

Two Lyres from Ur



Frontispiece. *The head of the stag from the Boat-shaped Lyre.*

Two Lyres from Ur

Maude de Schauensee



University of Pennsylvania Museum
of Archaeology and Anthropology

Philadelphia

Copyright © 2002 by Maude de Schauensee

First Edition

All Rights Reserved

Printed in the United States of America on acid-free paper

Library of Congress Cataloging-in-Publication Data

Schauensee, Maude de.

Two lyres from Ur / Maude de Schauensee.— 1st ed.

p. cm.

Includes bibliographical references (p.) and index.

ISBN 0-924171-88-X

1. Lyre—History. 2. Musical instruments, Ancient—Iraq—Babylonia.
3. Ur (Extinct city)—History. 4. Iraq—Antiquities. I. Title.

ML1015.L89 S34 2002

787.7'819'0935--dc21

2002003835

For

Robert H. Dyson, Jr.

without whom these important studies
would not have taken place

Contents

Illustrations	ix
Foreword, <i>Jeremy A. Sabloff</i>	xiii
Preface	xv
Acknowledgments	xvii
1. THE TWO LYRES—FROM EXCAVATION TO CONSERVATION	1
2. THE BOAT-SHAPED LYRE	17
3. THE LAPIS-BEARDED LYRE	51
Appendix A: Boat-shaped Lyre Treatment <i>Tamsen Fuller</i>	78
Appendix B: Conservation of the Bull's Head for the Lapis-bearded Lyre, <i>Virginia Greene</i>	87
Notes	105
References	115
Index	123

Illustrations

Frontispiece. The head of the stag from the Boat-shaped Lyre

Figures

1. Map of Mesopotamia 3
2. Plan showing the location of the tombs
and death pits in the Royal Cemetery 6
3. Detailed plan of the Royal Cemetery with the
identifying numbers of the tombs 10
4. Plan of the King's Grave 11
5. Plan of the Great Death Pit 14
6. Reconstruction drawing of the Boat-shaped Lyre 37
7. Digitized schematic drawing of the stag's head
on the Boat-shaped Lyre 43
8. Proposed construction and attachment
of the beard to the bull's head of the
Lapis-bearded Lyre 99

Plates

1. Sir Leonard Woolley, Dr. Rainey, and Mr. Madeira
in the Mesopotamian Gallery in 1955. xxii
2. Aerial view of the excavations at Ur 5
3. C. Leonard and Mrs. Woolley excavating the lyres
in the Great Death Pit 8
4. The Royal Cemetery during excavation 12
5. The Boat-shaped Lyre *in situ* 16
- 6a,b. Lapis lazuli cylinder seals (and modern
impressions) 19

7a.	Woolley's field card for the Boat-shaped Lyre	22
7b.	Woolley's field notes for the Boat-shaped Lyre . . .	23
8.	CAT-scan of the stag's head and the front upright of the Boat-shaped Lyre	24
9.	Front view of the stag on the Boat-shaped Lyre . . .	25
10.	CAT-scan through the body of the stag and front upright of the Boat-shaped Lyre	25
11.	X-ray of the rear upright of the Boat-shaped Lyre	27
12.	X-ray of a section of the yoke of the Boat-shaped Lyre	28
13.	Detail of the rear hooves of the stag on the Boat-shaped Lyre	30
14.	X-ray of the sound box of the Boat-shaped Lyre . .	31
15.	Detail of the sound box of the Boat-shaped Lyre	33
16a.	Detail of the yoke of the Boat-shaped Lyre	34
16b.	Macrograph of impressions of the string wrappings of the Boat-shaped Lyre	34
17.	Detail of the Boat-shaped Lyre during conservation	36
18a,b.	Drawings showing the sectional construction of the stag	39
19a.	CAT-scan of the body of the stag	40
19b.	X-ray of the legs of the stag	40
20.	Copper-covered standing bull from the temple of Nin-hursag at al'Ubaid	41
21a,b.	CAT-scans of the head of the stag	44
22.	Detail of the front of the sound box of the Boat-shaped Lyre	46
23a.	The Boat-shaped Lyre seen from the "reverse" . . .	48
23b.	The Boat-shaped Lyre mounted for exhibition . . .	49
24.	Mary Louise Baker painted the sound box made for the Lapis-bearded Lyre	50

25a.	Woolley's field card for the Lapis-bearded Lyre . . .	52
25b.	Woolley's field notes for the Lapis-bearded Lyre . . .	53
26.	Field photograph of the Lapis-bearded Lyre	55
27.	The new reconstruction of the Lapis-bearded Lyre	56
28.	The Silver Lyre following conservation	57
29.	Detail from the front plaque of the Lapis-bearded Lyre	59
30.	Field photograph of the bull's head and plaque from the Lapis-bearded Lyre	60
31a,b.	X-rays of the bull's head prior to new conservation	62
32a.	Exterior of bull's left ear	64
32b.	Interior of bull's left ear	64
33a,b.	Shell inlay from the temple of Nin-hursag at al'Ubaid	66
34.	Shell inlay	67
35.	The Plaster Lyre <i>in situ</i>	69
36.	Modern lyre from Uganda	71
37.	Woolley carrying the Plaster Lyre	73
38.	Kassite economic text from Nippur	75
39.	The Boat-shaped Lyre before removal from its plaster bed	80
40.	Interior of silver sheathing of the sound box	81
41.	The Boat-shaped Lyre at the start of conservation	83
42.	Lower section of the rear upright of the Boat-shaped Lyre	85
43.	The body of the stag during conservation	86
44.	Lapis lazuli horn tips from the Lapis-bearded Lyre	90
45.	Detail of the interior of the bull's head	91
46.	Interior of the gold mask of the bull's head	92
47.	The bull's eyes from the Lapis-bearded Lyre	93

48. Reverse of the lapis lazuli tesserae for the beard . . . 96
49. Detail of the bull's head and beard during
conservation 97
50. The silver sheet backing the bull's beard
following conservation 101
51. The bull's head following conservation 102

Foreword

The University of Pennsylvania Museum of Archaeology and Anthropology is proud to publish this important contribution by Maude de Schauensee, Associate Editor of the Hasanlu Publication Series at the Museum. Her detailed discussions of the Boat-shaped Lyre and the Lapis-bearded Lyre, as well as the conservation analyses by Tamsen Fuller and Virginia Greene, shed useful new light on these two key artifacts excavated in the late 1920s by Sir Leonard Woolley at the great Sumerian site of Ur.

Careful examination of the two lyres, X-rays, CAT-scans, materials research, and comparative analyses on techniques of manufacture at Ur and elsewhere in ancient Mesopotamia have enabled de Schauensee and colleagues to settle questions about how the lyres were constructed and how they functioned. They are able to show, for example, that the Lapis-bearded Lyre was approximately one-third larger than the previous restoration had indicated; thus, it is one of the largest lyres found at Ur. They are also able to offer a much clearer picture than before on the number of strings on the two lyres and the methods of stringing.

In addition, this research on the two lyres strongly underlines the importance of archival materials—in this case, Woolley's detailed field notes and photographs, as well as the significance of professional excavations (even those undertaken many decades ago), which provide relevant information about condition and context. As de Schauensee reminds us at the close of this publication, "Without Woolley's careful records and meticulous excavations, none of this would have been possible."

Jeremy A. Sabloff
The Williams Director
University of Pennsylvania Museum
of Archaeology and Anthropology

Preface

The purpose of this publication is to present new information obtained from studies and conservation of two musical instruments from Ur, in present-day Iraq, in the collections of the University of Pennsylvania Museum of Archaeology and Anthropology. Appendices by the Conservators present in summary form the conservation of the instruments.

Both projects concerned lyres from graves in the mid-third millennium B.C. 'Royal' Cemetery at Ur excavated in the late 1920s by the *Joint Expedition of the British Museum and the Museum of the University of Pennsylvania*. The two lyres, the Boat-shaped Lyre and the Lapis-bearded Lyre, are two of the most famous artifacts in the collections of the University of Pennsylvania Museum of Archaeology and Anthropology. They are two of only nine mid-third millennium lyres from the ancient Near East about which enough information has been obtained or recorded during excavation to provide archaeological evidence about this type of instrument.

The Boat-shaped Lyre needed new conservation, as the original, and for its period very good, conservation had over time and due to the summer heat of Philadelphia deteriorated to a condition dangerous to the stability of the object. In order to aid the Conservator to better understand the object and the original conservation both conventional methods and modern techniques not available at the time of the first conservation were used. These methods also provided insights into the construction of the lyre, revealing new information for us.

In the case of the Lapis-bearded Lyre, the intention was to correct errors to the first reconstruction of the sound box (the original wooden sound box had not survived), which had been brought to the attention of the curator, Dr. Robert H. Dyson, Jr., by the excavator, Sir Leonard Woolley, when he visited the University of Pennsylvania Museum. At the time of the study and the construction of a new sound box, the bull's

head was also newly conserved and studied, again using both new and conventional methods. Both lyres were returned to exhibition upon completion of the work where they remain for the enjoyment and instruction of the public, student, and scholar alike.

The studies of the Museum's two lyres are the first to have been undertaken since the conservation and study of the Silver Lyre in the collections of the British Museum, London, in the 1960s. We hope that the studies presented here will enhance information obtained from the Silver Lyre, as very little is known about instruments from this early period in Mesopotamia except through records on cuneiform texts from later periods.

Acknowledgments

Projects such as those which are the subject of this publication cannot be undertaken or completed without the assistance, generosity of ideas, or professional skills of many people, as well as the financial support that makes the work possible. For all of these very generous contributions the Museum and I thank everyone whose help brought the projects to a successful conclusion.

Contributors include: Dr. Robert Dyson, Jr., Director Emeritus and Curator Emeritus, Near East section, of the University of Pennsylvania Museum of Archaeology and Anthropology, who made the study and reconstruction of the Bull-headed Lyre and the conservation of the Boat-shaped Lyre possible and who contributed helpful thoughts; Dr. Jeremy Sabloff, present Director of the Museum, who fostered the completion of these two projects through this publication; Diane Davies, formerly Assistant Conservator at the Museum, and Virginia Greene, Senior Conservator at the Museum, who provided excellent conservation of the bull's head from the Lapis-bearded Lyre; Tamsen Fuller, Objects Conservator, Northwest Objects Conservation Laboratory, who carefully and skillfully conserved the Boat-shaped Lyre; James House*, formerly Professor of Art at the University of Pennsylvania, who prepared plans for the new sound box for the Lapis-bearded Lyre and completed most of the work on the sound box itself; and independent Conservator Mervin Martin, assisted by Edward MacLean, who completed the sound box.

We would also like to thank those from the British Museum without whose time and generous assistance the two projects could not have been completed: Drs. Edmund Sollberger* and Richard Barnett,* former Keepers of the Department of Western Asiatic Antiquities, and Dr. John Curtis, who now holds that title, who provided meticulous drawings of the Silver Lyre at the British Museum for comparative purposes, as well as assistance with field records and other information for the Lapis-bearded

Lyre; Dr. Curtis, in addition, for his great help before, during, and after my visit to the British Museum to research the Boat-shaped Lyre; Dr. St. John Simpson, for his assistance with that task; the Trustees of the British Museum, for permission to publish photographs and unpublished field records held in the Archives of the Department of Western Asiatic Antiquities at the British Museum; and Mr. Ian McIntyre, Dr. Andrew Oddy, and Dr. Sheridan Bowman, for their help in attempting to track down information about early conservation of the two lyres.

Those at the University of Pennsylvania Museum of Archaeology and Anthropology whose generous time and help brought the projects to a successful conclusion include: Dr. Stuart Fleming, Scientific Director of the Museum Applied Science Center for Archaeology (MASCA), who arranged the scientific studies conducted in connection with both projects and who provided many helpful thoughts; Dr. Naomi Miller, Senior Research Scientist in MASCA, who identified the wood samples from the Boat-shaped Lyre; Dr. Janet Monge, Keeper of Physical Anthropology, for preparing the silicone impressions of the pseudomorphs on the yoke of the Boat-shaped Lyre; Drs. Erle Leichty and Åke Sjöberg, of the Babylonian Section, who assisted with textual matters; John Murray, Exhibits Designer, and his team for design and preparation of mounts and cases for both lyres, in particular Howard Clemenko, who constructed the mount for the Boat-shaped Lyre; H. Frederick Schoch and Francine Sarin, who provided excellent photographs; Alessandro Pezzati, now Senior Archivist, whose help was invaluable in searching out letters and records pertaining to the lyres; Karen Vellucci, Assistant Director for Publications at the outset of the project, and Walda Metcalf, who currently holds that position; Tobia Worth, Helen Schenck, Jennifer Quick, John Walker, Matthew Manieri, and the Publications staff, without whose assistance this book could not have been prepared; Mary Virginia Harris, Near Eastern Section volunteer, for her invaluable assistance; and finally, Jennifer Hook and Veronica Socha, who provided excellent drawings of the Boat-shaped Lyre.

We would also like to thank the Department of Radiology at the Hospital of the University of Pennsylvania (HUP) for provid-

ing X-rays of the Lapis-bearded Lyre. For the X-rays and CAT-scans of the Boat-shaped Lyre and assistance with their interpretation, we thank the Department of Radiology at HUP, particularly Ann Costello and Dr. Bernard Birnbaum and their teams.

We extend special thanks to Dr. Anne Kilmer of the University of California at Berkeley, who provided very helpful and generous discussions and thoughts on the Boat-shaped Lyre; to Jessica Johnson, formerly at the Materials Conservation Laboratory, Texas Memorial Museum, University of Texas at Austin, who arranged for thin-sections of wood samples from the Boat-shaped Lyre to be made, and to Greg Thompson of the University of Texas at Austin, who prepared them; to Dr. Charles Swann of The Bartol Research Institute, University of Delaware for PIXE studies; and to Arthur Smith of West Chester University for the microprobe studies of the string impressions of the Boat-shaped Lyre.

Funds for the study and conservation of the Boat-shaped Lyre were generously provided by an Institute of Museum Services Conservation Grant matched by a gift from the Women's Committee of the University of Pennsylvania Museum in honor of Dr. Robert H. Dyson, Jr., on the occasion of his retirement as The Charles K. Williams II Director of the Museum.

An initial gift from the Volunteer Guides of the University of Pennsylvania Museum allowed us to embark on the study and the new reconstruction of the sound box of the Lapis-bearded Lyre. Additional funding was provided by the Hagop Kevorkian Fund and by Williamina^{*} and Rodolphe^{*} Meyer de Schauensee.

Funds for this publication and for an exhibition case for the Boat-shaped Lyre were provided through the generosity of Dr. and Mrs. Gregory Maslow.

To those not listed individually by name we thank you here with as much gratitude as those listed. These projects could not have been undertaken or completed without you!

^{*} deceased

Two Lyres from Ur



Plate 1. Sir Leonard Woolley (center) with Dr. Froelich Rainey, Director of the University of Pennsylvania Museum (right), and Mr. Percy Madeira, Chairman of the Board of Directors of the Museum (left), looking at the Lapis-bearded Lyre in the Mesopotamian Gallery in 1955. (Photograph Reuben Goldberg. UPM neg. S4-142564.)

The Two Lyres— From Excavation to Conservation

U nrelated events twenty-five years apart led to unique opportunities to study two lyres in the collections of the University of Pennsylvania Museum of Archaeology and Anthropology and to acquire previously unknown and sometimes surprising information about them. The results of these studies are the subject of this publication.

Sir Leonard Woolley, Director of the *Joint Expedition of the British Museum and the Museum of the University of Pennsylvania*, from 1922 to 1934, came to the University of Pennsylvania Museum of Archaeology and Anthropology in 1955 to receive the Lucy Wharton Drexel Medal (Plate 1). At that time he remarked to Dr. Robert H. Dyson, Jr., then Assistant Curator of the Near Eastern Section, that the sound box of the "Lapis-bearded Lyre"¹ did not look the way he remembered it when he excavated it. It was not until 1976, some twenty years after Woolley's comment, that Dyson, by then Director of the Museum, found the funding for research using original field information and the construction of a new sound box. At the same time the bull's head was newly conserved and restudied.

The second event occurred in 1979. At that time the original conservation of the "Boat-shaped Lyre,"² performed shortly after its excavation during the 1928–1929 season at Ur, had failed over time, making its removal from exhibition necessary. Funding in 1993 allowed for new conservation and restoration of this lyre to be undertaken.

The conservation of the two artifacts presented a unique opportunity to study them anew and gain better information

about their construction.³ Recent advances in the application of new analytical techniques to archaeological research, and reinterpretation of excavation data combined with scientific testing have produced new information as to their construction and usage. Before presenting the specifics on the lyres, however, let us put them into their historical and archaeological context.

Third-Millennium Ur

Today the site of Ur is located about 220 miles south of Baghdad, Iraq, and 10 miles west of the present course of the Euphrates River, in the low, flat, often marshy alluvial plain that forms part of the lower Tigris-Euphrates river valley (Figure 1). In the mid-third millennium B.C., however, Ur was located on major land and water trade routes, with the Euphrates flowing close to the city's edge. The head of the Persian Gulf is thought to have lain farther north than it does now (Moorey 1982:20), and the river closer to the city, placing it in a better position for trade than presently appears. Ur was the center of one of the city-states of Sumer in lower Mesopotamia. Its buildings were constructed of the locally available material: sun-dried mud-brick bound with mortar.

The Sumerians had constructed a well-developed irrigation system around Ur, which allowed them to produce the large crop surpluses that formed the basis of the economy and trade of the region. This wealthy economy necessitated a highly structured government and fostered a stratified social structure and craft specialization. Cuneiform tablets from the mid-second millennium tell us that the population included nobles and priests, farmers and slaves, and artisans with specialized skills (see also Pollock 1983, 1991). The gold, silver, lapis lazuli, hardwoods, and other materials used in the fabrication and decoration of some of the many objects from the royal tombs had to be imported.⁴ A vigorous trade in luxury goods, raw materials, and other commodities is well docu-

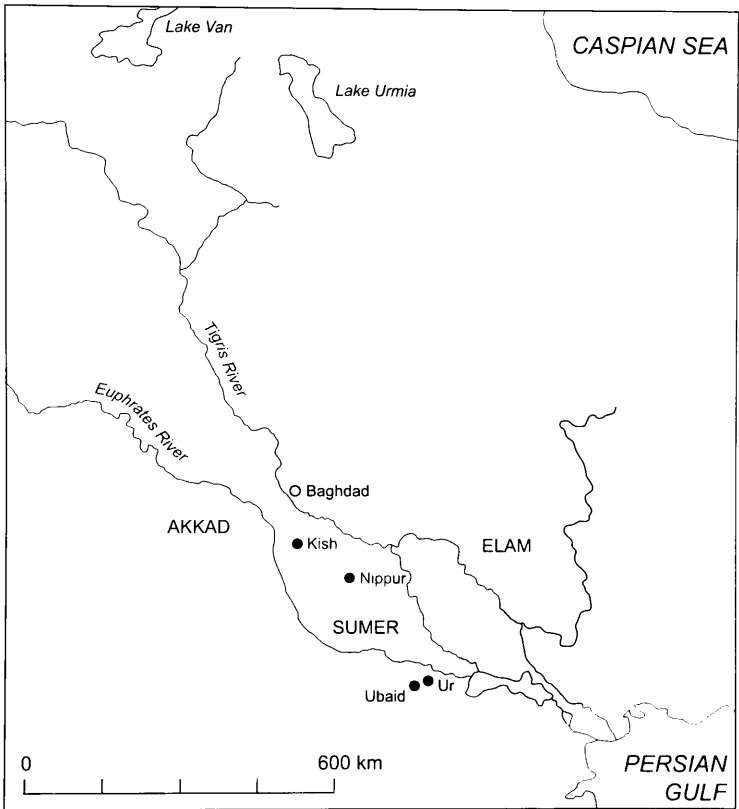


Figure 1. Map of Mesopotamia showing Ur in the marshy alluvial plain west of the Euphrates River.

mented at Ur. Indeed, the only raw materials found in any abundance in the surrounding alluvial plain were clay, used as a building material and for pottery and cuneiform tablets; palm wood; some local poplar, willow, and a few other trees and shrubs; reeds (Moorey 1994:349); and shell.

