which provides a fairly good reproduction of the depiction of the Lake Champlain corridor on Bourdon's manuscrpt, is figure 8 of David Y. Allen, "French Mapping of New York and New England, 1604-1760," *Coordinates* (Series A, no. 1) at http://purl.oclc.org/coordinates/a1.htm.

37. Thomas Elliot Norton, *The Fur Trade in Colonial New York, 1688-1776* (Madison, University of Wisconsin Press, 1974), 128-29.

38. [Villeneuve, Robert de?], [Region from Montreal to New York] (manuscript map, [1693?]). This map was at the Ministere des Affaires Etrangères (Paris), and may now be at the Bibliothèque Nationale (Paris), but I am unable to verify its present location. Photograph in Karpinski Collection (Huntington Karpinski no. 83).

39. Jean Baptiste Louis Franquelin, "Carte de la côte de la Nouvelle Angleterre, depuis le Cap Anne jusqu'a la Pointe Nevresing, ou' est compris le chemin par terre et par mer, de Boston a Manathes." (manuscript map, 1693) This map was formerly in the Archives of Service Hydrographique de la Marine in Paris, but I am unable to identify its present location. Photograph in Karpinski Collection (Huntington Library Karpinski no. 228); Harrisse, *Notes*, no. 251.

40. Cohen and Augustyn, *Manhattan in Maps*, 50-51.

41. "Carte du Lac Champlain, avec les Rivieres, depuis le Fort Chambly dans la Nouvelle France, jusques a Orange ville de la Nouvelle Angleterre, dressé sur divers memoires." [manuscript map, location unknown]; photograph in Karpinski (Huntington Karpinski no. 96). This map was probably published around 1709; a facsimile (misdated "about 1731") can be found in John Romeyn Brodhead, Berthold Fernow, E. B. O'Callaghan, *Documents Relative to the Colonial History of the State of New York* (15 vols.; Albany, N.Y.: Weed Parsons and Company, 1853-87), 9:1022.

42. Jean Boisseau, *Description de la Nouvelle France* (1643). A complete bibliographic description and a copy of this map is available online from the Web site of the W.H. Pugsley Collection of Early Canadian Maps at McGill University, http://digital.library.mcgill.ca/pugsley/maplist.htm.

43. For the Du Val map and its relation to the Champlain map of 1616, see Lawrence C. Wroth, "An Unknown Champlain Map of 1616," *Imago Mundi* 11 (1954), 85-94. Images of the 1664 edition of Du Val's map are available from available from the Pugsley Collection (see previous note), and from the Bibliothèque et Archives Nationale du Québec at http://services.banq.qc.ca/sdx/cep/document.xsp?id=0002663088. This site also features a good selection of published maps of New France, which can be searched at http://www.banq.qc.ca/collections/cartes_plans/index.html. A high-resolution image of the 1677 edition of Du Val's map can be found at http://www.oshermaps.org/map/1772.0001.

44. Nicolas Sanson, *Le Canada ou Nouvelle France* (1656). Available on the World Wide Web from the Norman B. Leventhal Map Center at the Boston Public Library at: http://maps.bpl.org/details_14085/?srch_query=Sanson+1656&srch_fields=all&srch_style=exact&srch_fa=save. All editions of Sanson's maps of North America are listed in Burden, *Mapping of North America*.

45. Francois Du Creux, *Tabula Novae Francia anno 1660*. This map was published in his *Historia Canadensis seu Novae Franciae* (1664). Available on the World Wide Web from the Bibliothèque et Archives Nationale du Québec at http://services.banq.qc.ca/sdx/cep/document.xsp?id=0002663543

46. The most important of Coronelli's maps that include the New York area is his *Partie occidentale du Canada ou de la Nouvelle France ou sont les nations des Ilinois, de Tracy, les Iroquois, et plusieurs autres peuples; avec la Louisiane* (Paris: J. Nolin, 1688). Available on the World Wide Web from the Wikipedia Commons at http://commons.wikimedia.org/wiki/File:Vincenzo_Coronelli_Partie_occidentale_du_Canada_1688.PNG.

47. For a comprehensive examination of the Delisle family and its place in the history of cartography as well as the mapping of North America, see Nelson-Martin Dawson, *L'Atelier Delisle: L'Amerique sur la table à dessin* (Sillery, Québec: Septentrion, 2000). See also Jean Delanglez, "The Sources of the Delisle Map of America, 1703," *Mid-America; an Historical Review* 25 (new series):4 (1943): 275-98.

48. Guillaume and Claude Delisle, *Carte du Canada ou de la Nouvelle France et des découvertes qui y ont été faites*, [Paris: Delisle, 1703]. Image of the second issue of this map (1708) is available from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/v5n0cy

49. Guillaume Delisle, *Carte de la Louisiane et du cours du Mississipi* (Paris: Delisle, 1718). Available on the World Wide Web from the Library of Congress (http://hdl.loc.gov/loc.gmd/g3700.ct000666).

50. Brodhead, *Documents Relative*, 5:577; Walter Klinefelter, *Lewis Evans and His Maps* (Philadelphia: American Philosophical Society, 1971), 7-8.

51. The first edition of Colden's map was published in his *Papers Relating to an Act of Assembly* (New York: William Bradford,1724). The second edition (1747) bears the title *A Map of the Country of the Five Nations, Belonging to the Province of New York; and of the Lakes Near Which the Nations of Far Indians Live, with Part of Canada*. A copy of Colden's map can be seen at the website of the University of Pennsylvania Library, http://www.library.upenn.edu/exhibits/rbm/kislak/lands/fivenationsmap.html

52. For the de Lérys' surveys of the Great Lakes, see Heidenreich, "Mapping the Great Lakes," 79-83.

53. Gaspard-Joseph Chaussegros de Léry, "L'entrée de la Riviere Choueguen scituée à la cote du sud du Lac Frontenac" (manuscript map,1727). Facsimile published in *Documentary History of the State of New York*, I, facing p. 292.

54. The illustration presented here is a detail from a lithographed nineteenth-century facsimile of a French manuscript map. The title of the facsimile *Carte du Lac Champlain depuis le fort Chambly jusquáu fort St. Frederick Levée par le Sr Anger arpenteur du Roy en 1732 fait à Quebec le 10 Octobere 1748 Signé de Lery* (Albany: Pease, [ca. 1849]). It was published in the *Documentary History of the State of New York*, I, facing p. 358. The complete map is available on the Internet from Stony Brook University (http://www.sunysb.edu/libmap/Lery.htm). Revised versions of this map were made in 1740 and 1748, and possibly at other dates.

55. The history of the French settlements in the Champlain Valley is narrated by Guy Omeron Coolidge in *The French Occupation of the Champlain Valley* (2nd ed.,1989; reprint Fleischmanns, NY: Purple Mountain Press, 1999) A detailed study of French settlement policies can be found in Richard Colebrook Harris, *The Seignorial System in Early Canada: A Geographical Study with a New Preface* (Kingston: McGill-Queen's University Press, 1984).

56. Jacques Nicolas Bellin, *Carte des lacs du Canada* (Paris: Rolin, 1744). Available on the World Wide Web from the Wisconsin Historical Society at http://www.wisconsinhistory.org/turningpoints/search.asp?id=104. For Bellin's place in the cartography of New France, see Heidenreich and Dahl, *French Mapping*, 15-17.

57. Jacques Nicolas Bellin, *Partie occidentale de la Nouvelle France ou Canada* (Paris: R.J. Julien, 1744); available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?465029. The companion map is Jacques Nicolas Bellin, *Partie orientale de la Nouvelle France ou du Canada* (Paris: Dépot de la Marine, 1744).

58. There were two separate editions in 1755 of the *Partie Occidentale de la Nouvelle France ou Canada*. One version was published in Nürnberg by the successors of Homan with the slightly variant title *Partie occidentale de la Nouvelle France ou du Canada*, and is an almost exact reissue of the 1744 edition (available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3310.ar001900). The Paris edition with the revisions is also available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3400.ar077400.

59. Jacques Nicolas Bellin, *Suite du cours du fleuve de St. Laurent depuis Quebec jusqu'au Lac Ontario* ([Paris]: 1757). Originally published in *Prevost's Histoire Générale des Voyages*. Copy illustrated here was reprinted in De La Harpe's *Voyages* (1780). Available on the World Wide Web from Stony Brook University at: http://www.sunysb.edu/libmap/Bellin57b.htm.

60. Examples of maps by these authors can be found at the Library of Congress Geography and Map Division website and at other major research libraries. For example: Robert de Vaugondy, Didier (1723-1786), *Carte des pays connus sous le nom de Canada, dans laquelle sont distinguées les possessions françoises, & angl?* (Paris, 1753), available from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3400.ar001500; John Baptiste Nolin, *Carte des colonies anglaises dans l'Amérique septentrionale, terminée par la re. Ohio* (Paris, Chés N. J. B. de Poilly, 1756), available from the Library of Congress at, http://hdl.loc.gov/loc.gmd/g3300.ar007100 Thomas Jefferys, **N***orth*

America. From the French of Mr. d'Anville, Improved with the Back Settlements of Virginia and Course of Ohio, Illustrated with Geographical and Historical Remarks ([London]: Jeffreys, 1755), available from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3300.ar002900

61. Pierre Pouchot, *Carte des frontieres Françoises et Angloises dans le Canada depuis Montreal jusques au Fort du Quesne*. Published in his *Mémoires sur la dernière guerre de l'Amerique l'Amérique septentrionale, entre la France et l'Angleterre* (Yverdon [Switzerland?]: s.n. 1781). This map is available on World Wide Web from the John Carter Brown Library at http://jcb.lunaimaging.com/luna/servlet/s/2m795n. A simplified facsimile of this map was published in the nineteenth century, and can be found in Brodhead, *Documents Relative,*10: 694.

62. Anonymous, [Rivière Richelieu, lac Champlain, lac Saint-Sacrement et rivière Connecticut], [1758]. Copy at National Archives of Canada (NMC 11639).

63. Anonymous, "Plan de Niagara et des fortifications faites en 1755 et 1756". National Archives of Canada (NMC 0026647); Anonymous, "Plan du Fort Carillon, 1758." This map of Fort Carillon (later Fort Ticonderoga) is from the National Archives of Canada (NMC 0007792); this map appears to come from a volume of military plans published in Frankfurt around 1790 (see OCLC #605370553).

Chapter 4

1. John Speed, *A Map of New England and New York* (London: Bassett and Chiswell, 1676). Published in his *A Prospect Of The Most Famous Parts Of The World*. Available on the World Wide Web from the Norman B. Leventhal Map Center of Boston Public Library at http://maps.bpl.org/id/10059.

2. Anonymous, *A Description of the Towne of Mannados or New Amsterdam as it was in September, 1661* (manuscript, 1664). The original of this map is located at the British Library, and a low-resolution image is available from the library at: http://www.bl.uk/onlinegallery/hightours/dukesplan/. It is described and reproduced in Cohen and Augustyn, *Manhattan in Maps*, 42-43, and in Stokes, *Iconography*, I, pl. 10, and pp. 207-10.

3. The anonymous and untitled "Nicolls map", now located at the British Library, is described and reproduced in Cohen and Augustyn, *Manhattan in Maps*, 44-45, and in Stokes, *Iconography*, I, pl. 10A-a, and pp. 210-12. This and many other British manuscript maps can also be found in Archer B. Hulbert, *The Crown Collection of Photographs of American Maps* (5 series, some with multiple volumes; Cleveland: Arthur H. Clark Co., 1907-1930), available on the World Wide Web from Research Laboratories of Archaeology, University of North Carolina Chapel Hill, http://rla.unc.edu/EMAS/CC.html. This collection is indexed by in the Newberry Library Cartographic Catalog at http://www.biblioserver.com/newberry/index.php. This particular map is Series I, vol. 5, pl. 18-21 in the *Crown Collection*.

4. Hubbard, Sgt. [Sergeant James], *A plott off ye Situation of the Towns & Places of ye Western End of Long Island to Hempstead* (manuscript, 1664). The original of this map was destroyed in a fire. It is reproduced as the frontispiece of Vol. XIV of Brodhead, *Documents Relative to the Colonial History of the State of New-York.* A digital image of

a blueprint copy is available from New York State Library, and can be found by searching its catalog at: http://www.nysl.nysed.gov/.

5. The manuscript original of the John Scott map is at the British Library (Add. ms 5414, f. 21). It is untitled and its author is not identified in the catalogs of the British Library. It is a large colored roll map measuring 114 x 174 cm. A small-scale copy has been published in Peter Whitfield, *New Found Lands: Maps in the History of Exploration* (New York: Routledge, 1998), 114. Uncolored photostatic copies can be found at the John Carter Brown Library at Brown University and at the Stony Brook University Library.

6. There is no satisfactory account of Scott's life. He is usually regarded as an unscrupulous rascal, as in Wilbur Cortez Abbott, *Colonel John Scott of Long Island, 1632-1704* (New Haven: Yale University Press, 1918). Lilian T. Mowrer has tried to redeem Scott's reputation in *The Indomitable John Scott: Citizen of Long Island, 1632-1704* (New York: Farrar, Straus and Cudahy, 1960), but her attitude towards her subject is uncritical and her documentation is badly flawed with footnotes that are impossible to trace. Scott's dealings with Long Island Indians are recounted in Lara M. Strong and Selcuk Karabag, "Quashawam: Sunksquaw of the Montauk," *Long Island Historical Journal* 3 (1991): 195-97. There is some additional information about the Long Island portion of Scott's map in Allen, *Long Island Maps and Their Makers*, 13-16.

7. This map is contained in an assembled atlas owned by the John Carter Brown Library at Brown University, which has been published in facsimile as Jeanette D. Black, ed., *The Blathwayt Atlas; a Collection of 48 Manuscript and Printed Maps of the 17th Century Relating to the British Overseas Empire in That Era, Brought Together about 1683 for the Use of the Lords of Trade and Plantations* (2 vols.; Providence: Brown University Press, 1970). Volume II, 99-101, contains a commentary on the Ryder map. A facsimile of this map has also been published separately as *Long Island Siruaide by Robartt Ryder* (Meriden, Conn., Meriden Gravure Co. for the John Carter Brown Library at Brown University, 1950). The original Ryder map at the John Carter Brown Library can be viewed online at http://jcb.lunaimaging.com/luna/servlet/s/djmthc

8. Ryder and others were requested by Governor Lovelace to survey Staten Island, but the survey is lost. See Peter R. Christoph and Florence A. Christoph, eds., *New York Historical Manuscripts: English. Books of General Entries of the Colony of New York, 1664-1673* (Baltimore: Genealogical Publishing Co., 1982), 496. For Ryder's possible role in surveying the Connecticut boundary see Philip J. Schwarz, *The Jarring Interests : New York's Boundary Makers, 1664-1776* (Albany: State University of New York Press, 1979), 29, 248-49, and . Christoph., *New York Historical Manuscripts: English...General Entries*, 229-30. See Black, *Blathwayte Atlas*, II, *Commentary*, 99, for his role in determining latitude of New York. His map of Long Island is also described by George W. Tuttle, "Map of Long Island," Staten Island Institute of Arts and Sciences, *Proceedings*, 3rd ser., II (1922-4), 91-104. There is additional information about the Long Island portion of this map in Allen, *Long Island Maps and Their Makers*, 16-19.

9. This earlier version of the Ryder map, which may be incomplete, lacks the eastern portion of Long Island. It is reproduced in greatly reduced facsimile in Victor Hugo Paltsits, *Minutes of the Executive Council of the Province of New York* (Albany: J.B. Lyon, 1910), I, 237.

10. Andros "To all Justices of the Peace, Constables, or Other Officers who in may Concerne," Dec. 15 1675, in Christoph, *New York Historical Manuscripts: English… 1674-1688*, 96.

11. The organization generally known as the Board of Trade or Board of Trade and Plantations had overall responsibility for supervising the administration of the colonies. The official name of this body changed repeatedly, but its members were generally known as "The Lords of Trade" or "The Lords of Trade and Plantations." See Ian K. Steele, *Politics of Colonial Policy: The Board of Trade in Colonial Administration, 1696-1720* (Oxford: Clarendon Press, 1968).

12. Black, *Blathwayte Atlas*, II, *Commentary*, 99.

13. John Romeyn Brodhead, *History of the State of New York* (2 vols; New York: Harper & Brothers, 1853-71), 2:121.

14. These early Dutch and English explorations of upstate New York are summarized by Alan V. Briceland, "British Exploration of the United States Interior," in Allen, ed., *North American Exploration*, 2:307-312. See also Helen Broshar, "The First Push Westward of the Albany Traders," *The Mississippi Valley Historical Review* 7:3 (Dec., 1920): 228-41.

15. Miller's manuscript was first published in 1843. It was reprinted with an introduction and notes by Victor Hugo Paltsists as *New York Considered and Improved, 1695* (New York: Burrows Brothers, 1903). The Paltsists edition is available online from the University of Nebraska-Lincoln Digital Commons at http://digitalcommons.unl.edu/etas/17/. The online edition includes high-resolution images of Miller's maps.

16. For Miller's plan of New York see Cohen and Augustyn, *Manhattan in Maps*, 52-53; Stokes, *Iconography*, I, pl.23-a and pl 23-b, and pp. 234-36; and the digital edition of Miller's book cited in the previous note.

17. Both the Miller plan and the earlier sketch are reproduced in Janny Venema, *Beverwijck: A Dutch Village on the American Frontier, 1652-1664* (Albany, N.Y.: State University of New York Press, 2003), 28-29.

18. For the etymology of de fuyck, see Merwick, *Possessing Albany*, 107, and Jasper Dankers' 1680 description in Roland Van Zandt, ed., *Chronicles of the Hudson: Three Centuries of Travelers' Accounts* (New Brunswick, N.J.: Rutgers University Press, 1971), 28.

19. For the history of the Kingston stockade and comments on Miller's plan of Kingston, see Marc B. Fried, *The Early History of Kingston and Ulster County*, N.Y. (Marbletown, Kingston, N.Y.: Ulster County Historical Society, 1975), 163-67. Additional information on the stockade and the early geography of Kingston can be found in Alf Evers, *Kingston: City on the Hudson* (Woodstock, N.Y.: Overlook Press, 2005), 19-80.

20. Information about Römer's life is from the *Dictionary of National Biography*; background information concerning his activities in New York can be found in Sara Stidstone Gronim, "Geography and Persuasion: Maps in British Colonial New York," *The William and Mary Quarterly* 58:2 (2001): 375-80.

21. Full title: "Plan de la Ville d'Albanie dans la Province de la Nouvelle Yorck en Amerique" (manuscript, 1698). Original at British Public Record Office (C.O.700, New York 3). Reproduced in Archer Butler Hulbert, *The Crown Collection of Photographs of*

American Maps (5 series, some with multiple volumes; Cleveland: Arthur H. Clark Co., 1907-1930), ser. 3, nos. 237-238. Available on the World Wide Web from the Research Laboratories of Archaeology of the University of North Carolina at: http://rla.unc.edu/Mapfiles/CC/CC-3.maps.226-250.pdf. Copy in Merwick, *Possessing Albany*, 108.

22. "Plan de Sconectidy frontiere dan le conté d'Albanie et province de la Nouvelle Yorck en Amerique" (manuscript, 1698?). Original in the British Public Record Office (C.O. 700, New York 6). Copy in Hulbert, *Crown Collection*, ser. 3, nos. 245-46. Available on the World Wide Web from the Research Laboratories of Archaeology of the University of North Carolina at: http://rla.unc.edu/Mapfiles/CC/CC-3.maps.226-250.pdf. Detail in Grassmann, *Mohawk Indians*, 527, and Burke, *Mohawk Frontier*, 37.

23. Copies of this map are at the British Public Record Office (C.O. 700, New York 5) and at the British Library (Crown 122:27). Copy in Hulbert, *Crown Collection*, ser. 1, vol. 1, pl. 1. Available on the World Wide Web from the Research Laboratories of Archaeology of the University of North Carolina at: http://rla.unc.edu/Mapfiles/CC/CC-1-1.maps.pdf Also in Michael Swift, *Historical Maps of North America* (London: PRC, 2001), 35.

24. Manuscript copies of this map are at both the British Library (Crown 121:10) and the Public Record Office. Reproduced in Hulbert, *Crown Collection*, ser. 1, vol. 3, pl. 15. Available on the World Wide Web from the Research Laboratories of Archaeology of the University of North Carolina at: http://rla.unc.edu/Mapfiles/CC/CC-1-3.maps.pdf. Copy of a nineteenth-century facsimile with a changed cartouche is available online at: http://www.sunysb.edu/libmap/Romer.htm.

25. Brodhead, *Documents Relative to the Colonial History of the State of New York*, III, 303.

26. Winthrop's map showing the route from Albany to Quebec is an untitled manuscript map at the Public Record Office (C.O. 700, New York 14). A photostat is available at the Library of Congress.

27. For information on John Winthrop and the abortive invasion of Canada, see the entry under Winthrop in the *Dictionary of American Bibliography*, and Broadhead, *Documents Relative to the Colonial History of the State of New York*, III, 727, 728, 752, 753, and IV, 56, 70, 71, 103, 105, 193.

28. Samuel Clowes, "A Mapp of the Indian Country to the Westward of Albany in ye Province of New York, Including that Tract of Land given by the Five Nations of Indians to His Majesty, His Heirs and Sucessors. Protracted by Order of the Hon Jonathan Nanfan, Liet. Governor and Comander in Chief of ...New York, 19 July 1701" (manuscript map). Public Record Office (C.O. 700, New York 15). This map is described in Gronim, "Geography and Persuasion," 380-81; Brandão, José António and William A. Starna, "'Some Things May Slip Out of Your Memory and Be Foregott': The 1701 Deed and Map of Iroquois Hunting Territory Revisited," *New York History*, 86:4 (Fall, 2005): 417-33. Small-scale reproductions are in both articles.

29. "A Map of the Province of New Yorke in American [*sic*] and the Territorys Adjacent by Augstin Graham Survey Generall" (manuscript map, 1698). Public Record Office (C.O. 700, New York 8). Reproduced in Hulbert, *Crown Collection*, ser. 3, no. 247-50. Available on the World Wide Web from the Research Laboratories of Archaeology of the University of North Carolina at: http://rla.unc.edu/Mapfiles/CC/CC-

3.maps.226-250.pdf. Small copy in Sara Stidstone Gronim, "Geography and Persuasion," 377. Gronim also mentions the map sent by Governor Dongan (pages 373, 375).

30. For dates of service of Graham and other surveyors general, see Edgar A. Warner, *Civil List and Constitutional History of the Colony and State of New York* (Albany: Weed, Parsons, 1884), 167. This is a serial publication, which was published for the New York State Legislature between approximately 1880 and 1891. Different volumes have different imprints. The 1884 edition is available from Google Books at http://books.google.com/books?id=Sz4dAAAAYAAJ.

31. This map was prepared for Lord Bellomont, who sent it to the Board of Trade explicitly to illustrate the "extravagant grants of land" made by his predecessor, Governor Fletcher. See Bellomont to Lords of Trade, Oct. 21, 1698, in Broadhead, *Documents Relative to the Colonial History of the State of New York*, IV, 397.

32. For the tribulations of New York's alleged transvestite governor, see Patricia U. Bonomi, *The Lord Cornbury Scandal: The Politics of Reputation in British America* (Chapel Hill: University of North Carolina Press, 1998).

33. The first edition bears the title *The History of the Five Indian Nations Depending on the Province of New-York in America* (New York: William Bradford, 1727); the second edition is corrupted by the publisher and entitled *The History of the Five Indian Nations of Canada: Which are Dependent on the Province of New-York in America, and Are the Barrier between the English and French in that Part of the World* (London: T. Osborne, 1747). Another London edition appeared in 1755. There are several modern reprints of this work.

34. "Abstract of the Evidence in the Books of the Lords of Trade relating to New-York," Brodhead, *Documents Relative to the Colonial History of the State of New York*, VI, 674.

35. For an overview of Colden's life and thought, see Alfred R. Hoermann, *Cadwallader Colden: A Figure of the American Enlightenment* (Westport, Ct.: Greenwood Press, 2002). Alice M. Keys, *Cadwallader Colden: A Representative Eighteenth-Century Official* (1906; New York: AMS Press, 1967) focuses on Colden's administrative and political career, including his work as surveyor general. For Colden's contributions to science, see Brooks Hindle, *The Pursuit of Science in Revolutionary America, 1735-1789* (Chapel Hill: University of North Carolina Press, 1956).

36. Cadwallader Colden to Board of Trade, Oct. 13, 1764, *The Colden Letter Books*, 2 vols., New-York Historical Society, *Collections* (vols. 9 and 10), 1:387-88.

37. Gronim, *Everyday Nature*, 110; William Burnet, "Observations of the Eclipses of the First Satellite of Jupiter," Royal Society of London, *Philosophical Transactions* 33 (1724-25): 162-64. According to Burnet, the figures were "calculated" by Colden and compared with "Pound's Tables." James Pound is the author of "New and Accurate Tables for the Ready Computation of the Eclipses of the First Satellite of Jupiter, by Addition Only," Royal Society of London, *Philosophical Transactions* 30 (1717-19): 1021-1034. Although Pound does not explicitly say so, his observations appear to have been made at St. Paul's Church in London, not at the Royal Observatory at Greenwich, and Burnet states that they were made in "London."

38. This map first appeared in a document Colden prepared entitled *Papers Relating to an Act of the Assembly of the Province of New-York, for Encouragement of the Indian Trade, etc. and for Prohibiting the Selling of Indian Goods to the French, viz. of Canada*

(New York: William Bradford, 1724). It was reprinted in his *History of the Five Nations* (1727). A copy from the 1747 edition of his *History of the Five Nations* is available from the John Carter Brown Library at Brown University at http://jcb.lunaimaging.com/luna/servlet/s/055cp9. The 1747 map appears to be unchanged from the 1724 version. Colden's role in drafting this map is unclear. As Gronim points out: "It is often identified as having been made by…Colden, but because the map was directly copied from Delisle, it was not necessary for the printer, William Bradford, to have a manuscript map from which to make an engraving; thus there may be no 'cartographer' for this map" ("Geography and Persuasion," note 15). However, as noted in the text, Delisle's map was modified in some respects, and it also appeared in Colden's *History of the Five Nations*, so it seems reasonable to assume that Colden was responsible for the changes. The question of "authorship" is not particularly important in this context, for several people are usually involved in the creation of most printed maps.

39. Cadwallader Colden, "Observations on the Situation, Soil, Climate, Water Communications, Boundaries &c. of the Province of New York," in E.B. O'Callaghan, *The Documentary History of the State of New York* (4 vols.; Albany: Weed, Parsons, and Company), IV, 109-15.

40. Colden to Governor William Shirley, [November, 1749-March 1750?], *The Letters and Papers of Cadwallader Colden* (9 vols.; New-York Historical Society *Collections*, vols. 50-56, 67-68), 9:54.

41. Schwartz and Ehrenberg, *The Mapping of America*, 147.

42. For more on the complex history of British claims to suzerainty over the Iroquois and the lands they conquered, see: Francis Jennings, *The Ambiguous Iroquois Empire: The Covenant Chain Confederation of Indian Tribes with English Colonies from its Beginnings to the Lancaster Treaty of 1744* (New York: Norton, 1984), esp. 282-83, 290; Brandão and Starna, "'Some Things May Slip Out of Your Memory,'" 417-33.

43. Douglass to Colden, 14 Sept, 1724, *Letters and Papers of Cadwallader Colden*, I, 164-167.

44. Ibid., 165.

45. Colden, "Observations," 114.

46. Ibid.

47. Ibid.

48. Some light is thrown on the methods of distance measurement probably used by Colden by Evans' discussion of surveying methods at the end of this chapter.

49. The Huntington Library's copy of Colden's map of the Province of New York (HM15440) has been missing since 2002. It is described in the Huntington Library's catalog as "a rough copy by Samuel Holland, probably made in 1757." A photocopy of this map is at the Library of Congress. The map that was at the New York State Library is partially reproduced in Winsor, *Narrative and Critical History*, V, [236-237].

50. Winsor comments in his *Narrative and Critical History* (V, 238): "probably Colden refers to it [this map], in his letter of December 4, 1726, to Secretary Popple, as 'a map of this province, which I am preparing by the Governor's order.' As this last letter … treats mainly of quit-rents, and as this map illustrates the same as fixed in the various patents, it is most likely that the latter is the map now under consideration."

51. Colden to Capt, James Cuningham, Dec. 6, 1756, Colden, *Letters and Papers*, V, 101.

52. For a comparison of British and French mapping of New York made by an eighteenth-century contemporary, see William Smith, *The History of the Province of New-York,* ed. Michael G. Kammen (2 vols.; 1757; Cambridge, Mass: Belknap Press of Harvard University Press, 1972), 1:150-51.

53. A copy and description of this map can be found in Burden, *Mapping of North America*, no. 380. It is also reproduced in Stokes, *Iconography*, II, C. Pl. 50, and described on p. 156. A copy from Columbia University's digitized copy of Stokes can be viewed at: http://www.columbia.edu/cu/lweb/digital/collections/cul/texts/ldpd_5800727_002/pages/ldpd_5800727_002_00000371.html.

54. John Speed *Newengland* [*sic*] *and New York* (London: Tho Basset, 1776). This map closely resembles the Visscher map of 1656, but a few names are anglicized. The New York Public Library has digitized this map at: http://digitalgallery.nypl.org/nypldigital/id?433720.

55. Both maps were published in John Seller, *Atlas Maritimus, or the Sea-Atlas* (London: Seller, 1675). High-resolution images of them can be found by searching the John Carter Brown Library at Brown University's Archive of Early American Images at http://jcb.lunaimaging.com/luna/servlet. Like many maps published in the seventeenth and eighteenth centuries, Seller's map of New England appeared in several editions or states. A standard reference for the various states of British Maps of Colonial North America is Henry Stevens and Roland Tree, *Comparative Cartography: Exemplified in an Analytical & Bibliographical Description of nearly One Hundred Maps and Charts of the American Continent Published in Great Britain during the Years 1600 to 1850* (1951; reprinted with addenda, London: The Map Collectors' Circle, 1967). Additional information can often be found in the second volume of Burden, *Mapping of North America*, which covers the years 1671-1700, and in McCorkle, *New England in Early Printed Maps*.

56. This Morden map is described by Black in *The Blathwayt Atlas*, II, 82-87, and in McCorkle, *New England in Early Printed Maps*, no. 676.3. It is available from the John Carter Brown Library at Brown University at http://jcb.lunaimaging.com/luna/servlet/s/az721c

57. This map exists in at least four states. See Stevens and Tree, *Comparative Cartography*, no. 35. There is a good color photograph of the first state in Cohen and Augustyn, *Manhattan in Maps*, 49. It is available on the World Wide Web from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?434020.

58. This map is usually cited as Richard Daniel, *A Map of ye English Empire in ye Continent of America viz. Virginia, Maryland, Carolina, New York, New England* ([London:] R. Morden and W. Berry, [1679]). It is available from the John Carter Brown Library at Brown University at http://jcb.lunaimaging.com/luna/servlet/s/81b6a2. Except for its iconography, it closely resembles Morden's 1676 map. This map exists in at least two states, and includes notes indicating that it was made by R. Daniel and engraved by W. Binneman. Like most maps, it really has multiple authors. On most seventeenth century maps, only the name of the publisher was given on the map, and consequently the publisher is conventionally assigned as the "author" of the map. In this case, where the names of the cartographer and the engraver are known, map catalogers and bibliographers are inconsistent in whom they designate as "author."

59. For early whaling on Long Island see, James Truslow Adams, *History of the Town of Southampton* (East of Canoe Place) (Bridgehampton, N.Y.: Hampton Press, 1918) and Gaynell Stone, ed., *The Shinnecock Indians: a Culture History* (Stony Brook, N.Y.: Suffolk County Archaeological Association ;Lexington, Mass.: Ginn Custom Pub.,1983).

60. *The English Pilot: The Fourth Book* was originally published by John Thornton and William Fisher (London, 1689). It has been reprinted with a useful introduction by Coolie Verner (Amsterdam: Theatrum Orbis Terrarum, 1967).

61. William Patterson Cumming, *British Maps of Colonial America* (Chicago: University of Chicago Press, 1974), 34.

62. [John Thornton?], *Part of New England, New York, East New Iarsey, and Long Island* (London: William Fisher and John Thornton, 1689). Available on the World Wide Web from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?1260168. Stokes thought that there might have been a relationship between the Thornton chart and the Roggeveen chart. See, Stokes, *Iconography*, II, 158.

63. Allen, *Long Island Maps*, 16-20.

64. See Ashley-Baynton Williams, "The Charting of New England," in *MapForum* 1:2 (no date, 1999?), http://www.mapforum.com/02/neweng.htm. See also, CoolieVerner, *A Carto-Bibliographical Study of The English Pilot the Fourth Book with Special Reference to the Charts of Virginia* (Charlottesville, Va.: University of Virginia Press, 1960).

65. Mark Tiddeman, *A Draught of New York from the Hook to New York Town* (London: W. & J. Mount & T. Page, 1731). A good copy can be found in Cohen and Augustyn, *Manhattan in Maps*, 66-67. Available on the World Wide Web from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?1650621.

66. Southack apparently drew the first version of his chart around 1718, but it was not published until around 1729 under the title *The New England Coasting Pilot from Sandy Point of New York, unto Cape Canso in Nova Scotia, and Part of Island Breton* ([London]: n.p.). An edition of this chart, tentatively dated 1734? is available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3301pm.gct00083. The publishing history of this chart contains many riddles, but it was reissued with some revisions, variant titles, and at various scales throughout the eighteenth century. See Clara Egli Le Gear, "The New England Coasting Pilot of Cyprian Southack," *Imago Mundi* 11 (1955): 137-44, and David Bosse's remarks on its publishing history in "The Boston Map Trade of the Eighteenth Century," in Alex Krieger, David Cobb, et. al., *Mapping Boston* (Cambridge, Mass.: MIT Press, 2001), 43-44.

67. John Mitchell, *A Map of the British and French Dominions in North America* ([London]: Mitchell, 1755). The Mitchell map is discussed in chapter six of this book. Typical of the French maps of this period is Jacques Nicolas Bellin, *Carte de la Nouvelle Angleterre, Nouvelle Yorck, et Pensivanie pour server a l'histoire generale des voyages* (Paris: [Bellin?], 1757.); available on the World Wide Web from the University of Alabama at http://alabamamaps.ua.edu/historicalmaps/northeast/index.html.

68. John Green, “Explanation for the New Map of Nova Scotia and Cape Britain” (London, 1755), 5. Green, whose real name was Braddock Mead, was an assistant of Thomas Jefferys. Mead and Jefferys will be discussed in chapter 6.

69. Cyprian Southack, *To His Excellency Samuel Shute Esqr* ... [*A New Chart of the English Empire in North America*] (Boston: Francis Dewing, 1717). Described and reproduced by Schwartz and Ehrenberg, *The Mapping of America*, 145. Available on the World Wide Web from the John Carter Brown Library at Brown University at http://jcb.lunaimaging.com/luna/servlet/s/318p36 .

70. Herman Moll, *New England, New York, New Jersey and Pensilvania* (London: Moll, 1729). Digital images of several editions of this map are available from the New York Public Library at http://digitalgallery.nypl.org/. Moll had published similar maps of the Northeast as early as 1708. The famous “beaver” image first appeared in a map of North America that Moll published in 1715. The image reproduced as Figure 7.15 in this publication is taken from a copy of Herman Moll, *A new and exact map of the dominions of the King of Great Britain on ye continent of North America* ([London] Printed and sold by T. Bowles, J. Bowles, and I. King, 1715 [i.e. 1731]), which is available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3300.ct000232.

71. [Daniel Neal], *A New Map of New England According to the Latest Observations*, in his *History of New-England* (London: J. Clark, R. Ford, and R. Cruttenden, 1720) . Reproduced in Krieger and Cobb, *Mapping Boston*, 27.

72. Henry Popple, *A Map of the British Empire in America with the French and Spanish Settlements Adjacent Thereto* (London: s.n., 1733). High resolution images of this huge 20-sheet map are available from the David Rumsey Collection at http://www.davidrumsey.com and from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3300m.gct00061. Mark Babinski analyzed this map in *Henry Popple’s 1733 Map of The British Empire in North America* (Garwood, NJ: Krinder Peak Publishing, 1998). The sources used to compile the Popple map are described by William P. Cumming and Helen Wallis in the introduction to a facsimile edition in part III of *North America at the Time of the Revolution* (Lympne Castle, Kent: Harry Margary, 1972-75).

73. Henry Popple was Clerk to The Board of Trade for only four months in 1727. However, his brother, Alured Popple, was for many years Secretary of the Board, and Henry maintained close connections with the Board. Henry Popple used his connections to confer on his map a quasi-official status, which was expressed by an annotation on the map itself: “Mr. POPPLE undertook this MAP with the Approbation of the Right Honourable the LORDS COMMISSIONERS of TRADE and PLANTATIONS; and great Care has been taken by comparing all the Maps, Charts and Observations that could be found, especially the Authentick Records & Actual Surveys transmitted to their LORDSHIPS, by the Governors of the British Plantations, and Others, to correct the many Errors committed in former Maps.” The Popple map also appeared in a small-scale edition, and was widely used in the eighteenth century.