As was typical for a large city of that period, Ur was divided into sections: the *Temenos*, or sacred area, with its temple and *Ziggurat*, where the seat of power and wealth of the city was centered; residential areas; and, outside the *Temenos* wall, the cemetery, which included many simple burials as well as the sixteen very rich and elaborate "Royal" graves. Buildings belonging to the mid-third millennium were largely destroyed by later inhabitants as they filled and leveled areas for new buildings (Figure 2; Plate 2). The cemetery was damaged from the digging of other graves while the Royal Cemetery was in use, from subsequent graves, and from construction of later buildings. A type of mortar, bitumen (a naturally occurring tar-like substance), used for some of these later buildings, gave Ur its modern Arab name: Tell-el-Mukayyar, or "Mound of Pitch" (Kramer 1963:7).

History of the Excavation

Tell-el-Mukayyar became known to Europe in 1616 when Pietro della Valle, a traveler from Rome, visited the region and brought back the first examples of mud-bricks inscribed in cuneiform script (Kramer 1963:7). In 1850 W. K. Loftus, a member of the Turkish Boundary Commission, visited Tell al Mukayyar and suggested it to the British Museum as a site for excavation. The British Museum accepted his recommendation, and a season was undertaken in 1853–1854 under the direction of Mr. J. E. Taylor, British Consul at Basra. Inscribed clay foundation cylinders of King Nabonidus, found at the corners of the *Ziggurat*, bore the ancient name of the site, Ur (Woolley 1934:3).



Plate 2. *Aerial view of the excavations at Ur. The buildings belong to the later Ur III Period. The Ziggurat is in the upper left hand corner. The cemetery excavation is the dark square at the lower center of the image. It lies outside the Temenos wall. (Photograph by the 84th Squadron of the Royal Air Force, 1930. Reprinted from Woolley 1934: pl. 2.)*

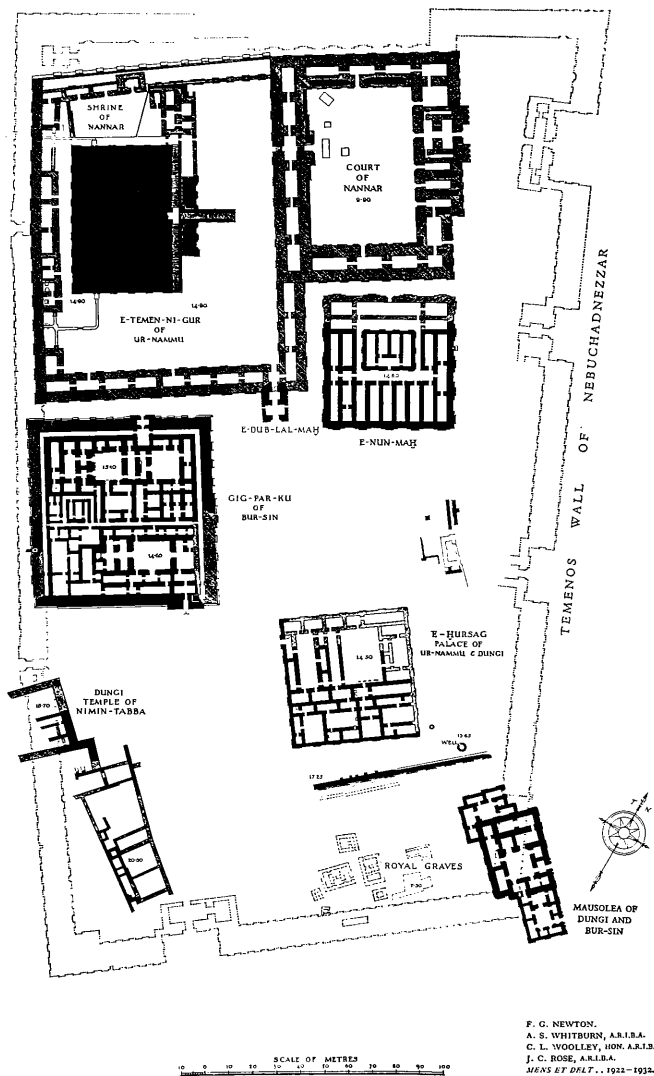


Figure 2. Plan showing the location of the tombs and death pits in the Royal Cemetery in relation to the city of Ur. Later buildings and walls cover those of the mid-third millennium. (Reprinted from Woolley 1934: pl. 1.)

In the late nineteenth century the University of Pennsylvania Museum conducted the first American excavations in the Near East at the site of Nippur and, at the same time, minor excavations at Ur (Moorey 1982:13). In the winter of 1918–1919, British Museum archaeologists digging at the nearby sites of Eridu and al'Ubaid also made a test excavation at Ur. In the summer of 1919, George Byron Gordon, Director of the University Museum, proposed a systematic excavation of the site to Sir Frederic Kenyon, Director of the British Museum. In 1922, the newly formed Government of Mesopotamia under King Feisal granted a permit to the *Joint Expedition of the British Museum and the Museum of the University of Pennsylvania* to excavate at Ur (Dyson 1977:6–10).

The already renowned British archaeologist C. (later Sir) Leonard Woolley was chosen to direct the excavations, which began in the fall of 1922. During that very first season, while digging a test trench through the southern part of the site, the team discovered the Royal Cemetery. The cemetery was not identified as “royal” until seals in some of the graves were read and interpreted as bearing royal titles. A seal from the tomb chamber of grave PG 800 provided the title “Pu-abi, Nin” (“the Lady Puabi”), meaning queen (Moorey 1977:27–28).

When Woolley started his excavations at Ur very little was known about Mesopotamian archaeology. Faced with this fact and the enormous complexity of excavating such an elaborate and large cemetery, particularly with workmen who were not yet trained, he spent the next four years evaluating the site, its stratigraphy and chronology, and training his workmen before finally tackling the cemetery in 1926 (Woolley 1934:5–6; Moorey 1977:24). He devoted his full attention to this project for the next three or four years. It is due to Woolley's extraordinarily careful excavation and meticulous recording that so much information was preserved about the Royal Cemetery⁵ (Plate 3). His notes and publications document the arrangement of the cemetery and relationships between the tombs. The small size of Woolley's staff and the large volume of ma-



Plate 3. C. Leonard and Mrs. Woolley (top) excavating the lyres in the Great Death Pit. The yoke and tuning pegs of the Silver Lyre can be seen behind Woolley as he excavates the Gold Lyre. The Boat-shaped Lyre is not yet visible. (Reprinted from Woolley 1934: pl. 70b.)

terial made his precise recording even more remarkable. Despite this effort, however, many questions still remain unanswered.

The Royal Cemetery

The sixteen royal graves, all apparently dating to a span of about one hundred years, belonged to the Early Dynastic III period, ca. 2600–2500 B.C., (Moorey 1977:24) and were concentrated in a relatively small area of the cemetery (Figure 3, Plate 4). The graves defined as “royal” by Woolley had an outer pit entered by a sloping earth ramp and usually a domed chamber for the principal decedent. Some royal graves had only an outer pit and lacked a tomb chamber, possibly owing to damage by later grave preparation. “Private” graves were simple: bodies were wrapped in straw mats or placed in simple coffins. However, at least one of the coffin burials contained grave goods as extensive as those of the royal tombs, but because of its type it was not included in the royal category by Woolley. It counted a gold helmet among its contents.⁶

The burial pit of “The King’s Grave” (PG 789), in which the University of Pennsylvania Museum’s Lapis-bearded Lyre was found, was untouched, but the accompanying domed brick-and-limestone tomb chamber had, like most, been looted in antiquity (Figure 4). The burial pit was rectangular and measured 5 by 10 m. Its contents spoke of complex ritual and the great wealth of the city. It had a sloping earth ramp by which the six soldiers; two wagons, each drawn by three oxen; and fifty-seven male and female attendants had entered. The soldiers wore copper helmets and carried spears; the oxen wore copper collars, and silver beads adorned their reins, which were attached to silver nose rings. The attendants were buried with their cosmetic containers and other personal items—calcite, copper, and ceramic vessels; lamps; jewelry consisting of head and body ornaments made of gold, silver, and semi-precious stones including lapis lazuli and carnelian and other materials.⁷

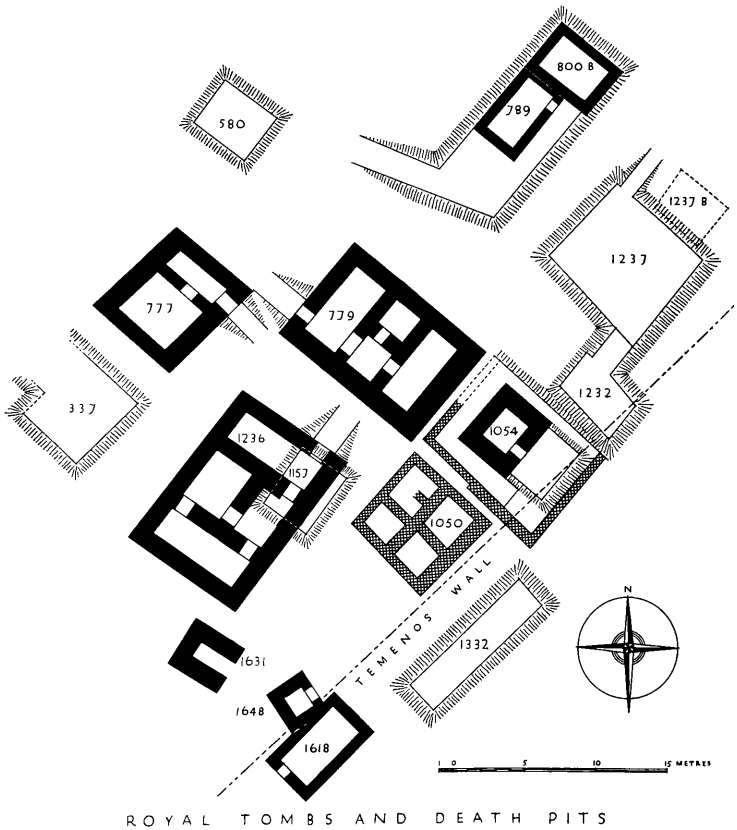


Figure 3. Detailed plan of the Royal Cemetery with the identifying numbers of the tombs. (Reprinted from Woolley 1934: pl. 273.)

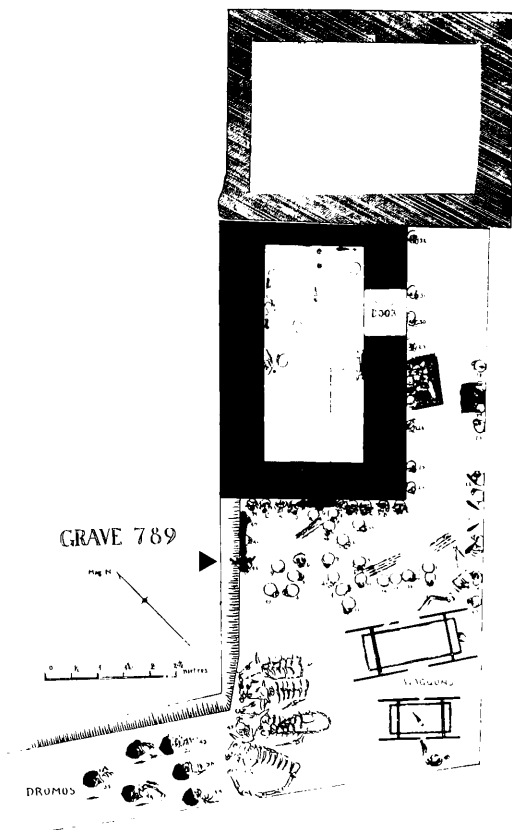


Figure 4. Plan of the King's Grave (PG 789). The Lapis-bearded Lyre (arrow) is located against the west wall of the outer pit just below the tomb chamber. The ritually killed attendants, the ox-drawn carts, and the guards would have entered by the sloping ramp. The tomb chamber, which had contained the body of the principal decedent, was plundered in antiquity. (Reprinted from Woolley 1934: pl. 29.)



Plate 4. View of part of the Royal Cemetery during excavation shows the domed roofs of some of the tomb chambers and the open grave pits. PG 789 is the King's Grave; PG 800 is Lady Puabi's Grave; and PG 1237 is the Great Death Pit. (Reprinted from Woolley 1934: pl. 3.)

Looters had robbed the tomb chamber of its contents, and the body no longer lay on its bier. However, the burial had probably been similar to that of the Lady Puabi (PG 800), which was adjacent to it and had not been looted in antiquity. Her tomb chamber contained only the elaborately jeweled body of Lady Puabi laid on a bier, accompanied by a single attendant and the many vessels and other goods considered necessary for her. Her five guards, five grooms for her asses, ten female attendants, and her grave goods, including a harp and a lyre, were found in the adjacent burial pit.⁸

The "Great Death Pit" (PG 1237) was so named because of its size and the sixty-eight female and six male attendants or guards it contained, the greatest number found in any of the graves. No tomb chamber accompanied this pit, but it may have been destroyed as a later grave was dug. The Boat-shaped Lyre was found in this grave, along with four lyres with box-shaped sound boxes, two copper stag figures on a single base, the two "Ram-in-the-Thicket" figures, and many other items (Figure 5). As in the other graves, the women wore many jewels and were accompanied by personal artifacts.⁹

Comparison with slightly earlier cemeteries, for example that at Kish,¹⁰ shows that shaft graves of this type were not unique to Ur. The Kish graves were similar in plan and content, but not as elaborate or so richly furnished. All demonstrated a complex burial ritual about which little is known, but which speaks of the sophisticated religion and culture of their civilization.¹¹

Musical Instruments from the Royal Cemetery

Musical instruments found in the Royal Cemetery included nine lyres and two harps,¹² a silver double flute, sistra (a type of rattle), and cymbals. Only the metal overlays or other non-perishable parts remained. In some cases, however, Woolley was able to make casts by carefully pouring plaster into voids

DEATH-PIT PG. 1237

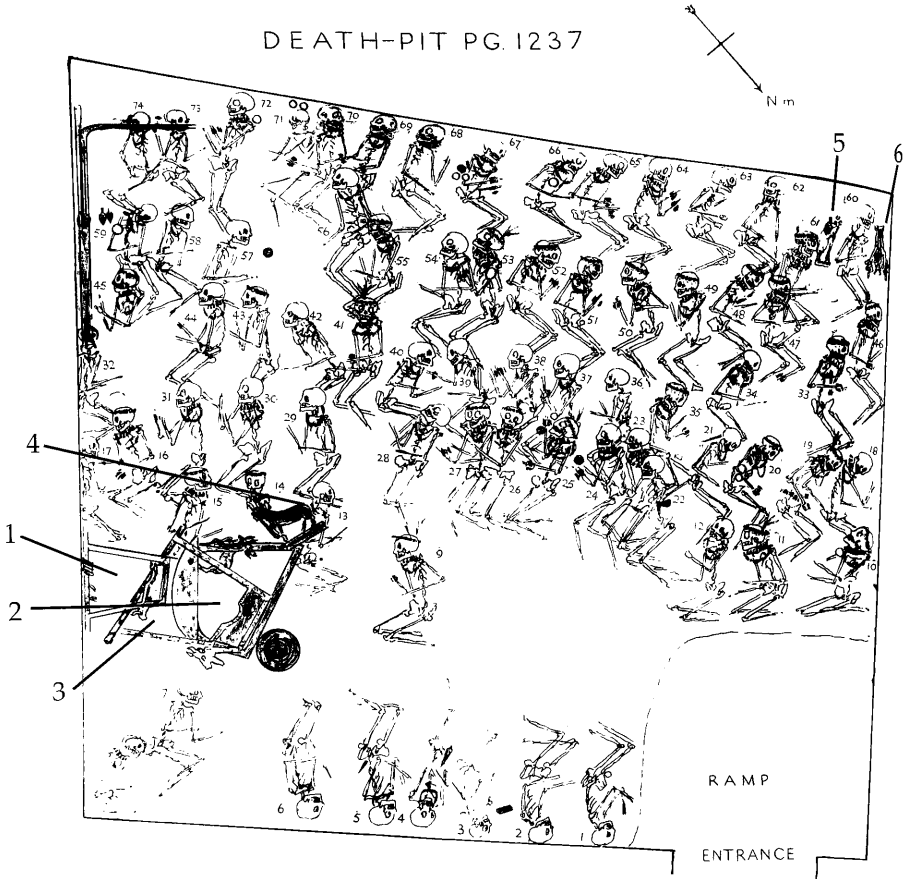


Figure 5. Plan of the Great Death Pit (PG 1237) showing the location of the Silver Lyre (1), the Boat-shaped Lyre (2), the Gold Lyre (3), the copper stags (4), and the two Ram-in-the-Thicket figures (5, 6). It is thought that the tomb chamber accompanying this grave was destroyed when a later grave was dug. (Reprinted from Woolley 1934: pl. 71.)

left in the soil by the lost organic parts of the instruments. Woolley's precise measurements and descriptions of other voids recorded unique information about the lost objects. Those of the decayed wood sound box of the Museum's Lapis-bearded Lyre provided the dimensions for its new reconstruction, while his meticulous recording of the Boat-shaped Lyre during excavation provided information fundamental to our restudy. The remains of the harps and lyres found in this cemetery are the only known examples of actual stringed musical instruments preserved from a mid-third millennium B.C. urban context. Since their discovery in the late 1920s, the lyres, as well as the other instruments found in the cemetery, have been the subject of much study.