74. Lewis Evans, *A Map of Pensilvania, New Jersey, New-York, and the Three Delaware Counties* ([Philadelphia]: 1749). The Evans map of 1749 has been widely reproduced, and is available online from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3790.ar103500.

75. The most important works on Lewis Evans are: Walter Klinefelter, *Lewis Evans and His Maps* (Transactions of the American Philosophical Society new series, vol. 61, part 7, 1971); Lawrence Henry Gipson, *Lewis Evans* (Philadelphia: The Historical Society of Pennsylvania, 1939); Henry N. Stevens, *Lewis Evans: His Map of the Middle British Colonies in America* (1905; revised ed. London: H. Stevens, son, and Styles, 1920); Lawrence Wroth, *An American Bookshelf, 1755* (Philadelphia: University of Pennsylvania Press, 1934).

76. Klinefelter, *Lewis Evans*,16; Colden, *Letters and Papers*, III, 275-77.

77. Evans to Colden, March 13 1748/9, *Colden Letters and Papers*, IV, 107-08.

78. See Gipson's comments on longitude readings by Evans in his *Lewis Evans*, 18-19 (note). In an undated letter to James Alexander, probably written shortly after the publication of Evans' 1749 map, Colden also criticized Evans' method of taking longitudes (see Colden, *Letters and Papers*, IX, 36-37). However, a comparison of the latitudes on the Evans 1749 map with those given by Colden (above) indicate that Evans' latitudes were either derived from Colden, or were better than Colden's. See also Klinefelter, *Lewis Evans*, 42, for a comparison of the longitudes on Evans' maps of 1749 and 1755.

Chapter 5

1. A good starting place for the study of land ownership in New York is the relevant chapters in Price, *Dividing the Land*. Price's work, which also deals with the other eastern states, is particularly valuable for treating developments in New York in a comparative context. Another excellent brief account, which includes a balanced overview of the previous literature, is the chapter on New York's land system in Patricia U. Bonomi, *A Factious People: Politics and Society in Colonial New York* (New York: Columbia University Press, 1971), 179-228. For an older but more detailed account, see Higgins, *Expansion in New York*. Charles Worthen Spencer, "The Land System of Colonial New York," New York Historical Association, *Proceedings*, 16 (1917): 150-64, is still a useful summary, particularly for political aspects of the land system. See also Irving Mark, *Agrarian Conflicts in Colonial New York: 1711-1775* (New York: Columbia University Press, 1940). Sung Bok Kim, *Landlord and Tenant in Colonial New York: Manorial Society, 1664-1775* (Chapel Hill: University of North Carolina Press, 1978) is an important and influential revisionist study. There are also many studies of land policies in specific regions. Of these, Armand Shelby La Potin, *The Minisink Patent* (New York: Arno Press, 1979) is particularly notable. Other specialized studies will be noted below.

For those interested in researching the history of specific land parcels, Joseph R. Bien's *Atlas of the State of New York* (New York: J. Bien and Co., 1895) is useful for its detailed maps showing boundaries of the most important early land grants. The Bien atlas is available online at the David Rumsey Collection, http://www.davidrumsey.com. An extensive table of the most important land patents (including location, county, date, extent, and patentees) can be found under the heading "Lands" in J.H. French, *Gazetteer of the State of New York* (Syracuse, N.Y.: J. Pearsall Smith, 1860), 46-53. Land maps in the New York State Archives are listed in David E.E. Mix, *Catalogue of Maps and Surveys, in the Offices of the Secretary of State, State Engineer and Surveyor, and*

Comptroller, and the New York State Library (Albany: Charles van Benthuysen, 1859); a reprint edition published in 1981 gives the present location of the materials that still exist: James Corsaro, ed., : *Mix's Catalogue of Surveys & Maps* ([Marcellus, N.Y.] : Central New York Society of Land Surveyors, [1981]). The existing maps, along with a much larger number of written land patents, can be found in an archival collection at New York State Archives cataloged as: New York (State). Dept. of State, *Applications for Land Grants, 1642-1803*. This collection is familiarly known as "the land papers," and it is also available on microfilm. The land papers themselves are indexed in E.B. O'Callaghan, ed. *Calendar of N.Y. Colonial Manuscripts, Indorsed Land Papers: In the Office of the Secretary of State of New York, 1643-1803* (1864; Harrison, N.Y.: Harbor Hill Books, 1987). This reprint edition also lists the materials that are missing in the existing land papers.

2. The English towns on western Long Island were Hempstead, Flushing, Gravesend, Middelburgh (Mespath or Newton), and Rustdorp (Jamaica). For land policies in the English and Dutch towns of New Netherland see Clarence White Rife, "Land Tenure in New Netherland," in *Essays in Colonial History Presented to Charles McLean Andrews* (1931; Freeport, N.Y.: Books for Libraries Press, 1966), 41-73, and Albert E. McKinley, "The English and Dutch Towns of New Netherland," *The American Historical Review*, 6:1 (1900): 1-18.

3. Although New York sported the only permanent military garrison in British North America, it was pathetically week prior to the American Revolution. Split between Albany and New York, the garrison numbered around 200 troops in the seventeenth century, and about 400 in the eighteenth. Poorly funded and disorganized, it does not seem to have posed much of a threat to anybody, either in war or in peace. See Stanley McCrory Pargellis, "The Four Independent Companies of New York," in *Essays in Colonial History Presented to Charles McLean Andrews*, 96-123.

4. Spencer, "The Land System in Colonial New York," 161. See introduction to microfilm edition of land papers (see above note 1) for a more detailed listing of the steps. Higgins, *Expansion in New York*, 29-31, also describes these procedures and the associated fees in greater detail.

5. See Beverley W. Bond Jr., *The Quit-Rent System in the American Colonies* (1919; Gloucester, Mass.: Peter Smith, 1965), 254-85.

6. Kim, *Landlord and Tenant*, 41.

7. La Potin, "The Minisink Grant," 34, 36.

8. Colden wrote quite an incisive critique of New York's land system, which was published as "The State of the Lands in the Province of New York in 1732," in O'Callaghan, *Documentary History of New York*, I, 377-389.

9. Kim, *Landlord and Tenant*, esp. 129-280; La Potin, *Minisink Patent*, 119-25.

10. Kim, *Landlord and Tenant*, 13-17; Robert C. Ritchie, *The Duke's Province: A Study of New York Politics and Society, 1664-1691* (Chapel Hill: University of North Carolina Press, 1977), 38.

11. Lawrence H. Leder, *Robert Livingston, 1654-1728, and the Politics of Colonial New York* (Chapel Hill: Published for the Institute of Early American History and Culture by the University of North Carolina Press, 1961), 35.

12. For Dongen's land policies see Kim, *Landlord and Tenant*, 20-43; his political maneuverings are treated in more detail by Ritchie, *The Duke's Province*, 167-179.

13. Kim, *Landlord and Tenant*, 71-86; John C. Rainbolt, “A Great and Useful Designe,” New-York Historical Society Quarterly 53:4 (1969): 333-51.

14. Spencer, “The Land System of Colonial New York,” 154; Higgins, *Expansion in New York*, 25-31.

15. Patricia U. Bonomi, *The Lord Cornbury Scandal : the Politics of Reputation in British America* (Chapel Hill: University of North Carolina Press, 1998).

16. Spencer, “Land System,” 154-58; La Potin, *The Minisink Patent*; Higgens, *Expansion in New York*, 26-29, 57-58.

17. A good overview is Norman J. Van Valkenburgh, *The Hardenburgh Patent: The Largest Colonial Grant* ([Syracuse, N.Y.]: New York State Association of Professional Land Surveyors, 1988). Alf Evers provides an entertaining account of history of the Hardenburgh Patent, including its ramifications and unwindings through the first half of the nineteenth century, in *The Catskills: From Wilderness to Woodstock* (rev. ed.; Woodstock, N.Y.: Overlook Press, 1982).

18. Quotation from Valekenburgh, *Hardenburgh Patent*, 8-9.

19. Listed in Mix, *Catalogue of Maps* (see note 5.1 above).

20. 1681 maps by Courteljou and Welles, Mix, *Catalogue of Maps*, 214 & 215; Van Zandt Cortelyou, Cortelyou Genealogy, 25, describes the circumstances surrounding the surveying of this property.

21. See Roger J.P. Kain and Elizabeth Baigent, *The Cadastral Map in the Service of the State : a History of Property Mapping* (Chicago : University of Chicago Press, 1992).

22. For an overview of seventeenth-century surveying techniques in New York, see Sara Stidstone Gronim, *Everyday Nature: Knowledge of the Natural World in Colonial New York* (New Brunswick: Rutgers University Press, 2007), 26-30.

23. This applies to many of the maps listed in Mix, *Catalogue of Maps*, for example, the 1680 map by Philip Welles of lots of land at Fresh Kill in Mix, vol. 1, no. 186.

24. This map is cited as “Draught of a tract of land, lying on the east side of Cow Neck on Long Island, belonging to Mr. John West, April 9, 1683, Philip Welles, Surveyor,” in Mix *Catalogue of Maps*, 138 (vol. 2, No. 12).

25. John R. Bleecker, “A Map of the Manor of Renselaerwick” (manuscript map). “By a scale of 100 Chains to an Inch.” A reduced-scale facsimile was made around 1850 for the *Documentary History of the State of New York* “from the original in the possession of Genl. Stephen Van Renselaer.” This facsimile has been reproduced by Jonathan Sheppard Books (Albany, N.Y., ca. 1990). A high resolution digital image of the nineteenth-century facsimile is available from New York State Library and from the Wikipedia Commons at http://commons.wikimedia.org/wiki/File:Rensselaerswyck_Map_Bleeker_Downsampled_Restored.png

26. A copy of a map of Lloyd Neck dated 1685 is in volume I of the *Lloyd Family Papers* (Collections of the NY Historical Society, 1926); a detailed map of the Minisink Patent (Orange County) dating from around 1703 is held by the New York Historical Society (M22.2.5); John Howell, Map of the Rombout Patent [Dutchess County]: Surveyed & Delineated by Me John Hol[w]ell, Surveyor Aprill 1st Anno Domini 1689, dated 1693 on verso, and held by the New York Historical Society (M29.2.10); John Beatty, "Map of Livingston Manor Anno 1714" (facsimile published in *The Documentary History of the State of New York*, III, facing p. 414); a copy of this facsimile is available

on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.rbc/rbpe.10203500.

27. For the resistance of Long Islanders to paying taxes on land, see Ritchie, *Dukes Province*, 186-90.

28. Reproduced as Plate 24-a in vol. I of Stokes, *Iconography*.

29. Welles lived as a farmer on Staten Island, and is referred to as a "steward" of Edmund Andros in 1680-81. A number of his surveys on Staten Island, Long Island, and around Kingston are listed in Mix, *Catalogue of Maps*. He is also mentioned as a commissioner for running the boundary between Connecticut and New York in 1684. See: Brodhead, *Documents Relative to the History of New York*, III, 302, 312 and IV, 630. According to Warner, *Civil List and Constitutional History of the Colony and State of New York* (p. 167), Welles served as Surveyor General from 1683-1690.

30. Earl of Bellomont to Lords of Trade, Oct. 17, 1700, Brodhead, *Documents Relative to the Colonial History of New York*, IV, 719.

31. Colden, "State of the Lands," in *Documentary History of New York*, I, 384 and elsewhere.

32. For the venality of New York's royal governors in the middle of the eighteenth century, see Smith, *History of the Province of New York*, 1:117, 2:61, and elsewhere; Stanley N. Katz, *Newcastle's New York: Anglo-American Politics, 1732-1753* (Cambridge, Ma.: Harvard University Press, 1968), 21-38.

33. Higgens, *Expansion in New York*, 31.

34. Regarding Colden's gentlemanly graft, see Higgens, *Expansion in New York*, 29-30, 61; Evers, *Catskills*, 194.

35. La Potin, "Minisink Patent," 37-42.

36. Unless otherwise noted, the information presented below is summarized from Higgens *Expansion in New York* and French's *Gazetteer*.

37. Potin, *Minisink Patent*, 88-95.

38. James Thomas Flexner, *Mohawk Baronet: Sir William Johnson of New York* (New York: Harper, 1959), 153.

39. Ibid., 225-26, 295-96.

40. Higgens, *Expansion in New York*, 88.

41. Higgens, *Expansion in New York*, 92; Bourcier, *History in the Mapping*, 10-11.

42. A summary of Colden's land transactions can be found in Eugene R. Fingerhut, Survivor: *Cadwallader Colden II in Revolutionary America* (Washington, D.C.: University Press of America, 1983), 6-7.

43. Colden to Board of Trade, Oct 13, 1764, *Colden Letter Books*, I, 388.

44. Colden to Capt. James Cuningham, Dec. 6, 1756; *Colden Letters and Papers*, V, 102.

45. These memoranda are mentioned and apparently reflected in "Representation of the Lords of Trade to the King," Brodhead, *Documents Relative to the Colonial History of New York*, V, 504. Two similar documents, dated 1726, can be found on pages 805-809 of the same volume. A more extended version can be found in Colden's essay in O'Callaghan's *Documentary History of New York* (cited above note 5.7). For Colden's political ideas generally and their relation to his views on land, see Carole Shammas, "Cadwallader Colden and the Role of the King's Prerogative," *New-York Historical Society* Quarterly, LIII:2 (1969), 103-26.

46. Brodhead, *Documents Relative to the Colonial History of New York*, VI, 674.

47. Colden to Popple, Dec. 4, 1726, Brodhead, *Documents Relative to the Colonial History of New York*, V, 806.

48. Colden to Board of Trade, Oct. 13, 1764, *Colden Letter Books*, I, 388.

49. The extent of Colden's mapping activities in these years is something of a mystery. Mix's *Catalogue of Maps* lists a number of maps made by Colden in Orange and Ulster Counties around 1720. Most of these are for lands in the former Evans Grant. After that, there is a gap until 1750, after which many maps signed "Cadwallader Colden and Alexander Colden, Surveyors-General" start to appear. Some of these may be based on earlier work by Cadwallader Colden, although the Coldens may have just signed the maps to indicate their approval of work done by other surveyors. Colden's map of "the Oblong" can be found at the New York Historical Society. A reduced-scale facsimile is the frontispiece to volume II of the *Colden Letters and Papers*. For the controversy over allocation of lands in the Oblong, see Katz, *Newcastle's New York*, 80-81.

50. Silvio A. Bedini, *At the Sign of the Compass and Quadrant: The Life and Times of Anthony Lamb* (Transactions of the American Philosophical Society, vol 74, part 1, 1984).

51. *Colden Letters and Papers*, II, 208-211.

52. Alexander to Colden, June 10 1744, *Colden Letters and Papers*, III, 61-63. Alexander, who was also an immigrant from Scotland, served on the Governor's Council of New York with Colden. He was among other things a prominent attorney in New York, while at the same time serving as surveyor general of East and West New Jersey. Like Colden and Douglass in Massachusetts, he was a leading figure in eighteenth-century American science. See also John P. Snyder, *The Mapping of New Jersey* (New Brunswick: Rutgers University Press, 1973), 29-35.

53. [James Alexander], G*eneral Instructions by the Surveyor General to the Deputy Surveyors of the Eastern Division of New Jersey* (New York: James Parker, 1747; microfiche edition, Woodbridge, CT: Research Publications, 1997, *Selected Americana from Sabin's Dictionary of Books Relating to America*. Similar instructions were issued for West New Jersey. See Deborah Jean Warner, "True North--And Why it Mattered in Eighteenth-Century America," *Proceedings of the American Philosophical Society* 149:3 (Sept., 2005), 375-76.

54. Colden to Cuningham, Dec. 6, 1756, *Colden Letters and Papers*, V, 101.

55. Ibid., 101-02. The original of this map is available at the Huntington Library (San Marino, CA), where it has been assigned the title [Map of Ulster and Orange Counties, New York, Showing the Settlements between the Blue Mountains and the Hudson River]. A copy of this map was apparently sent to the Governor's Council of New York in November 1757, where it is referred to as "a Map of that part of the Western Frontier of this Government new infested by the Enemy Indians." *Colden Letters and Papers*, V, 208-09.

56. The history of this quit rent legislation is summarized in Bond, *Quit-Rent System*, 271-74.

57. Bonomi, *Factious People*, 208, cites Colden and others. On efforts starting in 1748 to gain tighter control of colonies, see Schwarz, *Jarring interests*, 91.

58. The text of this act and its amendments are in the *Laws of the Colony of New York* (Chapter 1171), 584-1039. Keys, *Cadwallader Colden*, 285, presents some of the background to this legislation.

59. For Colden's critique of this act, see his letter to the Board of Trade, Jan. 25, 1762, in Cadwallader Colden, *Colden Letter Books* (2 vols.; New York: New York Historical Society, 1877-78), 1:155-58.

60. William Smith forcefully stated the concerns about quit rents. See Bond, *Quit-Rent System*, 274.

61. Sir William Johnson's land transactions are summarized in Flexner, *Mohawk Baronet*. More research needs to be done to determine Johnson's role in commissioning the large- scale surveys made in northern New York in the years following the conclusion of the French and Indian War.

62. Bond, *Quit-Rent System*, 276; *Colden Letter Books*, I, 388.

63. Bond, *Quit-Rent System*, 278.

64. Alexander Colden held the position jointly with his father from 1751-1762. From Feb.10, 1762, until June 29, 1774, Alexander had sole responsibility for the job. David Colden was surveyor general from June 29, 1774, to June 30, 1775. Warner, *Civil List and Constitutional History*, 167.

65. A summary of Sauthier's career is in Mark Babinski, *Notes on C.J. Sauthier and Lord Percy with a Listing of Maps of the State of New York Drawn by Simeon de Witt and David H. Burr* (Garwood, N.J.: Krinder Peak Publishing, 1997).

66. See "Instructions Issued to Governor William Tryon Concerning Grants of Land" from King George III, Feb. 3, 1774. Copy in *Colden Letters and Papers*, VII, 206-211. These instructions explicitly state that Tryon should work together in producing surveys and maps "with the Advice and Assistance of Our Lieutenant Governor of Our said Province, our Surveyor General of Lands for the Northern District of N. America, Our Secretary, Our Surveyor General of Lands, and Our Receiver General of Our Quit-Rents for Our said Province of New York…."

67. See documents reprinted in New York State University, Boundary Commission, *Report of the Regents of the University on the Boundaries of the State of New York*, Daniel J. Pratt, ed. (2 vol; Albany, 1884), 2:27, 28.

68. For Cadwallader Colden II's activities as deputy surveyor, see Fingerhut, *Survivor*, 13. Cadwallader II's chief claim to fame is that he survived the American Revolution and continued to hold Coldengham for the family.

69. Cadwallader Colden to Edward Collins and Phillip Livingston Jr., Oct. 6, 1741, *Colden Letters and Papers*, VIII, 276-77.

70. For Evans' consultation with Bleecker (also spelled Bleeker) see his "Analysis of a General Map of the Middle British Colonies," in Gipson, *Lewis Evans*, 61. There is also considerable confusion about Bleecker's middle name, which is sometimes given as Rutse or Rulse. See Lois Mulkearn's note to Thomas Pownall, *A Topographical Description of the Dominions of the United States of America* (Pittsburgh: University of Pittsburgh Press, 1949), 16 (note 6).

71. See note 25 of this chapter. Information about Bleecker is available at the People of Colonial Albany website at http://www.nysm.nysed.gov/albany/bios/b/jorbleecker201.html.

72. "Agreement Between David Colden and Gerard Bancker," January 1, 1775, *Colden Letters and Papers*, VII, 258-59.

73. The Cockburn papers can be found in two separate collections at the New York State Archives: "Cockburn field notes, land records, and maps, [ca. 1755]-1884" (call number B1773), and "Land papers, 1732-1864. Cockburn family" (call number SC7004). Brief descriptions of both collections are in the Archives' Excelsior online catalog. A number of maps from the Cockburn family papers and other sources are available on the World Wide Web from the sites of the New York State Archives and the New York State Library. They can be located by searching the Archives Digital Collections at http://www.archives.nysed.gov, and the Library's catalog at http://www.nysl.nysed.gov/.

74. Evers provides a good deal of information on Cockburn's activities in *Catskills*, 136-37, 182-83, and elsewhere.

75. William Cockburn, "A Map of the Farm of Johannes & Myndert Dedricks on the Baverkill [*sic*]," 1774. New York State Archives. Available on the World Wide Web at http://iarchives.nysed.gov/PubImageWeb/viewImageData.jsp?id=81360.

76. Cockburn's more notable maps of the Catskill region include: "A Map of the Northerly Part of the Great or Hardenbergs Patent, together with the Country Adjacent between Kingston and Kattskill Made for Messrs. Ludlow & McEvers" (manuscript, 1773), on display at the Ulster County Historical Society, and a 1771 map of the Hardenburgh Patent at the New York State Office of Real Property (detail reproduced in Evers, *Catskills*, following p.152).

77. William Cockburn, "A Map of the Patented Lands in the Countys of Albany, Ulster, Dutches & Cumberland in the Province of New York: viz between the Highlands and Crown-point, As far East as Connecticut River and West as Orisconi & Delaware River" (manuscript map, 1768). A photostat of this map is available at the New York State Library.

78. William Cockburn, "A Map of Sundrie Patents on the South Side the Mohawk River in the Counties of Albany & Troy" (manuscript map, 1775). Held by New York State Library.

79. William Cockburn, "A Map of the Province of New York as Divided into Counties, together with the Adjacent Provinces Compiled from the Latest Maps and Actual Surveys" (manuscript). The map itself is dated 1774, although Cockburn's note is dated 1780. Copies of this edition are at the New York State Library and the New York Public Library. These libraries also hold copies of the 1783 edition of this map.

80. This anonymous map is identified by the New York Historical Society as "[Map of New York land grants and purchases]" (call number M28.2.10). It is drawn to a scale of four miles to an inch (or 1:253,000), which is the scale used on several other late colonial property maps. A large detail is reproduced in Carole Shammas, "Cadwallader Colden and the Role of the King's Prerogative," *New-York Historical Society Quarterly* 53 (1969): 120-21.

81. This map, dated to 1771, is also at the New York Historical Society; it is assigned the title "[Map of New York land grants and purchases]" (call number M28.2.10). It is on a scale of 1:500,000.

82. "Map of Part of the Province of New York on Hudson's River, the West End of Nassau Island, and part of New Jersey. Compiled pursuant to the order of the Earl of Loudon, Septbr. 17, 1757. Drawn by Captain Holland" (manuscript map). This is

evidently the map "by Captain Holland and others" called by the Lords of Trade in 1766 "a very accurate and useful survey, … in which the most material patents are marked and their boundaries described," Brodhead, *Documents Relative to the Colonial History of the State of New York*, VII, 845.

83. These maps, located at the Huntington Library (San Marino, CA) are: "Map of the Great Pattent or Hardenburg Patent" (HM 15444) and "[The Lower Part of Hudson's River]" (HM 15409). It appears probable that Holland also used Colden's 1726 map of New York, since the copy of it at New York State Library bore the note: "This is a rough copy by Samuel Holland, probably made in 1757."

84. Full title: *The Provinces of New York, and New Jersey; with Part of Pensilvania, and the Governments of Trois Rivieres, and Montreal* (London: Robert Sayer and T. Jefferys, [1768]). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3800.ar103900. There is considerable controversy concerning Holland's role in the creation of this map, which will be discussed in the following chapter.

85. Anonymous, "A Plan of the Province of New York in North America for the Kings Most Excellent Majesty" (manuscript map, hand colored, ca. 1775). The original of this map is in the Crown Collection at the British Library; the Library of Congress has a colored photostat. This very large map is on a scale of 1:253,000 (four inches to a mile), and bears many similarities to Sauthier's *Chorographical Map*, but the names of grant holders and boundaries are sometimes different from Sauthier's, possibly reflecting an earlier date. A map at the Clements Library (Brun 371)) also bears a close resemblance to Sauthier's map.

86. Claude Joseph Sauthier, *A Chorographical Map of the Province of New-York in North America, Divided into Counties, Manors, Patents and Townships; Exhibiting Likewise All the Private Grants of Land Made and Located in That Province; Compiled from Actual Surveys Deposited in the Patent Office at New York, by order of His Excellency Major General William Tryon* (London: Faden, 1779). The manuscript of this map was apparently in London by the end of 1775. In the nineteenth century, a facsimile was published in O'Callaghan, *Documentary History of the State of New York*, I, facing p. 526. Three copies of the original published map are available online from the Library of Congress, one of which can be found at http://hdl.loc.gov/loc.gmd/g3800.ar107000.

87. Gronim, *Landscape Reimagined*, 195.

88. A summary of the history of New York's boundaries can be found in Franklin K. Van Zandt, *Boundaries of the United States and the Several States*. U.S.G.S. Professional Paper 909 (Washington, D.C.: GPO, 1976). Those interested in pursuing this subject in depth should start with Schwarz, *Jarring Interests*, which includes a comprehensive bibliography. Additional detailed information is contained in, New York State University, Boundary Commission, *Report of the Regents of the University on the Boundaries of the State of New York* (2 vols.; Albany, N.Y.: Argus Company, 1873-74).

89. The Duke of York's patent can be found in Laws of N.Y., I, 1-5., and in *Report of the Regents on the Boundaries*, 1:10,12, 14, 16, 18, 20. See note 5 to Chapter one in Schwarz, *Jarring Interests* for information about other copies of this patent.

90. This map is cataloged by the Library of Congress as Thomas Valentine, "A Plan of the Division Line between the Provinces of New-York and Quebec. In the 45th Degree of North Latitude. Survey'd in the Year 1771 & 1772. By Thomas Valentine & John

Collins, esquirs. Drawn by C. J. Sauthier ” (manuscript map, [1772]), http://hdl.loc.gov/loc.gmd/g3751f.ar107100.

91. For an account of the Collins-Valentine line and subsequent developments, see Francis M. Carroll, *A Good and Wise Measure: The Search for the Canadian-American Boundary, 1783-1842* (Toronto: University of Toronto Press, 2001), 70-80. A map showing the deviation between the Collins-Valentine line and the 45th parallel can be found on page 76 of that book.

92. This boundary is shown on Guy Johnson, “Map of the Frontiers of the Northern Colonies with the Boundary Line Established between Them and the Indians at the Treaty Held by S. Will Johnson at Ft Stanwix in Novr 1768, Corrected and Improved from the Evans map, by Guy Johnson Dep. Agt of Ind Affairs” (manuscript map, 1768). Facsimilies in Brodhead, *Documents Relative to the Colonial History of New York*, VIII, p. 136; *Documentary History of the State of New York*, I, facing p. 376. Boundary is shown as ridge of "Alleghany Mountains."

93. For Colden’s map of the Oblong, see note 49 above.

94. A detailed account of the Connecticut - New York boundary dispute, is in Schwarz, *Jarring Interests*, 5-73.

95. For a summary of the Massachusetts-New York boundary negotiations, see Schwarz, *Jarring Interests*, 74-133, 191-221. For the relationship between boundary disputes with Massachusetts and tenant “rebellions” in New York, see Kim, *Landlord and Tenant*, 281-415.

96. *New York Times*, May 27, 1998, A1.95.

97. The evidence that the Duke of York consulted the Visscher map is largely circumstantial, but this would have been the most up-to-date map of the province available to him in 1664. It was assumed by the members of the New York – New Jersey boundary commission in 1769 that the Visscher map had been consulted by the Duke when he designated the boundary See Schwarz, *Jarring Interests*, 186; Snyder *Mapping of New Jersey*, 14-15; Gronim, *Everyday Nature*, 34-36.

98. Schwarz, *Jarring Interests*, 82.

99. Gronim, *Everyday Nature*, 34-36.

100. The commission included Samuel Holland, who is also the author of the map illustrated in the text, *The Provinces of New York, and New Jersey; with Part of Pensilvania, and the Governments of Trois Rivières, and Montreal* ([London] Printed for Robt. Sayer ... and T. Jefferys [1768?]), which is available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3800.ar103900. For the history of the developments described in this paragraph, see La Potin, *Minisink Patent*, 131-73; Schwarz, *Jarring Interests*, 133-61, 179-190.

101. For a summary of the colonial era boundary negotiations between New York and Pennsylvania, see Schwarz, *Jarring Interests*, 175-78. The surveying of the final boundary will be discussed in chapter 8 of this book.

102. Schwarz, *Jarring Interests*, 168-74; Nye, *New York Land Patents* (includes list of Vermont Patents); Michael A. Bellesiles, *Revolutionary Outlaws: Ethan Allen and the Struggle for Independence on the Early American Frontier* (Charlottesville: University Press of Virginia, 1993).

103. Schwarz, *Jarring Interests*, 157 and note 28. The map shows the boundary drawn in 1719.

104. Mitchell is generally thought to be the author of the anonymous, *The Contest in America Between Great Britain and France With Its Consequences and Importance* (London, 1757), http://books.google.com/books?id=D40BAAAAQAAJ&dq=Mitchell+Contest+in+America&source=gbs_navlinks_s. See pages 24-28 for discussion of New York's boundaries.

105. For Evans' defense of the 1719 boundary, see Gipson, *Lewis Evans*, 20-21, 155.

106. J.G. [John Gibson], *The British Governments in Nth. America: Laid Down Agreeable to the Proclamation of Octr. 7, 1763*. Published in *Gentleman's Magazine*, 33 (Dec. 1763). Available online from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?435005.

Chapter 6

1. Lewis Evans, *A General Map of the Middle British Colonies, in America; viz. Virginia, Mariland, Delaware, Pensilvania, New-Jersey, New-York, Connecticut, and Rhode Island: Of Aquanishuonîgy, the Country of the Confederate Indians; Comprehending Aquanishuonîgy Proper, Their Place of Residence, Ohio and Tïiuxsoxrúntie, Their Deer-Hunting Countries, Couxsaxrâge and Skaniadarâde, Their Beaver-Hunting Countries; of the Lakes Erie, Ontário, and Champlain, and Part of New-France: Wherein is Also Shewn the Antient and Present Seats of the Indian Nations* ([Philadelphia]: Jas Turner, 1755). This map has been widely reproduced. It is available online from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3710.ar070900.

2. Lewis Evans, *Geographical, Historical, Political, Philosophical and Mechanical Essays. The First, Containing an Analysis of a General Map of the Middle British Colonies in America; and of the Country of the Confederate Indians: A Description of the Face of the Country; the Boundaries of the Confederates; and the Maritime and Inland Navigations of the Several Rivers and Lakes Contained Therein* (Philadelphia: B. Franklin, 1755). Reprinted in Gipson, *Lewis Evans*, 142-44.

3. Klinefelter, *Lewis Evans*, 38-50.

4. Ibid., 42.

5. Evans, *Analysis* in Gipson, *Lewis Evans*, 146-47.

6. Thomas Pownall's revised version of the Evans map is *A Map of the Middle British Colonies in North America First Published by Mr. Lewis Evans, of Philadelphia, in 1755, and Since Corrected and Improved, As Also Extended, with the Addition of New England and the Bordering Parts of Canada; from Actual Surveys Now Lying at the Board of Trade* (London: J. Almon, 1776). The map is available online from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3710.ar071000. The accompanying text was reprinted by Pownall in 1776 as *A Topographical Description of the Dominions of the United States of America. [Being a Rev. and Enl. Ed. Of] A Topographical Description of Such Parts of North America As Are Contained in the (Annexed) Map of the Middle British Colonies, &c., in North America*. This publication, in turn, was reprinted in an edition edited by Lois Mulkern, which includes Pownell's revisions for a proposed 1779 edition (Pittsburgh: University of Pittsburgh Press, 1949). The Mulkern edition will be cited here.

7. John Mitchell, *A Map of the British and French Dominions in North America, with the Roads, Distances, Limits, and Extent of the Settlements, Humbly Inscribed to the*

Right Honourable the Earl of Halifax, and the Other Right Honourable the Lords Commissioners for Trade & Plantations, by their Lordships Most Obliged and Very Humble Servant, Jno. Mitchell (London: Sold by Andrew Millar, 1755). This map exists in many states and editions. See Richard W. Stephenson, "Table for Identifying Variant Editions and Impressions of John Mitchell's Map," in Walter W. Ristow, *A la Carte; Selected Papers on Maps and Atlases* (Washington: Library of Congress, 1972), 109-13. Several editions of this map are available at the website of the Library of Congress, Geography and Map Division at http://lcweb2.loc.gov/ammem/gmdhtml/gmdhome.html.

8. For the life of John Mitchell see Edmund Berkeley, *Dr. John Mitchell: The Man Who Made the Map of North America* (Chapel Hill: University of North Carolina Press, 1974). A commentary on Mitchell's map by Louis De Vorsey accompanies a facsimile of the map published by Harry Margary, *North America at the Time of the Revolution* (Lympne Castle, Kent: Margary, 1972). A good introduction to the Mitchell map by Matthew Edney is available online from the Osher Map Library at http://www.oshermaps.org/special-map-exhibits/mitchell-map.

9. Dr. John Mitchell to Cadwallader Colden, April 5, 1751, *Colden Letters and Papers*, IX, 87-91.

10. Schwartz and Ehrenberg, *The Mapping of America*, 160.

11. This work is cited in chapter 5, note 104, of this work.

12. Maps of Bellin and Southack showing Long Island are reproduced in chapters 3 and 5 of this work.

13. Lester Jesse Cappon, Barbara Bartz Petchenik, and John Hamilton Long, *Atlas of Early American History: the Revolutionary Era, 1760-1790* ([Princeton, N.J.:] Published for the Newberry Library and the Institute of Early American History and Culture by the Princeton University Press, 1976), 58, 125-26.

14. Thomas Jeffreys, *A Map of the Most Inhabited Part of New England, Containing the Provinces of Massachusetts Bay and New Hampshire, with the Colonies of Konekticut and Rhode Island, Divided into Counties and Townships: the Whole Composed from Actual Surveys and its Situation Adjusted by Astronomical Observations* (London: Jeffreys, 1775). Available online from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3720.ar079700.

15. For Braddock Mead, see two articles by G.R. Crone: "John Green, Notes on a Neglected Eighteenth Century Geographer and Cartographer," *Imago Mundi* 6 (1949): 85-91, and "Further Notes on Braddock Mead, alias John Green, an Eighteenth Century Cartographer," *Imago Mundi* 8 (1951): 69-70. For this and other aspects of Jefferys' career, see J.B. Harley, "The Bankruptcy of Thomas Jefferys: An Episode in the Economic History of Eighteenth-Century Map-Making," *Imago Mundi* 20 (1966): 27-48.

16. Jefferys produced the plates for the maps in *The American Atlas*, but it was actually published after his death by Sayer and Bennett in 1776. The atlas was reprinted with an introduction by Walter W. Ristow (Amsterdam: Theatrum Orbis Terrarum, 1974). An earlier version of this atlas was published by Jefferys in partnership with Robert Sayer in 1768 as *A General Topography of North America and the West Indies*.

17. Among other things, Jefferys pirated Evans' *Map of the Middle British Colonies in America*, for which Pownell took him to task in the preface of his *Topographical Description*. For an account of the economics of the London map trade, see Mary

Sponberg Pedley, *The Commerce of Cartography: Making and Marketing Maps in Eighteenth-Century France and England* (Chicago: University of Chicago Press, 2005).

18. For the Douglass map of New England see David Bosse, "The Boston Map Trade of the Eighteenth Century," in Krieger and Cobb, *Mapping Boston*, 39-41. A much more detailed source of information on both the Douglass map and Jeffreys' map of New England is available online from the Osher Map Library in Matthew Edney's "The 'Percy Map': Maps and Military Strategy during the Revolution" at http://www.oshermaps.org/special-map-exhibits/mitchell-map/introduction.

19. This map is listed as C.O. 700 New York no. 20. *The Colonial Office and Predecessors Maps and Plans Series I: Catalog of the Maps, Plans, and Charts* contains the following tantalizing note: "Four sheets, Nos. 9, 10, 11 and 12, of a very extensive survey of the Province of New York. Probably a portion of the map formerly in vol. 11, then consisting of 12 sheets."

20. Stevens and Tree, *Comparative Cartography*, no. 33.

21. This edition is often confused with the first edition because of the unchanged date. It can be found on the Library of Congress Web site at http://hdl.loc.gov/loc.gmd/g3720.ar079900.

22. The most important general sources of information about the military mapping of North America during this period are: J.B. Harley, Barbara Bartz Petchenik, and Lawrence W. Towner, *Mapping the American Revolutionary War* (Chicago: University of Chicago Press, 1978), and Douglas W. Marshall, "The British Engineers in America: 1755-1783," *Journal of the Society for Army Historical Research* 51 (1973): 155-63.

23. Special attention should be called to the collection of over 2000 maps available on the World Wide Web from the Library of Congress as *The American Revolution and Its Era: Maps and Charts of North America and the West Indies, 1750-1789* http://lcweb2.loc.gov/ammem/gmdhtml/armhtml/armhome.html. Most of the items in this collection are described in Sellers and Van Ee, *Maps and Charts of North America and the West Indies* (Washington, D.C.: Library of Congress, 1981).

24. J.B. Harley, "The Contemporary Mapping of the War," in Harley, Petchenik, and Towner, *Mapping the American Revolutionary War*, 4-44.

25. Since many of these forts continued to be used during the Revolution, descriptions and maps of them can often be found in Robert B. Roberts, *New York's Forts in the Revolution* (Rutherford, N.J.: Farleigh Dickenson, 1980).

26. A good selection of plans of British forts in New York can be found in Jean Rocque, *Set of Plans and Forts in America* (London: Rocque, 1763), which has been made available on the World Wide Web by the Massachusetts Historical Society at http://www.masshist.org/maps/MapsHome/Home.htm.

27. Most of the colonial maps of Albany are reproduced in Merwick *Possessing Albany*.

28. William Eyre and Joseph Heath, "Plan of Fort William Henry and Camp at Lake George" (manuscript map; 1755?). Available on the World Wide Web from the Library of Congress, http://hdl.loc.gov/loc.gmd/g3804l.ar112100**.**

29. Thomas Jefferys, *A Plan of the Town and Fort of Carillon at Ticonderoga; with the Attack made by the British Army Commanded by Genl. Abercrombie, 8 July 1758* (London: Jefferys, 1768). Available on the World Wide Web from the Norman B. Leventhal Map Center at Boston Public Library at http://maps.bpl.org/id/10859

30. Samuel Blodget, *A Prospective [sic] View of the Battle Fought near Lake George, on the 8th of Septr. 1755, between 2000 English, with 250 Mohawks, under the Command of Genl. Johnson & 2500 French and Indians under the Command of Genl. Dieskau, in Which the English were Victorious, Captivating the French Genl. with a Number of his Men, Killing 700 & Putting the Rest to Flight* (Boston: Thomas Johnston, 1756). This map has been widely reproduced, and is available on the World Wide Web from the Massachusetts Historical Society at http://www.masshist.org/maps/Blodget/2724_Blodget.htm.

31. This pen-and-ink map is no.187 in the Peter Force Collection at the Library of Congress.

32. Biographical information on Pfister cannot be found in standard reference sources. The information presented here is based on: Lion G. Miles, "The Loyalists at the Battle of Bennington," in Town of Hoosick and Hoosick Historical Society, The Symposium on the Battle of Bennington (2000), published online at http://www.hoosickhistory.com/shortstories/battlesymposium.htm; information provided by Murray McCombs on the RootsWeb genealogy site (http://archiver.rootsweb.com/th/read/VTBENNIN/2000-06/0961360800); and on Thomas M. Barker, "Braunschweigers, Hessians and Torries in the Battle of Bennington (16 August 1777): The American 'Revolution' as a Civil War," *The Hessians: Journal of the Johannes Schwalm Historical Association* 10 (2007): 13-39.

33. Pfister's map can be found at the Huntington Library in San Marino California (HM 15475). The library has assigned the map the title: "The course of Canada Creek taken by order of His Excellency General Amherst."

34. James Gabriel Montresor, [Plan of the Attack on Fort William Henry and Ticonderoga; Showing the Road from Fort Edward, Montcalm's Camp and Wharf of Landing, &c.] (manuscript map, [1757?]). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802g.ar302900.

35. Anonymous, "Map of the Northern Parts of New York" (manuscript map, [1758?]). Available online from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3800.ar107700.

36. Anonymous, "A Map of the Route from the City of Albany to the Fort Osswego on the Lake of Cataroque" (manuscript map, [175-?]). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802m.ar108000.

37. Anonymous, "Map of the River etc. from Albany to Oswego in America" (manuscript map, [1755 or 1756]. Clements Library (Clements Maps 3-K-15, not listed in Brun). One of three related maps of river corridors in New York at the Clements Library apparently the property of, or drawn for, Sir Francis Dashwood.

38. See New York State Museum, New York's Oldest Canal at http://www.nysm.nysed.gov/research_collections/research/history/neck/index.html.

39. Thomas Kitchin, *Communication between Albany and Oswego* (London: Strahan and Cadell, 1772). Published in Thomas Mante, *The History of the Late War in North America* (London, 1772.), 61. Available online from the New York State Museum at: http://www.nysm.nysed.gov/research_collections/research/history/neck/kitchinmap.html A detail from this map can be found in Cynthia G. Falk, "Forts, Rum, Slaves, and the Herkimers' Rise to Power in the Mohawk Valley," *New York History* 89:3 (Summer 2008), 221-34.

40. See entry under Thomas Pownall in *The Dictionary of National Biography*.

41. This manuscript map is now at British Library (Kings Maps CXXI, 12). A color photostat is available at the Library of Congress. It is reproduced in Hulbert, *Crown Collection*, ser. I, vol. 1, pl. 46-47, http://rla.unc.edu/EMAS/CC.html.

42. There is an entry for Loring in the *Dictionary of American Biography*. More extensive information can be found on the Web site of the Jamaica Plain Historical Society (Massachusetts) at http://www.jphs.org/people/2005/4/14/commodore-joshua-loring-jamaica-plain-by-way-of-london.html.

43. I have identified four manuscript charts ascribed to Loring, all of which are dated 1756. They are: "A Map of Hudson's River from New York to Albany" (at the New York State Library); the detailed A plan of Lake George at a scale of 1:63,500 (also at New York State Library); and two smaller scale (1:253,440) maps with the title "A Draught of Lake George, and part of Hudson's River" (copies at the Library of Congress and at the New York State Library). The Library of Congress copy of this latter map is available online at http://hdl.loc.gov/loc.gmd/g3802g.ar107600.

44. A manuscript copy of Brasier's map with annotations (apparently by another military officer) is "A Survey of Lake Champlain, from Crown Point to Windmil Point, and from thence to St. Iohns. Survey'd by Order of His Excellency Major Genl. Amherst, Commander in Chief of His Majesty's Forces in North America, Anno 1762. By Wm. Brasier, Deputy Draughtsman, in the Office of Ordnance." Original at the Library of Congress; available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3802c.ar107200. The published version is also at the Library of Congress. It bears the title: *A Survey of Lake Champlain, including Lake George, Crown Point, and St. John. Surveyed by Order of His Excellency Major-General Sr. Jeffery Amherst, ... Commander in Chief of His Majesty's forces in North America, (Now Lord Amherst) by William Brassier, draughtsman. 1762* (London: Sayer and Bennett, 1776). In addition to being updated with references to events that took place in the American Revolution, the published version covers a larger area than the manuscript map cited above. To add to the confusion, the published map includes an inset map of Lake George, supposedly surveyed by a "Captain Jackson" in 1756. This inset looks a great deal like the map of Lake George discussed above, which is attributed to Captain Loring in 1756.

45. Information on printing costs and the publishing of military surveys in the eighteenth century can be found in Pedley, *Commerce of Cartography*, esp. 35-42, 119-31.

46. George Demler, "Map of Niagara River or Streights between the Lakes Erie and Ontario with the Islands, Falls, and Rapids Therein, As Also the Carrying Place with its Road and Distance" (manuscript, [1765?]), Clements Library (Brun 372); Bernard Ratzer, "Plan of Niagara River between the Lakes Ontario and Erie" (manuscript, [1764]), William L. Clements Library (Brun 416); Francis Pfister, "Plan of Niagara with an Explanation of its Present State" (manuscript, 1773), variant (?) copies at Clements Library (Brun 415) and at British Library (Crown 121:76). Reproduced in Hulbert, *Crown Collection*, Series 1, no. 11, http://rla.unc.edu/Mapfiles/CC/CC-1-1.list.pdf.

47. See references to Colden in chapters 4 and 5 of this work. The original of Colden's letter to Cunningham is in the Loudoun Papers at the Huntington Library (LO 2318).

48. Loudoun's comments were relayed by Alexander Colden to Cadwallader Colden (Nov. 14, 1756), *Colden Letters and Papers*, IX, 162-64.

49. This is the manuscript map entitled "Map of Part of the Province of New York on Hudson's River, the West End of Nassau Island, and Part of New Jersey. Compiled Pursuant to the Order of the Earl of Loudon, Septbr. 17, 1757. Drawn by Captain Holland." Described: Winsor, *Narrative and Critical History*, V, 238. It was destroyed in the fire at the New York State Library in 1911.

50. "List of Plans and Maps Belonging to the Right Honble the Earl of Loudoun, New York, May 16th, 1757," Huntington Library, Loudoun Papers, LO 3645.

51. The maps in the Kashnor Collection at the Huntington Library are described in a detailed unpublished finding aid entitled "Kashnor Collection of Early American Maps."

52. Huntington Library map HM 15453. The first item on the list of maps belonging to Lord Loudoun, cited above, is a "Map of the Province of New York in Two Pieces. By Holland & Rivez." This is probably the same map as the one under discussion.

53. Because they were never published, Pfister's maps are little known. The originals of many of his maps are at the British Library or at the Public Record Office. A few of his manuscript maps can be found in libraries in the United States. Photostats of several of Pfister's maps at the British Library are in Hulbert's *Crown Collection*, which is available on the World Wide Web from the Research Laboratories of Archaeology at the University of North Carolina, Chapel Hill, at http://rla.unc.edu/EMAS/CC.html. The Newberry Library's Cartographic Catalog at http://www.biblioserver.com/newberry/index.php can be used as a finding aid for this collection.

54. One of Pfister's maps bears the title "A Map of the Province of New York, part of New England, with a part of New France, the whole composed from actual surveys by Major Christie in 1759." Versions of this manuscript map at different scales can be found at the Public Record Office, the British Library, and the New York State Library. Photostats are available in Hulbert's *Crown Collection*. The version at the New York State Library is available on the World Wide Web , and can be found by searching the catalog of New York State Library at http://www.nysl.nysed.gov/.

55. Captain (later Major) Christie is mentioned almost in passing in the journals of James Montresor, as is Francis Pfister. Both belonged to the Royal American Regiment, along with the two Montresors. See G.D. Scull, ed., *The Montresor Journals*, Collections of the New-York Historical Society, XIV (New York: New-York Historical Society, 1881), 53, 89, 90, 94. Nothing is said in these journals about Christie's activities as a surveyor, and there is even some question about the identity of "Major Christie." R.V. Tooley's *Dictionary of Mapmakers* identifies him as "Charles Christie," but gives no references (rev. ed.; 4 vols.;Tring, Herts, England : Map Collector Publications in association with Richard Arkway, Inc., 1999- 2004). Most likely he is Gabriel Christie, who later became a Major-General and an important estate owner in Canada. Information about Gabriel Christie's life is contained in *The Dictionary of Canadian Biography* and from the New York State Museum at http://www.nysm.nysed.gov/albany/bios/c/gachristie.html. These sources say nothing about Christie's activities (if any) as a military surveyor.

56. Colden to Amherst, Nov. 10, 1766, *Colden Letter Books*, II, 119.

57. See Chipman, *Samuel Holland*, and (especially) Shipton, "General James Murray's Map," *Cartographer* 4(1967), 96.

58. Montresor, *Journals*, 135.

59. The best introduction to the career of Samuel Holland is now Stephen J.Hornsby, *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres and the Making of the Atlantic Neptune* (Montréal: McGill-Queen's University Press, 2011) Also useful is .F.J. Thorp's entry in the *Dictionary of Canadian Biography* (available online at http://www.biographi.ca/EN/ShowBio.asp?BioId=36586). An older source is Willis Chipman, "The Life and Times of Major Samuel Holland, Surveyor General, 1764-1801," *Ontario Historical Society Papers and Records* 21 (1924): 11-90.

60. J.B. Harley, "The Contemporary Mapping of the War," 27; Public Record Office (Great Britain) C.O. 323/24 and Samuel Holland, *Holland's Description of Cape Breton Island and Other Documents*, ed. D.C. Harvey, Public Archives of Nova Scotia Publication no. 2 (Halifax: Public Archives of Nova Scotia, 1935), 46.

61. For Holland's proposal to conduct a systematic geodetic survey of eastern North America, see Hornsby, *Surveyors of Empire*, 41-42, and J.B. Harley, "The Contemporary Mapping of the War," 27-28, which reprints a list of sophisticated surveying equipment requested by Holland for this project. The text of his proposal to the Board of Trade in 1764 is at the Public Record Office (A.O.3/140).

62. Most of the information about the capabilities of the British surveyors in North America comes from sources that deal primarily with their activities in areas outside of New York. See Holland, *Holland's Description of Cape Breton Island*; John Gerard William De Brahm, *Report of the General Survey in the Southern District of North America*, ed. Louis de Vorsey, Jr. (Columbia: University of South Carolina Press, 1971); Edwin Danson, *Drawing the Line: How Mason and Dixon Surveyed the Most Famous Border in America* (New York: Wiley, 2001); Hornsby, *Surveyors of Empire*, esp. 105 ff.

63. Holland's observations of longitude and latitude are reported in the *Philosophical Transactions of the Royal Society* 58 (1768): 46-53; 59 (1769): 247-52; 64 (1774): 171-76, 182-83.

64. "A Letter to the Astronomer Royal, from Samuel Holland, Esq. Surveyor General of Lands for the Northern District of America, Containing Some Eclipses of Jupiter's Satellites, Observed Near Quebec," *Philosophical Transactions* 64 (1774): 173-74.

65. Montresor says nothing in his *Journal* about using such instruments as theodolites or plain tables, and he makes no mention of measuring a baseline or of triangulation. One of his manuscript maps at the Library of Congress shows that he at least made angular measurements to ascertain the relative position of locations. See his "Plan of Governor's, Kennedy's, and Brown's Islan[ds] and Red Hook together with Part of the Bay and Soundings, Shewing the Position they Bear to Each Other and to New York, September 18th. 1766," http://hdl.loc.gov/loc.gmd/g3804n.ar108600.

66. As was seen in chapter four, Colden in 1738 gave the longitude of New York City as 74° 37' 0" from the Meridian of London (probably St. Paul's Cathedral, not Greenwich). All editions of Samuel Holland's *Map of New York and New Jersey* gives the longitude of New York City as 74° west of London, and attribute this reading to Governor Burnet in 1723 (which seems unlikely, since the figure Burnet reported in the *Philosophical Transactions* was 74°, 57' 30"). Sauthier's *Chorographical Map* gives the

longitude of New York City as 73° 55' 20" west of London. The modern figure is 73°58' west of Greenwich (which is 5' 15" east of the London meridian). Thus, even assuming that the measurements were made from London and not Greenwich, it appears that best of these figures were within ten miles of the modern distance.

67. "Report of Governor William Tryon on the State of the Province of New York, 1774" in O'Callaghan, ed., *Documentary History of the State of New York* , I, 740.

68. In addition to Holland's determination of the latitude of 41° for the New York - New Jersey boundary, there are a few other latitudes recorded in modern New York State during this period. The version of Brasier's *Survey of Lake Champlain* published in 1776 gives the latitude of Crown Point as 43° 50' 7", which is the same as that reported by Tryon. This compares with Colden's reading of 44° 10', and is somewhat closer to the modern figure of 43° 57'. Des Barres in his *Sketch of the Operations of His Majesty's Fleet* (1777) gives 40° 30' for Sandy Hook Lighthouse. Tryon reported 40° 27' 40", which is almost identical with the modern reading of 40˚ 28'. Colden gave the latitude of Albany as 42° 48'; Tryon reported 42° 36'; the modern figure is 42° 39'. These and other figures indicate that the most careful observations of latitude made by the British by 1775 were within a mile or two of the correct figure, although the measurements for more out-of-the-way places like Crown Point were often off by 10-15 miles.

69. A copy of this map, which was published in London by William Faden, is available from the Library of Congress Web site at http://hdl.loc.gov/loc.gmd/g3802h.ar106900. For information about this map and its historical importance, see the introduction by Louis de Vorsey, Jr. to the facsimile published by Margary in *North America at the Time of the Revolution*.

70. For a brief biography of Montresor, see John Clarence Webster, "Life of Montresor," *Transactions of the Royal Society of Canada*, sec. II, ser. III, 22 (1928), 1-31.

71. *A Plan of the City of New-York & its Environs to Greenwich, on the North or Hudsons River, and to Crown Point, on the East or Sound River, Shewing the Several Streets, Publick Buildings, Docks, Fort & Battery, with the True Form & Course of the Commanding Grounds, with and without the Town. Survey'd in the Winter, 1766. P. Andrews, sculp* (London, 1766). Available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3804n.ar110401. The Library of Congress site also has a second edition published by Dury in 1775 and a French edition published by Le Rouge in 1777.

72. Montresor's *Journals*, 342-87, provide a colorful description of his activities at this time.

73. This map is reproduced and described in detail by Stokes, *Iconography*, I, pl. 40, pp. 339- 40; by Cohen and Augustyn, *Manhattan in Maps*, 70-72; and by William P. Cumming, "The Montresor-Ratzer-Sautier Sequence of Maps of New York City, 1766-76," *Imago Mundi* 31 (1979): 55-65.

74. Quotation is from Cohen and Augustyn, *Manhattan in Maps*, 73. There are two versions of this map, in one of which the author's name was misspelled "Ratzen." The "Ratzen" plan can be viewed at the Library of Congress Web site at http://hdl.loc.gov/loc.gmd/g3804n.ar110700. The more extensive "Ratzer" version, which includes large parts of Brooklyn, is available from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?434801.

75. For an overview of Sir William Johnson's career, see Flexner, *Mohawk Baronet*.

76. This is a manuscript map, which exists in a number of variant copies. Facsimiles can be found in Brodhead, *Documents Relative to the Colonial History of New York*, VIII, 136; O'Callaghan, *Documentary History of the State of New York*, I, facing 376.

77. "To His Excellency William Tryon Esqr. Captain General & Governor in Chief of the Province of New York & &, This Map of the Country of the VI. Nations Proper, with Part of the Adjacent Colonies, is Humbly Inscribed by his Excellency's most Humble Servant" (manuscript map, 1771). The original of this manuscript map (now destroyed) was at New York State Library. A reduced-scale facsimile can be found in O'Callaghan, *Documentary History of the State of New York*, IV, following 660. A copy of this facsimile can be viewed on the Web site of the American Geographical Society Library at: http://collections.lib.uwm.edu/u?/agdm,456.

78.Broadhead, *Documents Relative to the Colonial History of New York*, VII, 845.

79. See Sellers and Van Ee, *Maps and Charts of North America*, no. 1039.

80. *The Provinces of New York, and New Jersey; with part of Pensilvania, and the Governments of Trois Rivières, and Montreal: Drawn by Capt. Holland. Engraved by Thomas Jefferys, Geographer to His Majesty* ([London]: Printed for Robt. Sayer ... and T. Jefferys [1768?]). This map is available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3800.ar103900. The 1768 date is assigned by the Library of Congress, but Stevens and Tree, *Comparative Cartography*, no. 44, gives the date of the original issue as 1775. Since Jefferys died in 1771, he could not have engraved the map after that date, regardless of when it was actually published. Details of this map are illustrated in chapter four of this publication.

81. Pownall, *Topographical Description*, 8.

82. Note on old catalog card for Colden map at New York State Library.

83. For a detailed geodetic comparison of this and other maps of New York State from the same period, see David Y. Allen, "Comparing Eighteenth-Century Maps of New York State Using Digital Imagery," New York Map Society Feature Article (2007), http://www.newyorkmapsociety.org/FEATURES/ALLEN.HTM

84. The later issues of this map are described in Stevens and Tree, *Comparative Cartography*, no. 44.

85. *This is The Provinces of New York and New Jersey; with Part of Pensilvania, and the Province of Quebec. Drawn by Major Holland, Surveyor General, of the Northern District in America. Corrected and improved, from the Original materials, by Governr. Pownall, Member of Parliament, 1776* (London: Robt. Sayer & John Bennett, 1776). This version can also be found at the Library of Congress Web site at http://hdl.loc.gov/loc.gmd/g3800.ar104500. This site also has a variant version of the Pownall map, as well as a German edition published in Frankfurt by Broenner.

86. *A Map of the Province of New York, with Part of Pensilvania, and New England, from an Actual Survey by Captain Montrésor, Engineer, 1775. P. Andrews, sculp.* (London: A Dury, 1775). Available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3800.ar106600.

87. Scull, ed., *Montresor Journals*, 341; Harley, "Map User," 85.

88. Scull, ed., *Montresor Journals*, 392.

89. Ibid., 323.

90. Both of these are available on the Library of Congress Web site. Dury's revised edition is http://hdl.loc.gov/loc.gmd/g3800.ar106702; the French edition is http://hdl.loc.gov/loc.gmd/g3800.ar106800. In addition, there were three states of the 1775 edition. See Stevens and Tree, *Comparative Cartography*, no. 42.

91. Dedication to *A Chorographical Map of the Province of New-York in North America, Divided into Counties, Manors, Patents and Townships; Exhibiting Likewise All the Private Grants of Land Made and Located in That Province; Compiled from Actual Surveys Deposited in the Patent Office at New York, by Order of His Excellency Major General William Tryon, by Claude Joseph Sauthier, Esqr.* (London: Faden, 1779). Three copies are available on the World Wide Web from the Library of Congress, including one with the URL http://hdl.loc.gov/loc.gmd/g3800.ar107000.

92. *A Map of the Province of New-York Reduc'd from the Large Drawing of That Province, Compiled from Actual Surveys by Order of His Excellency William Tryon, Esqr., Captain General & Governor of the Same, by Claude Joseph Sauthier; to Which is Added New Jersey. from the Topographical Observations of C. J. Sauthier & B. Ratzer* (London: Faden,1776). Available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3800.ar104702.

93. Both are available on the Library of Congress Web site. An edition by Lotter is at http://hdl.loc.gov/loc.gmd/g3800.ar104801; an edition by the heirs of Homann is at http://hdl.loc.gov/loc.gmd/g3800.ar104900.

94. The term "chorographical"seems to have had no precise meaning in the middle of the eighteenth century, but it generally referred to an intermediate scale map of a large area, such as a state or province. See, HelenWallis and Arthur Howard Robinson, *Cartographical Innovations: An International Handbook of Mapping Terms to 1900* ([Tring, Herts]: Map Collector Publications in association with the International Cartographic Association, 1987), 17.

Chapter 7

1. Four key works are: Harley et. al., *Mapping the American Revolutionary War*; Peter J. Guthorn, *American Maps and Map Makers of the Revolution* (Monmouth Beach, N.J.: Philip Freneau Press, 1966); Peter J. Guthorn, *British Maps of the Revolution* (Monmouth Beach, N.J.: Philip Frenau Press, 1972); Douglas W. Marshall and Howard Henry Peckham, *Campaigns of the American Revolution: An Atlas of Manuscript Maps* (Ann Arbor: university of Michigan Press / Maplewood, N.J.: Hammond, 1976). As with the previous chapter Sellers and Van Ee, *Maps and Charts of North America and the West Indies, 1750-1789* contains much useful bibliographical information. Most of the maps listed in the Sellers and Van Ee work can be found on the Web Site of the Library of Congress Geography and Map Division (http://lcweb2.loc.gov/ammem/gmdhtml/gmdhome.html), which is the best single source for online maps of the Revolution.

2. To check the extent to which New York dominated the mapping of the Revolution, I did a breakdown of the 218 maps enumerated in Kenneth Nebenzahl, *A Bibliography of Printed Battle Plans of the American Revolution* (Chicago: University of Chicago Press, 1975). Although this bibliography covers only one particular type of map, there is no reason to think that the overall distribution of battle plans is atypical. Out of

the 218 maps, 41 show areas in New York. This compares with 38 for the Boston campaign, and 28 for Virginia (including Yorktown). Nebenzahl's bibliography includes 27 maps for the West Indies, and 15 for engagements in Europe (mostly Gibraltar)—a reminder that the Revolutionary War was part of a broader conflict.

3. Harley, "The Map User in the Revolution," *Mapping the American Revolutionary War*, esp. 83-93.

4. See Harley's count of the maps enumerated by Guthorn, Ibid., 77.

5. For a comprehensive listing of Revolutionary War forts accompanied by many maps and plans, see Roberts, *New York's Forts in the Revolution*. A useful listing on the Web can be found at: http://www.dmna.state.ny.us/forts/fortsindex.htm.

6. The most recent account of the Battle of Long Island and other Revolutionary War battles near New York City is Barnet Schecter's readable *The Battle for New York: The City at the Heart of the American Revolution* (London and New York: Penguin Books, 2002). See also John J. Gallagher, *The Battle of Brooklyn* (New York: Sarpedon, 1995). For maps and other documents, see also Thomas W. Field, *The Battle of Long Island* (New York: Long Island Historical Society, 1869), and Henry Phelps Johnston, *The Campaign of 1776 around New York and Brooklyn* (1878; reprinted New York: Da Capo Press,1971). Still useful for both the New York City campaign and for Burgoyne's campaign is Justin Winsor's discussion of maps and other sources in "The Struggle for the Hudson," *Narrative and Critical History*, VI, 323-66.

7. According to Guthorn (*British Maps*, 44), Sproule was born on Long Island around 1741. Prior to the Revolution, he was an assistant to Samuel Holland. Several other mapmakers on the British side of the Revolutionary War were Americans who learned their craft by working under people like Holland, Montresor, or Des Barres.

8. Harley mentions this problem in his discussion of the use of maps along with other information sources in "The Map User in the Revolution," 105-07. He sites Wilbur C. Abbott, *New York in the American Revolution* (New York: Charles Scribner's Sons, 1929), 211. For Clinton's background and reconnoitering, and the use of loyalist guides, see Schecter, *Battle for New York*, 60, 136-40. For Sproule's biography, see Marshall and Peckham, *Campaigns of the American Revolution*, 131.

9. Samuel Holland, *The Seat of Action, between the British and American Forces; or, An Authentic Plan of the Western Part of Long Island, with the Engagement of the 27th August 1776 between the King's Forces and the Americans: Containing Also Staten Island, and the Environs of Amboy and New York, with the Course of Hudsons River, from Courtland, the Great Magazine of the American Army, to Sandy Hook, from the Surveys of Major Holland* (London: Robt. Sayer and Jno. Bennett, 1776), http://hdl.loc.gov/loc.gmd/g3802l.ar114600.

10. George Sproule, "A Plan of the Environs of Brooklyn Showing the Position of the Rebel Lines and Defenses on the 27th of August, 1776" (manuscript map, 1781);Clements Library (Brun *Guide* 420). This map is reproduced in Marshall and Peckham, *Campaigns of the American Revolution*, [22-23].

11. J.F.W. Des Barres *A Sketch of the Operations of His Majesty's Fleet and Army under the Command of Vice Admiral the Rt. Hble. Lord Viscount Howe and Genl. Sr. Wm. Howe, K.B., in 1776* (London: Des Barres, 1777), http://hdl.loc.gov/loc.gmd/g3801s.ar105700.

12. For Des Barres' publishing arrangements, see Pedley, *Commerce of Cartography*, 129-30, 135; Hornsby, *Surveyors of Empire*, 172-197.

13. An example of these maps is the anonymous "Sketch of the country illustrating the late engagement in Long Island" published in *The Gentleman's Magazine* (October, 1776), http://hdl.loc.gov/loc.gmd/g3802l.ar115000. See also John Bowles, *Plan of the attack on the provincial army on Long Island, August 27th 1776. With the draughts of New York Island, Staten Island, and the adjacent part of the continent. By an officer of the army* (London: 1776), http://hdl.loc.gov/loc.gmd/g3802l.ar114800.

14. The French version of Bowles' map is *Attaque de l'armée des provinciaux dans Long Island du 27. aoust 1776; dessin de l'isle de New-York et des Etats. Par un officier de l'Armée. Par acte du Parlement du 24 8bre. 1776* (Paris: Le Rouge, [1776]), which is also available at the Library of Congress Web site at: http://hdl.loc.gov/loc.gmd/g3802l.ar114900.

15. William Faden, *A Plan of New York Island; with Part of Long Island, Staten Island & East New Jersey, with a Particular Description of the Engagement on the Woody Heights of Long Island, between Flatbush and Brooklyn, on the 27th of August 1776 between His Majesty's Forces Commanded by General Howe and the Americans under Major General Putnam, with the Subsequent Disposition of Both Armies* (London: Faden, 1776). Available on the Library of Congress Web site at: http://hdl.loc.gov/loc.gmd/g3802l.ar114400. Reproduced and described, in Cohen and Augstyn, *Manhattan in Maps*, 78-81. This map, which also appeared in Faden's *American Atlas*, has an interesting and complex publication history: it was issued in at least five different states, some of which were updated to show later military events in the vicinity of New York. See Stevens and Tree, *Comparative Cartography*, no. 41.

16. See J.B. Harley's thoughtful discussion of "battle plans as carriers of news," in "The Map User in the Revolution," *Mapping the American Revolutionary War*, 93-96.

17. Quoted, Marshall & Peckham, *Campaigns of the American Revolution*, 21.

18. Examples can be found in two essays in Harley et. al., *Mapping the American Revolutionary War*: Lawrence W. Towner, "The Mapping of the American Revolutionary War in the Nineteenth Century," 111-124; and Barbara Bartz Petchenik, "The Mapping of the American Revolutionary War in the Twentieth Century," 125-148.

19. Most notably, Claude Joseph Sauthier, *Plan of the City of New-York as it was when his Majesty's Forces took Possession of it in 1776* (Manuscript, Alnwick Castle, MS list 6). Described with two black-and-white images in Cumming, "The Montresor-Ratzer-Sauthier Sequence of Maps of New York City," 61. A somewhat similar map, probably by Samuel Holland, is also described by Cumming in this article, and is reproduced in Cohen and Augustyn, *Manhattan in Maps*, 83.

20. Charles Blaskowitz, "A Plan of the Narrows of Hells-gate in the East River, Near Which Batteries of Cannon and Mortars Were Erected on Long Island With a View to Take Off the Defences and Make Breaches in the Rebel Fort on the Opposite Shore to Facilitate a Landing of Troops on New York Island" (manuscript map, [1776]). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar115400.

21. See Babinski, *Notes on C.J. Sauthier and Lord Percy*. Additional information on Percy and Sauthier can be found in Matthew Edney's article on the Percy Map at the

Osher Map Library Web site at: http://www.oshermaps.org/special-map-exhibits/percy-map.

22. For one of several manuscript versions of this map, see Claude Joseph Sauthier, "A Plan of the Attack of Fort Washington, now Fort Knyphausen, and of the American Lines on New-York Island by the King's Troops, on the 16th of November 1776" (manuscript map, 1776). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar115900. The version published by Faden bears the title *A Topographical Map of the Northn. Part of New York Island, Exhibiting the Plan of Fort Washington, Now Fort Knyphausen, with the Rebels Lines to the Southward, Which were Forced by the Troops under the Command of the Rt. Honble. Earl Percy, on the 16th Novr. 1776, and Survey'd Immediately after by Order of His Lordship. To Which is Added the Attack Made to the Northd. by the Hessians. Survey'd by Order of Lieutt. Genl. Knyphausen. Published by permission of the Rt. Honbl. the Commissioners of Trade & Plantations* (London: W. Faden, 1777). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar116001. All of these maps are in the William Faden Collection at the Library of Congress. This important collection from the era of the Revolutionary War, which consists of maps personally owned by Faden, gives us a glimpse into the workshop of a major British map publisher, providing some inkling of how he used the materials he had at hand.

23. Charles Blaskowitz, " Sketch of the White Plains, by Captain Blaskowitz" (manuscript map, 1776?). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804w.ar115600.

24. Charles Blaskowitz, "A Survey of Frog's Neck and the Rout[e] of the British Army to the 24th of October 1776, under the Command of His Excellency the Honorable William Howe, General and Commander in Chief of His Majesty's forces, &ca, &ca, &ca" (manuscript map, 1776). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802t.ar115200.

25. Claude Joseph Sauthier, *A Plan of the Operations of the King's army under the Command of General Sr. William Howe, K.B. in New York and East New Jersey against the American Forces Commanded by General Washington from the 12th. of October, to the 28th. of November 1776, Wherein is Particularly Distinguished the Engagement on the White Plains, the 28th. of October* ([London]: Faden, 1777). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804w.ar105500. The manuscript version of this map is also at the Library of Congress, and can be viewed at: http://hdl.loc.gov/loc.gmd/g3804w.ar105400.

26. Harley, "Map User," *Mapping the American Revolutionary War*, 103; Marshall & Peckham, *Campaigns of the American Revolution*, 26-29.

27. A good idea of the extent of the cartographic resources available to the king can be obtained by examining Hulbert's *Crown Collection of Photographs of American Maps*, which consists mainly of maps in the personal library of George III . See footnote 3 of chapter 4 for instructions on how to access and view these maps.

28. Evaluations of the practicability of the strategy of the Saratoga campaign include: Richard M. Ketchum, *Saratoga: Turning Point of America's Revolutionary War* (New

York: Holt, 1997), 64-88; and William B. Willcox, "Too Many Cooks: British Planning Before Saratoga," *Journal of British Studies* 2:1 (Nov. 1962), 56-90.

29. Thomas Kitchin, *Part of the Counties of Charlotte and Albany, in the Province of New York: Being the Seat of War between the King's Forces under Lieut. Gen. Burgoyne and the Rebel Army* (London: R. Baldwin, 1778).

30. William Brasier, *A Survey of Lake Champlain, Including Lake George, Crown Point, and St. John. Surveyed by Order of His Excellency Major-General Sr. Jeffery Amherst, ... Commander in Chief of His Majesty's Forces in North America, (Now Lord Amherst) by William Brassier, Draughtsman. 1762* (London: Printed for Robt. Sayer & Jno. Bennett, 1776); available of the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802c.ar107300.

31. John Burgoyne, *A State of the Expedition from Canada* (London: J. Almon,1780); William Faden, *Atlas of the Battles of the American Revolution : together with Maps Shewing the Routes of the British and American Armies, Plans of Cities, Surveys of Harbors, &c.* (New York: Bartlett & Welford, 1845?).

32. Anonymous, "Plan of the Position Which the Army under Lt. Genl. Burgoyne Took at Saratoga, on the 10th of September 1777, and in Which It Remained Till the Convention Was Signed" (manuscript map, [1777?). Available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3803s.ar117800.

33. Roberts, *New York Forts*, 149-86.

34. Anonymous, *A Map of Ticonderoga with the Old and New Lines and Batteries, Taken from an Actual Survey & Other Authentick Informations, 1777* ([London?]: n.p., 1777); available on the World Wide Web from the Library of Congress, http://hdl.loc.gov/loc.gmd/g3804t.ar117500**.**

35.Charles Wintersmith and William Twiss, "Plan of Ticonderoga and Mount Independence, Including Mount Hope, and Shewing the Rebel Works & Batteries as They Were When His Majesty's Troops Took Possession of Them on the 6th July 1777, Expressing Also the Encampments of the British on the 5th Instant, with the Extensive Communication Which Was Made in One Day, for the Transport of the Heavy Artillery from the 3 Miles Point to the Proposed Batteries, Including Likewise Sugar Hill, Where a Battery of Four 12 Pounders Would Have Been Ready to Open on the 6th at Noon" (manuscript map, 1777). Original at the John Carter Brown Library; available on the World Wide Web at http://jcb.lunaimaging.com/luna/servlet/s/4ubp3l.

36. Harley, "Contemporary Mapping," 38.

37. John André, "Plan of Forts Clinton & Montgomery Stormed Oct. 6th 1777 by the Troops under Sir Hen. Clinton" (manuscript map, 1777). Original at Huntington Library (San Marino, CA); reproduced in Guthorn, *British Maps*, 10. Samuel Holland, "A Plan of the Forts Montgomery & Clinton as Taken by His Majesty's forces under the Command of Genl. Sr. Henry Clinton the 6th of Octr. 1777" (manuscript map, 1777). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804f.ar118900.

38. John Hills, *Plan of the Attack of [sic.] Forts Clinton & Montgomery, upon Hudsons River Which Were Stormed by his Majesty's forces under the Command of Sir Henry Clinton, K.B. on the 6th of Octr. 1777* (London: Wm. Faden, 1784); Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804f.ar119600.

39. John Hills, *A Plan of the Surprise of Stoney Point, by a Detachment of the American Army, Commanded by Brigr. Genl Wayne, on the 15th July 1779. Also of the Works Erected on Verplanks Point, for the Defence of Kings Ferry, by British Forces in July 1779, from the Surveys of Wm. Simpson, Lt. 17th Rt., and D. Campbell Lt. 42d Rt.* (London: William Faden, 1784); reproduced: Nebenzahl, *Atlas of the American Revolution*, 132-33. Available on the Web from the Norman B. Leventhal Map Center of the Boston Public Library at http://maps.bpl.org/id/rb16868

40. Anonymous, " Sketch of the Rebel Works at West Point as Taken from the Description of Them Given by a Deserter Who Came to Stoney Point, 9th June, 1779" (manuscript map, 1779). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804w.ar120300.