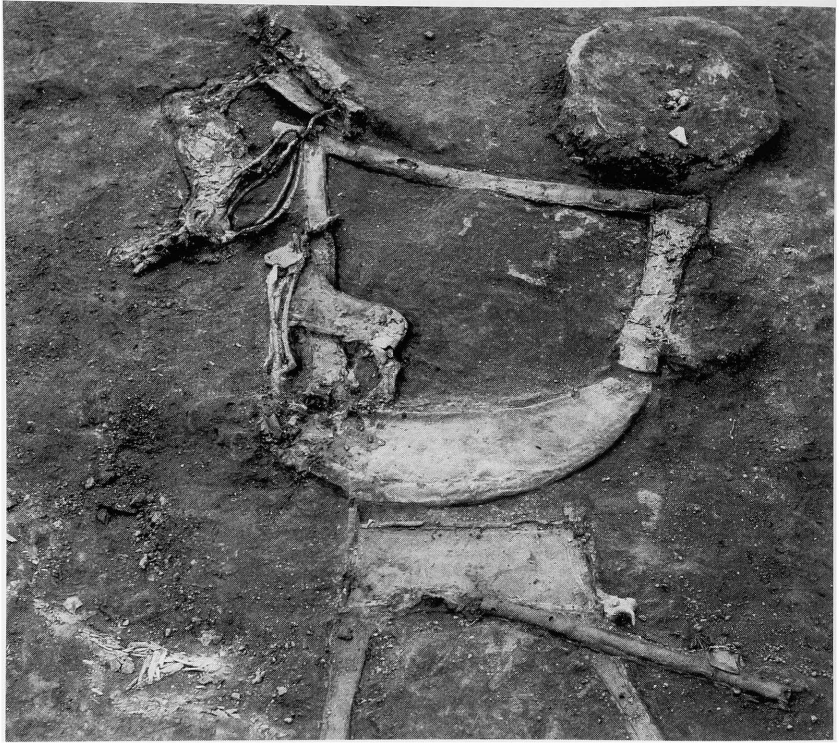


Plate 5. *The Boat-shaped Lyre before it was lifted from the ground. The branches and leaves of the tree in which the stag stands can be clearly seen. They obscure his front legs. The Silver Lyre lies in the foreground, and the yoke of the Gold Lyre (seated in the front upright) lies across it. This upright can be seen lodged between the two "tabs" on the underside of the yoke. The pair of stags (at the upper left of the Boat-shaped Lyre) are set on a single rectangular base and stand in trees similar to that in which the Boat-shaped Lyre's stag stands. (Reprinted from Woolley 1934: pl. 75b.)*

The Boat-shaped Lyre

The rounded profile of the Boat-shaped Lyre's¹ sound box, decorated with the complete figure of a stag, is unique: it is the only extant example of a lyre of this shape and decoration. Later texts speak of the use of goatskins as part of lyre resonators and it may be these that gave their shape to the sound box of this lyre (Kilmer 1980–1983:572); or they may have come from Palestinian and Syrian prototypes (Collon 1980–1983:581). Like the other lyres from Ur, the Boat-shaped Lyre is of the type called "asymmetrical." The strings are placed toward one end of a slanted yoke running to a point of attachment not centered beneath them. This results in unequal string lengths. Symmetrical lyres have a yoke in the same plane as the top of the sound box, therefore the strings are of equal length as they pass over the bridge at right angles to it. Both types of lyre appear to have been used in Mesopotamia at this time, although asymmetrical lyres seem to have been prevalent (Collon 1980–1983:580)² and are shown in representations at Ur.

Original Conservation

Woolley carefully recorded the Lyre's excavation and lifting. Field conservation used low-melting-point paraffin wax, bandage, plaster of Paris, and metal and wood supports (Woolley 1934:122). These were necessary to lift the Lyre from the ground and prevent damage to the thin silver sheathing which had become brittle as its chemical composition altered during its long burial (Plate 5). Further conservation followed after the Boat-shaped Lyre arrived at the British Museum from

Ur.³ It was sent to the University of Pennsylvania Museum as part of the division of finds. The Lyre was placed on exhibition.

The materials used in the earlier conservation deteriorated over time, forcing removal of the Lyre from exhibition in 1979. For safety reasons, it was dismantled by Virginia Greene, Senior Conservator at the Museum. Conservation by Tamsen Fuller, Northwest Conservation Laboratory, was started in the fall of 1993, and the Lyre was returned to exhibition in 1995.⁴

Identification

The instrument's shape raised uncertainty about its identification as a harp or a lyre⁵ (Plate 6a,b). Woolley recognized how unusual the instrument was, stating that "both in the matter of its stringing and in its outline the instrument is rather a compromise between a harp and a lyre" (Woolley 1934:256). The rounded sound box and rounded rear upright of a harp combined with the squared front upright and tapered yoke of a lyre, along with the complete figure of a stag, led to discussion among scholars as to whether the instrument had originally been a harp with parts of a lyre added; some suggested the stag had possibly come from another object.⁶ Understanding the true nature of the Boat-shaped Lyre was probably complicated by Woolley's misinterpretation of two instruments from Lady Puabi's grave, a lyre and a harp. During excavation they had been found on top of and collapsed into each other and had been thought to be one instrument (Woolley 1934:74–77, 249–250, pl. 109). Later study identified them as two: a harp with a wide oval resonator and round arm with large, sturdy gold-covered copper pegs for string attachment, and a box lyre with a bull's head whose uprights were lost.⁷ A pair of copper roe deer on a single rectangular base found near the Boat-shaped Lyre (Woolley 1934: pls. 71, 75b, 113) may have contributed to the idea that the stag on the Lyre might not have been integral to it. These copper stags stand in trees very similar to that on the Lyre. The function of the stags remains unknown.



Plate 6a. *Lapis lazuli cylinder seal (and its modern impression) found in the "Great Death Pit" showing a lyre with the sound box in the shape of a bovid. It is carried by two lyre-bearers in a procession and played by a person walking behind it (lower register). The strings are wound around the section of the yoke closest to the musician and run to a point of attachment in the center of the sound box below the bridge. (UPM accession no. 30-12-2; UPM neg. T4-2078.)*



Plate 6b. *Modern impression of a lapis lazuli cylinder seal found with the body of the Lady Puabi. It shows a harp being played as part of an offering scene (lower right). The strings are wound around large strong pegs set into the arm and run to points of attachment in the top of the resonator. (UPM accession no. CBS 16728; UPM neg. T4-2075.)*

The Construction Techniques

In his field notes Woolley described the Boat-shaped Lyre as follows:

Harp U 12355

of silver throughout[;] the body is boat-shaped and the front upright is supported by a silver statue of a stag 070 high, its forefeet resting in the crook of a long-stemmed arrow-leaved plant which rises up on each side of the head (this is copper).

total ht, 1.16

width, 1.05

For measured drawing see Field Notes. (Plate 7a,b)⁸

In his publication, Woolley is more detailed, describing the Lyre and the stag as made of wood overlaid with silver sheet, and recognizing how unusual it was that the silver stag's head was made this way, rather than being cast like the copper bulls' heads for other lyres and figures. He also recorded the markings for the string wrappings on the yoke. He estimated that there were eleven, and placed the string attachment at the slit in the sound box (Woolley 1934:256).

Although Woolley does not discuss the construction of the wooden body of the Lyre, he does state that he believed the "Plaster Lyre"⁹ used mortise and "probably" tenon construction to attach the uprights to it (Woolley 1934:256–257). It is likely, although no evidence was preserved, that the Boat-shaped Lyre was similarly made. Woolley does not mention metal construction nails in connection with the Plaster Lyre remains, so we must assume that none were used.

The silver sheet covering the Boat-shaped Lyre was about 1-mm thick, while that on the stag's head was thicker. The silver underwent metallographic analysis and was shown to be of great purity.¹⁰ The sheathing was attached to the wooden

structure by silver tacks with large flat heads and short tangs. Those securing the sheet to the Lyre had longer tangs than those for the stag. Tacks were found in the front of the front upright, the back of the rear upright, the top edges of the sound box, and the body and legs of the stag. In several instances, the tacks used for the Lyre are visible to the eye, but in others are revealed only through radiography (Plate 8). Similar silver tacks were used to attach the sheathing to the back of the beard for the bull's head on the Museum's Lapis-bearded Lyre,¹¹ and the sheathing of the Silver Lyre and Lady Puabi's harp,¹² both in the British Museum. Tacks similar to those used on the Boat-shaped Lyre were also used with other objects in the Royal Cemetery.¹³

The front upright of the Boat-shaped Lyre was rectangular in section, whereas the rear upright was oval. The relationship of the front upright to the stag presents a problem as both it and the rear hooves of the stag are approximately the same width as the top of the sound box and the upright does not pass through the body of the stag although it passes between his horns (Plate 9). CAT-scans confirmed that the front upright passed over his left shoulder (Plate 10). During cleaning of the silver sheathing the outline of the flattened upright was shown to be of almost equal sharpness on both sides of the now flattened stag's body. This seems to imply a thinning of the body at this point and suggests that a notch was cut into the stag's body to accommodate the upright. Both then would have been able to stand in the same plane without distortion.

Despite the flattening that occurred during burial, the rounded shape of the rear upright could be seen to resemble that of the arm of Lady Puabi's harp and the published sketch of the fragmentary harp found in another grave.¹⁴ The arms of both harps were round in section at the top, becoming oval at the base. The circular metal caps that would have fitted at the tops, and the oval bands at the bottoms, confirm the original shapes of the wooden arms of the harps. The rear upright of the Boat-shaped Lyre, however, appears to have remained oval throughout its length.

Harp

U 12355

of Silver Manganese

The body is boat-shaped and the front
cymbal is supported by a silver stalk
of a stay 070 high, its forefeet
resting in the crotch of a long-stemmed
arrow-leaved plant which rises up on
each side of the head (this in copper)

Max ht. 1.16

width 1.05

For measured drawing see Field Notes

Photos 1210-13 } in situ
1214 }
1215 }
1219 }
1339 Restored

Pg 1237

Plate 7a. Woolley's field card for the Boat-shaped Lyre made at the time of excavation. (Courtesy Trustees of the British Museum.)

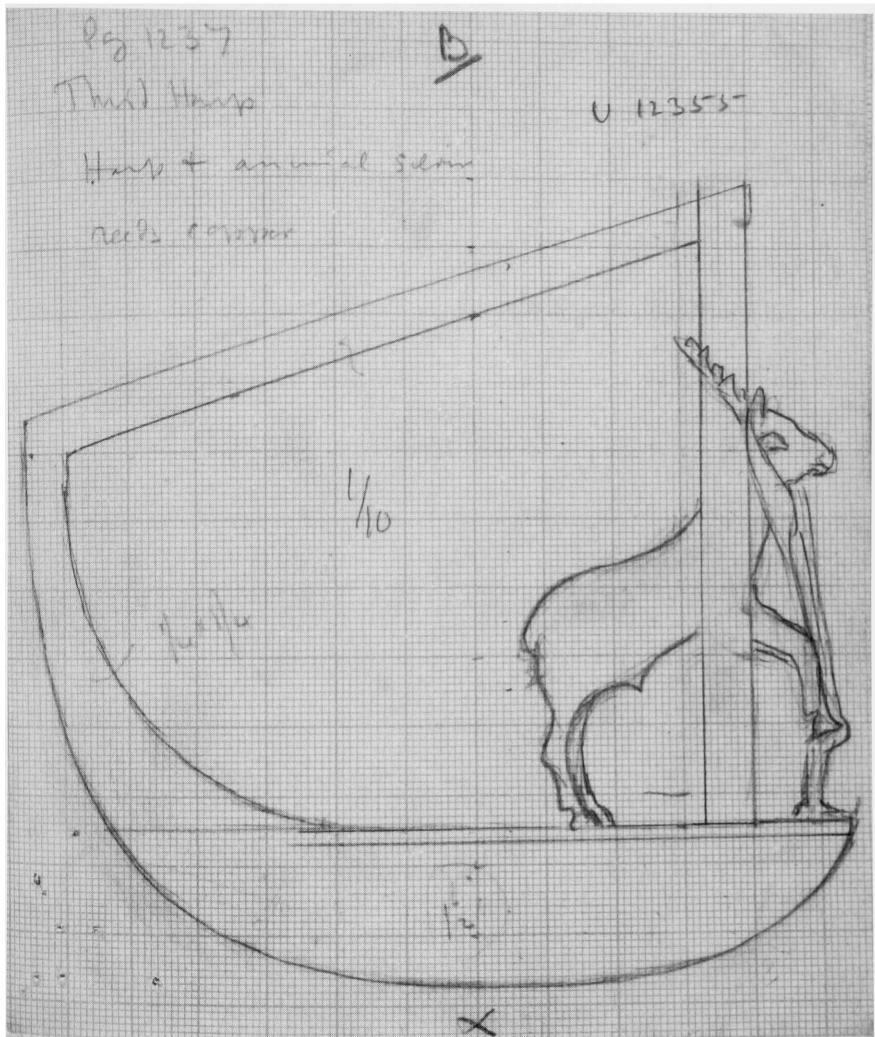


Plate 7b. Woolley's field notes show the drawing referred to on the field card and give a brief description: "PG 1237[;] Third harp[;] Harp & animal silver[;] reeds copper." (Courtesy Trustees of the British Museum.)



Plate 8. CAT-scan of the head of the stag and a section of the front upright of the Lyre. Regularly spaced small silver tacks securing the sheathing to the front of the upright are easily seen. Tacks are absent in the stag's head. The apparent thickening of a metal band over the stag's forehead appears to represent a method of manufacture similar to that of the bull's head for the Lapis-bearded Lyre, where strips of metal with concealed seams form the sheathing. The small bright dot in the eye may represent a copper wire securing the sections of the eye into the bitumen of the head. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)



Plate 9. *Front view of the stag on the Boat-shaped Lyre. Like the Lyre, it was flattened by the weight of the earth during burial. A fragment of the rectangular upright passes between the stag's horns. (Photograph by Francine Sarin, 1994.)*



Plate 10. *This CAT-scan shows a slice through the body of the stag and the front upright, now flattened due to pressure of the earth during burial. The two sides of the sheathing covering the rump of the stag are seen on the right of the image, narrowing and seeming to become almost one through the very compressed midsection and shoulder area. The front upright can be seen as separate from the body of the stag as it passes over his shoulder (above the shoulder in this image). The image therefore shows conclusively that the upright did not pass through the body of the stag. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)*

The similarity between the rear upright of the Boat-shaped Lyre and the arms of the two harps is strengthened by the use of a metal band at the base of the upright where it joined the sound box. The band appears to have served as reinforcement, as well as decoration, on the harps, whose wooden arms seated into a bitumen shoe at their juncture with the resonator. There is no bitumen shoe in the Boat-shaped Lyre, and the band appears to have been a decorative overlay on top of the sheathing which covered the entire length of the upright. X-rays showed that the sheathing for the rear upright was secured by evenly spaced, small, short-tanged tacks with large, flat heads. The large sturdy keys needed for stringing harps¹⁵ are not found in the X-ray, confirming their absence in the Boat-shaped Lyre (Plate 11, see Plate 42).

The sheathing for the round tapering beam of the yoke was wrapped around it with one side of the lower edge folded over and pressed or hammered flat. The other edge was folded back on itself, overlapping over the first. No tacks were used. The rear border of the sheet was folded under. The separate rear cap, with its edge also carefully folded under, was inserted under the sheathing of the yoke. It fitted over the end of the yoke beam and was held in place by a thin layer of bitumen (Plate 12). The front of the yoke was too badly damaged to allow identification of the edge treatment of the sheathing, or the presence or absence of a cap. Comparison with the Silver Lyre in the British Museum, which has an inlaid cap, suggests that one probably existed for the Boat-shaped Lyre. The yoke lay in saddles in the tops of the arms, but the question remains how, under tension from the pull of the taut strings, it was prevented from rolling. A peg or tight wrapping would have been needed to secure it, but no indication of one has been found. It is possible that a clue to securing the yoke may be found in the two tabs on the underside of the yoke of the Gold Lyre in the Iraq Museum. If, as the *in situ* photograph suggests, the front upright lay between, rather than in front of, the tabs, as the restored lyre shows, the tabs might have been part of a mechanism used to stabilize the yoke; however, fur-

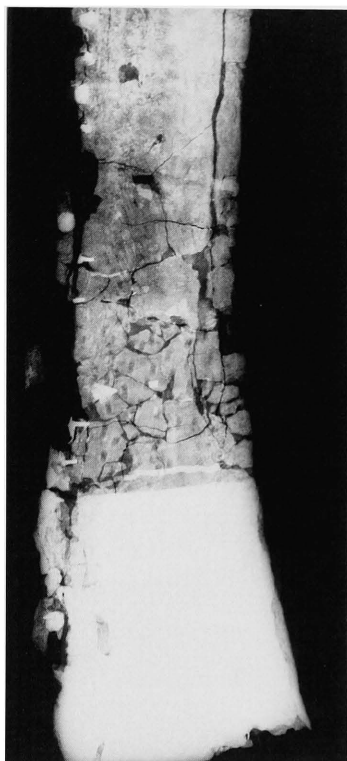


Plate 11. *Conventional X-ray shows large-headed silver tacks with short tangs on the back of the rear upright. Some of the tacks are complete, but only the tangs or heads of others remain. The extra thickness at the base of the upright (white in this image) is made by the silver sleeve overlying the sheathing. Conservation confirmed the presence of sheathing beneath the sleeve. The apparent pitting just above the sleeve is the plaster of the original restoration. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)*



Plate 12. *Conventional X-ray of the rear section of the yoke. The thickened metal of the folded and overlapped edges of the sheet can be seen along the bottom of the yoke. The folded back edge of the sheathing and the silver cap covering the terminal are also visible. No tacks or nails can be seen. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)*

ther study is needed.¹⁶ What appears to be the first string of the Boat-shaped Lyre might have been a securing wrapping, although its impression in the silver sheathing is identical to that of the other string wrappings. A playable string in this position, lying outside the upright, would almost certainly have hit the upright when plucked. Rimmer also remarked on this problem.¹⁷ Use of a securing wrapping is supported by the placement of all the silver tuning pegs for the Silver Lyre between the two uprights. Further, no contemporary representation of a lyre shows a string outside the uprights.

The sound box is large and narrow, with an estimated width of only 4.5 cm across the top. It is narrower than a resonator for a harp.¹⁸ The width was estimated from the combined measurements of the two fragments of the sheet that had been crushed and forced up between the back feet of the stag following burial, as well as study of photographs of the Lyre prior to its placement in a plaster support (Woolley 1929b: pl. opp. p. 319 top) (Plate 13). This width falls within the range for lyre sound boxes from Ur, as demonstrated by the Silver Lyre in the British Museum, although that instrument is considerably smaller in size.

The top of the sound box was covered by silver sheet separate from the sheathing on the sides. The sheets overlapped along the top edges of the sound box and were held in place by a single set of small flat-headed silver tacks. Conventional X-rays show no other tacks or nails in the sound box (Plate 14). Similar tacks were used to secure the sheathing of the harp from Lady Puabi's grave (see Woolley 1934:76). Impressions of horizontal wood grain were found on the interior surfaces of the silver sheathing of the Lyre during conservation, indicating that the sound box had been made of wood¹⁹ (de Schauensee 1998:fig. 4, Plate 40). Samples of remaining fragments of the wood were taken but could not be identified.²⁰

The sides of the sound box converge to a very narrow, almost V-shaped base, with the metal sheathing running from one side to the other over it in a single continuous sheet. There appears to have been very little bow in the shape of the sound



Plate 13. *Detail of the rear hooves of the stag showing the silver sheet originally covering the top of the sound box now crushed between them. (Photograph by Tamsen Fuller [12/1/93].)*

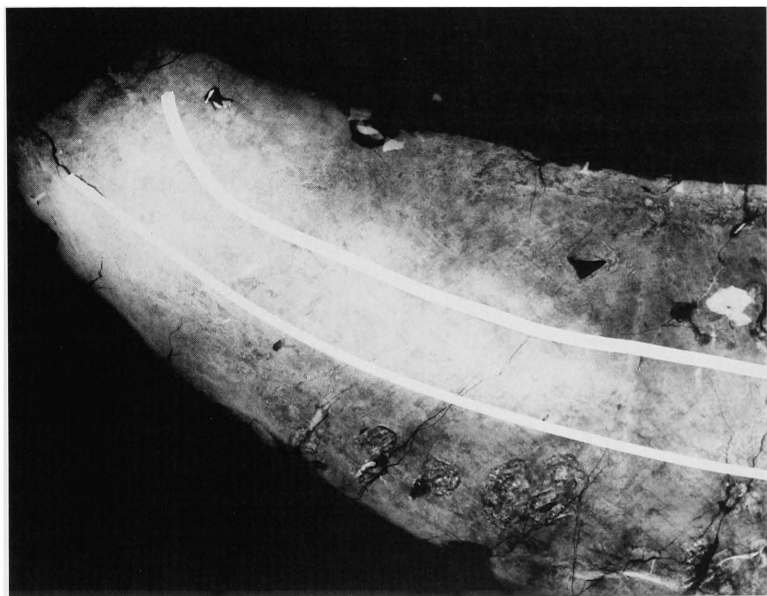


Plate 14. Conventional X-ray of the sound box showing three of the small tacks securing the sheet covering the top and sides of the sound box at its upper edge. The bottom edge of the sound box shows no extra thickness where sheets of metal could have been joined or overlapped. The two curved rods running the length of the image are part of the original conservation of the Lyre. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)

box, as indicated by the small amount of folding in the now-flattened sheathing.

The narrow slit in one side of the sound box had been cut through the sheet from the exterior. String impressions located at the upper edge of this slit radiate upward, demonstrating that this was their point of attachment (Plate 15). Visual examination showed that, if followed from yoke to slit, the strings would have narrowly missed the body of the stag. Similar impressions were found on the sound box of the Silver Lyre in the British Museum; however, these radiate upward from the bottom of the sound box indicating a point of attachment beneath it (Barnett 1969:pl. XVIa). The Gold Lyre in the Iraq Museum had a small opening in the bottom of the inlaid border of its sound box, as well as a change in the pattern of the inlay decoration, suggesting that the strings were attached at that point.²¹ It appears, then, that there was some variation in where lyre strings were attached. However, contemporary representations from Ur show strings entering the side of the sound box just below the bridge.

It is unclear how the strings of the Boat-shaped Lyre were inserted into the slit and held in position. There is no exit opening from the sound box for tied ends to emerge. This suggested the possibility of a sort of toggle arrangement for each string.²² Toggle arrangements are still used to attach strings on some lyres in parts of Africa, but an exit as well as an entrance hole is used (Kilmer 1998: fig. 10b).

After cleaning, the negative impressions in the corrosion (pseudomorphs) on the yoke seem to suggest thirteen sets of wrappings for the strings, although some are faint. The wrappings seem to be in pairs, although this may be an artifact of preservation due to increased pressure from the strings where they were wound tightly over the wrappings.²³ One string lay behind the rear upright and twelve in front of it. As discussed above, the first pair of wrappings may not be for a string. The pseudomorphs are preserved most clearly on the reverse of the yoke (Plate 16a,b). They closely resemble impressions on the yoke of the Silver Lyre. Silicone impressions of the pseudo-



Plate 15. *Detail of the sound box showing traces of the radiating pattern of the strings from the top edge of the slit upwards, apparently confirming that the strings entered at this point. (Photograph by Francine Sarin, 1994.)*



Plate 16a. Detail of the yoke showing pseudomorphs of wrappings for the strings as they were preserved in the corrosion. The edges of the sheathing for the yoke can be seen along the bottom of the yoke; the shape of the end-cap is also clearly visible. (UPM neg. #54-141529. Photograph by Francine Sarin, 1994.)



Plate 16b. This macrophotograph of pseudomorphs of the wrappings beneath string number 10 shows coarse fibers suggesting that the wrappings might have been loosely braided or wound as bundles of fiber around the yoke, rather than being strips of woven cloth. (UPM neg. #54-143817.)

morphs were made and microprobe (high-magnification three-dimensional) studies conducted to try to identify the materials from which the wrappings and strings were made, and to see if any information regarding harmonics could be determined. Unfortunately, these studies were unsuccessful.

Although stringing and tuning by tightening and loosening the strings are recorded in texts (Kilmer 1965:263–264), the pseudomorphs on the yoke do not allow identification of the tuning system used for the Boat-shaped Lyre. It is assumed that a system which included the use of tuning pegs, such as were found with the Silver Lyre, was probably used here as well, although no pegs were found. A bridge would also have been necessary for both physical and acoustical reasons of resonance. The impression of a bridge preserved on the sound box of the Silver Lyre provided information for its placement and size here (Barnett 1969: pl. XVIa).

Although we cannot be certain of the sound produced by this lyre, the size of the instrument (1.16 m high and 1.05 m in length) suggests that it would have been deep and resonant, probably similar to the sound mentioned in later texts. According to Kilmer (1980–1983:576), modern replicas of large lyres have deep, resonant, cello-like tones, while smaller ones have less resonance and are higher pitched.

The Stag

The stag, identified as a roe deer,²⁴ was realistically modeled. The body was carved from wood, and the head made of bitumen (see Figure 7). A sample of wood from the body has been identified as probably either pistachio (*Pistacia*) or boxwood (*Buxus*), neither of which is native to lower Mesopotamia.²⁵

The body of the stag figure was made in separate sections and the head separately modeled. Each leg section was covered with silver sheet with the edges folded over the top of the section (Plate 17). The sheathing was held in place by small silver tacks prior to assembly. The legs were then fitted to the wooden torso, probably by mortising. The torso, including the



Plate 17. This detail of the "reverse" of the Boat-shaped Lyre during conservation shows the flange of silver sheet that had been folded over the top of the hind leg section of the stag prior to assembly and the remains of some of the tacks that had secured it. The remains of the copper tree in which the stag stood are also visible. A leaf from the tree is located beneath the stag's ear. The sheet that had covered the top of the sound box now lies crushed between the stag's hind feet. The yoke is firmly seated in the top of the front upright that passes over the stag's shoulder. (University of Pennsylvania Museum Photograph.)

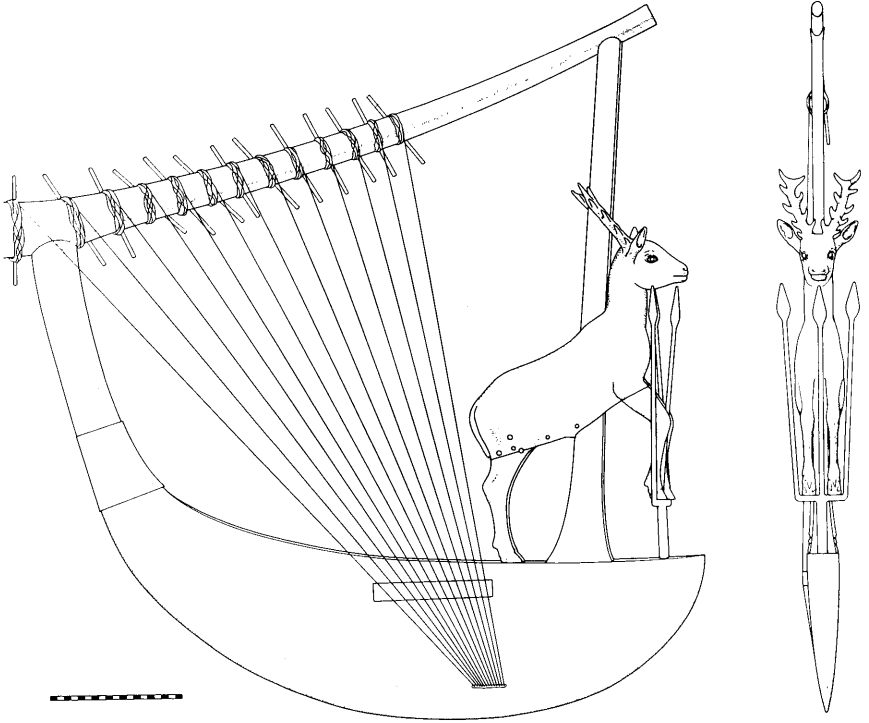


Figure 6. *Reconstruction drawing of the Boat-shaped Lyre, showing how it may have looked when in use. (Drawing by Veronica Socha, 1997.)*

tail, was covered by a single sheet of silver that overlapped the tops of the legs (Plate 18a,b). The soles of the front hooves were covered with small pieces of silver sheet fitted under the overlap of the sheet covering the legs, but those of the back hooves appear not to have been covered (Plate 19a,b). The hooves of the "Ram-in-the-Thicket" in the British Museum were similarly soled.²⁶ Those of the "Ram" in the University of Pennsylvania Museum either were not soled or these very small pieces of gold sheet were lost. Sturdy copper nails hammered through the thickness of the haunch of the stag further secured the parts of the body. Although flattened by the pressure of the earth during burial, it seems clear that the stag had been realistically modeled (Figure 6).

Comparison with the standing bull from the contemporary nearby site of al'Ubaid shows that similar construction methods were used for the two figures. Like the stag, the bull had been made in sections, each separately clad with copper sheet prior to assembly. The sheathing was applied in the same way: the legs were covered with copper sheet whose edges were folded over the top of each section and tacked in place; a sheet covered the torso, overlapping the tops of the legs. Copper nails with large flat heads secured the sheathing. Nail heads can be seen along the stomach and haunches and up the backs of the rear legs. A separate sheet appears to have been applied to the shoulders (Plate 20). According to Woolley, the body sections (legs and torso) were assembled by mortising, the tenons secured by copper bolts. These appear as three large domed heads on the haunch and shoulder, very similar to three large nail heads seen on the haunches of the stag. The head was secured by a wooden bolt. The wooden cores of the body and head are recorded as having been thinly covered with bitumen before the sheathing was applied. The ears and horns were separately made and added to the figure. Copper bolts attached the bull to its base.²⁷ In the case of the stag, wooden dowels must have attached the figure to the sound box because no traces of metal nails were recorded. It seems unlikely that the body of the stag had been coated with bitumen prior to the application of the sheathing as none was

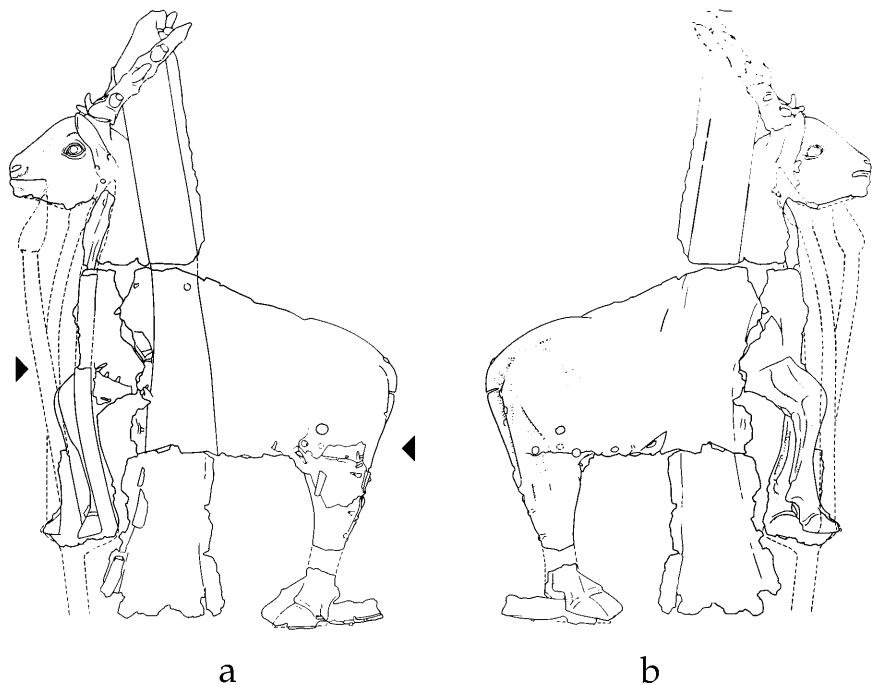


Plate 18a. Drawing of the "reverse" of the stag. The front upright passes over his left shoulder. Damage to the silver sheathing allows the sectional construction of the stag to be identified. Heads and tangs of some of the tacks may be seen securing the flanges folded over the tops of the leg sections and on the outside of the back leg. The head of one of the copper nails running through the haunch is also visible. (Drawing by Jennifer Hook, 1995. UPM neg # 38-143803.)

Plate 18b. Drawing of the "obverse" of the stag. The sheathing covering the torso of the stag overlaps the top of the hind legs hiding its sectional construction. Tacks are visible on the back of the haunch and back leg and along the abdomen. The head of one of the copper nails running through the haunch can also be seen. (Drawing by Jennifer Hook, 1995. UPM neg # 38-143804.)



Plate 19a. CAT-scan of the body of the stag shows how the sheathing had been attached to the wooden core by short large-headed tacks. Two of the structural copper nails through the haunch can be seen. Tacks are also visible in the front of the front upright. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)



Plate 19b. Conventional X-ray of the front legs of the stag showing tacks in the backs of each leg and edging the soles of the front hooves where the sheathing of the legs overlaps the sole plate. Although damaged, the flange of the sheathing and the tacks holding it in place may be seen at the top of the leg section. The rear hooves (to the right of the front legs and set on their sides in this image) have tacks in the backs of the legs but none under the hooves. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)



Plate 20. *Copper-covered figure of a standing bull on a rectangular base from the temple of Nin-hursag at al'Ubaid. The visible edges of the sheathing and the tacks show that this figure was made and covered with metal sheet using techniques like those for the stag from the Boat-shaped Lyre. (UPM accession no. CBS 15886; UPM neg. 9131).*

recorded in the field notes and no traces were found during conservation.

During conservation, the head and horns of the stag were found to have been modeled from bitumen, not made of wood as Woolley had thought.²⁸ Conventional X-rays and CAT-scans showed no seams or tacks in the silver sheathing of the head, horns, or ears. CAT-scans also showed a thickening of the sheet over the brow of the stag. This has not been explained but may be where separate sheets of metal covering the head overlap. X-rays showed a similar thickening of the sheet used to cover the bull's head from the Lapis-bearded Lyre. Here overlapping strips of metal could be determined. The CAT-scans, therefore, confirmed Woolley's belief that the stag's head was not cast but hammered.²⁹ The bottom edge of the head can no longer be defined, but the shape of the bitumen filling suggests that the head followed the same design as others from Ur, for example the gold bull's head from the Gold Lyre and a silver bull's head from the lyre from Lady Puabi's grave (Woolley 1934:pls. 117 right, 120a).

A square void was found in the bitumen of the head during conservation, and impressions in the bitumen show that a wood tenon had been used to join the head to the body of the stag (Figure 7).³⁰ A similar void was found in the bitumen filling a lion's head made of copper sheet from the temple of Nin-hursag at al'Ubaid (Hall and Woolley 1927:pl. XI:1). A large copper nail, fragments of which remain, ran from side to side through the stag's head, probably securing it to the wood neck support. An apparently similar use of copper construction nails is reported for the "Ram-in-the-Thicket": "the ears and lapis horns and eyes being fixed by copper rivets going right through the wood of the head" (Woolley 1929c:528).

The stag's ears were almost certainly made separately, but no seams or means of attachment are now discernible. The thickness of the silver sheet covering them appears to be the same as for the head.

CAT-scans have given surprising and unexpected new information about the construction of the horns: copper rods formed an armature for modeled bitumen horns (Plate 21a,b).

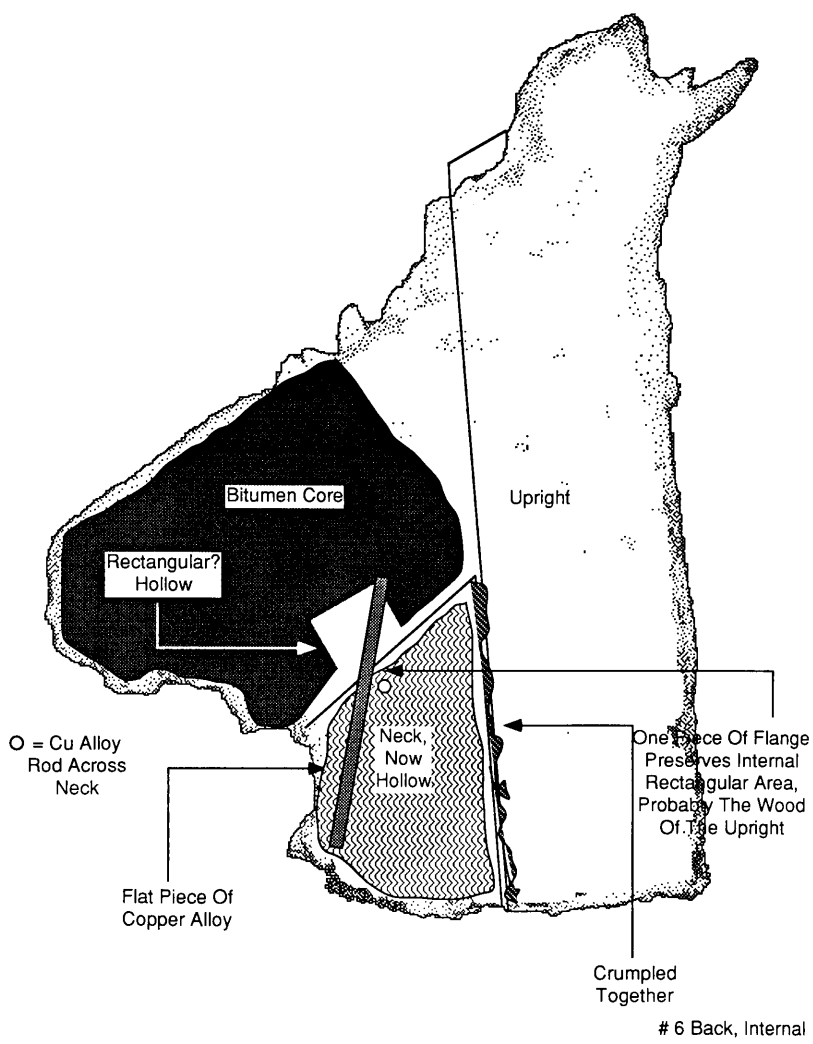
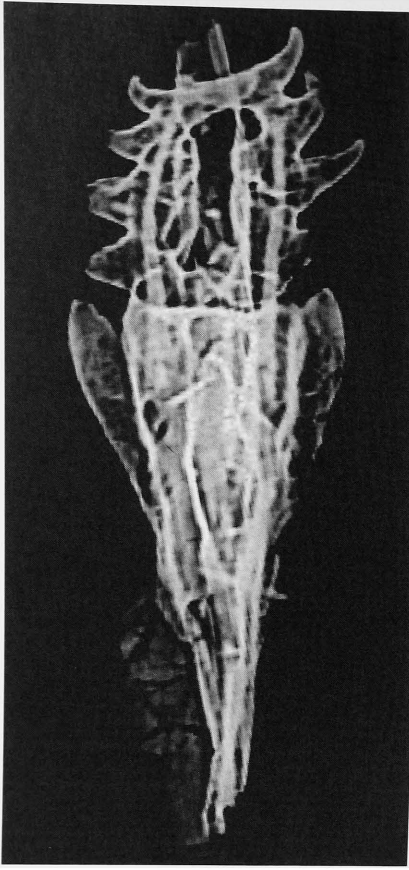
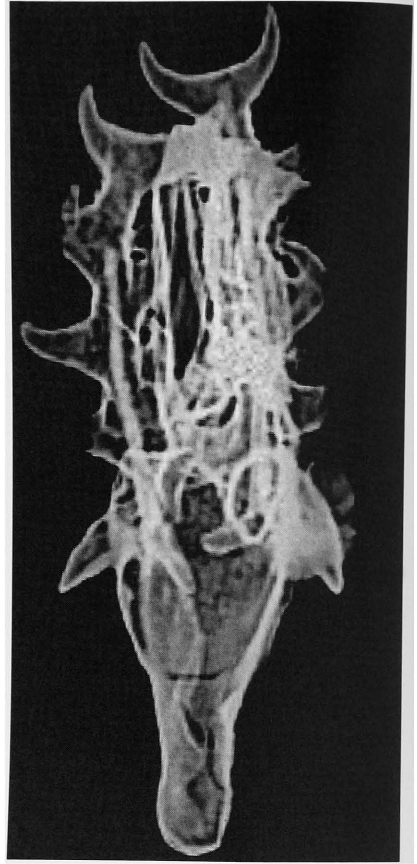


Figure 7. Digitized schematic drawing recording the void for the now-lost wooden support which had attached the bitumen-filled head of the stag to the wooden body. The bottom edge of the head is defined by the plane of the bitumen filling. (Image by Tamsen Fuller, 1994.)



a



b

Plate 21a. Front view of the head of the stag. This CAT-scan shows the internal copper rod armature for the horns inserted into the bitumen core of the head. Each rod was stabilized by a small pin set at right angles through the bottom of the rod. Bitumen was modeled over this armature. Small copper pins served as supports for the tines. The horns were covered with silver sheet and fitted into sockets projecting up from the head. The long slender horizontal rod at the bottom of the head is the structural nail that secured the head to the wooden neck tenon. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)

Plate 21b. CAT scan of the stag's head from the top showing the outline of the sockets for the horns, the armature rods, and the outline of the sheathing covering the horns, head, and ears. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1994.)