41. The most important of these British maps of fortifications on Long Island are: Samuel Holland, "A Plan of Brookhaven or Setalket Harbour with Its Environs" (manuscript map, [1778]); Clements Library (Brun 405). Samuel Holland, "Plan of Merritick in the Township of Southold on Long Island" (manuscript map, [1778]); Clements Library (Brun 413). George Spencer, "Plan of Oyster Bay as Fortified by the Queen's Rangers" (manuscript map, 1787); manuscript version at New York Historical Society; simplified redrawn version published in John Graves Simcoe, *Simcoe's Military Journal: A History of the Operations of a Partisan Corps, Called the Queen's Rangers* (New York: Bartlett & Welford,1847). Anonymous, "A Sketch of Lloyd's Neck, Particularly Shewing the Situation of the Redout, Encampment of the Troops, with the Ground Adjacent and Position of the Advanc'd Picket's" (manuscript map, ca. 1780); Clements Library (Brun 434).

42. Anonymous, "Plan of Long Island in New York Governement Nort America" (manuscript map, ca. 1777); Clements Library (Brun 411); reproduced in Marshall and Peckham, *Campaigns of the American Revolution*, 21. A much more elaborate map by a Hessian officer of the area around New York City is described in note 90 of this chapter.

43. John André, [Part of Southampton] (Manuscript, 1777). Clements Library (Brun 338).

44. Andrew Skinner, "A Map Containing Part of the Provinces of New York and New Jersey, Drawn from Surveys Compiled by Thomas Millidge, Major 1st Batalion, New Jersey Volunteers, 1780" (manuscript map, 1781). Original at the Library of Congress and available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3800.ar105300.

45. For general information about *The Atlantic Neptune*, see Hornsby, *Surveyors of Empire*, 163-197. An older work is Geraint Nantglyn Davies Evans, *Uncommon Obdurate; the Several Public Careers of J.F.W. Des Barres* (Salem, Mass.: Peabody Museum, 1969). Copies of most of the charts discussed below Have been digitized by the [British] National Maritime Museum, and can be found by searching the Web site of the Royal Museums at Greenwich at: http://www.rmg.co.uk/.

46. Joseph Frederick Wallet Des Barres, *A Chart of New York Harbour with the Soundings Views of Land Marks and Nautical Directions for the Use of Pilotage. Composed from Surveys and Observations of Lieutenants John Knight, John Hunter of the Navy, and Others* (London: Des Barres, 1779). Available on the World Wide Web from the [British] National Maritime Museum, and from the Norman B. Leventhal Map

Center of the Boston Public Library at http://maps.bpl.org/id/rb15754. This map exists in four states.

47. Cohen and Augustyn, *Manhattan in Maps*, 69; Evans, *Uncommon Obdurate*, 17.

48. Joseph Frederick Wallet Des Barres, *A Plan of Fort Montgomery & Fort Clinton, Taken by His Majesty's Forces, under the Command of Maj. Genl. Sir Henry Clinton, K.B.: Survey'd by Major Holland, Survr. Genl. &c.* (London: Des Barres, 1779). Available on the World Wide Web from the [British] National Maritime Museum, and from the Norman B. Leventhal Map Center of the Boston Public Library at http://maps.bpl.org/id/rb15756

49. Joseph Frederick Wallet Des Barres, *A Chart of New York Island & North River; East River, Passage through Hell Gage [i.e. Gate], Flushing Bay, Hamstead Bay, Oyster Bay, Huntington Bay, Cow Harbour, East Chester Inlet, Rochelle, Rye, Patrick Islands, &c*. (London: [Des Barres], [1777?]. Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434406.

50. Joseph Frederick Wallet Des Barres, [Oyster Bay and Huntington Bay, Long Island Sound] (London: Des Barres [1778] Available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3802o.ar123100

51. Joseph Frederick Wallet Des Barres, [Chart of the east end of Long Island Sound and the coast of Connecticut and Rhode Island] (London: Des Barres, 1779); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3772c.ar100600. The more detailed 1781 edition is available from the University of Connecticut's MAGIC collection at https://www.flickr.com/photos/uconnlibrariesmagic/3314033131/.

52. Joseph Frederick Wallet Des Barres, *The Coast of Nova Scotia, New England, New-York, Jersey, the Gulph and River of St. Lawrence, the Islands of Newfoundland, Cape Breton, St. John, Antecosty, Sable, &c., and Soundings Thereof ...* (London: Des Barres, 1780); available on the World Wide Web from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?434508. Joseph Frederick Wallet Des Barres, *A Chart of the Coast of New York, New Jersey, Pensilvania, Maryland, Virginia, North Carolina, & c.*; available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?484205.

53. Claude Joseph Sauthier, "Map of Staten Island in the Province of New-York. Surveyed by Order of His Excellency General Howe, Commander in Chief of His Majesty's forces in North America. By C.J. Sauthier Ingineer Geographer" (manuscript map, 1776). This map is in private hands at Ainwick Castle, England, and not readily available. It is described by Babinski, *Notes on C.J. Sauthier*, map 25; Cumming, *British Maps*, 83; Guthorn, *British Maps*, 41.

54. Augustyn and Cohen, *Manhattan in Maps*, 84.

55. B.F. Stevens, *B. F. Stevens's Facsimile of the Unpublished British Headquarters Coloured Manuscript Map of New York & Environs (1782). Reproduced from the Original Drawing in the War Office, London* (London: B.F. Stevens, 1900). Available on the World Wide Web from the David Rumsey Collection at http://www.davidrumsey.com/luna/servlet/s/vf8181.

56. Most notable is the use of the British Headquarters Map by the Mannahatta Project. See Eric W. Sanderson, *Mannahatta: A Natural History of New York City* (New York: Abrams, 2009).

57. Most of these manuscript maps are listed in Guthorn, *British Maps*.

58. Anonymous, “Plan of New York and Staten Islands with part of Long Island, survey’d in the years 1781, & 82” (manuscript map, 1782). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar110000.

59. Andrew Skinner, “A Map of the Environs of Brooklyn, Surveyed by Order of His Excellency General Sir Henry Clinton K.B. Commander in Chief of His Majesty’s Forces &c. &c., by Andw. Skinner 1781” (manuscript map, 1781). Original at the Clements Library (Brun, 375). A photostatic copy is at the New York Historical Society.

60. George Taylor, “A Map of the Pass, at Jamaica Long Island Surveyed by Order of His Excellency General Sir Henry Clinton K: B: Commander in Chief of His Majesty’s Forces &ca, &ca, &ca-March 1782 by George Taylor Captn. of Guides” (manuscript map, 1782). Original at Clements Library (Brun, 377). A photostatic copy is at the New York Historical Society.

61. See Clinton's annotations on George Sproule, “A Plan of the Environs of Brooklyn Showing the Position of the Rebel Lines and Defenses on the 27th of August, 1776” (manuscript map, 1775; fair copy 1781). Clements Library (Brun, 411). Reproduced in Marshall and Peckham, *Campaigns of the American Revolution*, 22-23.

62. Harley in *Mapping the American Revolutionary War*, 77, using figures derived from Guthorn's books on British and American maps, calculates that the Americans had 49 active mapmakers while the British had 90; the Americans produced a total of 295 maps, the British 530.

63. Guthorn, *American Maps*, 72-73, lists a number of anonymous American maps of fortifications in the Hudson Valley and on Long Island and Manhattan.

64. Diamant, *Romans*, 69 ff.

65. Described, Guthorn, *American Maps*, 30. One of these is in Peter Force, *American Archives; Fourth Series*, vol. III (Washington, 1840), following page 735.

66. Guthorn, *American Maps*, 33, 34.

67. Thomas Machin, “To his Excellency George Clinton Esqr. Governor of the State of New York this map of Hudsons River through the High Lands in humbly dedicated by his Excellencys most humble servant Thomas Machine, IV January MDCCLXXVIII” (manuscript map, 1778). Original is at Cornell University Library (Sparks Collection MPI 546). Reproduced in Diamant, *Chaining the Hudson*, 138-39; Guthorn, *American Maps*, 26.

68. Robert Erskine and Nathanael Greene, “Green’s Map of West Point and Adjacent Country” (manuscript, [1778-1779]). Two variant copies of this map are at the Library of Congress. The Geography and Map Division of the Library of Congress has also made available online several other French and American maps of West Point made during the Revolution, which can be found by searching for “ West Point” on its Web site at http://lcweb2.loc.gov/ammem/gmdhtml/gmdhome.html.

69. John Trumbull, *Ticonderoga and its Dependencies, August, 1776, from a Plan drawn by Col. John Trumbull* (s.l., s.n, 1776).

70. Anonymous, [*Map of Ticonderoga, Mount Independence, and the Adjacent Country*] (Philadelphia: Holland Sellers, 1778). Reproduced in Nebenzahl, *Atlas of the American Revolution*, 97.

71. Francois Louis Teisseidre de Fleury , “Sketch of Fort Skuyler defended by Col. Gansevoort suce the 1st Aug. till the 22nd” (manuscript map, [1777?]) Original at New

York Public Library, Special Collections Division, Manuscripts and Archives.]. Reproduced in Marshall and Peckham, *Campaigns of the American Revolution*, [43].

72. [Benjamin Tallmadge?], "A Rough Draught of Fort St. George on the South Side of Long Island Taken by Surprise by a Detachment of Troops under the Command of Major Tallmadge on the 23rd of Nov. 1780" (manuscript map, 1780?). Original at Connecticut Historical Society. Available on the World Wide Web from Stony Brook University at: http://www.sunysb.edu/libmap/img08b.jpg.

73. Nebenzahl, *Battle Plans*, nos. 96-98 (pages 64-65).

74. Guthorn, *American Maps*, 14-22.

75. Albert H. Heusser, *George Washington's Map Maker: A Biography of Robert Erskine* (New Brunswick, N.J.: Rutgers University Press, 1966), 163-66.

76. Guthorn *American Maps*, no. 112.

77. Ibid., no. 100.

78. Robert Erskine, "[Map of Orange and Rockland counties area of New York] Copied from surveys laid down by R. Erskine, F.R.S. 1778, 1779" (manuscript map, [1779]). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3803o.ar109000.

79. For an overview of the Clinton-Sullivan campaign and its consequences, see: Max M. Mintz, *Seeds of Empire: the American Revolutionary Conquest of the Iroquois* (New York: New York University Press, 1999); Joseph R. Fischer, *A Well-Executed Failure: the Sullivan Campaign against the Iroquois, July-September 1779* (Columbia: University of South Carolina Press, 1997).

80. Guthorn, *American Maps*, 27.

81. Lodge's maps are listed in Guthorn, ibid. They are reproduced in New York (State). Secretary of State. *Journals of the Military Expedition of Major General John Sullivan Against the Six Nations of Indians in 1779* (Auburn, N.Y.: Knapp, Peck & Thompson, 1887). For more on the role of Benjamin Lodge, see Harley, *Mapping the American Revolutionary War*, 70.

82. Anonymous, "Map of Gen. Sullivan's March from Easton to the Senaca & Cayuga Countries" (manuscript map, [1779]). Original at the Library of Congress; available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/ g3791s.ar106400.

83. John Mitchell, *Amérique septentrionale avec les routes, distances en miles, villages et etablissements françois et anglois, par le docteur Mitchel. Traduit de l'Anglois à Paris par Le Rouge, ingr. géographe du roy* (Paris: Le Rouge, 1777). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3300.ar005100.

84. Thomas Jefferys, *A Map of the most Inhabited Part of New England, Containing the Provinces of Massachusets Bay and New Hampshire with the Colonies of Conecticut and Rhode Island Divided into Counties and Townships, the W[h]ole Composed from Actual Surveys and its Situation Adjusted by Astronomical Observations. After the Original by M. Le Rouge* (Paris: Le Rouge, 1777). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3720.ar080200.

85. John Montresor, *Province de New-York en 4 feuilles, par Montrésor*(Paris: Le Rouge, 1777); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3800.ar106800. John Montresor, *Plan de New-York et des*

environs, levé par Montrésor, ingénieur en 1775 (Paris: Le Rouge, 1777); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar110600.

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87. Anonymous, *Attaque de l'armée des provinciaux dans Long Island du 27. aoust 1776; dessin de l'isle de New-York et des Etats. Par un officier de l'Armée. Par acte du Parlement du 24 8bre. 1776* (Paris: Le Rouge, [1776]); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802l.ar114900.

88. Anonymous, *Carte de l'entrée de la rivière d'Hudson, depuis Sandy-Hook jusques à New-York avec les bancs, sondes, marques de navigation &c. Rédigée d'après un plan anglois au Dépôt général de la marine, par ordre de M. de Sartine, conseiller d'Etat, ministre et secrétaire d'Etat, au Département de la marine* ([Paris?]: Dépôt de la marine, 1778); available on the World Wide Web at: http://hdl.loc.gov/loc.gmd/g3802h.ar122900.

89. Louis Brion de la Tour, *Carte du théatre de la guerre entre les Anglais et les Américains: Dressée d'après les cartes anglaises les plus modernes, par M. Brion de la Tour, ingénieur-geographe du roi* (Paris: Chez Esnauts et Rapilly, 1777); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3710.ar072800.

90. Charles de Gironcourt, "Plan general des operations de l'armée Britanique contre les rebelles dans l'Amerique depuis l'arivée des troupes hessoises le12 du mois d'aoust 1775 jusqu'à la fin de l'anée 1779" (manuscript map, [1780?]), http://hdl.loc.gov/loc.gmd/g3711s.ar105900. Original in the Force Collection at the Library of Congress (no. 147). Described by Peter J. Guthorn, "A Hessian Map from the American Revolution: its Origin and Purpose," *The Quarterly Journal of the Library of Congress* 33 (July, 1976), 219-31.

91. Harley, "Spread," in *Mapping the Revolutionary War*, 47; Guthorn, "Hessian Map," 3-4. See also Guthorn "Hessian Map" and his *American Maps*, 3-5, for more on the multi-national character of the cartographic corps of the two armies.

92. Guthorn, *American Maps*, 11-12. Michel Capitaine du Chesnoy , "Carte d'une partie de la province de New York et des Jerseys" is listed by Guthorn as number 141 in the Karpinski collection, but is number 107 in the Huntington Library's finding aid to the Karpinski collection.

93. Michel Capitaine du Chesnoy, "Plan of Carillon ou [*sic*] Ticonderoga : which was quitted by the Americaines in the night from the 5th to the 6th of July 1777 / par Mr. Capitaine, A.d.C. du Général La Fayette" (manuscript map, [1777]). Original at Library of Congress (G3804.T5:2F6S3 1777 .C3 Vault). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804t.ar300200.

94. Guthorn, *American Maps*, 30-31.

95. Ibid., 35-36. Several similar maps of West Point are in the Rochambeau Collection at the Library of Congress and are available on the World Wide Web.

96. Howard C. Rice and S.K. Brown, *The American Campaigns of Rochambeau's Army, 1780, 1781, 1782, 1783* (2 vols.; Princeton and Providence: Princeton University Press and Brown University Press, 1972). Vol. 2 is *The Itineraries, Maps and Views*.

97. Jean-Baptiste-Donatien de Vimeur, comte de Rochambeau, *Amérique campagne* (manuscript atlas, 1782). Available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3701sm.gar00001.

98. Several of these are held by the Library of Congress. Two notable examples: Anonymous, "Reconnoissance des ouvrages du nord de l'Isle de Newyork dont on a déterminé géometriquement les principaux points le 22 et le 23 juillet" (manuscript map, 1781); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar121500. Anonymous, "Plan de New-York et des îles environnantes"(manuscript map, [1781?]); available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar121300.

99. For example, Anonymous, "Map of Queens Village or Lloyd Neck in Queens County on the north side of Long Island in the Province (now State) of New York. Situated near the parallel of 41 degrees north latitude" (manuscript map, [1781]). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802l.ar120200.

100. Rice and Brown, *American Campaigns of Rochambeau's Army*, II, pl. 42.

101. Anonymous, " Position du camp de l'armée combinée a Philipsburg du 6 juillet au 19 aoust"(manuscript map, [1781]).Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802w.ar121100.

102. For example, Anonymous, " Position des Armées amériquaine et françoise à Kings-ferry, Peaks-hill, Crompond et Hunts-taverne du 17. septembre au 20 octobre1782" (manuscript map, [1782]). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804p.ar121900.

Chapter 8

1. For a detailed analysis of the sources of settlers in central and western New York, see James W. Darlington, "Peopling the Post-Revolutionary New York Frontier," *New York History* 74:4 (1993), 340-81. Also, David M. Ellis, "The Yankee Invasion of New York, 1783-1850," *New York History* 32 (Jan. 1951).

2. For an overview, see D.W. Meinig, "Geography of Expansion, 1785-1855," in John H. Thompson, ed., *Geography of New York State* (Syracuse, N.Y.: Syracuse University Press, 1977), 140-71. Additional details can be found in Higgins, *Expansion of New York*, 100-149. For a bibliography and research guide see James Folts, *Sources, Guides & Models for Land Research in New York State and City*, a *Fact Sheet* (Albany, N.Y.: New York State Archives, 2001). A great deal of additional information can also be found in works dealing with specific geographic areas, such as the holdings of the Holland Land Company in western New York. These works will be cited below.

3. The 1786 state census gave the total population of New York as 238,897. See Peter R. Eisenstadt and Laura-Eve Moss, *The Encyclopedia of New York State* (Syracuse, N.Y.: Syracuse University Press, 2005), 363.

4. *Historical Statistics of the United States* (2 vols.; Washington, D.C.: GPO, 1975), I, 32. Statistics for Ontario County are from Barbara Shupe, Janet Steins, and Jyoti Pandit. *New York State Population, 1790-1980: A Compilation of Federal Census Data* (New York: Neal-Schuman, 1987), 217.

5. Laurence M. Hauptman, *Conspiracy of Interests: Iroquois Dispossession and the Rise of New York State* (Syracuse, N.Y.: Syracuse University Press, 1999), 8.

6. For De Witt, see: Walter W. Ristow, *American Maps and Mapmakers: Commercial Cartography in the Nineteenth Century* (Detroit: Wayne State University Press, 1985), 73-83; Theodoric Romeyn Beck, *Eulogium on the Life and Services of Simeon De Witt* (Albany: E.W. and C. Skinner, 1835); William Heidt, *Simeon De Witt, Founder of Ithaca* (Ithaca, N.Y.: De Witt Historical Society of Tompkins County, 1968). A brief biography of De Witt written by Stefan Bielinski is available at the New York State Museum Web site (http://www.nysm.nysed.gov/albany/bios/d/sdewitt.html). An interesting sidelight on De Witt's early years is "The Cosmos in Miniature: the Remarkable Star Map of Simeon De Witt," Albert H. Small Documents Gallery at the Smithsonian Institution, http://americanhistory.si.edu/documentsgallery/exhibitions/dewitt_1.html.

7. Hauptman, *Conspiracy*, 58-81, has much on Schuyler and Indian lands. The phrase "waste and unappropriated lands" was used in New York State legislation to refer to Iroquois lands in western New York (see Hauptman, *Conspiracy*, 63).

8. Beck, *Eulogium*, 21.

9. John West Wells,. *Early Investigations of the Devonian System in New York, 1656-1836*. Geological Society of America, Special Paper 74 (New York: Geological Society of America, 1963), 14-15.

10. Simeon De Witt, *Considerations on the Necessity of Establishing an Agricultural College, and Having More of the Children of Wealthy Citizens Educated for the Profession of Farming* (Albany, N.Y.: Websters and Skinners, 1819).

11. Simeon De Witt, *Elements of Perspective* (Albany, N.Y.: H.C. Southwick, 1813).

12. Beck, *Eulogium*, 2-13.

13. For De Witt as a landowner in Ithaca, see Heidt, *Simeon DeWitt*, 20-37. The magnitude of De Witt's investments and activities as a landowner in the Ithaca area are revealed in his correspondence with his agent Francis Bloodgood in the Simeon De Witt papers at Cornell University Library. A selection of these letters is included as an appendix to Heidt's book

14. George Geddes, *Origin and History of the Measures that Led to the Construction of the Erie Canal* (1866; published in *Publications of the Buffalo Historical Society*, II, 1980), 269-70.

15. Washington to Jefferson, March 3, 1784, *The Thomas Jefferson Papers*. Online at http://memory.loc.gov/ammem/collections/jefferson_papers/.

16. Albert Hazen Wright, *Simeon De Witt and the Military Tract Township Names*, New York Historical Source Studies II, Studies in History No. 25 (Ithaca, N.Y.: De Witt Historical Society, 1961); Charles Maar, "The Origin of the Classical Place Names in Central New York," *New York Historical Association Quarterly Journal* 7 (July, 1926): 155-67. For a more general account of the use of classical place names in upstate New York and elsewhere, see George R. Stewart, *Names on the Land: A Historical Account of Place-Naming in the United States* (Boston: Houghton Mifflin, 1967), 181-88.

17. Alvin Kass, *Politics in New York State, 1800-1830* (Syracuse, N.Y.: Syracuse University Press, 1965), 14-15.

18. “Simeon De Witt: Enigmatic Surveyor General, 1784-1834.” Unpublished paper read at the Conference on New York State History, Hartwick College, Oneonta, New York, June 10-12, 1999.

19. William Chazanoff, *Joseph Ellicott and the Holland Land Company* (Syracuse, N.Y.: Syracuse University Press, 1970), 68-69.

20. Simeon De Witt to StephenVan Rensselaer, Sept. 7 1832. Simeon De Witt Papers, Rutgers University.

21. *Report of the Surveyor-General, Pursuant to a Concurrent Resolution of the Hon. The Senate and Assembly, of the 20th and 21st March, 1800* [Albany, N.Y. : s.n., 1801], [p. 3].

22. [Simon Desjardins?] in Simon Desjardins and Pierre Pharoux, *Castorland Journal: An Account of the Exploration and Settlement of Northern New York State by French Émigrés in the Years 1793 to 1797*, ed. and trans. by John A. Galluci (Ithaca, N.Y.: Cornell University Press, 2010).

23. Alan Taylor, The *Divided Ground: Indians, Settlers, and the Northern Borderland of the American Revolution* (New York: Knopf, 2006), 231-32.

24. De Witt to Hardenburgh, Oct.11,1789, New York Historical Society, Misc. Manuscripts, Simeon De Witt; for background see Taylor, *Divided Ground*, 191-9.

25. Michael A. Bellesiles, *Revolutionary Outlaws: Ethan Allen and the Struggle for Independence on the Early American Frontier* (Charlottesville: University Press of Virginia, 1993).

26. Higgins, *Expansion in New York*, 109; Eisenstadt, *Encyclopedia of New York* , 1640; Benton, *Vermont Settlers*; Van Zandt, *Boundaries of the United States*; University of the State of New York, *Report of the Regents of the University, on the Boundaries of the State of New York* (2 vols.;Albany: Argus, 1873-74), available online at: http://cdl.library.cornell.edu/cgi-bin/moa/moa-cgi?notisid=ANX0439-0001 (vol. 1); and http://cdl.library.cornell.edu/cgi-bin/moa/moa-cgi?notisid=ANX0439-0002 (vol. 2).

27. Andro Linklater, *The Fabric of America: How Our Borders and Boundaries Shaped the Country and Forged Our National Identity* (New York: Walker & Company, 2007), 60. For the contributions of Ellicott and Rittenhouse to the surveying of New York, see: Brook Hindle, *David Rittenhouse* (Princeton, N.J.: Princeton University Press, 1964), 279-83; Silvio A. Bedini, “Andrew Ellicott, Surveyor of the Wilderness,” *Surveying and Mapping* 36 (1976), 119-20, 127; Catherine Van Cortlandt Mathews, *Andrew Ellicott: His Life and Letters* (New York: Grafton Press, 1908), 55-79.

28. University of the State of New York. Boundary Commission, *Report of the Regents’ Boundary Commission upon the New York and Pennsylvania Boundary* (Albany, Weed Parsons and Company, 1886). There is also a good deal of documentation on the Pennsylvania boundary in the previously cited (1884) *Report of the Regents...on the Boundaries*, 241-87.

29. John Adlum and John Wallis, *Map Exhibiting a General View of the Roads and Inland Navigation of Pennsylvania and Part of the Adjacent States* (s.l., s.n. 1790s). A facsimile with a new title was published in the middle of the nineteenth century. This is John Adlum, *Map of Part of the State of New York with Parts of the Adjacent States Made in 1793-4 by John Aldam* [sic.] *& John Wallis. Copied from the Original 1/3 Off* (Albany: Munsell, 1861); it originally appeared in Franklin B. Hough, ed., *Proceedings of the Commissioners of Indian Affairs Appointed by Law for the Extinguishment of*

Indian Titles in the State of New York (Albany: Munsell, 1861), I, facing p. 45. It is Described by Mano, "Unmapping the Iroquois," in Hauptman, *The Oneida Indian Journey*, 182-85. A copy of the original map is available online from the Yale University Library at http://brbl-dl.library.yale.edu/vufind/Record/3444100

30. The most detailed maps of early land grants are contained in Joseph R. Bien, *Atlas of the State of New York* (New York: Bien, 1895); available on the Web from the David Rumsey Collection at http://www.davidrumsey.com/luna/servlet/s/2v0b12 . Good overview maps can be found in Higgins, *Expansion of New York*, and at the end of volume five of Alexander C. Flick, ed. *History of the State of New York* (10 vols.; New York: Columbia University Press, 1934).

31. The initial act authorizing confiscation of property of Loyalists is Laws of New York State, 3rd Session, Chap. 25 (1779). A detailed accounting of the lands seized and properties sold is in Alexander C. Flick, *Loyalism in New York During the American Revolution* (New York: Columbia University Press, 1901), 135-60, 215-72.

32. Laws of New York State, 4th Session, Chap. 4 (1781). See also E. Wilder Spaulding, *New York in the Critical Period, 1783-1789* (New York: Columbia University Press, 1932), 66-70.

33. The quotation is from John P. Kaminski, *George Clinton: Yeoman Politician of the New Republic* (Madison, WI: Madison House, 1993), 79.

34. For Clinton as land speculator, see Taylor, *Divided Ground*, 152.

35. For the activities of William Cooper, see Alan Taylor, *William Cooper's Town: Power and Persuasion on the Frontier of the Early American Republic* (New York, Knopf, 1996). William Cooper's own account was originally published as *A Guide in the Wilderness, or, The History of the First Settlements in the Western Counties of New York: with Useful Instructions to Future Settlers, in a Series of Letters addressed by Judge Cooper, of Cooperstown, to William Sampson, Barrister, of New York* (Dublin: Gilbert & Hodges, 1810). See also A.T. Volwiler, " George Croghan and the Development of Central New York, 1763-1800," *The Quarterly Journal* of the New York State Historical Association 4:1 (Jan., 1923), 21-40, http://external.oneonta.edu/cooper/articles/nyhistory/1923nyhistory-volwiler.html.

36. See Hauptman, *Conspiracy of Interests* and Taylor, *The Divided Ground*. See also Mano, "Unmapping the Iroquois," in Hauptman, ed., *The Oneida Indian Journey*, 171-95.

37. J.B. Harley, "New England Cartography and the Native Americans," in Emerson W. Baker, ed., *American Beginnings: Exploration, Culture, and Cartography in the Land of Norumbega* (Lincoln: University of Nebraska Press, 1994), 287-321.

38. See Higgins, *Expansion in New York*, 104-06; Richard H. Schein, "Framing the Frontier: The New Military Tract Survey in Central New York," *New York History* 74:1 (1993), 5-28; Jeannette B. Sherwood, "The Military Tract," *Proceedings of the New York State Historical Association* 24 (1926): 169-79.

39. See Darlington, "Peopling the Post-Revolutionary New York Frontier" on sources of the population in this area; Meinig, "Expansion of New York" on its lasting effects.

40. Francis P. Boscoe, "Totten and Crossfield Purchase" in Eisenstadt, *Encyclopedia of New York State*, 1568; Alfred L. Donaldson, *A History of the Adirondacks* (2 vol; 1921; Fleischmanns, N.Y.: Purple Mountain Press, 1992), I, 51-61.

41. For the development of the area around Plattsburgh, see Duane Hamilton Hurd, *History of Clinton and Franklin Counties* (1880; reprinted Plattsburgh, N.Y.: Clinton County Bicentennial Commission, 1978), 148-52. See also: http://www.historiclakes.org/towns/plattsburgh_gallery.htm; Thomas A. Rumney, "Plattsburgh," *Encyclopedia of New York State*, 1212; Higgins, *Expansion of New York*, 139.

42. The original act setting up the Land Commission is Laws of New York State, 7th Session., Chap. 68 (May 11 1784); this act was amended several times, most importantly by Laws of New York State, 9th Session, Chap. 67 (1786).

43. For details about the land commission and the politics surrounding its sales, see Kaminski, *George Clinton*, 195-97.

44. Higgins, *Expansion in New York*, 142; " Macomb Purchase," *Encyclopedia of New York State*, 939-40; Donaldson, *History of the Adirondacks*, I, 62-77.

45. The activities of the Cockburns and Brodhead are mentioned in Howard Thomas, *Black River in the North Country* (Utica, N.Y.: North Country Books, 1985), 21-22, 25-26. The best and most detailed account of the surveying and settlement of this area is still, Franklin B. Hough, *A History of St. Lawrence and Franklin Counties, New York, from the Earliest Period to the Present Time* (Albany: Munsell, 1853). Charles C. Brodhead's map was later engraved and published as *A Map of the Tract of Land in the State of New York called Macomb's Purchase Compiled from the Official Returns under the Inspection of the Surveyor General* (Albany?: Gavit, 1853). It appears in *The Documentary History of the State of New York*, III, facing p. 649. A copy of the facsimile can be viewed at the Alabama Maps site at: http://alabamamaps.ua.edu/historicalmaps/us_states/newyork/index_1850-1865.html.

46. For an overview, see Thomas, *Black River*, 19-28, 57-65 and Higgins, *Expansion in New York*, 143. For more detail, see Franklin B. Hough, *A History of Lewis County, in the State of New York: from the Beginning of its Settlement to the Present Time* (Albany: Munsell and Rowland, 1860)**,** and his *A History of Jefferson County in the State of New York, from the Earliest Period to the Present Time* (Albany: Munsell, 1854). See also, Edith Pilcher, *Castorland: French Refugees in the Western Adirondacks* (Harrison, N.Y.: Harbor Hill Books, 1985). For the surveying of this area see Desjardins, *Castorland Journal*, and Mary Pedley, "Land Company Mapping in North America: Fiefdom in the New Republic," *Imago Mundi* 42 (1990): 106-13.

47. Higgins, *Expansion in New York*, 141; Rohit T. Aggarwala, "Scriba's Patent," Eisenstadt, *Encyclopedia of New York State*, 1383.

48. Benjamin Wright, [Map of Scriba's Patent, 1794?]. Syracuse University Libraries Special Collections Research Center (Call number: New York G3802 .O2 1794 cases).

49. The history of the Phelps and Gorham Purchase and its aftermath can be pieced together from: William H. Siles, "Pioneering in the Genesee Country: Entrepreneurial Strategy and the Concept of a Central Place," in Jonas, *New Opportunities*, 35-68; Orsamus Turner, *History of the Pioneer Settlement of Phelps and Gorham's Purchase and of Morris' Reserve* (1851; Geneseo, NY : James Brunner, 1976); R.W. G. Vail, "The Lure of the Land Promoter: A Bibliographical Study of Certain New York Real Estate," *University of Rochester Library Bulletin* 24:2-3 (Winter-Spring, 1969), http://www.lib.rochester.edu/index.cfm?PAGE=1008; Howard Lawrence Osgood, *The*

Title of the Phelps and Gorham Purchase (Rochester, N.Y.: Rochester Historical Society, 1891), http://books.google.com/books?id=gZwvAAAAYAAJ

50. Hauptman, *Conspiracy of Interests*, 88-93.

51. Turner, *History of the Pioneer Settlement of Phelps and Gorham's Purchase*, 141, 163, 246-47, 261-63; Higgins, *Expansion in New York*, 115-23.

52. For Morris, see: Barbara Ann Chernow, "Robert Morris: Genesee Land Speculator," *New York History* 58 (1977): 195-220; and her *Robert Morris, Land Speculator 1790-1801* (New York: Arno Press, 1978). Andrew Ellicott's 1792 survey is described in Mathews, *Andrew Ellicott*, 105-07.

53. For the Pulteney Association and Charles Williamson, see: Higgins, *Expansion in New York*, 123-28; Paul D. Evans, "The Pulteney Purchase," *Proceedings of the New York Historical Society* 20 (1922): 83-103; Helen I. Cowan, *Charles Williamson: Genesee Promoter, Friend of Anglo-American Rapprochement* (1941; Clifton, N.J.: Augustus M. Kelley, 1973).

54. The activities of the Holland Land Company have been documented in a series of important monographs: Paul D. Evans, *The Holland Land Company* (Buffalo, N.Y.: Buffalo Historical Society, 1924); William Chazanof, *Joseph Ellicott and the Holland Land Company* (Syracuse, N.Y.: Syracuse University Press, 1970); William Wyckoff, *The Developer's Frontier: The Making of the Western New York Landscape* (New Haven: Yale University Press, 1988); Charles E. Brooks, *Frontier Settlement and Market Revolution: The Holland Land Purchase* (Ithaca, N.Y.: Cornell University Press, 1996).

55. For Joseph Ellicott as surveyor, see, in addition to the works of Chazanof and Wyckoff cited above, G. Hunter Bartlett, "Andrew and Joseph Ellicott," *Publications of the Buffalo Historical Society* 26 (1922): 3-48; Silvio Bedini, "Andrew Ellicott, Surveyor of the Wilderness," *Surveying and Mapping* 36 (1976): 113-35; John E. McIntosh, Jr., "Monumenting the Western Transit of the Holland Purchase," *Empire State Surveyor* 13 (Nov.-Dec., 1977): 7-10.

56. Evans, *Holland Land Company*, 201-202.

57. Joseph Ellicott, *Reports of Joseph Ellicott*, ed. Robert W. Bingham (2 vols.; Buffalo, N.Y.: Buffalo Historical Society Publications, 1937).

58. De Witt to Peter B. Porter, June 30, 1819, Buffalo Erie County Historical Society, Peter A Porter Collection, E-72.

59. De Witt to Abraham Hardenberg, May 26,1789. Letter in Misc. Ms., De Witt, New-York Historical Society.

60. Printed broadside (1 p.), Misc. Ms., De Witt, New-York Historical Society.

61. De Witt to William Macclure, June 17, 1803, Onondaga Historical Association, Simeon De Witt Papers.

62. "Report of Mr. Joseph Ellicot [*sic*] Concerning the State of the Survey of the Genessee Lands Made in 1798," *Reports of Joseph Ellicott*, 83-84.

63. Ibid.

64. Ibid., 97-102. For Andrew Ellicott's use of this instrument, see Turner, *History of the Pioneer Settlement of Phelps & Gorham's Purchase*, 246.

65. The rectangular survey system has a long history going back to the Greeks and Romans. In America, it has antecedents in the New England township system, and in the theories of Thomas Jefferson. In New York it was used for the colonial-era Totten and Crossfield Purchase. See Albert C. White, *A History of the Rectangular Survey System*

(Washington D.C.: Government Printing Office, 1983), and Andro Linklater, *Measuring America: How the United States Was Shaped by the Greatest Land Sale in History* (New York: Plume Books, 2003).

66. The *Transactions of the American Philosophical Society* 6 (1809) contains several articles dealing with the measurement of longitudes in North America in the first years of the nineteenth century. Particularly important is the article by the Spanish refugee scientist Jose Joaquin de Ferrer, "Astronomical Observations Made by Jose Joaquin de Ferrer, Chiefly for the Purpose of Determining the Geographical Position of Various Places in the United States and Other Parts of North America," 158-64. Ferrer started taking measurements in New York, both with a chronometer and by astronomical means, in 1801. Andrew Ellicott and David Rittenhouse were also involved in measuring longitudes by astronomical means in the early nineteenth century. For De Witt and the longitude of Albany, see his article "Observations on the Eclipse of 16 June, 1806," published in the same volume of the *Transactions*, 300-02, and his letter to Jedidiah Morse, May 7, 1808, Misc. Ms., De Witt, New-York Historical Society. By the end of 1806, Ferrer had ascertained the longitudes of a number of locations along the southern coast of Long Island, and along the Hudson River as far north as Albany, by using an Arnold chronometer.

67. Hindle, *David Rittenhouse*, 107.

68. De Witt to Abraham Hardenbergh, May 26, 1789, Misc. Ms., De Witt, New-York Historical Society.

69. The field books have been microfilmed by the Holland Land Company Project at the Reed Library, SUNY Fredonia, and are available in several research libraries in New York State. Additional information is available at the Western New York Heritage site at http://www.hlc.wny.org/

70. Much of this literature is summarized by Brooks, *Frontier Settlement*, 13-18. See especially, P.L. Marks et. al., *Late Eighteenth Century Vegetation of Central and Western New York State on the Basis of Original Land Survey Records*, New York State Museum Bulletin 484 (Albany, N.Y., 1992).

71. There is no comprehensive list of these maps. Those at the New York State Archives are listed in Mix, *Catalogue of Maps and Surveys*.

72. Simeon De Witt to Jeremiah Rensselaer, Sept. 1,1784, Misc. Ms., De Witt, New-York Historical Society.

73. Simeon De Witt, *Map of Land Patents from Original Surveys by Simeon De Witt* [ca. 1785] (LC G&M land ownership maps 0535 NY Orange.) Described: Sellers and Van Ee, *American Maps*, no.1085.