The eyes, which could not be removed for examination, were made of shaped pieces of lapis lazuli and shell fitted into each other, probably in the same way as the eyes of the bull on the Lapis-bearded Lyre (see Appendix B and Plates 8 and 47). The eyes were held in place by the bitumen filling the head.

The Tree

The tree in which the stag's front hooves stood was badly distorted and in very poor condition when found. It is visible in a photograph of the lyre during excavation but is now almost entirely lost. A thick copper rod formed the trunk. Thinner rods formed two branches that terminated in flat spade-shaped leaves at about the level of the stag's ears and under his chin (Woolley 1929b:320 and Plate 6). How the parts of the tree were joined remains unknown, but comparison to the "Ram-in-the-Thicket" suggests that the branches may have been fitted into the trunk (Rakic 1998). During conservation the trunk was discovered to have been inserted into bitumen which filled the tip of the sound box in front of the upright (Plate 22).

This is the only occurrence of bitumen used in this way with a musical instrument found at Ur. It appears to have served as a support for the tree. The tree is very similar in design and proportion to those used for the two stag figures found near the Boat-shaped Lyre and for the two Ram-in-the-Thicket figures.



Plate 22. *This image shows the copper tree trunk seated 6.5 cm into the bitumen that fills the front tip of the sound box. (Photograph by Tamsen Fuller, 1994.)*

Our study, therefore, has provided new information and also made clear that Woolley's original identification and careful description of this lyre as a single unique instrument were correct. New techniques not available at the time in which Woolley worked have augmented our knowledge of the instrument and the stag, while the meticulous work by Conservator Tamsen Fuller, together with new conservation methods and materials, have preserved this Lyre for generations to come (Figure 6, Plate 23a,b).



Plate 23a. The "reverse" of the Boat-shaped Lyre during conservation. Damage to the silver sheathing on this side revealed previously unknown construction details. The fragmentary remains of the copper tree in which the stag stands are also visible. Fragments of the sheet which had covered the top of the sound box now project upwards from it. (Photograph by Francine Sarin.)

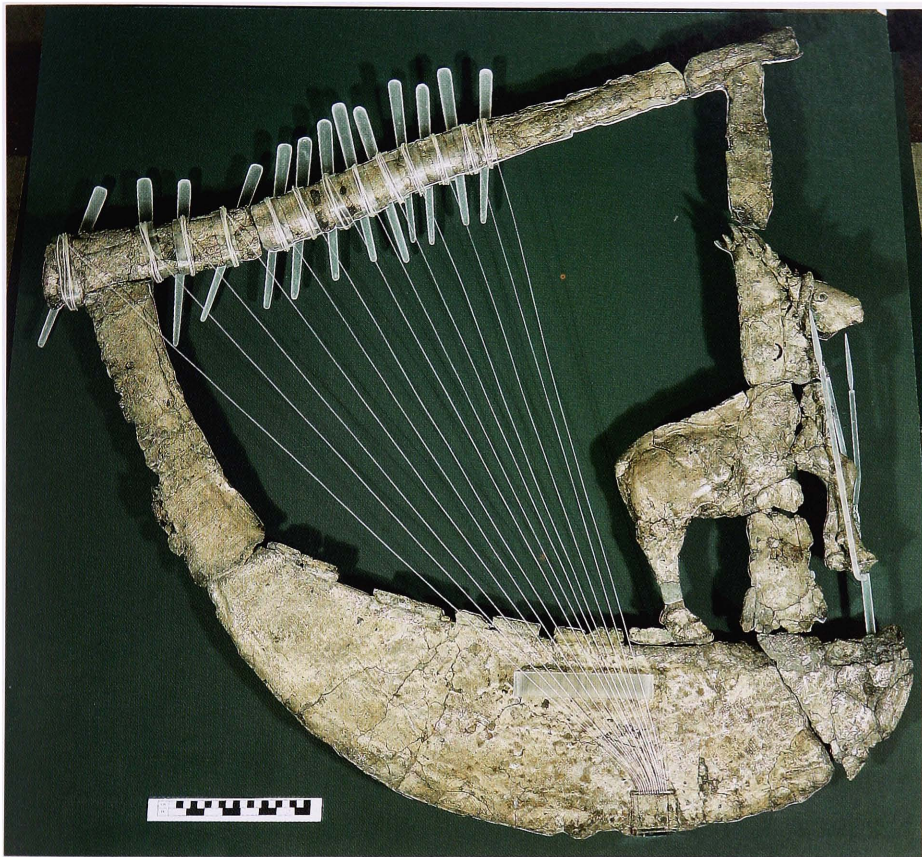


Plate 23b. *The Boat-shaped Lyre mounted for exhibition. The strings, tuning pegs, and bridge have been restored in clear plastic based on evidence from the lyre itself, the Silver Lyre, and contemporary representations. The string wrappings are indicated by strips of clear plastic. The missing sections of the tree and its branches have been restored in frosted plastic. (UPM neg. S4-142048.)*



QUARTZITE STATUE OF HÔRUBA
THE GREAT SEER OF HELIOPOLIS
KOPTOS
XXVI DYNASTY 004 B.C.

Plate 24. Mary Louise Baker painted the sound box made for the Lapis-bearded Lyre at the University of Pennsylvania Museum shortly after the bull's head and the plaque arrived from England in the late 1920s. (UPM neg. G8-8272.)



The Lapis-bearded Lyre

History

The Lapis-bearded Lyre came to the University of Pennsylvania Museum in 1929 as part of the division of finds for the 1926–1927 season, the first season of excavation in the Royal Cemetery. It was a box lyre—the type with the rectangular sound box prevalent in the cemetery—and was found in the King's Grave. It had had a wooden sound box decorated at the front by a bull's head made of wood covered with gold and lapis lazuli set above a plaque made of shell set in bitumen. When the Lyre was found the wood had disintegrated and the head and plaque were crushed and distorted.

The bull's head and the plaque were first conserved in the field by Woolley using wax and muslin, and later in the conservation laboratory of the British Museum. The reconstruction of the sound box was made at the University of Pennsylvania Museum,¹ when Dr. Léon Legrain, an epigraphist and museum representative on the Ur expedition, was Curator of the Babylonian Section (Plate 24).

The Lyre was placed on exhibit where it remained until 1976 when Dr. Robert Dyson, Jr., had it removed to start the process of research and the construction of a new sound box. Woolley's field card confirmed his comment in 1955 that the sound box did not look as he remembered it. The field notes show how difficult it was to interpret the undecorated Lyre correctly during excavation (Plate 25a,b²). It was one of the first lyres without a decorated sound box to be identified.

Bull's head

U. 1055-6

of gold, with lapis hair between the horns and a lapis beard set in silver. The gold horns are tipped with lapis. The body was of wood (see Field Notes) & down the front are shell plaques with engraved mythological scenes.

width across horns

025"

Photos

pg 789

Plate 25a. Woolley's field card described the Lapis-bearded Lyre: "Bull's head U. 10556 of gold, with lapis hair between the horns and a lapis beard set in silver: the gold horns are tipped with lapis. The body was of wood (see Field Notes) & down the front are shell plaques with engraved mythological scenes. Width across horns 025." (Courtesy Trustees of the British Museum.)

Gold headed bull

pg 789

was out of all proportion & on the other hand there
is nothing to prove that this is a harp & the
body is certainly different from that of the other.
Under bull were 3 skulls - behind it was
another wearing gold ribbon & wreath & in
front of it was a row of 3 more skulls
all close against a wood-work which lined inside
of pit in which bull stood

- line at back was most marked (see also
photo) & is against - beast's being a harp.
- also absence of inlay, as it denotes a
conventional box & absence of it makes a
natural body more probable. But a tail
of too long & - legs resemble the broken harp
in relief like those of the Deir el Bahri Hathor
cow - groove at back of body might be
- right hind leg seen from inside.

Plate 25b. Woolley's field notes for the Lapis-bearded Lyre read in part: "Gold headed bull[;] was out of all proportion—on the other hand there is nothing to prove that this is a harp and the body is certainly different from that of the others—under bull were three skulls—behind it was another wearing gold ribbon and wreath—in front of it was a row of 3 more skulls all close against the wood-work which lined inside (?) of pit in which the bull stood.

"Line at back was most marked (see also photo) & is against the beast's being a harp—also the absence of inlay, as it denotes a conventional box & the absence of it makes a natural body more probable. But the tail (?) is too long and the legs must have been in relief (?) like those of the Deir el Bahri Hathor cow—groove at back of body might be the right hind leg seen from inside."
(Courtesy Trustees of the British Museum.)

Woolley was not sure at first exactly what sort of object he had found (Woolley 1934:69–70).

In his 1934 publication Woolley describes the instrument, stating that the rear upright and sound box were of undecorated wood. He gives the Lyre's measurements, taken from voids left by the disintegrated wood, as "a maximum length of 1.17 m and for the back upright a height of 1.40 m" (Woolley 1934:70). The voids showed that the rear upright had been square or rectangular in section and the sound box rectangular.

The New Sound Box

In 1977, a careful study was made of the field notes and sketches, *in situ* photographs, and information about other lyres in the cemetery. These sources, measurements recorded by Woolley, and detailed information supplied by the British Museum provided the foundation for the new reconstruction. Working drawings were made by James House, retired woodworker and past instructor of sculpture in the Department of Fine Arts at the University of Pennsylvania, and a new reconstruction of the sound box was begun.³ Failing health prevented House from completing the project and the restoration was finished by independent Conservator Mervin Martin, assisted by Edward MacLean.

The new sound box used Woolley's published dimensions. The result was an instrument approximately one-third larger than the previous restoration, making it one of the largest lyres in the Royal Cemetery (Plate 27). The sound box was left plain in keeping with Woolley's findings during excavation, although a border was scribed around the edge. A bridge was restored to the Lyre based on the impression of one on the Silver Lyre in the British Museum (Barnett 1969: pl.XVIa) and because one would have been required for tone and resonance during play. Based on the same model (Plate 28), feet were added to our reconstruction. No attempt was made to construct a playable lyre. Although Woolley suggested the use of

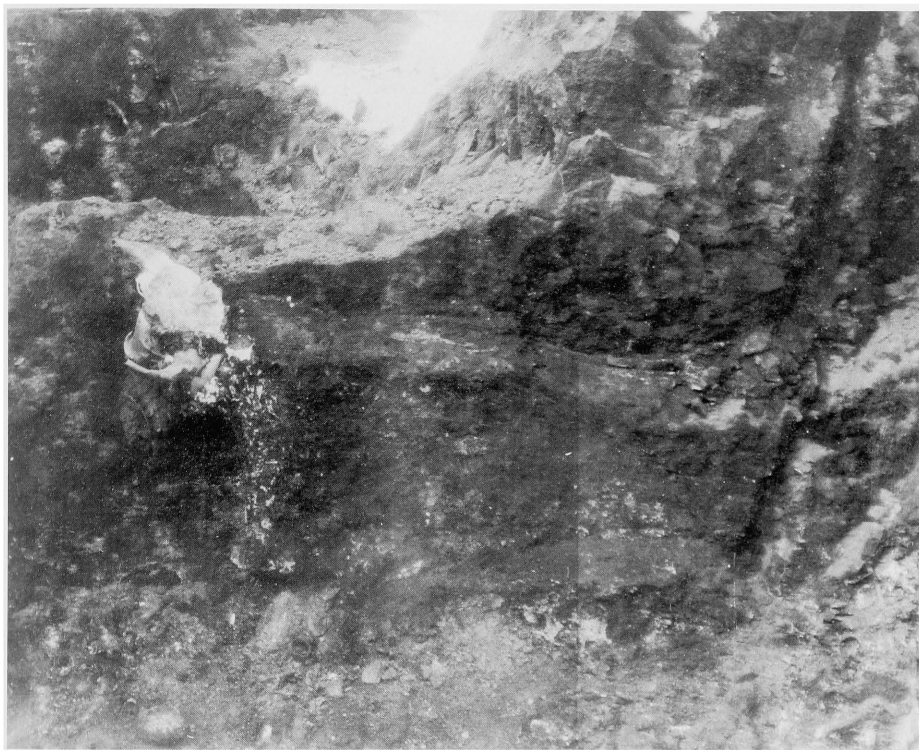


Plate 26. *Field photograph showing the voids left in the soil by the decayed wooden sound box and rear upright of the Lyre. The position of the bull's head relative to the sound box can also be seen. (Reprinted from Woolley 1934: pl. 106a.)*

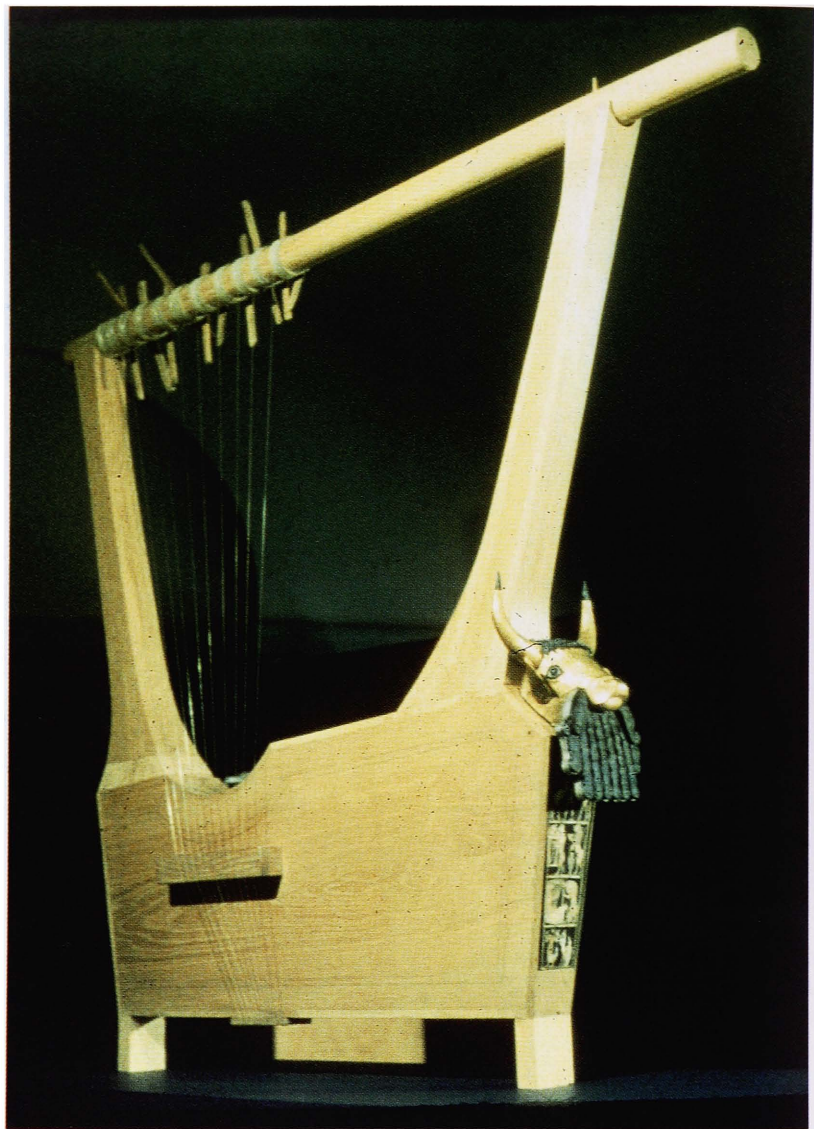


Plate 27. *The new reconstruction of the Lapis-bearded Lyre with its larger sound box. (UPM neg. S4-142569.)*

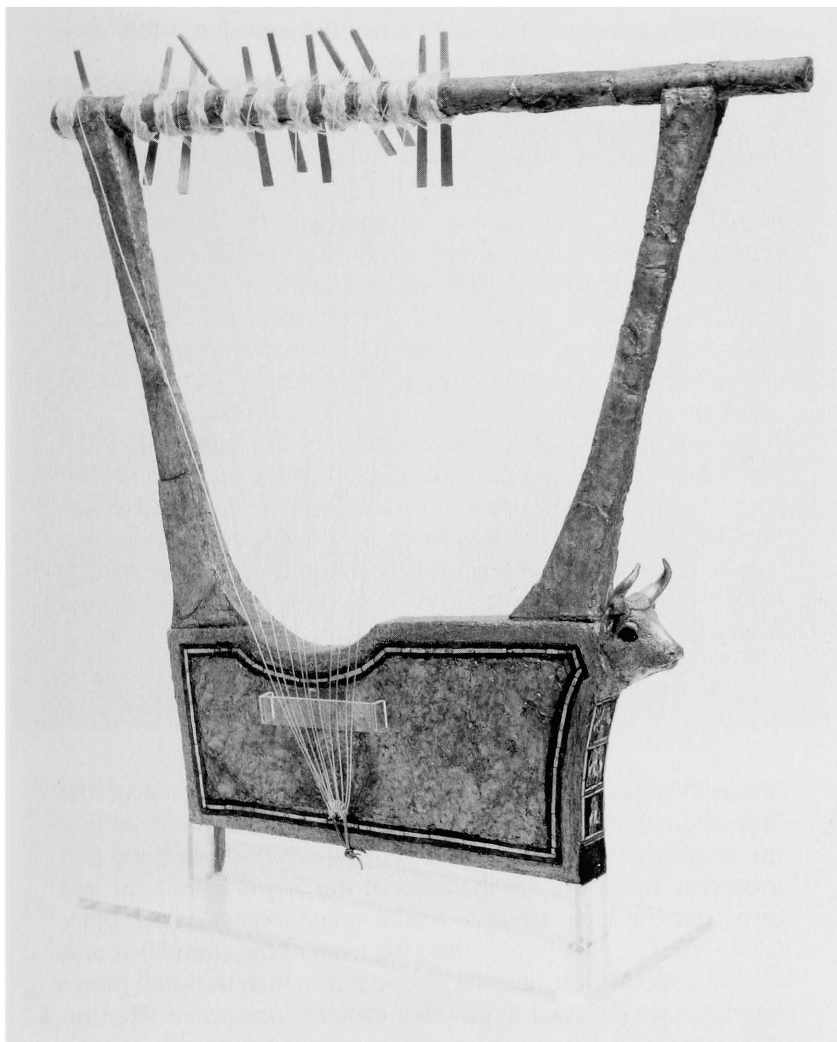


Plate 28. *The Silver Lyre (BM 121201) following conservation by the British Museum. (Courtesy Trustees of the British Museum.)*

mortise and tenon construction for the Plaster Lyre (Woolley 1934:257), no insight into the internal configuration of the sound box, a feature that could affect the sound, or other construction features could be obtained.

To determine the number and arrangement of the strings along the yoke, the type of wrappings, and the tuning pegs, information from the Silver Lyre was again used. Strings were attached under the bottom of the box, following the same model (Barnett 1969; Woolley 1934: pl. 111). Contemporary representations of lyres show varied numbers of strings, and texts refer to lyres with different numbers of strings (for example, see Kilmer 1960, 1965). Depictions could be crudely rendered, however, with the strings disproportionately thick, so the number of strings shown may not represent the actual number.

The large size of the new sound box suggests that the Lapis-bearded Lyre would have had to rest on the ground. The length of the reach needed to play the Lyre meant that the player could not steady it as he or she played. Another person would have had to perform this function in a manner similar to that shown on a panel from the Lyre's decorative plaque (Plate 29).

The Bull's Head

When Woolley excavated the Lyre the wooden core of the bull's head had vanished and the overlays had collapsed into the resulting void. The gold sheet that covered the head and the silver sheathing for the back of the beard were bent and torn, and the lapis tesserae (small inlay pieces) out of place (Plate 30). The panel decorating the front of the sound box was in similar condition, and the bitumen in which the shell pieces had been set decayed to powder. Woolley preserved what order remained by pouring molten wax, strengthened by muslin, over the head and the plaque to keep the parts in place before lifting them from the ground. Following removal he



Plate 29. This detail from the front plaque of the Lapis-bearded Lyre shows a large lyre being steadied while played just as the actual Lyre would have had to be. Here the sound box is in the shape of a recumbent bull and the strings enter it just below the bridge. Another animal plays a sistrum. (Detail of neg. T35-110.)

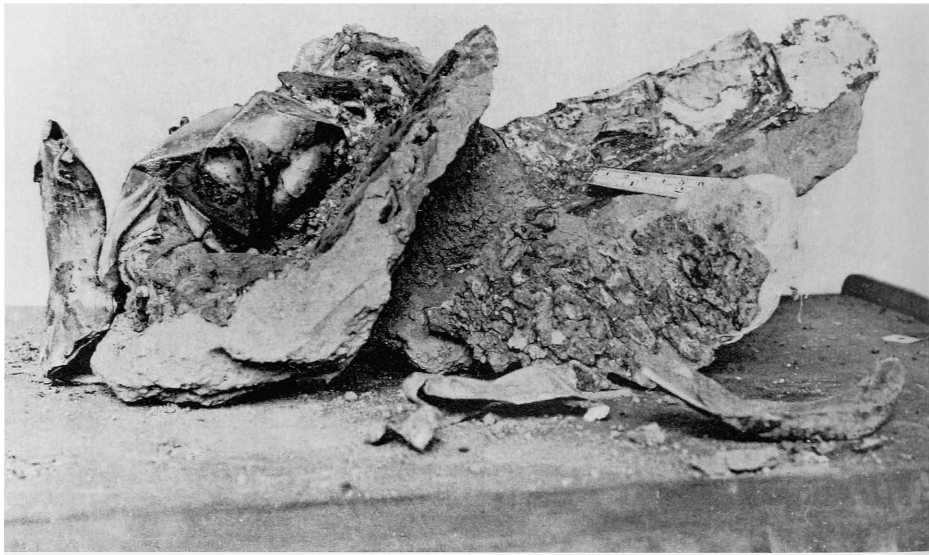


Plate 30. *Field photograph of the badly crushed and distorted bull's head and plaque immediately following excavation. The bull's nose is at the left of the image and the plaque at the right. (Reprinted from Woolley 1934: pl. 106b.)*

studied them and described the bull's head as having a wooden core over which gold sheet had been hammered, with separately made ears and horns also covered with gold sheet and "fixed to the core through holes in the gold plate" (Woolley 1934:70). Woolley described the restoration of the head and beard as follows (Woolley 1934:70):

...the head was straightened as much as possible...the horns and ears fitted perforce into their right positions as dictated by the holes and by the angle of the edges of the gold which had been brought up to disguise the joins. The silver backing of the beard was reduced and straightened, and the lapis tesserae, which had been kept in their original order, were replaced; the tesserae between the horns, in so far as they were in any order at all, had been preserved in that order [and were replaced].

Holes on the back of the bull's neck show where tacks had joined the strips of sheathing and attached them to the core.

New Conservation and Restoration of the Bull's Head

In 1976, when the bull's head and plaque were taken to the conservation laboratory, the plan was to clean and improve their appearance. However, as Diane Davies, then Assistant Conservator, and Virginia Greene, Senior Conservator, started their work, it became clear that more was needed. The head was not completely straight, the restoration of the beard showed signs of deterioration, early tests showed that fragments of the original silver backing for the beard lay hidden beneath the restoration, and an X-ray revealed an armature inside the head (Plate 31a,b). The armature was shown to be deteriorating. As a result, the decision was made to dismantle and newly restore the head and beard.

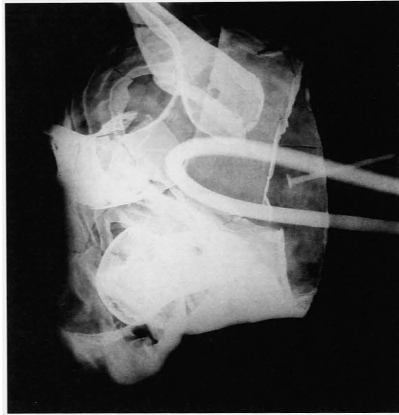
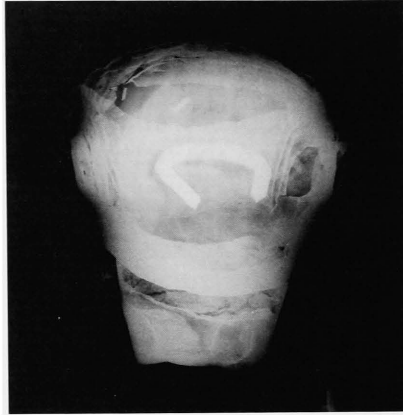


Plate 31a,b. Conventional X-rays of the bull's head prior to new conservation. The overlapping strips of gold sheet covering the wooden core can be seen in the mask of the face. The extra thickness of a band over the forehead resembles the unexplained thickness in the stag's head from the Boat-shaped Lyre. Holes for the attachment of the horns and ears are also visible. The U-shaped armature from the original restoration is seen inside the head. (Courtesy Hospital of the University of Pennsylvania, Department of Radiology, 1976.)

Examination confirmed Woolley's description of how the head had been covered. Strips of gold sheet had been pressed together so that no seams were visible. Like the silver backing for the bull's beard and the sheathing for the stag from the Boat-shaped Lyre, the gold sheet had been carefully folded over the edges of the core as the head was made (see Plate 46). The sheathing for the ears showed pressed seams along the tops of the pinnae, while small domed tacks secured it along the stem. Four tacks remained in the stem of the left ear, all others were lost. The sheet was neatly folded over the bases of the ears before they were attached to the head by small pegs (Plate 32a,b). The pegs did not survive but are suggested by the holes pierced through the sheet covering the head. The sheet covering the horns had been pressed or hammered into place and the edges folded over their bases. No holes for tacks were found. The pressed edges of the sheet can be seen in the X-ray and by eye. It is possible that a bitumen coating had been used to help secure the sheet, but none now remains nor was any recorded by Woolley.⁴ The gold sheet was analyzed and found to be very pure.⁵ The lapis lazuli horn tips were stepped for insertion and pierced horizontally for a securing peg (see Appendix B; Plate 44). This head is the only example on a lyre from Ur which has horn tips of a material different from the horns themselves.

When the eyes were disassembled during conservation, new information came to light showing how the separate sections had been set into each other. A copper wire through a small hole in the tip of the cone-shaped lapis pupil (the longest piece) held the sections together and secured them to bitumen behind the eyeball (see Appendix B; Plate 47). Traces of bitumen at the edges of the eyes of a silver bull's head from another lyre and a silver lion's head from a wooden chest⁶ suggest the same construction method for these eyes. A similar technique was used for the eyes of the copper-covered bitumen lion heads from al'Ubaid: a copper wire was threaded through the tip of the longest segment of the eye, the whole then set into the bitumen of the head (Hall and Woolley 1927:18, 31; pl. XII:2, 3).



Plate 32a. Exterior of the bull's left ear showing the heads of four tacks in its stem and the neatly pressed and almost invisible seam along the top of the pinna. (Photograph by Virginia Greene, 1977.)

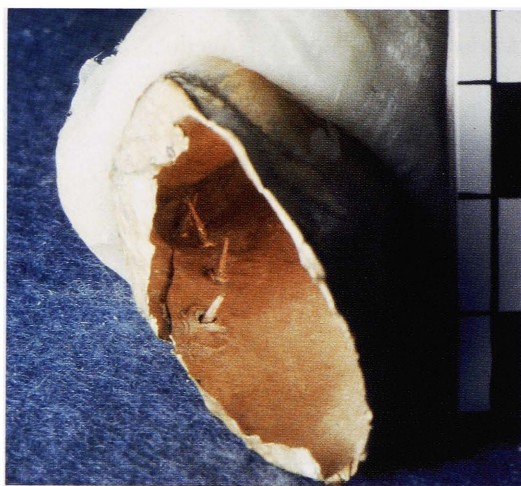


Plate 32b. Interior of the bull's left ear showing the shanks of the four tacks and the edges of the sheet that had been neatly folded over the base of the ear. (Photograph by Virginia Greene, 1977.)

The beard was made of individual lapis lazuli tesserae fitted together and carved to represent hair. Thin copper wires were threaded through biconical holes in the back of each tessera (see Appendix B, Plate 48). Although the tails of the wires are lost it seems certain that they were pressed directly into bitumen covering the now-lost wooden board supporting the beard. The same technique was used, for instance, for a bull-shaped shell inlay for a frieze (Plate 33a,b) and for the stone and mother-of-pearl inlay covering a column made of palm wood, both from al'Ubaid and now in the University of Pennsylvania Museum.⁷ The wire used with the frieze is described as threaded through biconical holes in the back of the pieces and twisted into a ring before being set directly into the bitumen (Hall and Woolley 1927:17, 90, 100, pls. XXXII:3, XXXV:7). Fragments of a wooden board support were found with another section of the same frieze. Shell inlay pieces for the beard of an unknown object from Ur were similarly pierced for copper wires, as shown by green staining at some of the holes⁸ (Plate 34). The smaller lapis tesserae forming the bull's forelock were not pierced for wire, but were set directly into bitumen (Appendix B).

In addition to the fragments of thin silver sheet found beneath the heavy restoration covering the back of the beard, several other fragments were found in storage. These were combined in the new restoration and formed an almost complete backing for the beard. The restored backing also provided previously unknown information about the construction of the beard: it had been made in three sections, each covered with silver sheet whose edges were carefully folded over the sides and secured by small silver nails prior to assembly. The three sections were held together and the beard attached to the head by long structural copper nails, a construction method very similar to that of the stag on the Boat-shaped Lyre (see Appendix B; pls. 49, 50). The width of the folded edges of the sheet suggested a thickness for the wooden support of the beard and, together with the lapis tesserae, gave an idea of the total depth of the beard.



Plate 33a. Shell inlay from the temple of Nin-hursag at al'Ubaid made in separate sections: head (here together with the chest), legs, and torso. (UPM accession no. CBS 15815. UPM neg. S4-142565.)



Plate 33b. The reverse of the inlay shows biconical holes with remains of the copper wire used to secure the individual pieces to the backing into which they were set. (CBS 15815; UPM neg. S4-142566.)



Plate 34. Shell inlay for a beard from an unknown object. Biconical holes in the reverse of the pieces (on the left in this image) show where copper wires had been threaded. (UPM accession no. CBS 15294; UPM neg. S4-142915.)

The panel on the front of the sound box did not need new conservation, so the backs of the shell plaques could not be studied.

Evidence for Stringing

The stringing of the Lapis-bearded Lyre was reconstructed based on the impressions in the silver sheathing of the Silver Lyre and the traces of strings from the Plaster Lyre (Plate 35). Woolley's meticulous excavation of the Plaster Lyre preserved the remains of its strings long enough for them to be examined, photographed, and recorded. He believed that the powdery nature of the residue indicated gut or sinew (Woolley 1934:257). This is the only occurrence in the archaeological record of early Mesopotamia where the remains of actual strings could be recorded. Both the Plaster Lyre and the Silver Lyre showed a radiating pattern of strings relative to the yoke and sound box. The impression of converging strings at the bottom of the sound box of the Silver Lyre (Barnett 1969:pl. XVIa) was used as the model for the point of attachment for those of the Lapis-bearded Lyre. The impressions also seem to confirm that the strings were attached directly to the sound box, possibly using a toggle system (see Notes 21, 22, Chapter 2). Representations from Ur also show the strings inserted directly into the sound boxes. Modern African lyres which use a similar method of string attachment have an opening in the front of the sound box and one behind so the strings are accessible. Some have a loop or bar to which the strings are attached. The ends of the loop, toggle, or ties for the bar are inserted into small openings in the sound box (Jenkins 1969:103, pl. XVI; Kilmer 1998, fig. 10a,b). A loop method has been suggested and is shown on some early representations. However, the impressions in the silver sheathing of both the Silver and Boat-shaped Lyres show that this method could not have been used for their stringing.

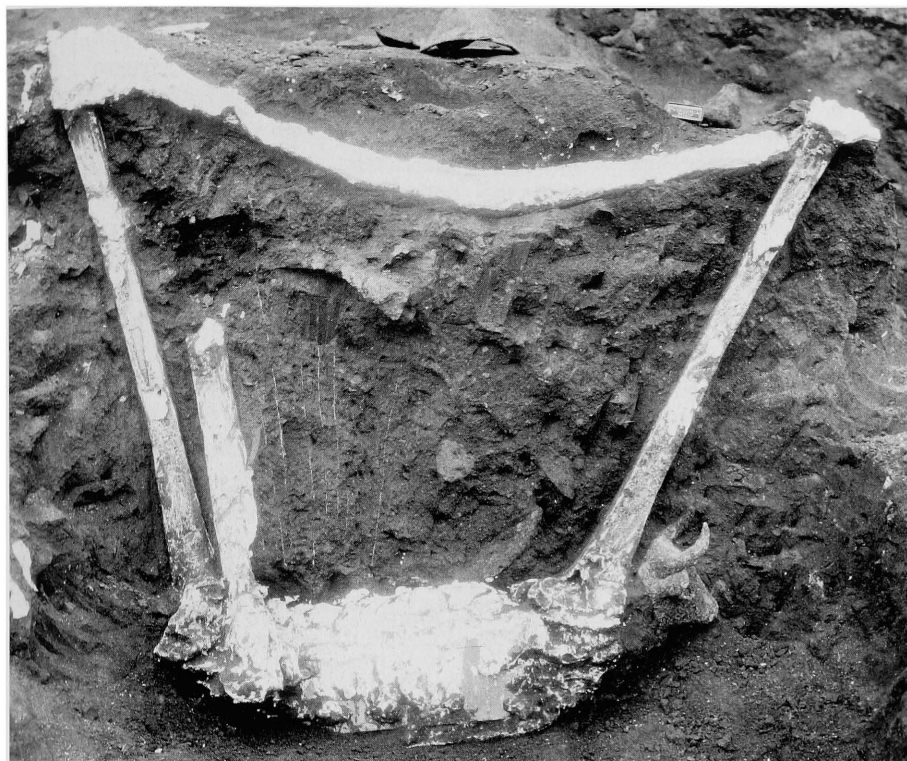


Plate 35. *The Plaster Lyre in situ shows faint traces of the strings running from yoke to sound box. These are the earliest remains of strings found in ancient Mesopotamia. The bow in the yoke is due to distortion during burial. An unrelated fragment lies just inside the back upright. (Reprinted from Woolley 1934: pl. 118a.)*

Cuneiform texts describing music theory and stringing mention a "thin string," however it is not known whether this refers to string diameter or to the tuning of a particular string (Crocker 1997; Duchesne-Guillemin 1965:269; Kilmer 2000: 113–115; Smith and Kilmer 2000:138–139). There are African lyres with strings of two different diameters in the collections of the University of Pennsylvania Museum showing that tuning using strings of differing sizes occurs today (Plate 36).

The wrappings under the strings, as shown in the pseudo-morphs on the Boat-shaped Lyre, also provide evidence of how the strings might have been tuned. Similar wrappings are used with some modern African lyres (Jenkins 1969:103). The silver sheaths from the tuning pegs of the Silver Lyre show their orientation and position relative to the yoke, and the fact that the strings were attached through small holes in the narrow ends of pegs.

As I am not a musicologist, I will not attempt to discuss how this evidence can be interpreted, but will refer the reader interested in further discussion to those specialized in the reading and interpretation of ancient musicological texts. Excellent discussions analyzing the complexity and diversity of music and music theory have been presented by Duchesne-Guillemin, Gurney, Kilmer, and Wulstan,⁹ among others.

Representations of Lyres and Harps

Although the two lyres presented here are so large that they would have had to be steadied while being played by a seated person, others were smaller and portable. These are represented either carried by the player or borne by a "lyre-bearer" (Sjöberg et al. 1984:81) in front of the musician (see Plate 6a). The Silver Lyre and the Plaster Lyre are both small lyres (Plate 37). Cuneiform texts and representations show us that both lyres and harps could be played alone or as part of an orchestra (e.g., Sjöberg et al. 1984:76–80). Lyres of all sizes (and harps) are represented on cylinder seals, clay sealings, and

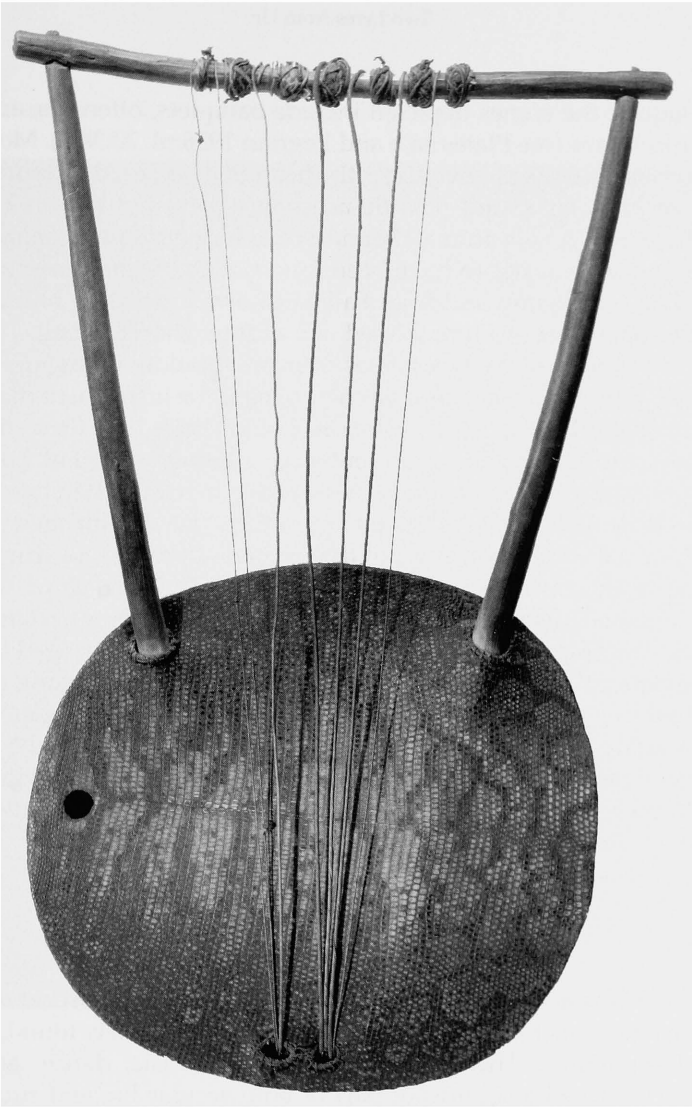


Plate 36. Modern lyre from Uganda with thin and thick rawhide strings. The strings are arranged in two groups, one set of four strings composed of three thick and one thin string, the other a set of one thick and two thin strings. The thin strings are about half the diameter of the thick ones. (UPM accession no. AF 5038; UPM neg. S4-142910.)

plaques; the scenes depicted include banquets, offerings, and processions (see Plates 6a,b and Legrain 1936:pl. 20:384.). Most representations of lyres show the head of a bull on the front of a rectangular sound box. Some show the sound box in the shape of a whole animal. Sound boxes in the shape of animal bodies appear not to have been found at Ur. A rare representation on a stamp seal from Failaka shows a standing bull on the sound box of a lyre shaped like a larger standing bull. The front upright of the lyre passes over the shoulder of the upper bull. The lyre player sits on a chair behind the instrument (Barnett 1969:100, fig. 1, pl. XVIb; see Collon 1980–1983 for a discussion of lyres). This representation, although different from it, may be compared to the Boat-shaped Lyre with its stag figure.