74. See *Totten and Crossfields Purchase* in *Certified Copies of Ancient Field Notes and Maps* (Report of the State Engineer and Surveyor, New York State Assembly Documents, 127th Session, 1904, vol. 25, no. 65, pp. 414-495).

75. Simeon De Witt, *Map of the Head Waters of the Rivers Susquehanna & Delaware Embracing the Early Patents on the South Side of the Mohawk River* (ca. 1790). This map was published in *The Documentary History of New York* with the dates of the patents added by E. B. O'Callaghan. This version is also available on the World Wide Web from the Harvard University Library at http://ids.lib.harvard.edu/ids/view/7178541?buttons=y

76. The original of this map is in the Special Collections Department of the New York Public Library.

77. A copy of this map is available online from the New York State Museum (http://www.nysm.nysed.gov/research_collections/research/history/neck/oriskany.html). For Lansing and his role in Oneida County history see: http://www.iment.com/maida/familytree/lansing/gerritglansing.htm.

78. The story of the takeover of Oneida lands has been told by Hauptman in *Conspiracy of Interests* and in *The Oneida Indian Journey*. This subject is also treated by Taylor in the latter part of *The Divided Ground*. For a list of maps dealing with the Oneida lands see: http://www.rootsweb.com/~nyccazen/Maps/SGOneidaMaps.html

79. Gideon Fairman, *A Map of the Oneida Reservation Including the Lands Leased to Peter Smith* (1795). This map was published by Franklin Benjamin Hough in his *Notices of Peter Penet and of His Operations among the Oneida Indians* (Lowville, N.Y.: Albany Institute, 1866). It has been republished several times, including in Hauptman, *Conspiracy of Interests*, 59. It is reproduced, described and analyzed by Mano in "Unmapping the Iroquois," in Hauptman, *The Oneida Indian Journey*,178. A copy of a map with this title dated 1810 is available from the New York State Archives at: http://iarchives.nysed.gov/PubImageWeb/viewImageData.jsp?id=153442. Many other early manuscript maps of Indian reservations can be found be searching the digital collections of the Archives.

80. Abraham Hardenburg [*sic*], *A Map of the Military Lands* (manuscript, [1792]). This map is at the New-York Historical Society.

81. This map (attributed to one John S. De Witt, probably an error for Simeon De Witt) is located at the Huguenot Historical Society in New Paltz, New York. Another early manuscript map by De Witt, dated 1790, bears the title *Township no. XXII: a map of township number twenty two of the lands directed by law to be surveyed for the troops of this State in the late Army of the United States*. It is held by the De Witt Historical Society in Ithaca, New York.

82. The gateway page for much of information on the Holland Land Company is located at http://www.hlc.wny.org/. The Holland Land Company maps are available from the New York Heritage site at http://www.nyheritage.org/collections/holland-land-company-maps.

83. James W. Darlington, "Peopling the Post-Revolutionary New York Frontier," *New York History* 74:4 (1993): 340-81; Wyckoff, *The Developer's Frontier*, 103-31.

84. Martin Brückner, *The Geographic Revolution in Early America: Maps, Literacy, and National Identity* (Chapel Hill: University of North Carolina Press, 2006), 120-34. At a somewhat later date, Amos Lay wrote that his map of the State of New York could "be inspected at the Reading-Room, Printing-Offices, and at the publick inns in Providence." *Rhode-Island American and General Advertiser*, Oct. 30, 1821, [4].

85. *A Map of the Genesee Lands in the County of Ontario and State of New York According to an Accurate Survey Which was Made of the Same, 1790* (London: n.p., 1791). This map was reprinted around 1850 by R.H. Pease in Albany and published in O'Callaghan, *Documentary History of the State of New York*. A copy of the facsimile has been posted on the World Wide Web by Bill Hecht at: http://freepages.genealogy.rootsweb.ancestry.com/~springport/maps/w_fingerlakes_1790.jpg

86. *An Account of the Soil, Growing Timber, and Other Productions, of the Lands in the Countries Situated in the Back Parts of the States of New-York and Pennsylvania, in North America. And Particularly the Lands in the County of Ontario, Known by the Name of The Genesee Tract, Lately Located, and Now in the Progress of Being Settled* ([London:] n.p., 1791. Reprinted in *Documentary History of the State of New York*, II, 1111-25.

87. For background, see Cowan, *Charles Williamson*, 7-14.

88. *A Map of Messrs: Gorham & Phelps's Purchase; Now the County of Ontario, in the State of New York* ([New Haven]: A. Doolittle, 1794). This map was reproduced in the 1976 reprint edition of Orsamus Turner, *History of the Pioneer Settlement of Phelps and Gorham's Purchase*. This and two other early maps of the Phelps and Gorham Purchase are also reproduced in Osgood, *The Title of the Phelps and Gorham Purchase* (Rochester, N.Y.: Rochester Historical Society, 1891), http://books.google.com/books?id=gZwvAAAAYAAJ

89. Charles, A Williamson, *Description of the Genessee Country …in a Series of Letters from a Gentleman to his Friend* (Albany: Loring Andrews & Co., 1798); Charles Williamson, *A Description of the Genessee Country in the State of New York … to which is added an Appendix Containing a Description of the Military Lands by Robert Munro* (New York: Printed for the author, 1804).

90. Schwartz and Ehrenberg, *The Mapping of America*, 212-16.

91. This little-known map without a title was engraved by Cornelius Van Baarsel. It is described by Vail, "The Lure of the Land Promoter."

92. Joseph Ellicott, *A Map of Morris's Purchase or West Geneseo in the State of New York, Exhibiting Part of the Lakes Erie and Ontario, the Straights of Niagara, Chautaugue Lake and All the Principal Waters, the Boundary Lines of Several Tracts of Land Purchased by the Holland Land Company, William and John Willink and Others* (s.l., sn. 1800). This map was published by the Holland Land Company, possibly in New York. It and other early manuscript and printed maps by Ellicott are also described in Vail, "The Lure of the Land Promoter." The 1804 edition is available online from the David Rumsey Collection at http://www.davidrumsey.com/luna/servlet/s/yq0132

93. Cazenove's comments on Ellicott's report to Holland Land Company dated Sept. 11, 1801. *Reports of Joseph Ellicott*, 77.

94. Simeon De Witt, *1st sheet of De Witt's State-map of New York* (New York: s.n., 1793).A high resolution image of this map is available from the Cayuga County New York GenWeb Project at http://www.rootsweb.ancestry.com/~nycayuga/maps.htm.

95. See note 29 of this chapter for bibliographic information about Adlum's map.

96. See Brückner, *The Geographic Revolution in Early America*, 98-141.

97. Stephen DeWitt Stephens, *The Mavericks, American Engravers* (New Brunswick: Rutgers University Press, 1950.)

98. William Cockburn, *A Map of the Province of New York as Divided into Counties, Together with the Adjacent Provinces Compiled from the Latest Maps and Actual Surveys* (manuscript, 1774 with revisions, 1780). Photocopies of this map are located at the New York State Library and New York Public Library. The original is privately owned.

99. William Cockburn, *A Map of the State of New York and Parts Adjacent* (manuscript, 1783). Photocopies of this map are located at the New York State Library and New York Public Library. The original is privately owned.

100. Jedidiah Morse, *A Map of The State of New York* (London: J. Stockdale, 1794). A copy is available online from the David Rumsey Collection at http://www.davidrumsey.com/luna/servlet/s/9x1bwc

101. Brückner, *The Geographic Revolution in Early America*, 120-41; see also J.B. Harley, "Atlas Maker for an Independent America," *Geographical Magazine*, XLIX (1977), 766-771.

102. Samuel Lewis, *The State of New York Compiled from the Best Authorities* (Philadelphia: Matthew Carey, 1795). Available online from the David Rumsey Collection (http://www.davidrumsey.com/luna/servlet/s/383k91).

103. Brückner, *The Geographic Revolution in Early America*, 120-21.

104. John Reid, *The American Atlas* (New York: Reid, 1796). This atlas accompanied William Winterbotham's *An Historical, Geographical, Commercial, and Philosophical View of the American United States* (New York: Reid, 1796). The entire atlas (41 maps) is available online from the David Rumsey Collection (http://www.davidrumsey.com).

105. Daniel Friedrich Sotzmann , *New York* (Hamburg: Karl Ernst Bohn, 1799). Available online from the Harvard University Map Collection at: http://nrs.harvard.edu/urn-3:FHCL:476639?buttons=y. This map was one of ten maps prepared for a projected *Atlas von Nordamerika*, which was to accompany his *Erdbeschreibung und Geschichte von America, die Vereinten Staaten von Nordamerika* (7 vols.; Hamburg: Karl Ernst Bohn, 1793-1816). It is described in Ristow, *American Maps*, 169-78; Ralph H. Brown, "Early Maps of the United States: The Ebeling-Sotzmann Maps of the Northern Seaboard States," *Geographical Review* 30:3 (Jul., 1940): 471-79.

106. Letter to Noah Webster, Oct. 4, 1796. Quoted by Brown, "Early Maps of the United States," 477.

107. *Ibid.*, 474.

108. Simeon De Witt, *A Map of the State of New York* (Albany: G. Fairman, 1802). Available online from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3800.ct001270.

109. Laws of New York State, 12th Session, Chap. 67 (1786).

110. New York *Daily Advertiser*, June 6, 1792, [4].

111. Laws of New York State, 19th Session, Chap. 69 (1796); Laws of New York State, 23rd Session, Chap. 56 (1800).

112. These town maps are listed in Mix, *Catalogue of Maps*.

113. Simeon De Witt, communication to the speaker of the Assembly in the New York State, *Assembly Journal* (27th sess., 1804), 109.

114. This analysis was done using the computer program MapAnalyst.

115. This 210,000 acre parcel was purchased by John Brown of Rhode Island (not the abolitionist, who later held a small tract of land in the Adirondacks). It was a subdivision of the Macomb Purchase, and predictably proved to be a disastrous investment for its owners. See Henry A.L. Brown and Richard J. Walton, *John Brown's Tract: Lost Adirondack Empire* (Canaan, N.H.: Phoenix Publishing, 1988); Alfred L. Donaldson, A *History of the Adirondacks*, I, 88-100.

116. On this subject, see Mano, "Unmapping the Iroquois."

117. Laws of New York State, 23rd Session, Chap. 56 (1800); New York *Evening Post*, April 1, 1803, [p. 2].

118. In 1804 De Witt reported to the assembly that sales were not sufficient repay a $3000 interest-free loan that he had received from the legislature to pay for the publication of the map New York State, and to pay for its distribution to every town and county government in the state. *Assembly Journal*, February 27, 1804, 108-110.

119. New York State, *Senate Journal*, January 25, 1803, 129; Ristow, *American Maps*, 78.

120. Simeon De Witt, *Map of the State of New York* ([Albany?]: s.n., 1804). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3800.ct001269

121. The 1804 map was advertised for sale by subscription in several newspapers, including the *American Citizen*, May 10, 1803, [p. 4]. I have been unable to find advertisements for it after its publication.

Chapter 9

1. There appears to be no published work that examines the development of the roads in New York State prior to 1797. For later developments see: Joseph Austin Durrenberger, *Turnpikes: A Study of the Toll Road Movement in the Middle Atlantic States and Maryland* (Valdosta, GA: Southern Stationary and Printing, 1931). Some additional information on later developments can also be found in Oliver W. Holmes, "The Turnpike Era," in *Conquering the Wilderness*, vol. 5 of Flick, ed. *History of the State of New York*, and George Rogers Taylor, *The Transportation Revolution, 1815-1860* (New York: Holt, Rinehart & Winston, 1951). Briefer accounts include: Eisenstadt, *Encyclopedia of New York*, "Turnpikes"; Daniel B. Klein and John Majewski. "Economy, Community and Law: The Turnpike Movement in New York, 1797-1845," *Law & Society Review* 26:3 (1992): 469-512.

2. Meinig, "Geography of Expansion," in Thompson, ed., *Geography of New York*, 156.

3. *Family Almanac and Franklin Calendar*, 1848 (Detroit, Mich.: Alex. M'Fanen), 17. Quoted in Clayton C. Mau, *The Development of Central and Western New York: From the Arrival of the White Man to the Eve of the Civil War, Portrayed Chronologically in Contemporary Accounts* (Rochester, N.Y.: Du Bois Press, [1944]), 86.

4. Siles, "Pioneering in the Genesee Country," in Jonas and Wells, *New Opportunities in a New Nation*, 52-54.

5. Cowan, *Charles Williamson*, 58-86.

6. Wyckoff, *Developer's Frontier*, 78-82.

7. "An Act for the Sale and Disposition of Lands belonging to the People of this State," Laws of New York State, Twelfth Session, Chap. 32, para. 18 (Feb. 25, 1789).

8. Durrenberger, *Turnpikes*, 41.

9. Ibid., 41-45.

10. See Charles Williamson, *Observations on the Proposed State Road, from Hudson's River, Near the City of Hudson, to Lake Erie, by the Oleout, Catharine's, Bath,*

and Gray's Settlement, on the Western Bounds of Steuben County (1800; Gale Ecco, Print Editions, 2010), also available online from Gale; Evers, *Catskills*, 236-42, 265-66.

11. Meinig, "Geography of Expansion," in Thompson, ed., *Geography of New York*, 156 ; Chazanof, *Joseph Ellicott*, 84-85.

12. Durrenberger, *Turnpikes*, 61.

13. Ibid.

14. For the economic aspects of the turnpike movement, see Daniel B. Klein and John Majewski, "Economy, Community, and Law: The Turnpike Movement in New York, 1797-1845," *Law & Society Review* 26:3 (1992), 469-512.

15. Durrenberger, *Turnpikes*, 87.

16. R.J. Forbes, "Roads to c 1900," in Charles Singer et. al., eds., *A History of Technology* (8 vols.; Oxford: Clarendon Press, 1954-1984): 4: 532-35. Charles Reichman, "The Main Plank Roads of Western Long Island," *Long Island Forum* 53:4 (1990), 136-42. Daniel B. Klein and John Majewski, "Plank Road Fever in Antebellum America: New York State Origins," *New York History* 75 (Jan., 1994): 39-65; available on the World Wide Web from The University of California Transportation Center at: http://www.uctc.net/papers/243.pdf.

17. John Melish, *Travels through the United States of America in the Years 1806 & 1807, and 1809, 1810 & 1811* (1818; New York: Johnson Reprint Corp., 1970), esp. 269, 510, 513, 523.

18. Christopher Colles, A *Survey of the Roads of the United States of America* (New York: s.n., 1789). An incomplete set of these maps is available online from the David Rumsey Collection (http://www.davidrumsey.com). The complete book was reprinted along with a valuable commentary by Walter W. Ristow, A *Survey of the Roads of the United States of America 1789* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1961). Colles' other activities are also described in this book, and in Ristow, *American Maps*, 158-66.

19. Christopher Colles, *The Geographical Ledger and Systematized Atlas* (New York: John Buel, [ca. 1794]). Described in Ristow's introduction to Coles *Survey*, 78-83, and in his *American Maps*, 162-66.

20. Abraham Bradley, Jr., *A Map of the United States Exhibiting Post Roads & Distances: the First Sheet Comprehending the Nine Northern States, with Parts of Virginia and the Territory North of Ohio* ([Philadelphia?]: Bradley, [1796?]). Available online from the Library of Congress (http://hdl.loc.gov/loc.gmd/g3700.ct001192). Described by Larry Caldwell and Michael Buehler, "Picturing a Networked Nation: Abraham Bradley's Landmark U.S. Postal Map," *The Portolan: Journal of the Washington Map Society* 77 (Spring, 2010), 7-25.

21. William McCalpin, *A Map of the State of New York: Compiled from the Latest Authorities: Including the Turnpike Roads Now Granted as also the Principal Common Roads Connected There With* (Oxford: s.n., 1808). Available online from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434761

22 The celebration of the Erie canal continues—witness Peter L. Bernstein's euphoric *Wedding of the Waters: The Erie Canal and the Making of a Great Nation* (New York: Norton, 2005). Two recent books that take a more critical view are Hauptman, *Conspiracy of Interests* and Carol Sheriff, *The Artificial River: The Erie Canal and the*

Paradox of Progress, 1817-1862 (New York: Hill and Wang, 1996). All three of these books have good bibliographies.

23. Cadwallader D. Colden, *A Memorial Concerning the Fur Trade of the Province of New-York. Presented to his Excellency William Burnet, Esq. Captain-General and Governor, &c. by Cadwallader Colden, Surveyor-General of the Said Province, the 10th of December, 1724*. Reprinted in David Hosack, *Memoir of DeWitt Clinton, with an Appendix Containing Numerous Documents Illustrative of the Principal Events of His Life and of the Early History of the Canals* (New York, J. Seymor, 1829), Appendix N. Available online from the Erie Canal Web site at http://www.eriecanal.org/.

24. See Philip L. Lord, Jr., " New York's Oldest Canal," http://www.nysm.nysed.gov/research_collections/research/history/neck/ . This Web page, hosted by the New York State Museum, includes several early maps; it is adapted from Philip L. Lord, Jr., *The Neck on Mohawck's River: New York's First Canal* ([Syracuse, N.Y.]: Canal Society of New York, 1993).

25. Brooke Hindle, *The Pursuit of Science in Revolutionary America, 1735-1789* (Chapel Hill: University of North Carolina Press, 1956), 372 ff.; Noble E. Whitford, *History of the Canal System of the State of New York* (2 vols.; Albany, N.Y.: Brandow Printing Co., 1906), part I.

26. Christopher Colles, *Proposals for the Speedy Settlement of the Waste and Unappropriated Lands on the Western Frontiers of the State of New York, and for the Improvement of the Inland Navigation Between Albany and Oswego* (New York: Samuel Loudon, 1785).

27. *The Report of a Committee Appointed to Explore the Western Waters in the State of New-York: for the Purpose of Prosecuting the Inland Lock Navigation* (Albany: Barber and Southwick, 1792; reprinted in *The Inland Navigation Surveys of 1792* (Albany: New York State Museum, 1992). The history of the canal is described in Hauptman, *Conspiracy of Interests*, 82-85; Ronald E. Shaw, *Erie Water West: A History of the Erie Canal, 1792 -1854* (Lexington: University of Kentucky Press, 1966); Whitford, *History of the Canal System*; Bernstein, *Wedding of the Waters*, 91-101. The map was probably a survey made by Abraham Hardenburg (see Geddes, *Canal*, 267). Elkanah Watson, *History of the Rise, Progress, and Existing Condition of the Western Canals in the State of New-York from September 1788, to the Completion of the Middle Section of the Grand Canal in 1819, together with the Rise, Progress, and Existing State of Modern Agricultural Societies, on the Berkshire system, from 1807 to the Establishment of the Board of Agriculture in the State of New-York, January 10, 1820* (Albany: D. Steele, 1820.

28. Hosack, *Memoir of DeWitt Clinton*, Appendix, Note O. See also De Witt's letter of 1822 to William Darby in Buffalo Historical Society *Publications*, II, 28.

29. Chazanof, *Joseph Ellicott*, 159-61.

30. The 1809 Report of the Canal Commissioners was published in vol. 1 of New York (State), *Laws of the State of New York: in Relation to the Erie and Champlain Canals, together with the Annual Reports of the Canal Commissioners, and other Documents Requisite for a Complete and Official History of Those Works* (2 vols.; Albany: E. and E. Hosford Printers, 1825).

31. The 1811 report is published in Ibid., 48-69.

32. John H. Eddy, *Map of the Western Part of the State of New York: Shewing the Route of a Proposed Canal from lake Erie to the Hudson River* ([Newark, N.J.?]: s.n., 1811). Available on the World Wide Web from the Harvard University at http://ids.lib.harvard.edu/ids/view/6924632?buttons=y

33. Colden, Cadwallader D. *Memoir at the Celebration for the Completion of the New York Canals* (New York: W.A. Davis, 1825).

34. New York (State) Canal Commissioners, *Map and Profile of the Proposed Canal from Lake Erie to Hudson River in the State of New York: Contracted by Direction of the Canal Commissioners from the Maps of the Engineers in 1817* (Albany, N.Y.: The Commissioners, 1817). Available online from the Albany Institute of History and Art at http://www.albanyinstitute.org/details/items/map-and-profile-of-the-proposed-canal-from-lake-erie-to-huds.html This is a medium scale map (1:380,160 or six miles to an inch). The same map was also published in the same year at a scale of 1:253,440 or 4 miles to an inch in New York City by E. Valentine.

35. New York (State) Canal Commissioners, *A New Map and Profile of the Proposed Canal from Lake Erie to the Hudson River in the State of New York; Constructed under the Direction of the Canal Commissioners from the Maps of the Engineers* ([Albany, N.Y.?]: [The Commissioners?], 1821). Its scale is1:253,440 or four miles to an inch. Available on the Web from the New York Public Library, http://digitalgallery.nypl.org/nypldigital/id?434777 .

36. The New York State Archives has a collection entitled *Original Maps of Surveys for the Erie Canal*. It consists of 19 sheets by James Geddes at a scale of 10 chains to an inch (or 1:660) and shows individual buildings and other structures.

37. Ristow, *American Maps*, 282.

38. David H. Vance, John Ogden Dey, and Amos Eaton, *Map of the Western Part of the State of New York* (Albany, N.Y.: John Ogden Dey, 1825), available on the World Wide Web from the David Rumsey Collection, http://www.davidrumsey.com/luna/servlet/s/j6081n.

39. Amos Eaton, *Geological Profile Extending from the Atlantic to Lake Erie* (Albany, N.Y.: Packard & Van Benthuysen, 1824). Available on the World Wide Web from the Library of Congress, http://hdl.loc.gov/loc.gmd/g3801c.ct000233.

40. A typical example is William Williams, *The Tourist's Map of the State of New York: Compiled from the Latest Authorities* (Utica, N.Y.: William Williams, 1828). Available on the World Wide Web from the New York Public Library, http://digitalgallery.nypl.org/nypldigital/id?434650.

41. After 1860 maps of New York's network of canals were frequently published by the Office of the State Engineer and Surveyor in the documents of the New York State Legislature. An example is the1905 map available from the Erie Canal site at http://www.eriecanal.org/UnionCollege/Making_It_Work-add.html

42. These maps, which were prepared for the New York State Canal Commissioners, are at a scale of ten chains to an inch (1:660). They consist of 19 single-sheet maps bound into a single volume, and have been assigned the title [Original maps of surveys for the Erie Canal] by the New York State Archives.

43. James Geddes, [Manuscript Map of Hudson-Champlain Canal], 35 leaves in notebook. James Geddes collection, Onondaga Historical Association. A reduced-scale published map of the same area is James Geddes, *Map and Profile of the Champlain*

Canal as Made from Lake Champlain to the Hudson River and Surveyed Thence to the Tide at Waterford ([Albany, N.Y.?]: n.p., 1820). Scale of three miles to the inch (1:190, 080).

44. David Bosse, "Maps in the Marketplace: Cartographic Vendors and Their Customers in Eighteenth-Century America," *Cartographica* 42:1 (2007), 6, 9, 22.

45. _____., "The Boston Map Trade in the Eighteenth Century," in Krieger and Cobb, *Mapping Boston*, 49-54.

46. John Norman, *Chart of the Coast of America from New York to Rhode Island* (Boston: Matthew Clark, 1789). Available from the University of Connecticut's historical map collection Flickr site at: https://www.flickr.com/photos/uconnlibrariesmagic/3273788949/

47. Captain N. [Nathaniel] Holland, *A New and Correct Chart of the Coast of New England and New York with the Adjacent Parts of Nova Scotia and New Brunswick, from Cape Sable to the Entrance of Hudson or North River by Captain Holland* (London: Laurie & Whittle, 1794). It also appeared in Laurie & Whittle's *North American Pilot* (1795). This map is available online from the Norman B. Leventhal Map Center at Boston Public Library, http://maps.bpl.org/id/10077/. For the origins of this chart, see Hornsby, *Surveyors of Empire*, 195.

48. William Heather, *A New Chart of America with the Harbors of New York, Boston, &c* (London: William Heather, 1799). Available online from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434394.

49. William Heather, *To the Independent Mariners of America: This Chart of Their Coast from Savannah to Boston is Most Respectfully Dedicated* (London: William Heather, 1799). A few years later Heather also published *The New North America Pilot* (London: Heather and Company, 1801).

50. Captain N. [Nathaniel] Holland, *A New and Accurate Chart (from Captain Holland's surveys) of the North American Coast, for the Navigation between Cape Cod in New England and the Havanna in the Gulf of Florida* (London: Laurie and Whittle, 1809).

51. *A Chart of New York Harbour with the Banks, Soundings, and Sailing Marks, from the Most Accurate Surveys & Observations* (London: Mount and Page, 1784-1794). Available online from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434405.

52. For Blunt, see Peter J. Guthorn, *United States Coastal Charts, 1783-1861* (Exton, Penn.: Shiffer Publishing Company, 1984), 9-11; Harold L. Burstyn, *At the Sign of the Quadrant: An Account of the Contributions to American Hydrography Made by Edmund March Blunt and His Sons* (Mystic, Cn.: Marine Historical Association, 1957).

53. Edmund March Blunt, *Chart of Long Island Sound* (Newburyport, Mass.: Blunt, 1809). An 1822 edition of the chart is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?433658 .

54. Edmund March Blunt, *Blunt's New Chart of the North Eastern Coast of North America Extending from Lat 39˚30' Long. 74˚8' W. to Lat. 45˚ N. Long. 66˚ W.* (New York: Blunt, 1813). Reproduced in Guthorn, *United States Coastal Charts*, 56-57. There are several later editions of this chart.

55. Edmund March Blunt, [Entrance to New York Bay from Sandy Hook] (New York: Blunt, 1822). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?433659

56. Edmund Blunt, *The Harbour of New York* (New York: E and G.W. Blunt, 1827). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ct001257.

57. Edmund Blunt, *The Harbour of New York with the Coasts of Long Island and New Jersey from Fire Islands to Barnegat Inlet, Compiled and Surveyed by Edmund Blunt* (New York: E. and G.W. Blunt, 1830). There is some question about the dating of this and the previous chart. Although published in 1830, this chart bears a note that it was copyrighted in 1823. The Library of Congress notes on its catalog record for the 1827 chart that it appears to be part of a larger chart. Thus, there may be earlier printed versions of one or both of these charts. Both charts are reproduced and described in Guthorn, *United States Coastal Charts*, 69-70.

58. *Edmund Blunt, Long Island Sound from New York to Montauk Point, surveyed in the years 1828.29.30* (New York: E. & G.W. Blunt, [1830]). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1260176.

59. Quoted by Burstyn, *At the Sign of the Quadrant*, 41.

60. For example: John Bowditch, *Map of Sag Harbor & its environs taken by Capt. John Bowditch, Feb. 12th 1808* (manuscript), National Archives (U.S.), RG 77, dr. 179-2A; Hartman Bache, *Sac* [i.e. Sag] *Harbor* (manuscript, 1829), National Archives (U.S.), Record Group 77, series PRS. Bache's chart was eventually published as plate 33 of U.S. Bureau of Topographic Engineers, *US 197 Atlas: Internal Improvements* [Washington D.C., Bureau of Topographic Engineers, 1844?].

61. Ephraim Chesebrough, *A New and Correct Chart of Long Island Sound….* (New Haven: Amos Doolittle, [1814?]). Details of this chart are reproduced in Guthorn, *Coastal Charts*, 62-63.

62. This "Chart of Part of Long Island Sound Made by the British Squadron und. Comm.re Hardy During the Late War," [1814?] is cited in full in note 76 below.

63. Andrew Thompson Goodrich, *Map of the Hudson between Sandy Hook & Sandy Hill: with the Post Road between New York and Albany* (New York: A.T. Goodrich, 1820). Available on the World Wide Web from the New York Public Library. The copy at New York Public Library is divided into fourteen sheets, each with its own URL. The URL for sheet one is: http://digitalgallery.nypl.org/nypldigital/id?484082.

64. John Melish, *Military and Topographical Atlas of the United States, Including the British Possessions & Florida* (Philadelphia: Melish, 1813). Melish also published an expanded edition in 1815, which is available on the World Wide Web from the David Rumsey Collection at: http://www.davidrumsey.com.

65. Herman R. Friis, "A Brief Review of the Development and Status of the Geographical and Cartographical Activities of the United States Government: 1776-1818," *Imago Mundi*, 19 (1965): 77; Forest G. Hill, *Roads, Rails & Waterways: The Army Engineers and Early Transportation* (Norman: University of Oklahoma Press, 1957), 3-36; Henry P. Beers, " A History of the U.S. Topographical Engineers, 1818-1863," http://www.topogs.org/History.htm.

66. U.S. Army, Corps of Engineers, “Commanders of the Corps of Engineers,” http://www.usace.army.mil/About/History/Commanders.aspx

67. Stokes, *Iconography*, III, 502-03; see also R.S. Guernsey, *New York City and Vicinity during the War of 1812-15* (2 vols..; New York: C.L. Woodward, 1889-95).

68. Stokes, *Iconography*, III, 504.

69. This manuscript map is located at the U.S. National Archives. It is described and reproduced by Friis, “Brief Review,” 77-78.

70. Stokes, *Iconography*, III, 552.

71. These maps are listed in Stokes, *Iconography*, III, 552-53.

72. The published map bears the notes “by Lieut. James Gadsen, of the Engineers”and “copied from the original map by C. Hayward 120 Water St. N.Y. for D.T. Valentines Manual, 1856.” Several similar maps in manuscript are at National Archives. *Valentine's Manual* focused on the history of New York City, and was published under various titles between 1841 and 1922

73. This map was drawn at a scale of four inches to a mile. The original is at the U.S. National Archives, RG 77 (D41). Photocopies are available at several libraries, including Stony Brook University.

74. U.S. National Archives, RG 77, dr. 34-1

75. For the activities of the British in Long Island Sound, see James Tertius De Kay, *The Battle of Stonington: Torpedoes, Submarines, and Rockets in the War of 1812* (Annapolis, Md: Naval Institute Press, 1990). For a brief biography of Hardy, see the Royal Naval Museum Library, Research Information Sheet #93 at: http://royalnavalmuseum.org/info_sheets_thomas_hardy.htm.

76. *Chart of Part of Long Island Sound Made by the British Squadron und. Comm.re Hardy during the Late War* (manuscript, [1814?]). This map includes the note: “Copied from the M.S. by Henry N. Thompson.” It is now at the U.S. National Archives.

77. Patrick May, *A Map of Sacketts Harbour: with Explanatory Notes by Patrick May, Who Was a Soldier in That Place for 2 Years* (Bristoll, Conn.: Patrick May, 1815).

78. Anonymous, *Plan of the Siege of Plattsburg and Capture of the British Fleet on Lake Champlain, the 11th. Septr. 1814 : to Accompany B. Tanner’s print of MacDonough’s Victory* (S.l.: s.n., 1814). Available online from the William L. Clements Library at the University of Michigan at http://clements.umich.edu/exhibits/online/1812bicentennial/cases/c9/9-tanner-plattsburg.jpg

79. James Wilkinson *Memoirs of My Own Times* (Philadelphia: Snell, 1816), includes a separate atlas volume with maps of War of 1812 and other engagements Wilkinson was involved in.

80. William James, *A Full and Correct Account of the Military Occurrences of the Late War between Great Britain and the United States of America; with an Appendix, and Plates* (2 vols.; London: printed for the author, 1818).

81. This map, held by the New York Historical Society, is drawn at a scale of one mile to an inch (1:63,360). A note on the map states that it is “from Major Roberdean’s [*sic*] original survey.”

82. National Archives: Drawer 154, sheet 43-8, Fortifications Map File, Office of the Chief of Engineers. Reproduced: Friis, “Brief Review,” 79.

83. Bernstein, *Wedding of the Waters*, 175; see also George Geddes, *Origin and History*, 290.

84. For English atlas users, see John Brian Harley, "Power and Legitimation in the English Geographical Atlases of the Eighteenth Century," in John A. Wolter and Ronald E. Grim, eds. *Images of the World: The Atlas through History* (Washington, D.C.: Library of Congress, 1997), 161-204 (esp. 167-75). See also Pedley's comments on Harley's data in *Commerce of Cartography*, 84-90. For map use in British North America, see David Bosse, "Maps in the Marketplace: Cartographic Vendors and their Customers in Eighteenth-Century America," *Cartographia* 42:1 (2007): 1-51. Also important for developments in the early United States: Brückner, *The Geographic Revolution in North America*, esp. 56-61; and John Brian Harley, "Atlas Maker for Independent America," *Geographical Magazine* 49 (1977): 766-72, which deals with Matthew Carey.

85. L. Ray Gunn, "Antebellum Society and Politics (1825-1860)," in Klein, *Empire State*, 310.

86. Edward Countryman, "From Revolution to Statehood," in Klein, *Empire State*, 291.

87. Reproduced in Taylor, *William Cooper's Town*, following p. 278.

88. Joseph Ellicott, *Map of the Village of New Amsterdam (Now the City of Buffalo) Made for the Holland Land Company* (Albany, N.Y.: Pease, 1851). This facsimile is also available from Historic Urban Plans, and can be found on the Web at several sites, including the Holland Land Company page at: http://www.hlc.wny.org/buffalo.jpg.

89. John Klein, *Map of the City of Troy: from Actual Survey* (s.l.: John Klein, 1818). This map is held by the New York State Library.

90. John Fish, *Map of Utica* (New York: Balch. Stiles & Co., 1828). This map is held by the Connecticut State Library.

91. Benjamin Tanner, *A Plan of Ogdensburgh in the County of St. Lawrence, State of New York* ([New York?]: C.P. Harrison, 1830).

92. Eisenstadt, *Encyclopedia of New York State*, 47; Countryman, "From Revolution to Statehood," in Klein, *Empire State*, 287.

93. These are described and portions reproduced in "The De Witt Maps," a Web page from the New York State Museum at: http://www.nysm.nysed.gov/albany/map/mapdewitt.html.

94. Simeon De Witt, *A Plan of the City of Albany Surveyed at the Request of the Mayor, Aldermen, and Commonality* ([Albany, N.Y.?]: [De Witt?], 1794. A facsimile has been published by Historic Urban Plans.

95. Evert Van Alen, *Map of the City of Albany, Surveyed at the Request of the Mayor, Aldermen, and Commonality* (s.l.: [Albany, N.Y.?], 1818). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434784.

96. George W. Merchant, *Map of the City of Albany* ([Albany, N.Y.], s.n., 1828), available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434779); Oliver Steele, *Map of the City of Albany: Inscribed to the Commonality of Mayor Aldern* [*sic*] *and the City of Albany* (Albany, N.Y., Oliver Steele, 1833).

97. Statistics from University of Virginia Historical Census Browser: http://mapserver.lib.virginia.edu/.

98. In addition to Stokes, *Iconography of Manhattan*, Augustyn and Cohen, *Manhattan in Maps*, and Haskell, *Manhattan Maps* continue to be useful for this period.

99. John McComb, *Plan of the City of New York* (New York: Hodge, Allen, and Campbell, 1789). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ar111300.

100. Cornelius Tiebout, *Plan of the City of New York* (New York: T. & J. Swords, 1792).

101. Benjamin Tanner, *Plan of the City of New-York* (s.l.: s.n., 1799).

102. J.A., *Plan of the City of New York* ([New York]: Longworth, 1803). Available on the World Wide Web from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?434799.

103. William Hooker, *Hooker's New Pocket Plan of the City of New York* (New York: W. Hooker, 1824). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?489850.

104. William Chapin, *Plan of the City of New York: for the Use of Strangers* (New York: S. Mahon, 1831). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434675.

105. Benjamin Taylor, *A New & Accurate Plan of the City of New York in the State of New York in North America* ([New York?]: s.n., 1797). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434610.

106. David Longworth, *This Actual Map and Comparative Plans Showing 88 years of Growth of the City of New York is Inscribed to the Citizens* (New York: David Longworth, 1817). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434798.

107. This map was described as "published by P. Desobry under the direction of U. Wenman," (New York: P. Desobry, [1834?]). Available on the World Wide Web from New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1253204.

108. In addition to Stokes, *Iconography of Manhattan* and Cohen and Augustyn, *Manhattan in Maps*, see Hilary Ballon, ed., *The Greatest Grid: The Master Plan of Manhattan, 1811-2011* (New York: Museum of the City of New York and Columbia University Press, 2012), and Marguerite Holloway, *The Measure of Manhattan: The Tumultuous Career and Surprising Legacy of John Randel, Jr., Cartographer, Surveyor, Inventor* (New York: W.W. Norton, 2013).

109. Cohen and Augustyn, *Manhattan in Maps*, 102.

110. William Bridges, *This Map of the City of New York and Island of Manhattan, as Laid out by the Commissioners Appointed by the Legislature, April 3d, 1807 is Respectfully Dedicated to the Mayor, Aldermen and Commonality Thereof by Their Most Obedient Servant Wm. Bridges, City Surveyor* ([New York]: s.n., 1811). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ct000812.