Representations of harps often lack the perspective to show the wide resonator, but their rounded profile and stringing from arm to resonator identifies them.¹⁰ None show the shape and stringing of the Boat-shaped Lyre. It is interesting that the Sumerian word *balag*, probably meaning “stringed instrument,” appears to have been used for both instruments, although “drum” has now been suggested as a possible meaning as well. Another word, *sammu*, is now thought to have meant lyre, although harp has also been suggested (Kilmer 1993–1997:463, 2000:115–116; Lawergren and Gurney 1987; Sjöberg et al. 1984:75).

Sumerian Music

Insights into musical practices of Sumer and other parts of the ancient Near East are provided by cuneiform tablets found in Mesopotamia. Therefore we know that music, dance, and voice formed a significant part of both secular life and ritual practice. Instrumental music and song were used in contexts that included banquets and feasts, processions and rituals, and informal domestic and work settings. Stringed, wind, and percussion instruments are recorded in later texts.¹¹ Vocalization included lullabies, laments and dirges, chants, and hymns.



Plate 37. C. Leonard Woolley carrying the Plaster Lyre. It could easily have been played as it was carried by the musician because of its small size. (Archives of the University of Pennsylvania Museum of Archaeology and Anthropology.)

Dances, processions, and rituals of different kinds were among the types of events accompanied by the lyre.

Later texts show the reverence in which the Sumerians held lyres (Sjöberg et al. 1984:76–77): “for 7 days and 7 nights (they) put in place 7 lyres as if they stood at heaven’s base.” Texts also include examples of lyres played to accompany singing on different occasions: “he who prays in a sweet voice, who dances joyfully to the accompaniment of the holy lyre”; “to the accompaniment of the lyre of laments you intone a dirge”; “at the temple the god sings to the accompaniment of the lyre of laments.” We also learn that the lyre could be accompanied by a drum: “they play for her on the holy *ub*-drum and the holy lyre.”

Sumerian music followed seven different heptatonic (seven-note) and diatonic (two-and-a-half-step) scales. These were described in texts studied by Kilmer and Gurney, respectively. Kilmer first identified the names and numbers of the strings for lyres, their stringing, and their musicology, in her study and interpretation of an economic tablet of the Kassite period from Nippur (Plate 38), and another tablet from Ur.¹² Reconstructed lyres, using the stringing and tuning methods described in texts and suggested by the remains of the lyres themselves, give an idea of what ancient lyres may have sounded like (Kilmer, Crocker, and Brown 1976; Kilmer 1993–1997; 1998:15; 2000:113–115; Kilmer and Tinney 1996, 1997; Smith and Kilmer 2000).

The Sounds of the Two Lyres

The large size of the two lyres tells us that the sound they produced must have been deep and resonant. However, as none of the internal structure of any of the lyres was preserved, we cannot know just how they sounded. Further, the resonators of modern stringed instruments have vents to allow the sound to emerge. Representations do not indicate where, or if, there were vents in the sound boxes of Sumerian lyres (Lawergren

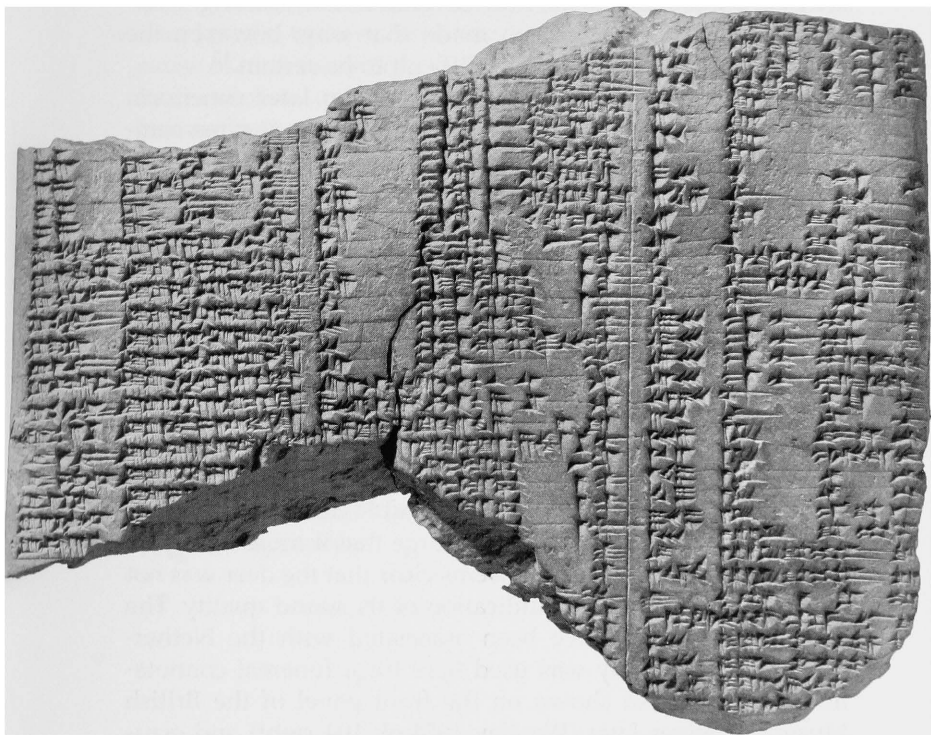


Plate 38. Kassite economic text from Nippur from which Dr. Anne Kilmer identified for the first time the names and number of strings for lyres and the arrangement and relationships of lyre strings. (UPM accession no. CBS 10996; UPM neg. 72979.)

and Gurney 1987). That of the Boat-shaped Lyre appears to have had no opening other than the small slit for attachment of the strings. Suggestions have been made that the bottoms of box lyres were left open for resonance. The bottom of the Silver Lyre's sound box is not now covered with sheathing. It appears that it may have been made that way; however, the condition of the piece makes it difficult to be certain.¹³

Clues to the sounds of lyres come from later cuneiform tablets (Sjöberg et al. 1984:76, 77). Their sound was often compared with that of a "softly lowing bull," "my lyre chamber, lowing(?) like a wild bull" or described as soothing: "the lyre, the soothing instrument which..., they kept at their side," "oh, weeping lyre"; or sonorous: "in the lyre chamber where the string music is great." The references to bulls in relation to lyres is consistent with the representations—and with the instruments themselves—which show the sound box decorated with a bull's head.

No discussion in texts has yet been found referring to the sound made by roe deer, the animal on the Boat-shaped Lyre. This type of deer is known to live on open plains and produce a non-resonant dog-like barking sound.¹⁴ Because the sound box of the Boat-shaped Lyre is so large that it must have produced a resonating sound, it seems clear that the deer was not placed on the Lyre as an indication of its sound quality. The deer is thought to have been associated with the Netherworld¹⁵ and possibly was used here for a funereal connotation. Deer are also shown on the front panel of the British Museum's Silver Lyre (Woolley 1934:pl. 104 right) and occasionally elsewhere in the Royal Cemetery.

The care and complexity of manufacture of lyres, along with the precious materials from which they were made, indicate the high regard in which lyres in particular, and other musical instruments as well, were held during Sumerian and later times. The context of the Royal Cemetery in which they were found further confirms their special nature.

Later texts tell us about materials used in the manufacture of lyres and other musical instruments (Sjöberg et al. 1984:75):

"[gold] for decorating Nanna's lyre"; "resin for the front(?) of the lyre"; "I fashioned a lyre and a *lilis*-drum of silver for him"; "appropriation for the bronze lyre" and "for Baba's cedar lyre." The different woods and other materials would also have affected the sound of the lyres. For example, boxwood was known to have been used for musical instruments because of its resonant qualities and has recently been identified in connection with lyres (Kilmer 1998:15). The use of gold, bronze, and silver and other non-perishable materials is confirmed by the archaeological evidence from the lyres in the Royal Cemetery at Ur; the organic materials left no trace.

Conclusion

Our studies, with the excellent collaboration and expert technical abilities of the conservators and the help of modern technologies, can only serve to confirm Woolley's original findings and augment slightly the meager knowledge available from the remains of the instruments themselves. Without Woolley's careful records and meticulous excavations none of this would have been possible.

Appendix A

Boat-shaped Lyre Treatment

Tamsen Fuller

Objects Conservator
Northwest Objects Conservation Laboratory

This summary of the conservation of the Boat-shaped Lyre from Ur (University of Pennsylvania Museum no. 30-12-253) describes the treatment procedures only, as the structure of the instrument is described elsewhere. Treatment was conducted in the Conservation Laboratory of the University of Pennsylvania Museum over the period from October 28, 1993, to April 23, 1994.

Procedure

Research

A search was made for records pertaining to the then-present condition of the Lyre that could be germane to future treatment. The most useful records were found to be descriptions of the excavation and subsequent treatment in Woolley's *The Royal Cemetery II* (1934) in the University of Pennsylvania Museum archives, especially photographs, and "The Babylonian Collections of the University Museum" (Legrain 1944), and Conservation Laboratory treatment records.

The *Royal Cemetery* accounts, although somewhat unclear, do describe the basic materials used in excavation and subsequent attempts to enhance and stabilize the Lyre. Examples of wood, wax, and plaster described as field materials for lifting the Lyre were found during the present treatment. Woolley also describes the crushed condition of the Lyre and its relation in the ground to other buried items. Evidence of the inlays and decorative details were found on this lyre during treatment. Attempts to convert the mineralized silver back to silver metal were described by Woolley and found partially completed on the front of the Lyre only.

Archives provided useful earlier photographs and descriptions that gave glimpses of the past history of the Lyre.

Conservation Laboratory records described the way in which the Lyre had been embedded in plaster for display and the failure of this system because of heavy use of temperature-sensitive waxes (Plate 39).

Treatment Documentation

The condition of the Lyre and all phases of treatment were recorded in black-and-white photography for the permanent record, and with color slides and prints. Along with this went written accounts and electronic images. The complete treatment records are housed in the Conservation Laboratory of the University of Pennsylvania Museum.

Analysis

Previously taken radiographs and three-dimensional CAT-scan images taken at certain stages during treatment were useful for interpretation of the structure of the Lyre. Several wood samples were obtained during the course of treatment (Plate 40), and inlay fragments from associated artifacts were also located, documented, and retained separately.

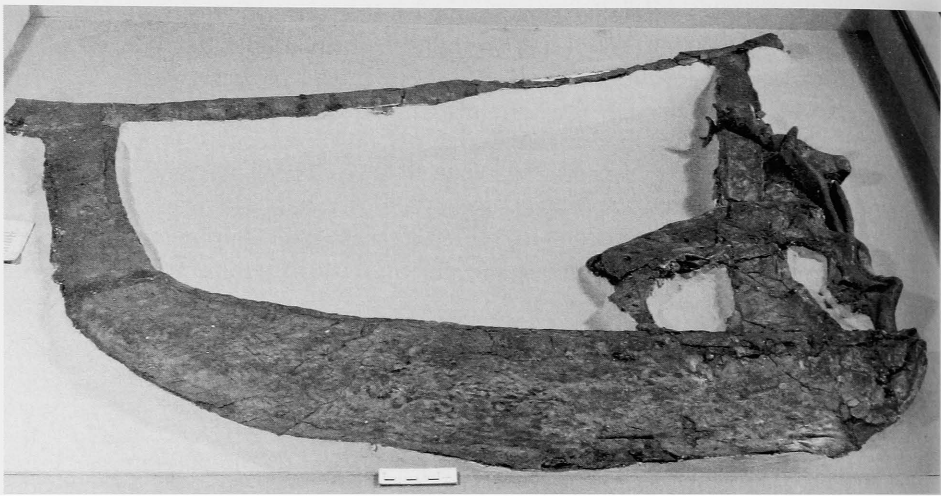


Plate 39. *The Boat-shaped Lyre removed from exhibition in preparation for removal from its plaster bed. The wax used in the original conservation had softened and moved over time, leaving the fragile silver sheathing sunken and vulnerable to cracking and damage. (Photograph by Virginia Greene, 1979.)*

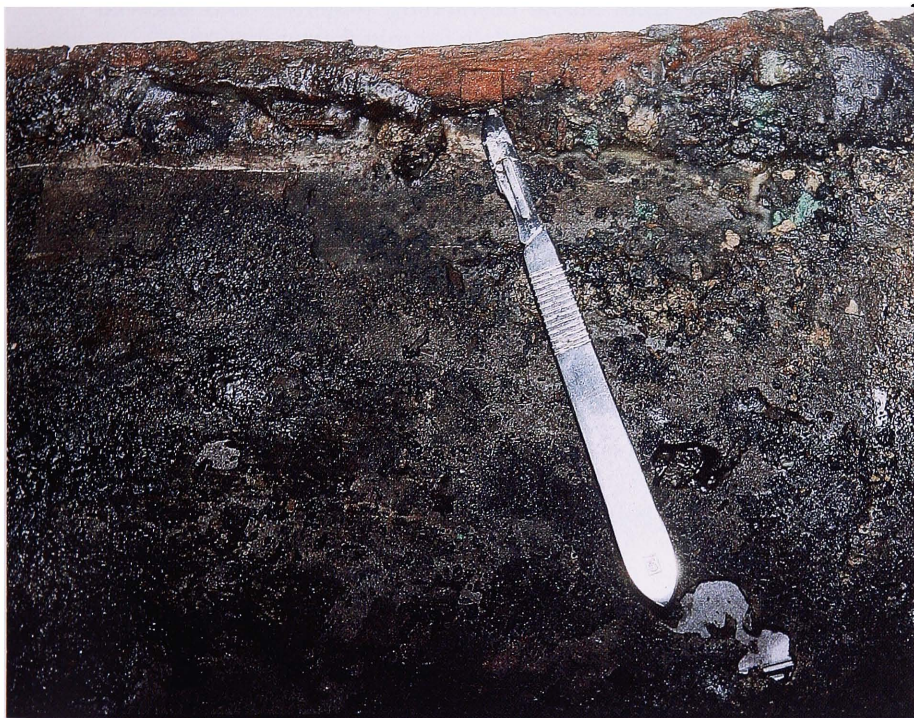


Plate 40. Interior surface of the silver sheathing of the sound box. Fragments of wood from which the sound box had been made were found at the upper edge (brown area above scalpel) during conversation. The structure of the wood was too decayed for identification. (Photograph by Tamsen Fuller, 1994.)

Initial Investigations

Because the Lyre was received for treatment in a fragile condition with eleven main fragments plus many small fragments, special supports were made for each (Plate 41). The supports were made from stable cushioning materials and allowed fragments to be handled safely for initial examination.

Basic initial procedures included tests to determine the best methods for removing old excavation, display, and treatment materials that obscured original surfaces.

Removal of Non-Original Surface Materials

Facings that had been applied to the face of the Lyre when it had been removed from display in 1979 could be removed mechanically, by peeling them away, owing to waxes on the Lyre surface which served as a release agent. Some refacing, by use of fiberglass and an acrylic resin, was necessary, as the Lyre surface fragments did not adhere well to interior materials. Subsequently, the interior of the Lyre was found to be filled with wax and soil, with many voids. This structure made the Lyre environmentally sensitive and lacking in tensile strength.

The back of the Lyre had not been seen since the time of its excavation. The original field bandage of cloth strips and wax was removed using various heat sources, including heated spatulas and hot air guns; the melted wax was then absorbed into cloth strips and disposable soft brushes.

One of the fragments retained substantial amounts of field plaster, which had to be removed mechanically with small burrs and saws.

Physical Stabilization for Basic Handling

After surface cleaning, it was clear that the interior of each Lyre fragment required internal support in order to be han-

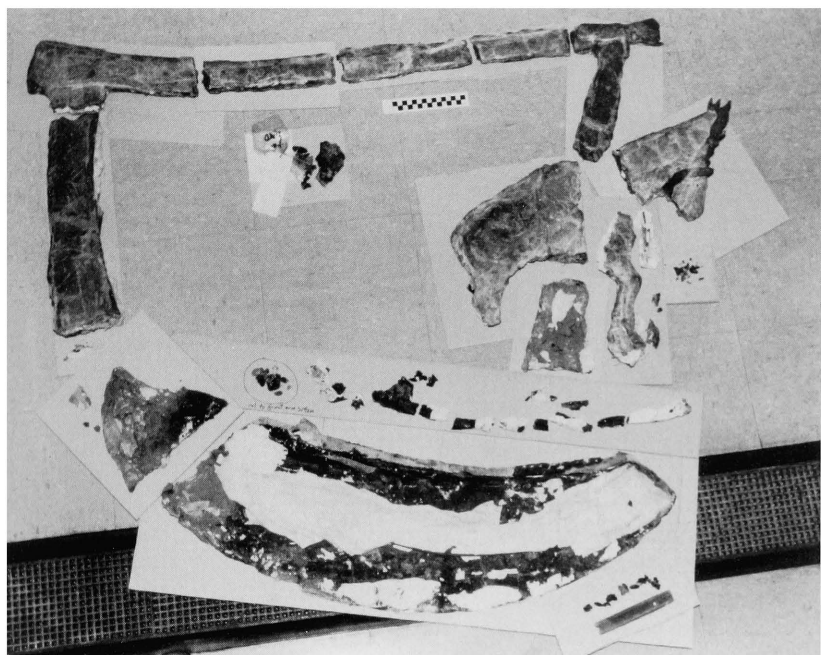


Plate 41. *The Boat-shaped Lyre before the start of conservation in 1993. The fragments are temporarily faced for security. (Photograph by Tamsen Fuller, 1993.)*

dled for further study and for display. The front surface of each piece was separated from the back, using heat to melt internal wax and appropriate rigid supports to lift the loosened fragments (Plate 42). The inside surfaces of front and back were faced with fiberglass cloth pieces and an acrylic resin, while the interior was filled with small glass spheres embedded in the same stable acrylic resin (Plate 43).

The three pieces that made up the yoke of the Lyre were joined together using this same internal support method.

Cosmetic Work

Final surface cleaning was done with solvents to remove old pigmented waxes and remnants of paint from the front of the Lyre, where there were also remnants of the converted silver metal surface.

Areas where interior support materials showed were toned, using stable acrylic paints.

Support Mount

Basic supports were provided for each piece of the Lyre so that the fragments could be aligned and mounted for display. The pieces were laid face down on a flexible film in a bed of wet sand for support, while a thin layer of epoxy putty was laid over another film protecting the back of the fragment. When the epoxy cured, it was removed so that the mount maker could use each support as part of the final mounting system.