111. John Randel, *The City of New York as Laid out by the Commissioners with the Surrounding Country by their Secretary and Surveyor John Randel, Junr.* (New York:

[P. Maverick?], 1821). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ct001389.

112. The detailed surveys made by Randel underlying this map were redrawn by a later city surveyor named Otto Sackersdorff and published in 1868 as *Maps of Farms Commonly Called the Blue Book* (New York: n.p. , 1868); a copy of this rare book is available on the Web site of the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1531804. The original Randel maps digitized by the Museum of the City of New York can be found at: http://www.mcny.org/content/randel-farm-maps.

113. OCLC lists editions or reprintings for 1795, 1796, 1804, 1809, 1811, 1812, 1814, 1815, and 1817. Some of the later editions show substantial revisions, including the 1804 edition entitled " New York," which appeared in Aaron Arrowsmith's *A New and Elegant General Atlas* (available online from the David Rumsey Collection at http://www.davidrumsey.com). Additional updates and improvements can be seen in the 1814 edition entitled *The State of New York*, which was published by Mathew Carey (available on the World Wide Web from the University of Alabama at: http://alabamamaps.ua.edu/historicalmaps/us_states/newyork/index.html).

114. Horatio Gates Spafford, *New York State in 1813: from Spafford's Gazetteer of the State of New York, Albany, 1813* ([Albany, N.Y.?]: s.n., 1813). Available online from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?433816.

115. Fielding Lucas, Jr., *Geographical, Statistical, and Historical Map of New York* (Philadelphia: H.C. Carey & I. Lea, 1822). This map appeared in Carey & Lea's *Complete Historical, Chronological, and Geographical American Atlas*. The 1827 edition of this map is available on the World Wide Web from the University of Alabama at: http://alabamamaps.ua.edu/historicalmaps/us_states/newyork/index.html.

116. J.A.C. Buchon, *Carte Géographique, Statistique, et Historique du New York* (1825). In Buchon's *Atlas geographique, statistique, historique et chronologique des deux Ameriques et des îles adjacentes; traduit de l'atlas execute en Amerique d'après Lesage, avec de nombreuses corrections et augmentations* (Paris: Carez, 1825). Available on the World Wide Web from the University of Alabama at: http://alabamamaps.ua.edu/historicalmaps/us_states/newyork/index.html.

117. William Hooker, *Map of the State of New York: with the Latest Improvements* (New York: Wm. Hooker, [1827?]). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?433971.

118. Young, J. H. (James Hamilton), *Map of the State of New York* (Philadelphia: A. Finley, 1824). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434936.

119. William Williams, *The Tourist's Map of the State of New York: Compiled from the Latest Authorities* (New York: William Williams, 1828). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434650.

120. More information on Lay can be found in David Y. Allen, "The Obscure Amos Lay: An Early Nineteenth-Century American Cartographer," *The Portolan: Journal of the Washington Map Society* 71 (Spring, 2008): 34-45.

121. "Proposals by Thomas [*sic*!] Lay," *The Nautical Almanac and Astronomical Ephemeris for the Year 1821* (New York: Edmund M. Blunt and William Hooker, 1819), 186.

122. *A Map of the Northern Part of the State of New York Compiled from Actual Survey by Amos Lay and Arthur J. Stansbury* ([New York]: Sold by Brown and Stansbury, 1801). Two sheets, 64 x 74 cm., if joined; scale ca. 1:443,520.

123. Amos Lay, *Map of the Northern Part of the State of New York* ([Albany, N.Y.?]: [A. Lay?], 1812). 76 x 126 cm.; scale ca. 1:443,520. Available on the World Wide Web from the David Rumsey Collection at http://www.davidrumsey.com/luna/servlet/s/qn70c1

124. [New York] *Evening Post* (Feb. 2, 1813), [3].

125. Ibid.

126. Amos Lay, *A New Correct Map of the Seat of War in Lower Canada Protracted from Holland's Large Map Compiled from Actual Survey Made by Order of the Provincial Government* (Philadelphia: A Lay and J. Webster, 1814). Scale ca. 1:443,520. Available on the World Wide Web from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/v82w0l

127. Amos Lay, *Map of the State of New York with Part of the States of Pennsylvania, New Jersey &c.* (Albany [New York?]: A. Lay, 1817). 127 x 127 cm.; scale ca. 1:443, 520. This map is available at many large research libraries, and online from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/j62wfb.

128. *The Nautical Almanac, and Astronomical Ephemeris for the Year 1821*, 186-87.

129. Amos Lay, *Lay's Map of the United States Compiled from the Latest and Best Authorities and Actual Surveys* (New York: JHM Bowen, 1827). A British edition was published in 1834 as *Map of the United States Compiled from the Latest and Most Accurate Surveys by Amos Lay, Geographer & Map Publisher, New York* (London: "Published by the proprietor" [Lay?], 1834). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3700.rr000020.

130. William Damerum, *Map of the Southern Part of the State of New York including Long Island, the Sound, and the State of Connecticut, Part of the State of New Jersey and Islands Adjacent* ([New York]: [W. Damerum], 1815). Available on the World Wide Web from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/y29055.

131. For a more detailed account of Eddy's life and work, consult David Y. Allen, "New York City Map Maker John H. Eddy," *The Portolan: Journal of the Washington Map Society* 79 (Winter, 2010), 9-19. The most important primary source of information about Eddy is an obituary "Biographical Sketch of the Late Geographer John H. Eddy," signed by "W." in *The American Monthly and Critical Review*, May 1818, 12-14. Two earlier articles based primarily on this source are: Silvio A, Bedini, "History Corner: John H. Eddy, New York State Geographer," *Professional Surveyor* 19:2 (March, 1999); Walter W. Ristow, "The Short Life of John H. Eddy, an American 'Geographer.'" in *The Map Collector* 67 (1994): 21-23. Additional information about Eddy's life can be found in: Samuel Lorenzo Knapp, *The Life of Thomas Eddy* (New York: Conner and Cook, 1834), which is available in digital form from Google. This book was also published in

London, 1836, and available in recent reprint editions. Information on J.H. Eddy is found on pages 33, 326-337 of the 1834 edition.

132. John H. Eddy, *Diary of a journey from New York through Albany, Schenectady, Utica and Rome, to Oswego in Company with Commissioners Appointed by the Legislature To Examine Internal Navigation between Hudson River and Lakes Ontario and Erie* [1810, June 30-July 18]. The original of the diary is at the Newberry Library, a photocopy is at the Special Collections Department of the New York Public Library. The diary concludes "end of Vol. 1st," but the location of the second volume (if any) is unknown.

133. Eddy's canal map is cited above (note 32).

134. John H. Eddy, *Map of the Straights of Niagara from Lake Erie to Lake Ontario* (New York: Prior and Dunning, 1813). A copy of this map can be found at the New York State Library. It is available online from the William L. Clements Library of the University of Michigan at http://clements.umich.edu/exhibits/online/1812bicentennial/cases/c10/10-eddy-niagarariver.jpg

135. *Map Illustrative of a Communication between the Great Lakes and Atlantic Ocean, by Means of a Canal between Lake Erie and Hudson's River* ([New York?]: n.p., 1816). This map is extremely rare. It is listed in the online catalog of the British Library, but I have not been able to locate a copy in the United States. It is described by Bedini, "History Corner: John H. Eddy."

136. John H. Eddy, *Map of the Country Thirty Miles Round the City of New York* (New York: Prior and Dunning, 1811). An exceptionally good copy is available from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/566i3h. The bibliographic record accompanying the Rumsey map includes extensive information on this and other editions of Eddy's circular map.

137. The solar eclipse of 1806 was an important event in efforts to ascertain the longitude of locations in New York and elsewhere in the eastern United States. See *Transactions of the American Philosophical Society* 6 (1809), which includes observations by Simeon De Witt and Jose Joaquin de Ferrer made in New York. Eddy gives the longitude of New York as 74 degrees, zero minutes, and 45 seconds west of Greenwich, which is very close to the modern figure. Eddy's figure is the same as that calculated by Ferrer on p. 360 of the above volume.

138. A copy dated 1812 (by "I.H. Eddy"), and the 1828, 1839, and 1842 editions are all on the Web site of the New York Public Library. The 1836 edition is on the Web site of the Harvard University Map Collection.

139. George Woolworth Colton, *Map of the Country Thirty Three Miles around the City of New York* (New York: J.H. Colton & Co., 1846). A copy dated 1850 is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434629. The 1853 edition is available from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/hi9u0f.

140. David H. Burr, *Map of the Country Twenty-five Miles Round the City of New-York* (New York: D.S. Stone, 1835). Available on line from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/sg2b48.

141. Stokes, *Iconography of Manhattan*, III, 551.

142. John H. Eddy, *The State of New York with Part of the Adjacent States* (New York: James Eastburn & Co., 1818). This map was Engraved by Tanner, Vallance, Kearny & Co., and printed by Samuel Maverick. It is available on the World Wide Web from the David Rumsey collection at: http://www.davidrumsey.com/luna/servlet/s/6iu1k7. The New York Public Library has a copy of this map printed by Samuel Maverick and published in 1821 by A.T. Goodrich. (See the bibliographic record accompanying the very dark image of the map at http://digitalgallery.nypl.org/nypldigital/id?434759). This map appears to derive from the same plate as the 1818 version.

143. This version was published in Philadelphia by Tanner, Vallance, Kearny & Co. David Rumsey's copy is from the 1823 edition of Tanner's *New American Atlas*, but it is copyrighted 1819. This version of the map contains extensive revisions and was engraved on a new plate. A clear image of this map can be found in the David Rumsey Collection (http://www.davidrumsey.com/luna/servlet/s/5437od), where it is cataloged under Tanner rather than Eddy.

144. David H. Burr, *An Atlas of the State of New York: Containing a Map of the State and of the Several Counties* (New York: D.H. Burr, 1829). All sheets of this atlas are individually cataloged and available online from the New York Public Library at: http://digitalgallery.nypl.org/.

145. Ristow, *American Maps*, 103-108.

146. New York State, *Senate Journal*, 50th Session (1827), 8.

147. New York State, *Senate Journal*, 50th Session, Second Meeting (1827), 50; New York State , Session Laws, 50th Session, Second Meeting, Chapter 2 (Oct. 17, 1827).

148. Lay submitted a petition to the Assembly on Feb. 17, 1827, proposing to publish a map of the state. See "Legislative News," *Auburn Free Press*, Feb. 28, 1827, 1.

149. David H. Burr, *A New and Elegant Map and Large Atlas of the State of New York* (Albany: David H. Burr, July 1828). Broadside held by the New York State Library (Manuscripts Division).

150. New York State, *Senate Journal*, 52nd Session (1829), 159-61.

151. Laws of New York State, 50th Session, Second Meeting, Chapter 2 (Oct. 17, 1827).

152. New York State, *Senate Journal*, 52nd Session (1829), 159.

153. I have been able to locate the following editions of Burr's map of New York State, most of which are available online: *Map of the State of New-York and the Surrounding Country* (1829), available online from the New York Public Library, http://digitalgallery.nypl.org/nypldigital/id?433793; an 1832 edition with the same title is in the David Rumsey Collection, http://www.davidrumsey.com/luna/servlet/s/1o674o; a heavily revised edition, reengraved by Stiles, was published by Colton in 1834 with the title *Map of the State of New York: with Parts of the Adjacent Country, Embracing Plans of the Cities, and Some of the Larger Village*, http://digitalgallery.nypl.org/nypldigital/id?434756; a very similar 1835 edition with the title *New-York* was published in Albany by Williams Press , http://digitalgallery.nypl.org/nypldigital/id?434744; in 1835 by Burr published a revised version with the title *New York* showing Long Island as an inset in his *New Universal Atlas* , http://www.davidrumsey.com/luna/servlet/s/qz4kc0; in 1836 Colton published an

edition very similar to and bearing the same title as the one he had published in 1834, http://digitalgallery.nypl.org/nypldigital/id?434751; another 1836 edition by Colton is very similar but bears the title *New-York*, http://digitalgallery.nypl.org/nypldigital/id?434740; in 1838 Ithaca publisher W.P. Stone published a new edition with the same title as the original 1829 map; in 1839 published Stone and Clark published a map with the same title as part of their new edition of the Burr atlas, http://digitalgallery.nypl.org/nypldigital/id?433768; in 1839 Burr published a version with the title *Map of New York Exhibiting the Post Offices, Post Roads, Canals, Rail Roads &c*. in his Burr's American Atlas (London, Arrowsmith), http://digitalgallery.nypl.org/nypldigital/id?434745; in 1840 a small-scale version entitled *State of New York* was published by Colton, http://www.davidrumsey.com/luna/servlet/s/mgumt8; an 1841 edition bearing the original title *Map of the State of New-York and the Surrounding Country* was published by Stone and Clark in Ithaca, (http://digitalgallery.nypl.org/nypldigital/id?433819).

154. Ristow, *American Maps*, 106-08.

155. Price, *Dividing the Land*, 241-42.

156. New York State, *Senate Journal*, 51st Session (1828), 157.

157. Proof sheets of the Burr atlas dated 1828 with corrections and unpublished additions can be found in book 12 of the Surveyor General's papers at the New York State Archives.

158. David H. Burr, *Atlas of the State of New York*…. (New York: 1829). Maps of New York City and New York State are dated 1832; remainder of atlas appears identical with 1829 edition. See bibliographic note for atlas on David Rumsey Collection, http://www.davidrumsey.com/luna/servlet/s/m3lmt9.

159. David H. Burr, *Atlas of New York* (New York: For Sale by Principle Booksellers, 1838). The Colton imprint does not appear on the title page, but can be found on a folded colored map included in the volume. Individual sheets of this atlas from the New York Public Library are individually cataloged and can be found at: http://digitalgallery.nypl.org/nypldigital/dgdivisionbrowseresult.cfm?div_id=hm.

160. David H. Burr, *An Atlas of the State of New York, Designed for the Use of Engineers, Containing a Map of the State and of the Several Counties* (Ithaca, N.Y.: Stone & Clark, 1839). Individual sheets of this atlas from the New York Public Library have been individually cataloged, and can be viewed at: http://digitalgallery.nypl.org/nypldigital/dgdivisionbrowseresult.cfm?div_id=hm.

161. David H. Burr, *An Atlas of the State of New York: Containing a Map of the State and of the Several Counties* (Ithaca, N.Y.: Stone & Clark, 1841).

162. John Disturnell, Theodric Romeyn Beck, Joseph Henry, *To the members of the Legislature: The Undersigned Respectfully Represents That a Revised Edition of Burr's New York State Atlas ... is About Being Issued ... To Accomplish the Above, it is Proposed to Introduce a Bill for the Consideration of Your Honorable Body, Asking for an Appropriation of Money to Pay for Two Hundred Copies, or More, of Said Work....* (New York: J. Disturnell, 1855).

Chapter 10

1. For Hassler's life, see Florian Cajori, *The Chequered Career of Ferdinand Rudolph Hassler* (1929; reprint, New York: Arno Press, 1980). Unless otherwise noted, details of Hassler's life are summarized from Cajori. Recently, Albert E. Theberge has written a scholarly history of the Coast Survey, under the title *The Coast Survey, 1807-1867: Volume I of the History of the Commissioned Corps of the National Oceanic and Atmospheric Administration* (Silver Spring, MD, 1998-) This publication is continually updated and available online at: http://www.lib.noaa.gov/noaainfo/heritage/coastsurveyvol1/CONTENTS.html. Also available on the Web is *Ferdinand Rudolph Hassler (1770-1843): A Twenty Year Retrospective, 1987-2007 (*NIST Special Publication 1068), a collection of materials relating to Hassler edited by Harriett Hassler and Charles A Burroughs at: http://nvl.nist.gov/docspub/ISDpapers/2007/HasslerSP1068.pdf

2. For Hassler's activities in Switzerland, see Martin Rickenbacher, "Ferdinand Rudolf Hassler und die Vermessung der Schweiz 1791–1803," *Cartographica Helvetia* 36 (2007): 11–25. There is also a well documented "virtual exhibition" on Hassler in English, which deals in part with this subject at: http://www.f-r-hassler.ch/en/.

3. This project is described in an important letter by John Vaughn to Jefferson (Dec. 20, 1806), which is reproduced in Cajori, *Chequered Career*, 41-42.

4. Act of February 10, 1807 (2 Stat. L., 413) – "An Act to provide for surveying the coasts of the United States."

5. Roberdeau's comments were first printed in the *Daily National Journal* on January 1, 1827. They were reprinted by Hassler himself in Ferdinand Rudolf Hassler, *Principal Documents Relating to the Survey of the Coast of the United States since 1816* (New York: William Van Norden, 1834, 37-46, followed by a typically disputatious reply by Hassler.

6. For background on this survey, see Carroll, *A Good and Wise Measure*, 3-31.

7. Carroll, *A Good and Wise Measure*, 71-77. For a brief history of Fort Montgomery, see http://www.historiclakes.org/explore/Montgomery.html).

8. Cajorie, *Hassler*, 103-04.

9. Hassler's earliest publication on the Coast Survey was *Papers on Various Subjects connected with the Survey of the Coast of the United States*, which was published as *Transactions of the American Philosophical Society*, new ser., vol. 2, pt. 12 (1825). This preceded three subsequent volumes, which have been cataloged together as *Principal Documents Relating to the Survey of the Coast of the United States; and the Construction of Uniform Weights and Measures for the Custom Houses and States* (3 vols.; New York: W. Van Norden, 1834-36).

10. Quoted by Cajori, *Hassler*, 206-207.

11. Theberge, "The Great Fire Island Baseline," http://www.lib.noaa.gov/noaainfo/heritage/coastsurveyvol1/HASSLER3.html#GREAT. For a readable summary of the technical aspects of Coast Survey mapping under Hassler see Mark Monmonier, *Coastlines: How Mapmakers Frame the World and Chart Environmental Change* (Chicago: University of Chicago Press, 2008), 42-57.

12. Charles Henry Davis, *The Coast Survey of the United States* (Cambridge, Mass.: Metcalf and Company, 1849), 8.

13. The index to the comprehensive collection of Coast Survey manuscript charts at Alabama Maps can be found at: http://alabamamaps.ua.edu/historicalmaps/Coastal%20Survey%20Maps/index.html.

14. Aaron L. Shalowitz, *Shore and Sea Boundaries: With Special Reference to the Interpretation and Use of Coast and Geodetic Survey Data* (2 vols.; Washington, D.C.: Government Printing Office: 1962-64), II, 165-68, 194-96.

15. U.S. Coast Survey, *Map of New-York Bay and Harbor and the Environs* ([Washington, D.C.]: U.S. Coast Survey, 1844). Engraved on six sheets; scale 1:31,000. Available online from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/f4h00v.

16. U.S. Coast Survey, *Map of New-York Bay and Harbor and the Environs* ([Washington, D.C.]: U.S. Coast Survey, 1845). Scale 1:80,000. Available online from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ct001258.

17. Davis, *Coast Survey*, 26-28.

18. The charts at a scale of 1: 80,000 are: *Eastern Part of Long Island Sound, from a Trigonometrical Survey under the Direction of F.R. Hassler* (1848); *Middle Part of Long Island Sound, from a Trigonometrical Survey under the Direction of F.R. Hassler* (1855); *Long Island Sound (Western Sheet), from a Trigonometrical Survey under the Direction of F.R. Hassler and A.D. Bache* (1855); *Western part of the Southern Coast of Long Island, from a Trigonometrical Survey under the Direction of F.R. Hassler and A.D. Bache* (1851); *Middle Part of the Southern Coast of Long Island, from a Trigonometrical Survey under the Direction of F.R. Hassler* (1857); *Eastern Part of the Southern Coast of Long Island, from a Trigonometrical Survey under the Direction of F.R. Hassler and A.D. Bache* (1857). These are available online from NOAA's Historical Map and Chart Collection at: http://historicalcharts.noaa.gov/historicals/search. It should be noted that additional manuscript and printed maps along with other graphics can also be found by searching NOAA's Photo Library at http://www.photolib.noaa.gov/.

19. These larger scale charts include: *Oyster or Syosset Bay* (1847; scale 1:30,000); *Huntington Bay* (1849; scale 1:30,000); *Hempstead Harbor* (1859; scale 1:20,000); *Fisher's Island Sound* (1847; 1:40,000), and several detailed charts of areas near New York Harbor with navigational obstacles (such as Hell Gate). These also are available online from NOAA at: http://historicalcharts.noaa.gov/historicals/search.

20. Bache's career is described in part II of Theberge, *Coast Survey*. See also: Merle M. Odgers, *Alexander Dallas Bache, Scientist and Educator, 1806-1867* (Philadelphia: University of Pennsylvania Press, 1947). Hugh Richard Slotten, *Patronage, Practice, and the Culture of American Science: Alexander Dallas Bache and the U.S. Coast Survey* (Cambridge: Cambridge University Press, 1994) places Bache in a broader social, political, and cultural context.

21. Part III of Theberge's *Coast Survey* deals with the Civil War years. See also: U.S. Coast and Geodetic Survey, *Centennial Celebration of the United States Coast and Geodetic Survey, April 5 and 6, 1916* (Washington, D.C.: Government Printing Office, 1916); U.S. Coast and Geodetic Survey, *Military and Naval Service of the United States Coast Survey, 1861-1865* (Washington D.C.: Government Printing Office, 1916); Slotten, *Patronage, Practice*, 109-11.

22. U.S. National Oceanic and Atmospheric Administration, Office of Coast Survey, *Historical Maps and Charts*, http://www.nauticalcharts.noaa.gov/csdl/ctp/abstract.htm.

23. For Coast Survey mapping of New York Harbor in the 1850s, see Theberge, *Coast Survey*, Part III (unpaginated HTML, but marked 273-78 in his table of contents). None of the manuscript maps of New York harbor done in the 1850's appear to have been published. The only map of the Hudson River published by the Coast Survey prior to the Civil War is U.S. Coast Survey, *Preliminary Chart of the Hudson River New-York from Teller's Point to the Mouth* ([Washington, D.C.]: U.S. Coast Survey, 1855). This chart, which shows only the lower Hudson River, gives many soundings, but little detail on land. Activities of the Coast Survey after 1867 are chronicled by John Cloud in an ongoing series of essays, "Science on the Edge," available on the NOAA Central Library Web site at http://www.lib.noaa.gov/noaainfo/heritage/coastandgeodeticsurvey/index.html#scienceedge.

24. For activities of the Coast Survey after the Civil War, see: Thomas G. Manning, *U.S. Coast Survey vs. Naval Hydrographic Office: A 19th-Century Rivalry in Science and Politics* (Tuscaloosa: University of Alabama Press, 1988); George Otis Smith, "The United States Geological Survey and its Relation to the United States Coast and Geodetic Survey," in *Centennial Celebration of the United States Coast and Geodetic Survey*, 47-48; A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities to 1940* (Cambridge, Mass.: Harvard University Press, 1957), 195-214.

25. For "Humboldtian science," in general see Susan Faye Cannon, "Humboldtian Science," in her *Science in Culture: The Early Victorian Period* (New York: Dawson and Science History Publications, 1978), 73-110; Michael Dettelbach, "Humboldtian Science," in N. Jardine, et. al., eds. *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996), 287-304. It is questionable to what extent Hassler can be described as a representative of Humboldtian science. Although Hassler's concerns about geodesy, astronomy, and the use of precision instruments and advanced mathematics are typical of one aspect of Humboldtian Science, there was practically no contact between Hassler and Humboldt, and Hassler's science does not emphasize the interconnectedness between phenomena which is so characteristic of Humboldtian science. Slotten describes Bache as a classic practitioner of Humboldtian Science in *Patronage, Practice*, 112-46. Also relevant to this subject and the mapping of New York is William A. Koelsche, "Arnold Guyot and Humboldtian Science in Mid Nineteenth-Century New England," *Northeastern Geographer* 1 (2009): 34-45.

26. For general information on the development of thematic maps, see: Arthur H. Robinson, *Early Thematic Mapping in the History of Cartography* (Chicago: University of Chicago Press, 1982); Arthur H. Robinson and Helen M. Wallis, *Cartographical Innovations: An International Handbook of Mapping Terms to 1900* (St Albans, Herts: Map Collector Publications and International Cartographic Association, 1987); Michael Friendly and Daniel J. Denis, *Milestones in the History of Thematic Cartography, Statistical Graphics, and Data Visualization: an Illustrated Chronology of Innovations*, http://datavis.ca/milestones/. For developments in France, see Josef W. Konvitz, *Cartography in France, 1660-1848: Science, Engineering, and Statecraft* (Chicago: University of Chicago Press), 124-159. Developments in the United States have been traced by Susan Schulten, *Mapping the Nation: History and Cartography in Nineteenth-Century America* (Chicago: University of Chicago Press, 2012).

27. Robinson, *Early Thematic Mapping*, 15.

28. Originally published in Valentine Seaman, *An Account of the Epidemic Yellow Fever As It Appeared in the City of New York in the Year 1795* (New York: Hopkins, Webb and Co., 1796). A copy of map can be found in Brian Altonen, "Historical Disease Maps," http://brianaltonenmph.com/gis/historical-disease-maps/

29. Lloyd Stevenson, "Putting Disease on the Map: the Early Use of Spot Maps in the Study of Yellow Fever," *Journal of the History of Medicine* 20 (1965): 227-261; ZevRoss Spatial Analytics, *Mapping Disease: The Evolution of Spatial Epidemiology*, http://www.zevross.com/special/special_intro.html; Tom Koch, *Cartographies of Disease: Maps, Mapping, and Medicine* (Redlands, Ca.: ESRI Press, 2005). Although Seaman's map is still considered to be the first "spot map," it seems to have been preceded by at least one map showing worldwide distribution of diseases. See Frank A. Barrrett, "Finke's 1792 Map of Human Diseases: the First World Disease Map?", *Social Science & Medicine* 50 (2000): 915-21.

30. Koch, *Cartographies of Disease*, 34-38.

31. The most useful overview of this subject is still Henry Leighton, "One Hundred Years of New York State Geologic Maps, 1808-1909," New York State Museum *Bulletin* 133 (1909): 115-55. It includes a comprehensive list of geologic maps of the state published prior to 1909. Available online from New York State Library at: http://www.nysl.nysed.gov/scandocs/museumbulletin.htm.

32. There is some question about which is the first geological map. One of the first was published in Saxony in 1778 by Johann Friedrich von Charpentier (1738-1805). See the entry under Charpentier in Curtis Schuh's bibliography of mineralogy at the Web site of the *Mineralogical Record*, http://www.minrec.org/libdetail.asp?id=518

33. This map is described in Simon Winchester's "overtitled" but readable popular account, *The Map That Changed the World: William Smith and the Birth of Modern Geology* (New York: Harper Collins, 2001).

34. John West Wells, *Early Investigations of the Devonian System in New York, 1656-1836* (New York: Geological Society of America, Special Paper 74, 1963), 8-13. Maclure's map is reproduced in Michele Aldrich, *New York Natural History Survey, 1836-1845: A Chapter in the History of American Science* (Ithaca, N.Y.: Paleontological Research Institution, Special Publication 22, 2000), 9, and in the back of the 1964 edition of George P. Merrill, *The First One Hundred Years of American Geology* (1924; New York: Hafner Publishing Company, 1964).

35. For Amos Eaton see: Cecil J. Schneer, "Ebenezer Emmons and the Foundations of American Geology," *Isis* 60:4 (Winter, 1969):441-44; Palmer C. Ricketts, *History of Rensselaer Polytechnic Institute*, 1824-1934 (3rd ed.; New York: John Wiley & Sons,1934), available online from RPI at http://www.lib.rpi.edu/Archives/e-collections/Ricketts,PC_1934/index.html; Merrill, *The First One Hundred Years of American Geology*, 75-126; Wells, *Early Investigations of the Devonian System in New York*, 25-61; Aldrich, New *York Natural History Survey*, 8-32. The Amos Eaton Papers are housed in the Manuscripts and Special Collections Department of New York State Library, and a detailed finding aid is available at http://www.nysl.nysed.gov/msscfa/sc10685.htm.

36. Amos Eaton and Theodric Romeyn Beck, *A Geological Survey of the County of Albany, Taken under the Direction of the Agricultural Society of the County* (Albany, N.Y.: S. Southwick, 1820); Amos Eaton, *A Geological and Agricultural Survey of*

Rensselaer County, in the State of New-York. To Which Is Annexed, a Geological Profile, Extending from Onondaga Salt Springs, across Said County, to Williams College in Massachusetts. Taken under the Direction of the Honourable Stephen Van Rensselaer (Albany, N.Y.: E. and E. Hosford, 1822).

37. Amos Eaton, *A Geological and Agricultural Survey of the District Adjoining the Erie Canal in the State of New York. Taken under the Direction of the Hon. Stephen Van Rensselaer. Part I. Containing a Description of the Rock Formations; together with a Geological Profile, Extending from the Atlantic to Lake Erie* (Albany, N.Y.: Packard & Van Benthuysen, 1824). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3801c.ct000233.

38. David H. Vance, *Map of the Western Part of the State of New York, 1823* (Albany, N.Y.: D.H. Vance, 1823); available on the World Wide Web from the New York Public Library at http://digitalgallery.nypl.org/nypldigital/id?434808. The 1825 edition, which bears the same title was published in Albany by John Ogden Dey. It can be found at the David Rumsey collection at http://www.davidrumsey.com/luna/servlet/s/j6081n.

39. Amos Eaton, *This Colour'd Map Exhibits a General View of the Economical Geology of New York and Part of the Adjoining States* (Albany, N.Y.: Webster and Skinners, 1830). The map was included with his *Geological Text-book Prepared for Popular Lectures on North American Geology: with Applications to Agriculture and the Arts* (s.l., s.n., 1830). It is reproduced in Aldrich, *New York State Natural History Survey*, 13.

40. The Natural History Survey eventually led to the publication of some 30 volumes under the title *Natural History of New York* (1842-94). This publication is a bibliographic nightmare: individual volumes apparently were produced by several publishers and there is no generally accepted author. The survey as a whole is generally attributed by catalogers to either " New York State Museum" or " New York (State). Natural History Survey." Some institutions have cataloged portions of this series separately, e.g. "Geology of New York" with its individual authors. Other than the publications of the survey itself, the best source of information is Aldrich, *New York Natural History Survey*. See also, Schneer, "Ebenezer Emmons," and Philip G. Terrie, "The New York Natural History Survey in the Adirondack Wilderness, 1836-1840," *Journal of the Early Republic* 3:2 (1983): 185-206.

41. These publications are described as division 4 of the *Natural History of New York*: *Geology of New York* (Albany, N.Y.: Carroll & Cook, printers to the Assembly, 1842-43): v. 1, Mather W.W. First geological district; v. 2, Emmons, Ebenezer, Second geological district; v. 3, Vanuxem, Lardner, Third geological district; v. 4, Hall, James, Fourth geological district.

42. For Emmons as a geologist, see Aldrich, *New York State Natural History Survey*, esp. 74-81; Merrill, *The First One Hundred Years of American Geology*; Cecil J. Schneer, 1969, "Ebenezer Emmons and the foundations of American geology," *Isis* 60 (1969), 439-450.

43. *New York State Senate Documents*, 69th Session (1846), vol. 3, doc. no 73.

44. For Mather's career, see C.H. Hitchcock, "Sketch of W.W. Mather," *The American Geologist*, XIX (1897), 1-15.

45. Mather, W.W. (William Williams), *Geological Map of Long & Staten Islands with the Environs of New York by W.W. Mather, Geologist of the First District of New York, 1842. From the topographical surveys of J. Calvin Smith* (s.l.: Endicott, 1842). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434024

46. J. Calvin Smith, *Map of Long Island with the Environs of New York and the Southern Part of Connecticut, Compiled from Various Surveys & Documents by J. Calvin Smith* (New York: S. Stiles & Co., 1836). There are several later editions of this map. The 1844 and 1847 editions are available on the Web site of the New York Public Library.

47. Aldrich, *New York State Natural History Survey*, 114

48. Robert H. Dott, Jr., "James Hall, Jr.," National Academy of Sciences, *Biographical Memoirs* 87 (2006), 180-97, available online at: http://books.nap.edu/openbook.php?record_id=11522&page=180.

49. Hall's map appears after page 685 of *The Geology of New York*. It includes all of New York except eastern Long Island and goes as far west as the Mississippi River.

50. Leighton, "One Hundred Years of New York State Geologic Maps," 121.

51. This is cited as William S. Haines, James Hall,. E.R. Blackwell, *Trigonometrical Survey of the Falls of Niagara* (Albany, N.Y. : Carroll & Cook, 1843). Available online from the Wikimedia Commons at http://commons.wikimedia.org/wiki/File:1843_Blackwell_Map_of_Niagara_Falls,_New_York_-_Geographicus_-_NiagaraFalls-haines-1843.jpg.

52. New York State Natural History Survey, *Geological Map of the State of New York by Legislative Authority* (New York: S.C. Clark, 1842). Available on the World Wide Web from Cornell University Library at: http://library24.library.cornell.edu:8280/luna/servlet/s/xdyyv2.

53. John A. Dix [Secretary of State], "Report in Relation to a Geological Survey of the State," *New York State Assembly Documents* 59th session (1836), no. 9, 45.

54. Aldrich, *New York State Natural History Survey*, 181, 248 (note 66); Leighton, "One Hundred Years of New York State Geologic Maps," 121.. In spite of its being in some respects the best map of New York State available at the time, it was not widely distributed and is extremely rare. Copies can be found at Yale University Library, the Library of Congress, and in the Hall Papers at the New York State Archives.

55. This is Ebenezer Emmons, *Agricultural and Geological Map of New York* (New York : S.C. Clark, printer, 1844).

56. Ebenezer Emmons, *Agricultural Map of the State of New York* (New York: G. & W. Endicott , [1846?]). At back of the first volume of his *Agriculture of New-York: Comprising an Account of the Classification, Composition and Distribution of the Soils and Rocks ... together with a Condensed View of the Climate and the Agricultural Productions of the State* (Albany, N.Y.: C. Van Benthuysen & Co, 1846-54). Pages 361-62 of that volume describe and explain the geological and agricultural maps. The map is available on the World Wide Web from Cornell University Library at: http://library24.library.cornell.edu:8280/luna/servlet/s/8o2anp.

57. The construction of the Croton Aqueduct and related matters are described in Gerard T. Koeppel, *Water for Gotham: A History* (Princeton, N.J.: Princeton University Press, 2000).

58. Nathaniel Currier, *Hydrographic Map of the Counties of New-York, Westchester and Putnam: and Also Showing the Line of the Croton Aqueduct* (New York, N. Currier, [1846?]), http://digitalgallery.nypl.org/nypldigital/id?434768.

59. *Map of the Croton Water Pipes with the Stop Cocks* (New York: Endicott, ca. 1842). Described and reproduced, Augustyn and Cohen, *Manhattan in Maps*, 118-19; a later edition was published by Nathaniel Currier ca. 1850.

60. An example on the New York Public Library Web site is: *Profile of Tibbets Brook Route of Croton Aqueduct from the Harlem River to the Battery in Manhattan* (New York : P. Desobrys Lithr., [between 1837 and 1842?]), http://digitalgallery.nypl.org/nypldigital/id?434553.

61. For the development of statistical maps in Europe, see Robinson, *Early Thematic Mapping*, Robinson and Wallis, *Cartographical Innovations, and* Konvitz, *Cartography in France*. For the development of early thematic mapping in the United States, see Schulten, *Mapping the Nation*, 79-195, and Herman R. Friis, "Statistical Cartography in the United States Prior to 1870 and the Role of Joseph C.G. Kennedy and the U.S. Census Office," *The American Cartographer* 1:2 (1974): 131-57. Knowledge of statistical maps became widespread in Europe after the publication of two (related) landmark atlases: Heinrich and Hermann Berghaus, *Physikalisch Atlas* (2 vols. 1838-48) or Alexander Keith Johnston, The *Physical Atlas of Natural Phenomena* (1848 and later).

62. Two examples of atlases with statistical material on the David Rumsey site (http://www.davidrumsey.com) are: H.C. Carey and I. Lea, *A Complete Historical, Chronological, And Geographical American Atlas* (Philadelphia: Carey and Lea, 1822), and R.M. Martin, *Illustrated Atlas and Modern History of the World* (New York: J. & F. Tallis, 1851). See also: *Mitchell's School Atlas* (Philadelphia : Thomas, Cowperthwait & Co., 1839), which is available on the Library of Congress Web site at: http://hdl.loc.gov/loc.gmd/g3200m.gct00054.

63. John Homer French, *The State of New York: from New and Original Surveys* (Syracuse, N.Y.: R.P. Smith, 1859). Available from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/y5840g.

64. The title of this map is "Geological and Land Patent Map of the State of New York Showing the Geology of the State According to the New York System and the Bounds and Names of all the Original Patent and Land Grants of More Than 50,000 Acres." A single copy of a separate map bearing this title, attributed to Robert Pearsall Smith, is cataloged on OCLC as being held by Yale University.

65. Notice in *The Literary World*, Sept. 30 1848, 69.

66. For Blodget, see Ristow, *American* Maps, 369; Friis, "Statistical Cartography," 138; and Schulten *Mapping the Nation*, 101-07. For the early development of meteorology and of meteorological maps in New York State and the nation, see Koelsche, "Arnold Guyot" and the works cited in his bibliography.

Chapter 11

1. Historical Census Browser, University of Virginia Geospatial and Statistical Data Center, http://mapserver.lib.virginia.edu/

2. Gunn, "Antebellum Society," in Klein, *Empire State*, 330.

3. Campbell Gibson, *Population of the 100 Largest Cities and Other Urban Places in the United States: 1790 to 1990* (U.S. Bureau of the Census, Population Division Working Paper No. 27, June, 1998, https://www.census.gov/population/www/documentation/twps0027/twps0027.html. For detailed statistics of the growth of individual towns, see Shupe, Steins, and Pandit, *New York State Population, 1790-1980.*

4. Ristow; Aldrich, *Natural History Survey*, 127. The table of bids reproduced here shows lithography to have been five to ten times cheaper than steel or copper engraving.

5. For Mitchell, see Ristow, *American Maps*, 303-13.

6. OCLC lists 1831, 1832, 1833, 1836, 1846, 1847, 1848, 1850, 1854, 1856, and 1860.

7. The New York Public Library Web site has 1831, 1832, 1833, 1838, and 1850 editions.

8. For the Colton Company, see Ristow, *American Maps*, 313-26.

9. David H. Burr, *New-York* (New York: J.H. Colton & Co., 1833). This version of the Burr map was engraved for Colton by Samuel Stiles. An 1835 edition of this map, printed by Stiles, is available on the New York Public Library Web site at: http://digitalgallery.nypl.org/nypldigital/id?434744.

10. J.H. Colton & Co., *Topographical Map of the City and County of New-York, and the Adjacent Country: with Views in the Border of the Principal Buildings, and Interesting Scenery of the Island* (New York: J.H. Colton & Co., 1836). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.wd000155.

11. Ristow, *American Maps*, 13; Cohen and Augustyn, *Manhattan in Maps*, 120-21; Stokes, *Iconography*, III, pl. 124 and 687-88.

12. George Woolworth Colton, *Map of the Country Thirty Three Miles around the City of New York* (New York: J.H. Colton & Co., 1846). A copy dated 1850 is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434629. The 1853 edition is available from the David Rumsey Collection at: http://www.davidrumsey.com.

13. Samuel Stiles, *Map of the City of Brooklyn, as Laid out by Commissioners, and Confirmed by Acts of the Legislature of the State of New York: Made from Actual Surveys, the Farm Lines and Names of Original Owners, Being Accurately Drawn from Authentic Sources, Containing also a Map of the Village of Williamsburgh, and Part of the City of New-York: Compiled from Accurate Surveys & Documents and Showing the True Relative Position of All* (New York: J.H. Colton & Co., 1846). An 1849 edition of this map is available from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434722.

14. J.H. Colton & Co., *Traveller's Map of Long Island* (New York: J.H. Colton & Co., 1843). This edition is available from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434769. The 1857 edition is available from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802l.ct001632.

15. I have identified the following editions of Colton's railroad and township map: 1852, 1853, 1859, 1860, 1862 1863, and 1883. The 1862 edition, which shows some roads, is available from the University of Alabama at: http://alabamamaps.ua.edu/historicalmaps/us_states/newyork/index_1850-1865.html. The

1883 edition, which shows no roads, is available from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3801p.rr002670.

16. In 1856, a map entitled *New York* appeared in *Colton's Atlas of the World*. In 1860, a very similar map appeared as *Johnson's New York* in *Johnson's New Illustrated (Steel Plate) Family Atlas*. Both of these maps are available on the David Rumsey site. See notes on the bibliographic description of the Johnson atlas on the Rumsey site for information about the relationship between the Colton and Johnson companies. Several similar maps by both Colton and Johnson can be viewed at: http://alabamamaps.ua.edu/historicalmaps/us_states/newyork/index_1850-1865.html.

17. Smith is mentioned by Ristow, *American Maps*, 316-17, and there is a brief entry for him in *The New-York Historical Society's Dictionary of Artists in America, 1564-1860*. The only fact ferreted out about his personal life is that he was married, and that is known only because a Mrs. John Calvin Smith exhibited a painting on velvet at the American Institute in 1842.

18. J. Calvin Smith, *Map of Long Island with the Environs of New York and the Southern Part of Connecticut* (New York: J.H. Colton, 1836). Subsequent editions appeared in 1837, 1844, 1847, and 1855. The 1844 and 1847 editions are available on the Web site of the New York Public Library.

19. J. Calvin Smith, *Map of the State of New York: Showing the Boundaries of Counties & Townships, the Location of Cities, Towns and Villages, the Courses of Rail Roads, Canals & Stage Roads* (New York: J. Disturnell, 1841); available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434739. 1842, 1844, 1848 and 1850 editions are also on the New York Public Library Web site. 1853, 1855, and editions can be found in the OCLC database. Some of these maps are cataloged under "John Smith." There is also a separate and larger *Map of the State of New York*, which appeared in five editions between 1848 and 1858; this was "drawn and engraved by Sherman and Smith," and published by the firm of Ensigns & Thayer. The 1850 edition of this map is also available on the New York Public Library Web site at: http://digitalgallery.nypl.org/nypldigital/id?434725.

20. Some published town maps can be found by searching on OCLC, but many are uncataloged (as are most manuscript maps). Two sources worth checking are: Albert Hazen Wright, *The New York Town Maps in Library of Congress and Cornell Archives* (Ithaca, N.Y.: [the author?], 1965); Alma Burner Creek, *Maps of the Genesee Valley & Finger Lakes Region, 1776-1950* (Rochester, N.Y.: Rochester Regional Research Council, 1977).

21. For an overview, see: Jerry Musich, "Mapping a Transcontinental Nation: Nineteenth- and Early Twentieth-Century American Rail Travel Cartography," in James R. Akerman, ed., *Cartographies of Travel and Navigation* (Chicago: University of Chicago Press, 2006), 97-150.

22. Gunn, "Antebellum Society," in Klein, *Empire State*, 312; Meinig, "Geography of Expansion," in Thompson, ed. *Geography of New York State*, 162-65; H. Roger Grant, "Railroads," *Encyclopedia of New York State*.

23. The home page for the Library of Congress railroad maps collection is at:http://memory.loc.gov/ammem/gmdhtml/rrhtml/rrhome.html . It includes historical background material, and is based on: Andrew M. Modelski, *Railroad Maps of the*

United States: a Selective Annotated Bibliography of Original 19th-century Maps in the Geography and Map Division of the Library of Congress (Washington, D.C.: Library of Congress, 1975).

24. Thomas Pentingale, *Map of the Rail Roads of the State of New York Showing the Stations, Distances & Connections with Other Roads* (Buffalo, N.Y.: Pentingale & Behn, 1858). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3801p.rr002640.

25. An example is: David Vaughan, *Map of the State of New-York Showing its Water and Rail Road Lines. Jan 1855, by Direction of John T. Clark State Engineer & Surveyor* (Albany, N.Y.: C. Van Benhuysen, 1855) Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3801p.rr002610]

26. J.H. Colton, *Map of New York & Erie Rail Road and its Connections; the Most Direct Route from New York to All Western Cities and Towns* (New York: Colton, 1855). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3711p.rr004830.

27. For the early history of county maps, see: Paul Laxton, "The Geodetic and Topographical Evaluation of English County Maps, 1740-1840," *The Cartographic Journal* 13 (1976), 37-54; Michael P. Conzen, "The County Landownership Map in America: Its Commercial Development and Social Transformation, 1814-1939," *Imago Mundi* 36 (1984), 9-31.

28. Conzen, "County Landownership Map," 11.

29. Ristow, *American Maps*, 339-46.

30. Ibid., 355-78.

31. For lists of county maps see: Richard W. Stephenson, *Land Ownership Maps, a Checklist of Nineteenth Century United States County Maps in the Library of Congress* (Washington, D.C.: Library of Congress, 1967); Albert Hazen Wright, *A Check List of New York State County Maps Published 1779-1945* ([Ithaca, N.Y.?]: [The Author?], 1965).

32. See the previous note for checklists of county land ownership maps available at the Library of Congress and at Cornell University. One strategy for tracking down maps of specific counties is to search for them using an "advanced search" on OCLC, limiting the search to format (maps) and including the location and dates you are interested in. Although some online maps are cataloged on OCLC, only paper holdings are shown for some institutions. If you are looking for online maps, it is good idea to check an institution's Web site to see if it has a paper map cataloged on OCLC is also available online. A surprising number of nineteenth-century county maps of New York are available on the Web from unexpected sources, such as the Norman B. Leventhal Map Center at Boston Public Library (http://maps.bpl.org/). Some maps made available on the Web by smaller New York State institutions can be located through the New York Heritage Digital Collections site, http://www.nyheritage.org. Genealogical sites are also worth exploring for maps and links to other relevant sites. A good starting point for New York State materials is the New York State Genealogy page at Genealogyinc.com (http://www.genealogyinc.com/newyork/).

33. R. Pearsall Smith, "United States County Maps," *Proceedings of the American Philosophical Society* 9:70 (Mar. 1864), 350-52.

34. Ibid., 350.

35. Ibid., 352.

36. See the "Cartogenealogy of R.P. Smith" in Conzen, "County Landownership Map," 14-16.

37. John Homer French, *The State of New York: from New and Original Surveys* (Syracuse, N.Y.: R.P. Smith, 1859), available on the World Wide Web from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/y5840g.. A second edition appeared in 1860. In 1865, the copyright was sold to H.H. Lloyd, who published several editions.

38. As will be seen in the next chapter, in 1877 a New York State commission criticized the French map for a number of cartographic sins, including displacing the location of towns from one to three miles.

39. John Homer French, *Gazetteer of the State of New York* (Syracuse, N.Y.: R.P. Smith, 1860).

40. The gazetteer has been digitized by Google at: http://books.google.com/books?id=R_zHwh4xByQC. The most recent and complete of the supplementary indexes is Walter W. Steesey, *All-Name Index to the Historical and Statistical Gazetteer of New York State, 1860 by J.H. French, and a Listing of Geographic Names Missing in the Original Index* (Interlaken, N.Y.: Heart of the Lakes, 1993).

41. Ristow, "Jay Gould as Surveyor and Mapper," *American Maps*, 379-86.

42. Ristow, "Henry Francis Walling," *American Maps*, 327-338; Michael Buehler, "Henry F. Walling and the Mapping of New England's Towns, 1849-1857," *The Portolan: Journal of the Washington Map Society* 71 (Spring, 2008): 22-33, republished on line by Boston Rare Maps, http://www.bostonraremaps.com/pdf/portolan%20spring08%20article%20reprint.pdf.

Chapter 12

1. New York (State), *Messages from the Governors* (11 vols.; Albany, N.Y.: J.B. Lyon, 1909), III, 162. (Annual message, Jan. 2, 1827.

2. Laws of New York State, 50th Session, Second Meeting, Chapter 2 (Oct. 17, 1827).

3. On the Borden survey, see: Simeon Borden and Robert Paine Treat, " Account of a Trigonometrical Survey of Massachusetts, by Simeon Borden, Esq., with a Comparison of Its Results with Those Obtained from Astronomical Observations, by Robert Treat Paine, Esq., Communicated by Mr. Borden, Robert Treat Paine, Simeon Borden," *Transactions of the American Philosophical Society* , New Ser., 9:1 (1846): 33-91; A.D. Butterfield, "History and Development of Triangulation in Massachusetts," *The Journal of the Worcester Polytechnic Institute*. 1:3-4 (1898): 285-299, 335-355.

4. Simeon Borden, *Topographical Map of Massachusetts: Compiled from Astronomical, Trigonometrical, and Various Local Surveys* (Boston: C. Hickling, 1844).

5. *Topographical Map of the State of Massachusetts, Based on the Trigonometrical Survey by Simeon Borden. The Details from Actual Surveys under the Direction of H. F. Walling***.** (New York: H. & C. T. Smith and Co., 1861.) For Walling's activities, see Ristow, *American Maps*, 327-338; Michael Buehler, "Henry F. Walling and the Mapping

of New England's Towns, 1849-1857," *The Portolan: Journal of the Washington Map Society* 71 (Spring, 2008), 22-33.

6. E.B. Hunt, "Proposal for a Trigonometrical Survey of New-York," *Proceedings of the American Association for the Advancement of Science* 6 (1852): 382-85. See also Ristow, *American Maps*, 355-56.

7. Hunt, "Proposal for a Trigonometrical Survey," 384.

8. Ibid., 382.

9. Ibid.

10. Ibid.

11. Ibid., 383.

12. The text of the memorial was published in *The Independent* (March 14, 1852): 47.

13. New York State, *Senate Documents*, 75th Session, 1852, vol. 1, no 41.

14. *Bulletin of the American Geographical and Statistical Society* 2 (1857): 40-42.

15. Ibid., 41.

16. See also: "Report of the State Engineer and Surveyor Relative to Map of the State," New York State Assembly Documents, 80th Session, 1857, vol. 2, no. 114.

17. Verplanck Colvin: "An Historical Sketch of the Origin and Present Condition of the New York State Land Surveys," Appendix B of his *Report on the Progress of the Adirondack State Land Survey to the Year 1886, with an Historical Sketch of the Work and Table of Elevations* (Albany, N.Y.: Weed, Parsons and Company, 1886), 40.

18. " Transactions of the Society for 1876," *Journal of the American Geographical Society of New York* 8 (1876), 28.

19. Biographical information on Gardiner can be found in the *Dictionary of American Biography*, *Appleton's Encyclopedia*, and in his obituary published in *The New York Times* (Sept. 11, 1912, 11). The best source of information about Gardiner's career is the unpublished papers in two collections at the New York State Library (SC 11835 and CD 7027). These include not only extensive correspondence, but also numerous newspaper clippings and other materials saved by Gardiner.

20. James T. Gardiner, *A Report to the Society on the Uses of a Topographical Survey to the State of New York* (New York: American Geographical Society, January 26, 1876).

21. Ibid., 5.

22. Ibid., 8.

23. Laws of New York State, 99th Session, Chap. 193 (April 29, 1876).

24. "Report of the Board of Commissioners of the State Survey," New York State *Senate Documents*, 100th Session, (1877), no. 19. This report also includes a separate report by Gardiner, which is included as an appendix.

25. *The New York Times*, Jan. 24, 1877, 2.

26. Gardiner, "Report of the Director" in "Report of the Board of Commissioners" (1877), 27.

27. "Report of the Board of Commissioners," 10.

28. In addition to the article in *The New York Times* quoted above, see especially "Report of the Commissioners of the New York State Survey," *The North American Review* 124 (1877), 504-06.

29. New York (State), *Messages from the Governors* (11 vols.; Albany, N.Y.: J.B. Lyon, 1909), VII, 26-27.

30. *The New York Times*, Jan. 30, 1877, 4; *The New York Times*, Feb. 17, 1877, 3.

31. Copies of these memoranda can be found in the James Terry Gardiner scrapbook, New York State Library, Doan-Gardiner Papers (SC 11835), Box 14, folder 1.

32. Gardiner to Grover Cleveland, [typewritten memorandum on the origin and history of the New York State Survey, 1883], New York State Library, James T. Gardiner Papers (CD 7027), Box 2.

33. Quoted by Cleveland, in New York (State), *The Public Papers of Grover Cleveland, Governor* (Albany, N.Y.: Argus Publishing Company, 1883), 70-71. I have been unable to locate a copy of Robinson's signing memorandum.

34. "Report of the Director of the New York State Survey, Showing the Progress of the Survey During the Year 1879," New York State, *Assembly Documents*, 103rd Session (1880), vol. 6, no. 86, 49-54.

35. Clipping from unidentified newspaper dated April 10, 1877. In Gardiner scrapbook, Doane-Gardiner Papers, Box 14.

36. *Public Papers of Grover Cleveland*, 70-71.

37. Ibid., 72.

38. This is the previously cited typewritten memorandum on the origin and history of the New York State Survey, New York State Library, Gardiner Papers, Box 2.

39. Letter signed by C.O. Boutelle, "Asst. in charge of office of the U.S.C.& G. Survey." Enclosed in letter from William Dorsheimer (head of the commissioners of the State Survey) to Cleveland (April 10, 1884). James T. Gardiner Papers (CD 7027), Box 2, no. 257.

40. *Messages from the Governors*, VII, 986-89.

41. "Report of the Special Committee to Investigate Matters Connected with the State Surveys," New York State, *Assembly Documents*, 108th Session, (1885), vol. 7, no. 137.

42. *The New York Times*, May 9, 1885, 4; "Transactions of the Society for the Year 1886," *Journal of the American Geographical Society of New York* 18 (1886), lxi-lxii.

43. Stories from the Brooklyn Eagle and several other newspapers opposed to the survey are included in the Gardiner scrapbook at New York State library.

44. *Science*, March 13, 1885, 217.

45. *The State of New York. Sheet No. 1, Eastern and Central New York* (Albany, N.Y.: Charles Van Benthuysen & Sons, 1879). Four editions of this map appeared between 1879 and 1881.

46. New York State Survey, *Special Report of the New York State Survey on the Preservation of the Scenery of Niagara Falls: and Fourth Annual Report on the Triangulation of the State for the Year 1879* (Albany, N.Y.: C. Van Benthuysen & Sons, 1880).

47. James T. Gardiner, *Map showing Recession of Niagara Falls in 33 years between 1842 and 1875* ([Albany, N.Y.?]: [New York State Survey?], [1875?]). This map was accompanied by a reprint of the *Trigonometrical Survey of the Falls of Niagara Executed for the Geological Report of the Fourth District in 1842* (New York: J. Bien, 1875). A copy of Gardiner's report and the accompanying maps is hosted online by the Missouri Botanical Garden at http://www.mobot.org/plantscience/resbot/Niag/GardRep/index.htm

48. A good summary of the political maneuvering surrounding the protection of Niagara Falls is J.B. Harrison, "The Movement for the Redemption of Niagara," *New Princeton Review* 2 (March, 1886): 233- (13 pp.). General background information is in William Irwin, *The New Niagara: Tourism, Technology, and the Landscape of Niagara Falls, 1776-1917* (University Park: Pennsylvania State University Press, 1996), 63-95.

49. The text of Gardiner's letter of resignation was published in *The New-York Daily Tribune* (Friday, June 19, 1885), and in several other newspapers. These articles can be found in the Gardiner scrapbook at New York State Library.

50. Ibid.

51. This article is identified in the Gardiner scrapbook as being from *The Brooklyn Daily Eagle*, June 19, 1885. However, I could not find this particular article in *Brooklyn Daily Eagle Online, 1841-1902* (http://eagle.brooklynpubliclibrary.org/), although similar remarks were published in that newspaper on August 7, 1885.

52. *The New York Times*, Sept. 11, 1912, 11.

53. New York (State). State Survey, *The Final Results of the Triangulation of the New York State Survey, Together with a Description of the Methods Employed. Also, the Eleventh Annual report of the Commissioners of the State Survey, Transmitted to the Legislature, March 22, 1887* (Albany, N.Y., Weed, Parsons, and Company, 1887).

54. *Final Results*, 8-10.

55. The best source of information about the Adirondack Survey is Colvin's reports to the legislature, which have been digitized by the New York State Library, and can be located by searching its Excelsior catalog. The only published biography of Colvin is Nina H. Webb, *Footsteps through the Adirondacks: The Verplanck Colvin Story* (Utica, N.Y.: North Country Books, 1996). This unreferenced, but well researched, biography sheds little light on Colvin as a surveyor and cartographer. A useful compilation of Colvin's writings with introductory essays by Norman J. Valkenburgh is Paul Schaefer, ed., *Adirondack Explorations: Nature Writings of Verplanck Colvin* (Syracuse, N.Y.: Syracuse University Press, 1997). Colvin's role in the campaign to save the Adirondacks is placed in context by Philip G. Terrie, *Contested Terrain: A New History of Nature and People in the Adirondacks* (Syracuse, N.Y.: The Adirondack Museum and Syracuse University Press, 1997); Useful information on Colvin's maps and their influence can be found in Boucier, *History in the Mapping*, 39-44, and in Norman J. Van Valkenburgh's introductory chapters to Percy Reese Morgan, *On the Adirondack Survey with Verplanck Colvin: the Diaries of Percy Reese Morgan* (Fleischmanns, N.Y.: Purple Mountain Press, 1991). Colvin's fans have organized themselves into a "Colvin Crew," which holds periodic meetings and hikes to follow Colvin's footsteps in the Adirondacks.

56. Laws of New York State, 95th Session, Chap. 733 (May 15, 1872).

57. Laws of New York State, 106th Session, Chap. 499 (June 2, 1883).

58. Interview with John Keating, Bureau Chief, Bureau of Real Property, New York State Department of Environmental Conservation (July 31, 2008).

59. *Messages from the Governors*, VIII, 552.

60. Gardiner to Powell, December 19, 1883, quoted by Thomas G. Manning, *Government in Science: The U.S. Geological Survey, 1867-1894* (Lexington: University of Kentucky Press, 1967), 127.

61. Henry Gannett, *Journal of the American Geographical Society of New York* 27:1 (1895), 23.

62. *The New York Times*, Feb.26, 1885, 4.

63. "Report of the Special Committee to Investigate Matters Connected with the State Surveys," New York State, *Assembly Documents* , 108th Sess. (1885), vol. 7, no. 137, 6-7.

64. Ibid., 8.

65. See Verplanck Colvin, "Seventh Annual Report on the Progress of the Topographic Survey of the Adirondack Region of New York for the Year 1879," New York State, *Assembly Documents*, 103rd Sess. (1881), vol. 3, no. 61, 13-18. This report includes excerpts from Colvin's unpublished reports for the years 1874-1877.

66. "Report on the Progress of the Adirondack State Land Survey to the Year 1886, with an Historical Sketch of the Work and Table of Elevations," New York State, *Assembly Documents*, 109th Sess. (1886), vol. 7, no. 80.

67. *Forest and Stream* 28:16 (May 12, 1887), 351.

68. Verplanck Colvin, *Adirondack and State Land Surveys, 1887: The Legislature and the Governor* (Albany, N.Y.: n.p., 1887)

69. Manning, *Government in Science*, 100.

70. *The New York Times*, Oct. 18, 1891, 1. *The Times* opposed Colvin's candidacy because he was not a "practical engineer."

71. *Messages from the Governors*, IX, 424-25.

72. These papers are in the Bureau of Real Property of the New York State Department of Environmental Conservation. Some 337 of the maps in this collection have been microfiched, and are available at the New York State Archives and elsewhere. See also Webb, *Footsteps through the Adirondacks*, 123-46. A selection of these maps have been made available on the World Wide Web by the New York State Archives.

73. *The New York Times*, Nov. 9, 1901, 2.

74. These maps are listed in Francis B. Rosevear and Barbara McMartin, *Colvin in the Adirondacks: a Chronology and Index: Research Source of Colvin's Published and Unpublished Works* (Utica, N.Y.: North Country Books, 1992), 117-127.

75. Colvin, *Seventh Annual Report*, 13-18.

76. Ely was a Rochester physician, whose maps of the Adirondacks were published by G.W. and C.B. Colton between 1867 and 1876. Based in Glens Falls, Stoddard was an accomplished photographer and writer, as well as a cartographer. Information about Stoddard and a low-resolution image of one of his maps is available at the Web site of the Chapman Historical Museum at http://chapmanmuseum.org/collections/stoddard/. Stoddard published various editions of his map of the Adirondacks between 1874 and 1914. No high resolution images of Ely's or Stoddard's maps are available online, but they are widely available in New York State libraries.

77. Bourcier, *History in the Mapping*, 40.

78. Seneca Ray Stoddard, *Adirondacks Illustrated* (Glens Falls, N.Y.: Stoddard, 1881), xiii.

79. The earliest state maps of the Adirondacks were published by the Forest Commission, but the cartographers were hired by Colvin's rivals in the office of the State Engineer and Surveyor. A number of Colvin's maps are cited in the useful "Catalogue of Field-notes, Surveys, and Landpapers of Patents, Grants, and Tracts Situate within the Counties Embracing the Forest Preserve of the State of New York," (compiled by J.B. Koetteritz), which is included as an appendix to the Forest Commission's *Annual Report*

for 1893, 309-499. Available online from Google Books at: http://books.google.com/books?id=f34AAAAAYAAJ.

80. New York (State). State Engineer and Surveyor, *Map of the Adirondack Wilderness and Adjoining Territory* ([Albany, NY?: Forest Commission], 1884); 20 leaves, each 67 x 70 cm. Two copies of this map are in the Manuscripts Division of the New York State Library. The only other cataloged copy is at the University of Chicago. One of the copies at the State Library has extensive handwritten updates and corrections. An uncataloged reduced-scale version of this map is in the first *Annual Report* of the Forest Commission at the State Library.

81. New York (State). Forest Commission, *Map of the Adirondack Plateau Showing the Position & Condition of Existing Forests* ([Albany, N.Y.?]: Forest Commission, 1884).

82. New York (State). Forest Commission, *Map of the Great Forest of Northern New York: Showing Boundaries (in Red) of the Forest Area, and Boundaries (in Blue) of the Proposed Adirondack Park* ([Albany, N.Y.]: Forest Commission, 1890). The first "blue line" map was in Colvin's first *Annual Report* (1873).

83. New York (State). Forest Commission, *Map of the Adirondack Forest and Adjoining Territory Compiled from the Official Maps and Field Notes on File in the State Departments in Albany* ([Albany, N.Y.]: Forest Commission, 1893).

84. New York (State). Adirondack Park Agency, *Adirondack Park, Land Use and Development Plan Map and State Land Map* (Ray Brook, N.Y.: The Agency, 2003). "Facsimile" [digital copy] available online at: http://www.apa.state.ny.us/gis/FacsimileMap.html).

85. In addition to the original maps, 300 of them have been microfiched and are available at the New York State Archives. A few samples are available online from the State Archives Digital Collections at: http://www.archives.nysed.gov/d/index.shtml.

86. For the history of the U.S. Lake survey, see Arthur M. Woodford, *Charting the Inland Seas: A History of the U.S. Lake Survey* (Detroit: Wayne State University Press, 1994); Cyrus B. Comstock, *Report upon the Primary Triangulation of the United States Lake Survey*. Professional Papers of the Corps of Engineers, U.S. Army, No. 24 (Washington D.C.: GPO, 1882).

87. Woodford, *Charting the Inland Seas*, 55. Several early Lake Survey charts of the northern boundary waters of New York area can be found by searching the NOAA historical maps Web site at http://historicalcharts.noaa.gov/. This collection is not complete, and additional charts can be located by using OCLC.

88. Gannett, "The Mapping of New York State," 23.

89. Horatio Seymour to Samuel B. Woolworth, April 1, 1879. Copy in John T. Gardiner papers, Box 2, folder 8, item 193.

90. *The New York Times*, Jan. 3, 1884, 4; *Messages from the Governors*, VII, 988.

91. *The New York Times*, Jan. 3, 1884, 4.

92. *The New York Times*, July 1, 1883, 9; see above under Colvin.

93. *Messages from the Governors*, VIII, 176.

94. See the previously cited "Report of the Special Committee to Investigate Matters Connected with the State Surveys," *New York Assembly Documents* (108th Sess., vol. 7, 1885), no. 137.

95. *The New York Times*, March 9, 1887, 9.

96. Gannett, “The Mapping of New York State.” On Gannett, see Jerry Penry, “The Father of Government Mapmaking: Henry Gannett,” *American Surveyor* (Nov. 2007).

97. Manning, *Government in Science*, 93-104.

98. Gannett, “The Mapping of New York State,” 22.

99. The text of this agreement is in the Annual Report of the State Engineer and Surveyor, *New York State Assembly Documents* (117th Sess., vol.3, 1894), 52-53.

100. Clarence King to James Hall, July 27, 1880. New York State Library, James Hall Papers, folder no. 185.

101. New York State Library, Gardiner Scrapbook.

102. H.M.W., “Co-operative Topographic Survey of New York,” *Bulletin of the American Geographical Society* 35:1 (1903), 44.

103. Guy Elliott Mitchell, “The Topographic Map of the United States,” *Economic Geography* 5:4 (1929), 387.

104. Henry Gannett, *A Manual of Topographic Methods*. Monographs of the United States Geological Survey, vol.22 (Washington D.C.: GPO, 1893).

105. For a detailed discussion of the characteristics of USGS maps with a brief historical overview, see Morris M. Thompson, *Maps for America: Cartographic Products of the U.S. Geological Survey and Others* (3rd ed.; Washington D.C.: GPO, 1987).

106. Gannett, “The Mapping of New York State,” 28.

107. Ibid., 29.

108. Manning, *Government in Science*, 102-04, provides additional information on inaccuracies in early topographic maps.

109. Most of New York State 15 minute maps are available from University of New Hampshire at http://docs.unh.edu/nhtopos/NewYorkList.htm. High quality images of many sheets are also available from the David Rumsey Collection. Another source is MapTech at http://historical.maptech.com.

110. A comprehensive list of early geological maps of New York State is contained in Henry Leighton, “One Hundred Years of New York State Geological Maps, 1809-1909,” *New York State Museum Bulletin* 133 (1909), 121-155. This publication is available online from the New York State Library.

111. The *Geologic Atlas of the United States* repository is available on the World Wide Web from Texas A&M University at http://repository.tamu.edu/handle/1969.1/2490.

112. A good starting point for research on the history of Geological Mapping in New York is the unofficial gateway to the New York State Geological Survey at: http://nygeosurvey.geology-forum.com/.

113. New York State Geological Survey, *Preliminary Geologic Map of New York: Exhibiting the Structure of the State So Far As Known* ([Washington, D.C.?]: United States Geological Survey, 1894). Available online from the Brigham Young University Map Collections and the Internet Archive at https://archive.org/details/preliminarygeolo00mcge. A rare preliminary edition of this map was published in 1892.

114. Frederick J.H. Merrill, *Geologic Map of New York: Exhibiting the Structure of the State So Far As Known* ([Albany, N.Y].: New York State Museum, 1901).

115. For the early history of soil mapping in the U.S., see: the history page of the U.S. Dept. of Agriculture's soil survey information site at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=nrcs142p2_053369#history

116. A brief overview of the early history of soil mapping in New York State is contained in: New York (State). Division of State Planning. *A Mapping Program for New York State*. Bulletin No. 37 (1938), 33-44.

117. For information about Stony Brook University's online inventory of soil maps see: http://sunysb.libguides.com/content.php?pid=134971&sid=1227688.

118. For background on the public health movement, see: Jon A. Peterson, **"**The Impact of Sanitary Reform upon American Urban Planning, 1840-1890," *Journal of Social History* 13:1 (Autumn, 1979), 83-103. A good deal of information about public health in New York City is contained in Edwin G. Burrows and Mike Wallace, *Gotham: A History of New York City to 1898* (New York: Oxford University Press, 1999). For a detailed account, consult John Duffy, *A History of Public Health in New York City* (2 vols.; New York: Sage, 1974), and his more recent overview, *The Sanitarians: A History of American Public Health* (Urbana: University of Illinois Press, 1990).

119. Obituary of Viele in *Bulletin of the American Geographical Society* 34:2 (1902), 184. His publications include, Egbert L. Viele, *Report on Civil Cleanliness, and the Economical Disposition of the Refuse of Cities* (New York: Edmund Jones & Co., Printers, 1860).

120. Viele drew up a detailed manuscript "Plan of Drainage for the Grounds of the Central Park" in 1855. It is reproduced and the story of Viele's involvement in the creation of the park is described in Cohen and Augustyn, *Manhattan in Maps*, 130-31. In 1856, Viele published two maps of the park on one sheet with the titles *Map of the Lands Included in the Central Park, from a Topographical Survey, June 17th, 1856; [Also:] Plan for the Improvement of the Central Park, Adopted by the Commissioners, June 3rd, 1856* (New York: Egbert L. Viele, 1856). This map is available on the World Wide Web from New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1697276.

121. Egbert L. Viele, *Topographical Map of the City of New York: Showing Original Water Courses and Made Land* (N[ew] Y[ork] : Ferd. Mayer & Co., c1865), available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3804n.ct002003. Cohen and Augustyn reproduce this map and say something about its background and importance in *Manhattan in Maps*, 136-39. A variant edition bearing the title: *Sanitary & Topographical Map of the City and Island of New York* (New York: Ferd. Mayer & Co. Lithographers, 1865) was published in the *Report of the Council of Hygiene.* A copy of this version is available on the World Wide Web from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/22jsyt.

122. Egbert L. Viele, *Topographical Atlas of the City of New York, Including the Annexed Territory Showing Original Water Courses and Made Land* (New York: E.L. Viele, 1874). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1527360, and from the David Rumsey Collection at: http://www.davidrumsey.com/luna/servlet/s/d0d119.

123. Steven Kurutz, "When There Was Water, Water Everywhere," *The New York Times*, June 11, 2006, http://www.nytimes.com/2006/06/11/nyregion/thecity/11viel.html.

124. A fairly complete and searchable index to the maps in the New York State Senate and Assembly Documents is available at the Stony Brook University Library. For information about the current status of the online version of this inventory, see: http://sunysb.libguides.com/content.php?pid=134971&sid=1233163.

125. Weed, Parsons & Co., *Map of the State of New York, 1865: Showing the Population of Towns & Wards* (Albany, N.Y.: Weed, Parsons & Co.).

126. For an overview of statistical mapping by the federal government, see Schulten, *Mapping the Nation*, 119-195. Friss, "Statistical Cartography in the United States Prior to 1870," 138, comments on the "electric suddenness" with which statistical cartography came of age in the Census Bureau after the 1870 census.

127. United States. Census Office. *Statistical Atlas of the United States Based on the Results of the Ninth Census 1870 with Contributions from Many Eminent Men of Science and Several Departments of the Government, Comp. under the Authority of Congress by Francis A. Walker, M. A., Superintendent of the Ninth Census* (New York: J. Bien, 1874). Available on the World Wide Web from the David Rumsey Collection (http://www.davidrumsey.com/luna/servlet/s/335r7j) and the Library of Congress at http://hdl.loc.gov/loc.gmd/ g3701gm. gct00008.

128. Maps from the 1880 census were published in Fletcher W. Hewes and Henry Gannett, *Scribner's Statistical Atlas of the United States* (New York: Charles Scribner's Sons, 1883), http://www.davidrumsey.com/luna/servlet/s/8o013c. The results of the 1890 were belated published in 1898 by the Census Office as Henry Gannett, *Statistical Atlas of the United States: Based upon the Results of the Eleventh Census* (Washington D.C.: G.P.O. 1898), http://www.davidrumsey.com/luna/servlet/s/xwt2j8. The 1900 census was published by the Census Office as Henry Gannett, *Statistical Atlas* (Washington, D.C.: U.S. Census Office, 1903), http://www.davidrumsey.com/luna/servlet/s/illlae. No atlas accompanied the 13th census (1910).

129. Lawrence Viellier, "Map showing over-crowding of buildings on lots and consequent lack of light and air space also the prevalence of tuberculosis, typhoid fever, scarlet fever and diphtheria in the tenement house district bounded by 11th Avenue, 6th Avenue, West 17th Street, West 14th Street" (manuscript map, 1899). This is one of a group of maps apparently prepared for a large exhibition held by the Tenement House Committee in 1899: see article by Lawrence Viellier, "The Tenement-House Exhibit of 1899" originally published in *Charities Review* 10 (1900-1901), 19-25, and published on the World Wide Web by William L. Crozier for the Lower Manhattan Project in 19993 at: http://www.tenant.net/Community/Les/veiller1.html. Some 89 maps in two series from this exhibit have been cataloged by the New York Historical Society.

130. Frederick E. Pierce, *The Tenement House Committee Maps: Map of City of New York Showing Densities of Population in the Several Sanitary Districts, June 1, 1894* -- No. 2. *Map of City of New York Showing the Distribution of Principal Nationalities by Sanitary Districts* (s.l.: Harper & Brothers, 1894)), http://hdl.loc.gov/loc.gmd/ g3804n. ct001463r. Two smaller population maps are also included in this article, which appears to be taken from *Harper's Weekly*.

Chapter 13

1. David Woodward: *The All-American Map: Wax Engraving and Its Influence on Cartography* (Chicago: University of Chicago Press, 1977).

2. Rand McNally & Co., *Rand, McNally & Co.'s New Railroad, County, and Township Map of New York : Showing every Railroad Station and Post Office in the state* (Chicago: Rand McNally & Co., 1884). A copy is at the American Geographical Society Library at the University of Wisconsin, Milwaukee.

3. Ristow, *American Maps*, 326 (on Colton), 467-80 (on Rand McNally).

4. Little has been written about these companies, but some information is in Woodward, *All-American Map*, 28-41.

5. Asher & Adams, *Asher & Adams' New York and Part of Ontario* (s.l., 1871). Scale ca. 1:1, 275,000. Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3800.ct000488.

6. E.C. Bridgeman, *Bridgman's New Rail Road & Township Map of New York from the Latest Official & Other Authentic Sources Adapted for Use in Institutions of Learning, Business Offices & Libraries* (New York, 1896). Scale 1:320,000. Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3801p.rr002710.

7. Louis A. Risse, *General Map of the City of New York, Consisting of Boroughs of Manhattan, Brooklyn, Bronx, Queens and Richmond: Consolidated into One Municipality by Act of the Legislature of the State of New York* (New York: Board of Public Improvements, Topographical Bureau, 1900). Scale 1:21,000. Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1531831. Described in Cohen and Augustyn, *Manhattan in Maps*, 144-46; Stokes, *Iconography*, III, 840.

8. Arnold Guyot, *Map of the Catskill Mountains* (New York: J. Schedler, 1879). A copy dated 1870 is available from the University of Texas at Arlington Map Collection at http://texashistory.unt.edu/ark:/67531/metapth231810/ For background see Evers, *Catskills*, 487-95.

9. For example: J. Waldo Smith, *Map and Profile Showing Sources of, and Manner of Obtaining, an Additional Supply of Water for the City of New York, Oct. 9th, 1905* ([New York]: Board of Water Supply, 1905; New York (State) Forest, Fish and Game Commission, *Map of Lands Belonging to the Forest Preserve Situated in the Counties of Delaware, Greene, Sullivan and Ulster* ([Albany, N.Y.]: Wynkoop, Hallenbeck, Crawford Co., 1899).

10. These are in the "Railroad Maps Collection" on the Web site of the Library of Congress, which includes many maps that show roads and canals as well as railroads. See http://lcweb2.loc.gov/ammem/gmdhtml/rrhtml/rrhome.html.

11. Such maps are scattered about in various archival collections. A number can be found in New York (State). Dept. of Law. Bureau of Real Property, Railroad Deed Files, 1870-1962.

12. A general introduction to railroad maps with references for further reading is included in the Library of Congress Web site mentioned in note 10 above. See also, Musich, "Mapping a Transcontinental Nation," in Akerman, ed., *Cartographies of Travel and Navigation*, 97-150.

13. James R. Akerman, "Twentieth-Century American Road Maps and the Making of a National Motorized Space," in Akerman, ed., *Cartographies of Travel and Navigation*, 164.

14. Peter J. Hugill, "Good Roads and the Automobile in the United States, 1880-1929," *The Geographical Review* 72 (1982): 327-49.

15. Walter M. Meserole, *Progress Map Showing Side Path Construction in the State of New York under the Side Path Law* ([New York?]: League of American Wheelmen, 1911).

16. G.W. & C.B. Colton & Co., *Colton's Driving & Wheeling Map of the Country Twenty Five Miles North of the City of New York* (New York: Colton, 1892). Scale 1:73,000. Available on the World Wide Web at: http://www.davidrumsey.com/luna/servlet/s/8c6utm

17. Geo. H. Walker & Co., *Cyclists' Road Map of the Hudson River District, New York* (Boston: Geo. H. Walker & Co., 1897). Scale 1:190,080. Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1517363.

18. Evers, *Catskills*, 684; cites *Encyclopedia Britannica*, 14th ed., 1930 under Motor-car.

19. Hugill, "Good Roads," 331-32; Forbes, "Roads to c 1900," 527-42.

20. Hugill, "Good Roads," 335-36.

21. Seneca Ray Stoddard, *Map of the Adirondacks: Compiled from Government Surveys and Personal Notes* (Glens Falls, N.Y.: S.R. Stoddard, 1912).

22. Thomas Schlereth, "Twentieth-Century Highway Maps," in David Buisseret, ed., *From Sea Charts to Satellite Images: Interpreting North American History through Maps* (Chicago: University of Chicago Press, 1990), 260-65.

23. R.D. Servoss, *Sectional Road Map of Westchester County, New York and Part of Fairfield County, Conn. Indexed. Showing the Good Roads* (New York: Servoss, 1895). Both this and the 1902 edition are available on the World Wide Web from the David Rumsey Collection. Search for multiple images at: http://www.davidrumsey.com/ .

24.*Cyclists' Paradise and Automobilists' Arcadia: a Guide for Tourists, with an Accurate Map Showing Roads and Cycle Paths of Long Island, with Runs, Hotels, and Time Tables, Sufficient Data to Enable Anyone to "Lay Out a Trip" Intelligently* (Long Island City: Long Island Railroad Co., 1900). This booklet with a map is available at the New York Public Library, but not published on its Web site.

25. Gardiner S. Chapin and Arthur H. Schumacher, *The Rand McNally Photo-Auto Maps/Guide Book, New York to Albany and Saratoga Springs, Saratoga Springs to Albany and New York* (Chicago: Motor Car Supply Co., 1907). Available on the World Wide Web from the David Rumsey Collection. Search for multiple images at: http://www.davidrumsey.com/.

26. For the overall history of county atlases, see Michael P. Conzen, "North American County Maps and Atlases," in Buisseret, *From Sea Charts to Satellite Images*, 186-211, and the references cited there.

27. Stephenson, *Land Ownership Maps*, 26-31.

28. The classic exposition of the methods used by county atlas salesmen is Bates Harrington, *How 'Tis Done: A Thorough Ventilation of the Numerous Schemes Conducted by Wandering Canvassers together with the Various Advertising Dodges for*

the Swindling of the Public (Chicago: Fidelity Publishing Co., 1879; Syracuse, N.Y.: W.I. Pattison, 1890).

29. For more on the Beers family, see Ristow, *American Maps*, 404-09.

30. F.W. (Frederick W.) Beers, *Atlas of New York and Vicinity* (New York: Beers, Ellis, & Soule, 1868); F.W. (Frederick W.) Beers, *Atlas of the Hudson River Valley from New York City to Troy* (New York: Watson & Co., 1891). Both are available on the World Wide Web from the David Rumsey Collection. Search for multiple images at: http://www.davidrumsey.com.

31. For a list of the New York City and county atlases at the New York Public Library, see http://www.nypl.org/locations/tid/%252Fnode/72698.

32. Frederick W. Beers & Co., *Illustrated historical Atlas of Erie Co., New York from Actual Surveys and Records* (New York, F. W. Beers & Co., 1880), http://digitalgallery.nypl.org/nypldigital/id?1584471

33. For the career of Everts, see Jefferson M. Moak, "Louis H. Everts: American Atlas Publisher and Entrepreneur," *Coordinates: Online Journal of the Map and Geography Round Table of the American Library Association*, Series B, no. 11 (June 11, 2009), http://purl.oclc.org/coordinates/b11.htm. Some of Everts' earlier activities are mentioned by Ristow in *American Maps*, 413, 415, 416, 434, 439, 441. For continued use of the "trundle wheel," see A.L Westgard, *Tales of a Pathfinder* (New York: A.L. Westgard, 1920), 13-14.

34. Albert Hazen Wright, *A Check List of the County Atlases of New York* (Ithaca, NY: [The Author?], 1943). The commercial site Ancestry.com purchased duplicate reels of the Library of Congress County Land Ownership Atlas collection and has added the scanned black-and-white images to its site. This collection consists of more than 1,200 atlases, each representing an individual county, in 36 states, published between 1860 and 1918. This collection is viewable only to those who subscribe to Ancestory.com.

35. For more on fire insurance maps, see Robert Karrow and Ronald E. Grim, "Two Examples of Thematic Maps: Civil War and Fire Insurance Maps," in Buisseret, *From Sea Charts to Satellite Images*, 213-37. See also Walter W. Ristow, "United States Fire Insurance and Underwriters Maps, 1852-1968," *Quarterly Journal of the Library of Congress* 25 (1968): 194-218; and his introduction to: Library of Congress, Geography and Map Division, *Fire Insurance Maps in the Library of Congress: Plans of North American Cities and Towns Produced by the Sanborn Map Company* (Washington, D.C.: Library of Congress, 1981). For a more detailed but unscholarly overview, see Diane L. Oswald *Fire Insurance Maps: Their History and Applications* (College Station, TX: Lacewing Press, 1997).

36. Described, Cohen and Augustyn, *Manhattan in Maps*, 128-29; the Perris atlas itself is available on the New York Public Library Web site at: http://digitalgallery.nypl.org/nypldigital/id?1270028 .

37. Several of these are on the New York Public Library Web site in its collection of "Early Real Estate Atlases of New York" at: http://digitalgallery.nypl.org/nypldigital/explore/dgexplore.cfm?col_id=442.

38. Examples of Bromley New York City atlases can be found on the Web sites of both the New York Public Library and of David Rumsey.

39. The following Century county atlases are listed on OCLC: Livingston (1902), Wyoming (1902), Otsego (1903), Ontario (1904), Wayne (1904), Genesee (1904),

Ontario (1904), Cayuga (1904), Montgomery and Fulton (1905), Herkimer (1906), Oneida (1907), Niagara (1908), Erie (1909), Orleans (1913).

40. For the Library of Congress guide, see note 35 (above). A searchable version of this guide accompanied by other information on Sanborn maps is now available from the Library of Congress at http://www.loc.gov/rr/geogmap/sanborn/ . The Berkeley list is at: http://www.lib.berkeley.edu/EART/sanbul_NY_A.html].

41. The microfilm edition of the Sanborn maps at the Library of Congress is *Sanborn Fire Insurance Maps* (Teaneck, N.J.: Chadwyck-Healey, 1983-[1991?]); the online version derived from the microfilm is: *Digital Fire Insurance Maps, 1867-1970* (Ann Arbor, MI; Proquest, 2001). The microfilm edition of the maps from the Sanborn archives is cited as follows: *Sanborn Map Company. Fire Insurance Maps from the Sanborn Map Company Archives: New York City Late 19th Century to 1990* (Bethesda MD.: University Publications, 1991-).

42. See the previously cited "Early Real Estate Atlases of New York" at: http://digitalgallery.nypl.org/nypldigital/explore/dgexplore.cfm?col_id=442.

43. The authoritative work on this subject is John W. Reps, *Views and Viewmakers of Urban America: Lithographs of Towns and Cities in the United States and Canada, Notes on the Artists and Publishers, and a Union Catalog of Their Work, 1825-1925* (Columbia, Mo.: University of Missouri Press, 1984).

44. John L. Scherer and Richard Schein, *A Bird's Eye View of New York: Views and Viewmakers of New York State, 1836-1892* (Hamilton, N.Y.: Gallery Association of New York State, 1991).

45. One of these probable exceptions is Rene Cinquin, who in the 1920s published "Aero-Views" of towns on Long Island and elsewhere. His views frequently include graphics showing airplanes. Several examples of his work can be found on the Web site of the Library of Congress.

46. A good example is a view by the Seaside Villa Homes Co., *Wildwood Lake Park, Riverhead, Township of Southhampton, Suffolk County, N.Y.* (s.l.: [1903]); available on the World Wide Web from the Library of Congress at http://hdl.loc.gov/loc.gmd/g3804r.pm006242.

47. These views form part of the American Memory Project, and are listed in John R Hébert and Patrick E Dempsey, *Panoramic Maps of Cities in the United States and Canada : a Checklist of Maps in the Collections of the Library of Congress, Geography and Map Division* (2nd ed.; Washington, D.C: GPO, 1984).

48. George H. Daniels, *The Central Lake Region of the Adirondack Mountains Reached by the New York Central & Hudson River R.R.* (Buffalo, N.Y.: Matthews-Northrup Co., 1900). A copy of this map is at the Clements Library; Stony Brook University holds 1900, 1902, and 1904 editions of this map.

49. Walton Van Loan, *Map of all Points of Interest within Four miles of the Catskill Mountain House with Roads and Foot Paths* (New York: Charles Hart Lith., 1879), copy at Harvard College Library, another edition at Stony Brook University; Walton Van Loan, *Bird's-eye View of the Mountain Resorts of New York State, and How to Reach Them* (Catskill, N.Y.: Walton Van Loan, 1884), copies at Harvard College Library and Stony Brook University. Two of Van Loan's maps are available on the Catskill Mountaineer Web site at: http://catskillmountaineer.com/maps.html.

50. William F. Link, *The Hudson by Daylight Map: Showing the Prominent Residences, Historic Landmarks, Old Reaches of the Hudson, Indian Names, &c. With Descriptive Pages* (New York: W.F. Link, 1878). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?9811_001.

51. Long Island Railroad Company, *Map of Long Island Showing the Long Island Railroad* (n.p.: c1884). Available on the World Wide Web from the Library of Congress at: http://hdl.loc.gov/loc.gmd/g3802l.rr004480.

52. Long Island Railroad Company, *Map of Long Island Showing the Long Island Railroad* (New York: Sackett & Wilhelms Litho. Co., 1884). Copies of this version are held by the Clements Library, Queens Borough Public Library and the Society for the Preservation of Long Island Antiquities.

53. For early suburbanization generally, see Sam Bass Warner, *Streetcar Suburbs: the Process of Growth in Boston, 1870-1900* (Cambridge, MA: Harvard University Press, 1962). For the role of railroads and trolley lines in promoting suburbanization and publishing maps, see also Musich, "Mapping a Transcontinental Nation," in Akerman, ed., *Cartographies of Travel and Navigation*, 142-48.

54. For Brooklyn as a suburb, see Joseph Dorinson, "The Suburbanization of Brooklyn; Persistence Without Plan," in Barbara Kelly, ed., *Long Island: The Suburban Experience* (Interlaken, NY: Heart of the Lakes, 1990), 15-23.

55. Henry I. Jebb, *Jebb Guide Map, Greater New York* (New York: [Jebb?], 1930). Available on the World Wide Web from Stony Brook University at http://www.sunysb.edu/libmap/img0050b.jpg.

56. *Map of the Lakeland farms, Near the Villages of Lakeland and Hermanville, on the Long Island Rail Road* ([New York?]: n.p., [1850?]. Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?434017.

57. New York Printorium, *The Land of Beulah; 40 miles from New York on the Long Island Railroad, and Within Half a Mile of the Brentwood Depot* ([New York]: New York Printorium, [ca. 1850]). Copy at Stony Brook University.

58. Thos. D. Smith, *Map of Village of Massapequa, Property of Thomas H. Brush & Co.* (s.l., s.n., 1889). Copy at Queens Borough Public Library.

59. J.T. Van Smyth, *Oceanside, Indicated on above Bird's Eye View as the Pines! The Land Being Covered with Handsome Pine Trees, Located at Westhampton Beach, Quantuck Bay, Long Island, N.Y.* (New York: Seaside Villa Homes, 1904). Copy at the Library of Congress.

60. Jonathan Sammis, *Map of the City of Breslau, Long Island, as Surveyed by Jonathan Sammis, Surveyor, 1870, 30 Miles from Brooklyn, S.S.R.R.* (New York: Beiter, Koch & Stutz, 1870). Copy at New York Historical Society.

61. Richard Bayles, *Historical and Descriptive Sketches of Suffolk County with a Historical Outline of Long Island* (1874; reprint Port Washington, N.Y.: Ira J Friedman, 1962), 174.

62. Works on Garden City include Vincent F. Seyfried, *The Founding of Garden City, 1869-93* (Garden City, N.Y.: Seyfried, 1969); M.H. (Mildred Hess) Smith, *History of Garden City* (Manhasset, N.Y.: Channel Press, 1963).

63. Garden City Co., *Map of Garden City, Queens Co., Long Island, New York* (New York: Garden City Co., 1895). Copy at New York Public Library.

64. Ristow, *American Maps*, 441-43.

65. Asher & Adams, *New Topographical Atlas and Gazetteer of New York, Comprising a Topographical View of the Several Counties of the State, ... Including ... Map of the United States and Territories ... Compiled from the Latest Astronomical Observations, Official Surveys and Records of the United States and Territories* (New York: Asher & Adams, 1871). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1575772 .

66. Little is known about Julius Bien or his publishing house. There are brief entries for Julius Bien in several biographical dictionaries, including the *Dictionary of American Biography* and *The New-York Historical Society's Dictionary of Artists in America*. There is also a some biographical information about him in the online version of the *Jewish Encyclopedia* (http://www.jewishencyclopedia.com/view.jsp?artid=1052&letter=B), and in David Rumsey's "blog post" at: http://www.davidrumsey.com/blog/2009/9/13/julius-bien-master-engraver-and-cartographer.

67. Joseph Rudolf Bien and Cornelius Clarkson Vermeule, *Atlas of the Metropolitan District and Adjacent Country.…* (New York: Julius Bien & Co., 1891). Available online from the David Rumsey Collection. Search for multiple images at: http://www.davidrumsey.com. Cornelius Clarkson Vermeule was a nationally important figure in scientific mapping, whose long career lasted until the middle of the twentieth century. See Snyder, *Mapping of New Jersey*, 115-123.

68. Joseph Rudolf Bien, *Atlas of Westchester County, New York* (New York: Julius Bien & Co., 1893). Available online from the David Rumsey Collection. Search for multiple images at: http://www.davidrumsey.com.

69. Joseph Rudolf Bien, *Atlas of the State of New York* (New York: Julius Bien & Co., 1893). Available online from the David Rumsey Collection. Search for multiple images at: http://www.davidrumsey.com. This is the "revised and corrected" version of the atlas, which originally appeared in 1894.

70. *New Century Atlas of Counties of the State of New York from Official Records, Government and State Surveys, and Expert Personal Investigations of the Records and Latest Reliable Data of Each of the Countries* (New York and Philadelphia: Everts Pub. Co., 1912) .

71. Information about Everts' career can be found in note 33 of this chapter.

Chapter 14

1. A lucid summary of the development of aerial photography and remote sensing and its application to mapping is contained in Monmonier, *Coastlines*, 58-70. An overview is available online from Paul R. Baumann, *History of Remote Sensing, Aerial Photography* (2001) at: http://employees.oneonta.edu/baumanpr/geosat2/RS%20History%20I/RS-History-Part-1.htm. See also Warren R. Phillipson, *Manual of Photographic Interpretation* (Bethesda, Md. : American Society of Photogrammetry and Remote Sensing, 1997).

2. Fairchild Aerial Camera Corporation, *Aerial Survey, Manhattan Island, New York City* ([New York]: The Corporation, [1921]) A photograph from this series showing the southern tip of Manhattan can be seen at: http://www.loc.gov/rr/geogmap/guide/gmillapa.html.

3. Fairchild Aerial Camera Corporation, *Sectional Aerial Maps of the City of New York* (1924). Available on the World Wide from New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1532561

4. New York (State). Division of State Planning. *A Mapping Program for New York State*. Bulletin No. 37 (1938), 27.

5. The practitioners of this art have their own professional association, which was founded in 1934 as the American Society of Photogrammetry. Now the American Society for Photogrammetry and Remote Sensing (ASPERS), it has conventions, publications, and a Web site that can be found at: http://www.asprs.org/.

6. *Mapping Program for New York State*, 27.

7. For information about the availability of these photographs, see http://www.archives.gov/publications/general-info-leaflets/26-cartographic.html#aerial1 . A collection of early aerial photographs of central New York dating from the 1930s through the 1960s is available on the Web from Cornell University's Institute for Resource Information Studies at http://aerial-ny.library.cornell.edu/.

8. NAPP Data Set ID NPONAPP008770081 (8 May 1977). Obtained from USGS Earth Explorer (Eros Data Center).

9. See the New York State, Geographic Information Systems Clearinghouse, Digital Orthoimagery Application at: http://www.nysgis.state.ny.us/gateway/mg/.

10. New York (State). Map Information Unit. *Inventory of Aerial Photography and Other Remotely Sensed Imagery of New York State*. (l983- , "limited revision," 1991; 3rd ed., 1995; Albany, N.Y.: New York State Dept. of Transportation, 1995).

11. Some of these images can be seen at the following sites: Rutgers University, Grant F. Walton Center for Remote Sensing and Spatial Analysis, *New York – New Jersey Highlands Regional Assessment 2002 Update Website* at: http://deathstar.rutgers.edu/crssa_sum2.html; Long Island Sound Resource Center, mapviewer at: http://www.lisrc.uconn.edu/lisrc/index.asp.

12. Places to look for remotely sensed images include: NASA Earth Observatory, http://earthobservatory.nasa.gov/; NASA Visible Earth, http://visibleearth.nasa.gov/; USGS, Earth Resources Observation and Science (EROS) Center http://eros.usgs.gov/.

13. This image from NASA's *Visible Earth* was taken from the Space Shuttle Radar Topography Mission (Feb. 13, 2000).

14. A good overview of the array of remotely sensed images now available can be obtained from Michael D. King et. al., eds., *Our Changing Planet: The View from Space* (Cambridge: Cambridge University Press, 2007).

15. Ralph E. Ehrenberg, "'Up in the Air in More Ways Than One': The Emergence of Aeronautical Charts in the United States," in Akerman, ed., *Cartographies of Travel*, 207-59.

16. Ibid., 216.

17. The museum's Web site is at: http://www.cradleofaviation.org/.

18. Guy Elliott Mitchell, "The Topographic Map of the United States," *Economic Geography* 5:4 (Oct., 1929): 386-87.

19. Thompson, *Maps for America*, 102-07, 241-42, 245.

20. See the previously cited *Mapping Program for New York State*.

21. Ibid., 1.

22. Ibid., 14-17.

23. Thompson, *Maps for America*, is the best source for general information about USGS maps, but its presentation of USGS history is sketchy, and does not discuss the ties between the USGS and military and intelligence mapping, some of which were still classified at the time of its final edition (1989). The most detailed account of non-classified post-war developments in military (and other) topographic mapping is in John T. Pennington, *History of the U.S. Army Engineer Topographic Laboratories (1920 to 1970)* (Fort Belvoir, VA: Army Engineer Topographic Laboratories, 1973). For developments in the late 1940s and early 1950s, see also William E. Wrather et. al., "U.S. Geological Survey 75th Anniversary Observance," in R. T. Evans and H.M. Frye, *History of the Topographic Branch (Division)*, U.S. Geological Survey Circular 1341 (Reston, VA: Us. Geological Survey, 1954), http://pubs.usgs.gov/circ/1341/pdf/circ_1341.pdf. For the use by the USGS of classified materials, see the two articles by John Cloud cited in note 26.

24. Interview with Morris Thompson by Alan Voss, Jan. 15, 2006. Two MPEG-4 video files. Available from the ASPRS Archive at http://archive.asprs.org/workingsite/index.aspx. The remarks cited can be found beginning at 30:15 in file one.

25. The most complete listing of old editions of USGS maps, along with downloadable images, can be obtained by searching the USGS historical Map Collection at http://nationalmap.gov/historical/. The metadata accompanying these maps gives some idea of when and how they were produced.

26. The use of Corona images is described in two articles by John Cloud: "American Cartographic Transformations During the Cold War," *Cartography and Geographic Information Science* 29:3 (2002): 261-82; "Imaging the World in a Barrel: CORONA and the Clandestine Convergence of the Earth Sciences," *Social Studies of Science* 31:2 (April, 2001): 231-51.

27. Maercklein, Leslie A., *The Development of a Statewide Mapping Program and Projection Grid System* (Albany, N.Y.: New York State Department of Transportation, 1968)

28. Ibid., 1.

29. Ibid., 3-4.

30. Ibid., 5-7.

31. Personal communication to the author from Paul McElligott, Head Map Information Unit, New York State Dept. of Transportation, June 22, 1994; New York (State) Dept. of Transportation, *Mapnotes: A Review of Mapping and Related Activities within New York State* (Albany, N.Y.: New York State Dept of Transportation, 1971).

32. Conzen, "County Land Ownership Map," 23-29.

33. E.B. Hyde & Co., *Atlas of Passaic County, New-Jersey: Topographical, Geological, Historical, Illustrated* (New York: E.B. Hyde & Co., [1877]. Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1602551.

34. Hyde & Co., *Atlas of the Brooklyn Borough of the City of New York* (3 vols.; New York: Hyde & Co., 1898-1899). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1517522.

35. E. Belcher Hyde Map Company, *Atlas of the Borough of the Bronx, City of New York* (4 vols.; Brooklyn: The Company, 1900 – [1902?]). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1533049.

36. Hyde & Company, *Map of the Greater Portion of Westchester County, New York* (Brooklyn: Hyde & Company, 1900). Available on the World Wide Web from the David Rumsey Collection at: http://www.davidrumsey.com/. In 1908, Hyde published a similar atlas covering a somewhat wider area under the title *Atlas of the Rural Country District North of New York City* (New York: E. Belcher Hyde, 1908). This atlas is also available in the David Rumsey collection.

37. E. Belcher Hyde, *Atlas of the Borough of Queens* (3 vols.; Brooklyn: E. Belcher Hyde, 1901-04). Available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1693987.

38. E.B. Hyde & Co., *Atlas of ... Suffolk County, Long Island, New York* (2 vols. in 3; Brooklyn: E. Belcher Hyde, 1915-1917) This edition, which appears never to have been completed, and did not cover all of Suffolk County, is available from the New York Public Library Web site at: http://digitalgallery.nypl.org/nypldigital/id?1633912.

39. E. Belcher Hyde, *Atlas of Nassau County, Long Island, N.Y.* (Brooklyn: E. Belcher Hyde, 1914). This edition is available on the World Wide Web from the New York Public Library at: http://digitalgallery.nypl.org/nypldigital/id?1633804.

40. E. Belcher Hyde, *Atlas of the Borough of Manhattan* (4 vols.; Brooklyn: E. Belcher Hyde, 1906-07). Copy at the New York Public Library, but not available online.

41. Dolph & Stewart, *Atlas of Suffolk County* (New York: Dolph & Stewart, 1929).

42. Hagstrom Company, *Hagstrom's Map of Lower New York City: House Number and Subway Guide* (New York: A.G. Hagstrom, 1919).

43. For example, Hagstrom Company, *Hagstrom's Atlas of Queens and Nassau Counties, Long Island, N.Y.* (New York: Hagstrom Company, 1950)

44. For the current activities of the Sanborn Company, see its Web site at: http://www.sanborn.com/company/.

45. Akerman, "Twentieth-Century American Road Maps," in Akerman, ed., *Cartographies of Travel*, 177.

46. Ibid.

47. Walter W. Ristow, "A Half Century of Oil-Company Road Maps," *Surveying and Mapping* 24 (1964): 623.

48. There is a Road Map Collectors Association, which maintains a Web site at: http://www.roadmaps.org/

49. General Drafting Company, *Long Island* (New York: General Drafting Company, 1937). This map was prepared for Standard Oil of New York, a division of Socony-Vacuum Oil Company, Inc.

50. Rand McNally and Company, *I Love New York Tourism Map: I* [Heart Symbol] *NY* ([Albany, N.Y.?] : Division of Tourism, New York State, Dept. of Commerce, [1984]).

51. Map Works, Inc., *New York State Map: I* [Heart Symbol] *New York* ([Albany, N.Y.?]: New York State Dept. of Economic Development, Division of Tourism, 2008).

52. Empire State Gas and Electric Association, *Atlas of Rural Electric Lines in New York State* (New York: [The Association?], 1931); University of the State of New York. Regents' Inquiry into the Character and Cost of Public Education in the State of New York, *School District Atlas of the State of New York* (New York: Charles Bruning Co., 1937).

53. William P. Munger, *Historical Atlas of New York State* (Phoenix, N.Y.: F.E. Richards, 1941).

54. Wallace E. Lamb, *Sectional Historical Atlas of New York State* (11 vols.; Phoenix, N.Y.: F.E. Richards, 1955-56).

55. Robert J. Rayback et. al., *Richards Atlas of New York State* (Phoenix, N.Y.: F.E. Richards, 1957). Some copies of this edition bear the date 1959; the 1965 edition appears to have been the only one that was revised.

56. New York (State). Office of Planning Coordination, *The Appalachian Region of New York State: An Atlas of Natural and Cultural Resources* (Albany, N.Y.: State of New York, Office of Planning Coordination, 1969).

57. Paul R. Baumann, *Water Balance Atlas of New York State* (Oneonta, N.Y., Dept. of Geography, S.U.N.Y. at Oneonta, 1970).

58. New York (State). Dept. of Transportation, *New York State County Maps and Atlas* (Albany, N.Y.: The Department, 1974-).

59. James Healey, *Solar Energy Atlas for New York State* (Albany, N.Y.: Atmospheric Sciences Research Center, State University of New York at Albany, 1975).

60. Richard Beach and Malcolm Fairweather, *Agricultural Atlas of New York State* (Plattsburgh, N.Y. : Dept. of Geography, State University of New York at Plattsburgh, 1979).

61. Richard Beach and Malcolm Fairweather, *New York State: a Socio-Economic Atlas* (Plattsburgh, N.Y. : State University of New York, 1983).

62. Richard S. Mitchell, *Atlas of New York State Ferns* (Albany, N.Y. : University of the State of New York, State Education Dept., 1984).

63. Robert F. Andrle and Janet R. Carroll, eds., *The Atlas of Breeding Birds in New York State* (Ithaca : Cornell University Press, 1988).

64. DeLorme Mapping Company, *New York State Atlas & Gazetteer* (Freeport, Me.: DeLorme Mapping Co., 1987). This atlas has undergone numerous editions and revisions; the eighth edition appeared in 2007.

65. For information about the history of DeLorme, see its Web site at: http://www.delorme.com/about/innovation.aspx.

66. For general background on the development of computer cartography, see: John Hessler, "How to Map a Sandwich: Surfaces, Topological Existence Theorems and the Changing Nature of Modern Thematic Cartography, 1966-1972," *Coordinates: Online Journal of the Map and Geography Round Table of the American Library Association*, Series A, no. 7 (March 15, 2009), http://purl.oclc.org/coordinates/a7.htm. Other works include: Timothy Foresman, ed., *The History of Geographic Information Systems: Perspectives from the Pioneers* (Upper Saddle River, N.J.: Prentice Hall, 1998); Waldo Tobler, "Automation and Cartography," *The Geographical Review* 49:4 (1959): 526-34;

Nicholas Chrisman, *Charting the Unknown: How Computer Mapping at Harvard Became GIS* (Redlands, Ca.: ESRI Press, 2006).

67. The LUNR Project is described in: New York (State). Office of Planning Coordination, *LUNR (Land Use and Natural Resource Inventory) Classification Manual* (Albany, N.Y.: New York State Office of Planning Coordination, 1971); Roger Tomlinson, et. al., *Computer Handling of Geographical Data: An Examination of Selected Geographic Information Systems* (UNESCO Natural Resource Research Series, No. 13. Paris: The UNESCO Press, 1976), 110-34.

68. An interesting attempt to develop a more detailed land use classification is described by Micahel J. Matthews et. al., "Database for the New York State Urban Wildlife Inventory," *Landscape and Urban Planning* 15:1-2 (June 1988, 23-37).

69. Donald F. Cooke, "Topology and TIGER: The Census Bureau's Contribution," in Forseman, ed., *History of Geographic Information Systems*, 47-57. See also: Timothy "Trainor, Census Cartography 2007: Reflections Status, and Predictions," *Cartography and Geographic Information Science*, April 2007, available online from The Free Library at http://www.thefreelibrary.com/Census+cartography+2007%3A+reflections,+status,+and+predictions.-a0165781353

70. Richard H. Schweitzer, Jr., "The Urban Atlas Project: Historical and Cartographic Review," *Auto-Carto II Proceedings of the International Symposium on Computer-Assisted Cartography* (September 21-25,1975), 162-68, http://mapcontext.com/autocarto/proceedings/auto-carto-2/pdf/the-urban-atlas-project-historical-and-cartographic-review.pdf.

71. All volumes were published by the U.S. Bureau of the Census in 1974 or 1975, and bear titles beginning: *Urban Atlas, Tract Data for Standard Metropolitan Statistical Areas…* Volumes were published for Albany-Schenectady-Troy, Buffalo, New York City, Rochester, and Syracuse.

72. The starting place for finding current maps and data from the U.S. Bureau of the Census in *American Factfinder* at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

73. Thompson, *Maps for America*, 187-88; David D. Greenlee and Stephen C. Guptill, "GIS Development in the Department of Interior," in Foresman, ed., *History of Geographic Information Systems*, 181-198.

74. For information about the National Map, see http://nationalmap.gov/about.html.

75. For information about the US Topo program, see http://nationalmap.gov/ustopo/.

76. Letter to the author from Paul McElligott, Head, Map Information Unit, New York State Dept. of Transportation, June 22, 1994.

77. The corporate history of ESRI is summarized on its Web site at: http://www.esri.com/about-esri/history.

78. The CUGIR home page is at: http://cugir.mannlib.cornell.edu/.

79. The New York State GIS Clearing house can be found at: http://gis.ny.gov/

80. Old Maps Online, http://project.oldmapsonline.org/about.

81. The list of Historical Map Web Sites maintained by the Perry-Casteñada Library is at http://www.lib.utexas.edu/maps/map_sites/hist_sites.html.

82. The History of Cartography site is at: http://www.maphistory.info/index.html.

83. ESRI's *ArcGIS Online* is now probably the most important platform for displaying GIS maps on the Web. For information about the software see http://www.esri.com/software/arcgis/arcgisonline. Content, including many maps of New York, can be viewed by searching the ArcGIS Gallery at http://www.arcgis.com/home/gallery.html

84. The interactive features of the National Map (many of which were hosted until recently by the now discontinued *National Atlas of the United States)* are hosted by The National Map Viewer at http://nationalmap.gov/viewer.html.

85. U.S. Census Bureau, *American FactFinder* can be found at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

86. The home page for David Rumsey's GIS browser is at: http://www.davidrumsey.com/GIS/index.htm.

87. The *New York Ocean and Great Lakes Atlas* is at: http://atlas.oglecc.ny.gov/

88. *The Color Landform Atlas of New York State* is at: http://fermi.jhuapl.edu/states/ny_0.html.

89. Map New York is at: http://mumford.albany.edu/nysi_new/index.asp]

90. The *Digital Atlas of New York City* is at: http://130.166.124.2/NYpage1.html.

91. The NY/NJ Highlands viewer is at: http://dbcrssa2.rutgers.edu/highlands/viewer.htm.

92. United States Geological Survey, Woods Hole Science Center, *Map Server GIS of LIS* at: http://woodshole.er.usgs.gov/project-pages/longislandsound/Data/GIS.htm.

93. Erie County, New York, Internet Mapping Service at: http://gis1.erie.gov/support/ErieHelp/.

94. See the Long Island Index at: http://www.longislandindexmaps.org/.

96. NYCityMap is at: http://maps.nyc.gov/doitt/nycitymap/

97. Information on the New York Public Library's New York City Historical GIS Project can be found at: http://www.nypl.org/blog/2012/06/13/nyc-historical-gis-project. See also http://maps.nypl.org/warper/ and http://www.nypl.org/blog/2012/01/10/unbinding-atlas-working-digital-maps.

98. For the Welikia and Mannahatta Projects see http://welikia.org/. The Mannahatta Project is described in detail in Eric W. Sanderson *Mannahatta: A Natural History of New York City* (New York: Abrams, 2009).

99. The Internet address for OASIS is http://www.oasisnyc.net/.

100. For the development of automotive route-finders, see Robert L. French, "Maps on Wheels: The Evolution of Automobile Navigation," in Akerman, *Cartographies of Travel*, 260-90.

101. *Flickr* can be found at: http://www.flickr.com; Panoramio at http://www.panoramio.com.

102. Google Maps is at: http://maps.google.com/. Google Earth can be downloaded at: http://earth.google.com/.

103. Including: Rich Gibson and Schuyler Erie, *Google Maps Hacks: Tips and Tools for Geographic Searching and Remixing* (Sebastopol, C.A.: O'Reilly, 2006); Michael Purvis, Jeffrey Sambells, and Cameron Turner, *Beginning Google Maps Applications with PHP and Ajax: From Novice to Professional* (Berkeley, C.A.: Apress, 2006).

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105. Selected pages from the Gallery are on the "layers" menu on the main Google Earth page. For other listings, click on the "add content" button on the "Places" menu, or go to: http://earth.google.com/gallery/.

106. The Dept. of Environmental Conservation site is at http://www.dec.ny.gov/pubs/42978.html; the DLSE NY Landscape Region Project is at: http://geoscience.stevekluge.com/projects/dlesege/; a link to Brian Abbott's subway map can be found at: http://brianabbott.net/.

107. The web site of the Office of Cyber Security and Critical Infrastructure Coordination (CSCIC) is at: http://www.cscic.state.ny.us/.

108. New York (State). Office of Cyber Security and Critical Infrastructure Coordination, *State of New York Geographic Information System (GIS) Strategic Plan* (August, 2008), http://www.nysgis.state.ny.us/coordinationprogram/straplan/documents/nys_strat_plan_final.pdf.

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Locating Maps

Many of the maps discussed in this book are available as high resolution images on the World Wide Web. The three largest collections of New York State maps are hosted by the Library of Congress, the New York Public Library, and the David Rumsey Collection.

The best single source for locating maps on paper or online is the OCLC (Online Computer Library Center), WorldCat, which lists many maps cataloged by major libraries, mostly in North America. Libraries with particularly strong holdings of New York State Maps include the New York Public Library, the New York Historical Society, the New York State Library, American Geographical Society Library at the University of Wisconsin-Milwaukee, and the Library of Congress. In addition, important collections of manuscript maps and other rare maps can be found at the Clements Library, the John Carter Brown Library, the Huntington Library (San Marino, CA), the British Library, the British Public Record Office, the U.S. National Archives, and Archives Canada. Uncataloged maps of specific areas within New York State can sometimes be found only at local historical societies and public libraries.

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