Plate 42. Lower section of the rear upright of the Boat-shaped Lyre. Temporary supports are in place in preparation for lifting the sleeve overlying the sheathing covering the entire upright. (Photograph by Tamsen Fuller, 1994.)

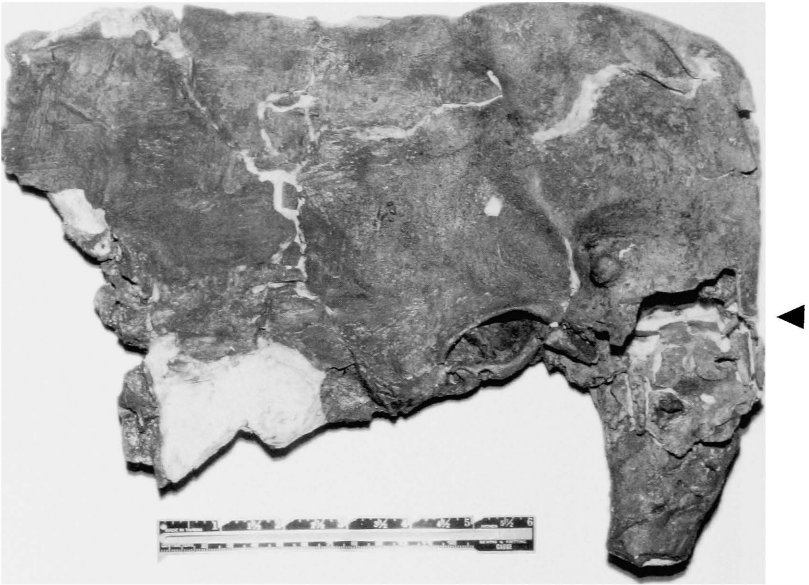


Plate 43. *The body of the stag during conservation. The supporting fill of small glass spheres embedded in stable acrylic resin is in place and ready for toning. (Photograph by Tamsen Fuller 1994.)*

Appendix B

Conservation of the Bull's Head for the Lapis-bearded Lyre

Virginia Greene

Senior Conservator
University of Pennsylvania
Museum of Archaeology and Anthropology

This report is a summary of the conservation treatment of the bull's head and associated plaque for the Lapis-bearded Lyre (CBS 17694 + CBS 17684), carried out in 1977–1979. A full record of all procedures and materials, including black-and-white and color photographs, is on file in the Conservation Laboratory of the University of Pennsylvania Museum.

First Restoration

The bull's head was lifted from the ground using paraffin wax reinforced with muslin. It was badly distorted, with the lapis tiles out of place, and the silver backing for the beard bent and broken (Woolley 1934:70). After separating the various elements of the bull's head, the gold was annealed and reshaped with finger pressure, and the component parts of the head filled with plaster of Paris over a U-shaped iron armature and reassembled.

Condition of the Head Before Treatment

In 1976, when the lyre was dismantled, the head and shell plaque were brought to the Conservation Laboratory. There were many small cracks and tears in the gold sheathing for the head, and some distortion of the torn edges. The most serious damage, and the largest loss, was on the right side of the neck strip. Many small creases were visible around the nose, probably produced when the gold sheet was reshaped after excavation. The ears were filled with plaster and secured in place with modern wooden pegs and adhesive. The adhesive had deteriorated and the pegs were loose. The horns were also filled with plaster and attached with adhesive. There were no major losses, but both horns had numerous cracks and tears, with some distortion of the edges of the gold sheet. This was particularly severe on the bull's left horn where the plaster core had been broken and repaired. About 5 mm were missing from the end of the right lapis horn tip. An armature was revealed inside the head through radiography at the Hospital of the University of Pennsylvania (Plate 31a,b). Some rusting of the iron had occurred, and removal was clearly advisable.

The eyeballs were made of shell and lapis. They showed no damage or evidence of repairs. The forelock was composed of small lapis tesserae (seventy-three complete, three fragmentary) set in six horizontal rows. The beard was made of fifty-eight lapis tesserae forming six locks in the center and three curls on each side. The tiles forming the outermost curl on each side lay on top of the other side curls. All the tiles were set in a matrix of dark brown wax. The wax, examined under 20X magnification, appeared as a translucent yellow wax with many small dark inclusions. This material is almost certainly paraffin wax mixed with the remains of the original bitumen (Woolley 1934:70). A sample of the wax was saved.

The edges and back of the beard were covered with metallic silver paint over a layer of yellow ocher paint. The original silver backing was not visible. There was considerable separation of the lapis tiles and the wax from the underlying plaster.

Conservation of the Head

The ears and horns were removed from the head. The horn tips proved to have a narrow, tapering tenon with a crosswise hole (Plate 44). The tenon on the right tip was broken through the hole; the other was undamaged. The tenon would have been inserted into the original horn material and secured by a pin or dowel, now lost. The gold sheet was wrapped around the horn, overlapping its bottom, and hammered into place.

All fragments of the original beard were removed from the head. The lapis tiles forming the forelock were faced as a unit and removed. When the brown wax in which they had been embedded was removed, the backs of the tiles proved to be plain.

The ears, horns, and head were faced with layers of tissue and cheesecloth using microcrystalline wax; they were then soaked in warm water and the plaster filling was removed mechanically. The temporary facings were then removed and all torn edges were aligned.

With the interior surface of the head exposed, two sets of small holes could be seen on the edge of the gold sheet behind the horns, matching the pairs of holes on the neck strip. It was also clear that the gold sheet extended only a few millimeters under the bottom row of lapis hair tiles. The thickness of the gold sheet varied from 0.075 mm to 0.15 mm. The differences did not correlate with particular parts of the head. The gold strip for the neck was realigned by matching the two sets of pinholes (Plate 45). The gold was lined with strips of fiberglass cloth and Acryloid B-72 resin (ethyl methacrylate copolymer) (Plate 46). The lapis hair tiles were lined as a unit and secured into position on the head using additional strips of fiberglass.

The eyeballs were removed from the head and disassembled. On the back of the left eyeball was a coiled fragment of mineralized copper-alloy wire. A small amount of black grainy material was visible around the wire, presumably the remains of the original bitumen adhesive. The eye was found to be composed of three separate parts (Plate 47):



Plate 44. *Lapis lazuli* horn tip showing the set-back perforated tang for insertion into the cores of the horns. The right horn tip (left in this image) is repaired. (Photograph by Virginia Greene, 1977.)

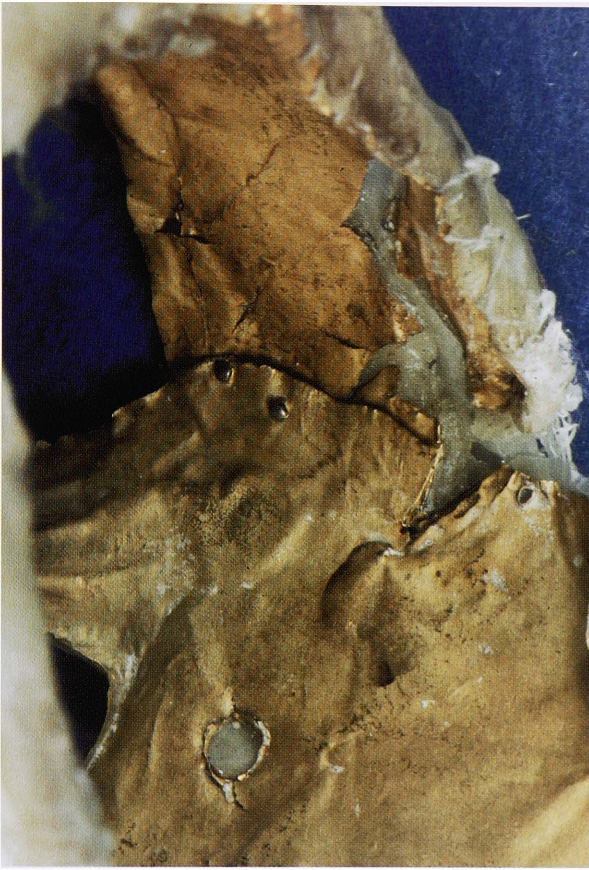


Plate 45. *This detail of the interior of the gold sheet that covered the bull's head shows the holes for tacks attaching the sheets to the head realigned (in the center of the image). The hole for attachment of the ear is visible to the right of the opening for the eye. The protective support used during conservation still covers the exterior of the sheathing (cream colored in this image). (Photograph by Diane Davies, 1977.)*



Plate 46. Interior of the gold bull's head during conservation. The mask has been strengthened with fiberglass cloth and resin preparatory to filling with the new core material. The folded flanges of the sheet at the openings for the eyes, horns, and beard would have covered the edges of the wooden core. (Photograph by Virginia Greene, 1977.)

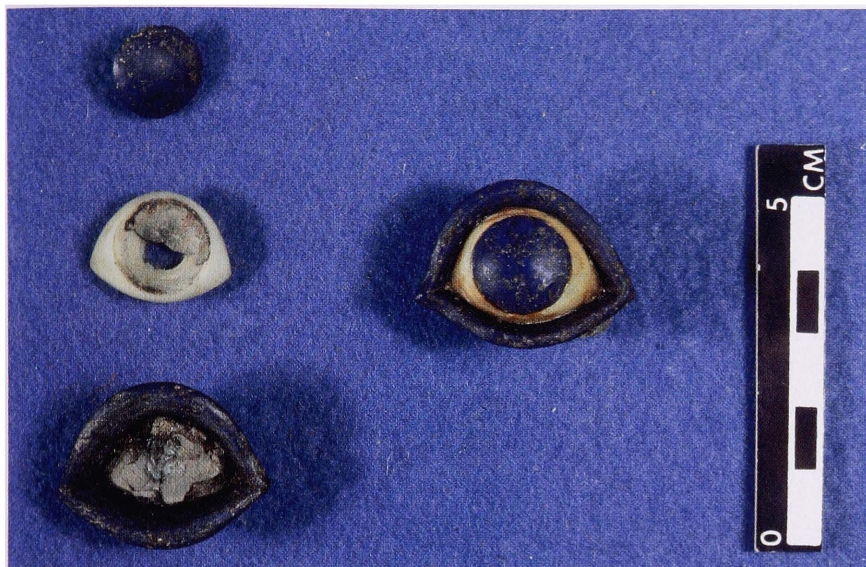


Plate 47. *Lapis lazuli and shell eye disassembled to show its component parts. A small fragment of the copper wire threaded through the base of the cone-shaped pupil remains. Traces of bitumen are visible on the interior surface of the shell white of the eye. (Photograph by Diane Davies 1977.)*

1. A lapis iris, conical in form. The tip of the cone, which faces the rear of the eyeball, has a biconical hole. On the left side this hole held a fragment of mineralized copper-alloy wire. There is no point of attachment between this wire and the coiled wire on the back of the eyeball.
2. A central shell element with a hollow in the shape of a truncated cone into which the iris fits. This forms the white of the eye.
3. An outer element of lapis, similar in shape to the shell element, forms the edge of the eyelid. The details of the eyeball construction (like those of the horn tips) had not been recorded previously.

Following cleaning, the eyes were reassembled.

Conservation of the Beard

The lapis tiles were faced with tissue and microcrystalline wax. The paint was then removed from the back surface, exposing fragments of the original silver sheet. The silver was very soft and friable, with a laminated structure and crumbling edges. As the silver was exposed, it was consolidated and given a temporary facing.

When the restoration materials were removed and the backs of the lapis tiles exposed, part of the original construction technique was revealed. Each tile had a biconical hole, many of which still held the mineralized remains of copper-alloy wire (Plate 48). The presence of these holes had never been recorded and was entirely unsuspected, although large shell "inlay" pieces with similar holes (some of which also have remains of wire) are known from Ur (Plate 34).

Three large fragments of the back of the original silver beard were found incorporated into the restored bull's beard.

The shapes of these pieces show that the beard was not backed as a single unit but in sections. Four small silver tacks, ca. 6–8 mm long, can be seen along the juncture of two sections. The heads of two of the tacks are visible and show clearly that the tacks were inserted from the outside of each section, securing the silver sheet to the beard core.

Also preserved is part of a long copper-alloy pin or nail used to join two of the beard sections. The original length of the pin is unknown; the existing fragment is 3.7 cm long, and copper stains on the silver suggest that it was at least another 2–3 mm longer. The head of the pin is missing, but deformation of the silver sheet makes it obvious that the pin was inserted from the outside of one section, completely through that section, and into the adjacent unit. Between the pin and the silver was a tiny fragment of completely mineralized wood, the only trace of the original beard support. The fragment was too small and too heavily mineralized for identification.

On the inner surface of the silver were two lengths of mineralized copper-alloy wire (15 and 22 mm long), small lumps of copper corrosion products, a small piece of bitumen, and very small fragments of a light brown powdery material that was not identified. Large areas of the silver sheet were also stained green. The wire may be from the beard tiles, which fell onto the silver sheet after the disintegration of the wood core of the beard. The brown powder may be residue from the deteriorated wood.

One fragment of the silver sheet had finished edges on the top and sides, along with parts of three copper-alloy pins or nails that appear to have been used to attach the beard to the head. Two of the pins were driven in from the back of the beard, through the beard and into the head. The original length of these pins is uncertain; the surviving sections are ca. 5 cm long. The third pin, of which only 2 cm remain, was inserted from the side of the beard into the head core (Plate 49).

Additional fragments of the silver beard backing, which had not been used in the original restoration, were located in



Plate 48. Reverse of the lapis lazuli tesserae for the beard showing the remains of thin copper-alloy wires which had been threaded through the biconical holes. (Photograph by Virginia Greene, 1977.)

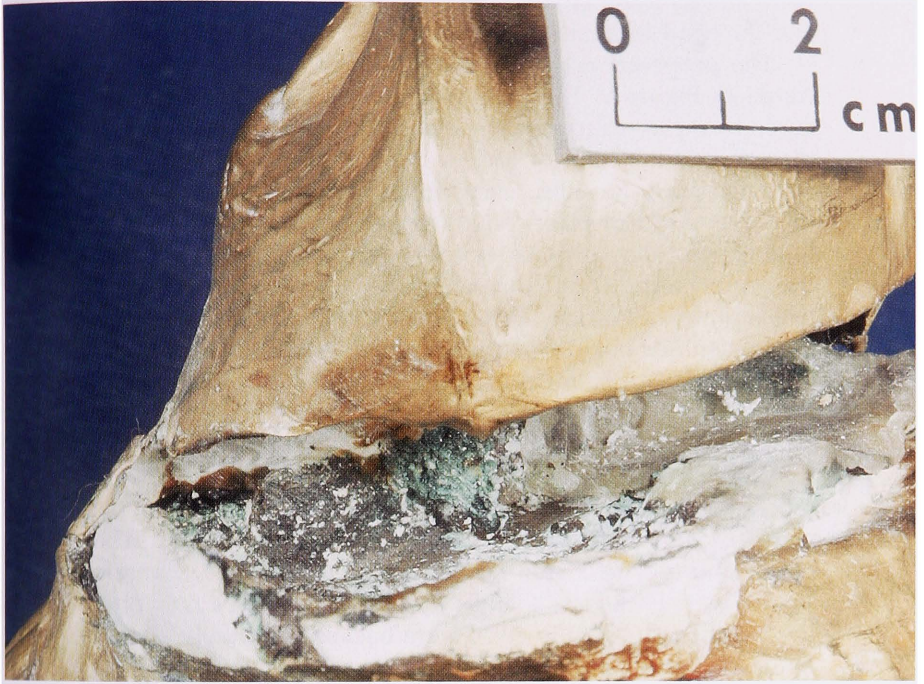


Plate 49. View under the chin of the bull shows a fragment of the silver backing for the beard and one of the structural copper nails holding the beard onto the head still in place as the head is prepared for new conservation. The white area is the plaster of Paris support from the original conservation. The bull's nose is at the top of the image. (Photograph by Diane Davies, 1977.)

storage. One fragment had a short length of copper-alloy pin inserted through the side near a silver tack; three other fragments also had silver tacks. One flat fragment had the remains of a piece of copper-alloy wire adhering to it. In addition, there were eleven loose silver tacks, a shaft of a copper-alloy pin, and the head from another similar pin.

The proposed original construction of the beard is illustrated in Figure 8. The lapis tesserae for the beard were secured by means of copper wires and bitumen. Silver sheet was placed over the back of each section of the beard and hammered around the sides. Small silver tacks were used to hold the silver sheet in place. The three sections were joined with long copper-alloy pins, driven through the side sections into the central section. Two pins were used on the right side; only one is preserved on the left side but there is room for a second. The assembled beard was then secured to the head core with additional copper-alloy pins: at least two were driven in from the back of the beard upward into the head, and at least one additional pin was inserted on each side.

With the assistance of the curatorial staff, the tiles were repositioned to give a better fit and appearance. The tesserae were backed with fiberglass cloth and Acryloid B-72. The beard and the two side sections, originally three separate pieces, were backed as a single unit for ease in handling; only the two outermost side curls were backed separately. A permanent support of fine fiberglass chopped-strand mat and Acryloid B-72 was put on the inner surface of the silver, and the temporary wax and tissue facing were removed.

It was decided not to replace the fragments of silver sheet on the beard. A Plexiglas mount was therefore constructed for the larger fragments of the original silver backing so that they could be exhibited separately (Plate 50).

The lapis beard tiles were mounted on a Plexiglas support, which was part of the new armature (see below), and the original thickness of the beard was approximated using a fill of polyvinyl acetate emulsion and styrene pellets. The back of the beard was covered with mat board to simulate the original sil-

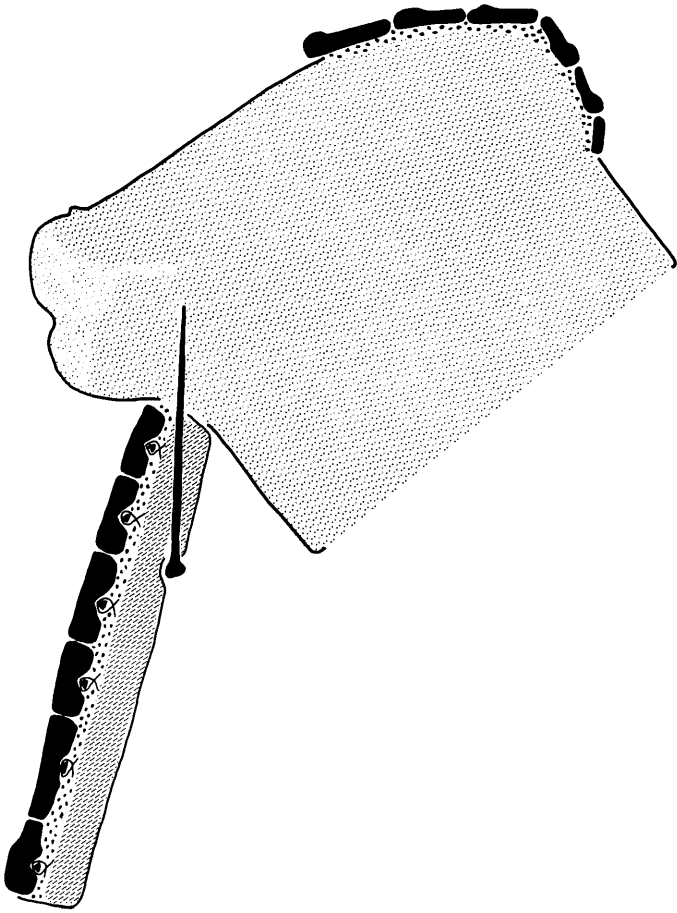


Figure 8. Line drawing showing the proposed construction and attachment of the beard to the bull's head of the Lapis-bearded Lyre. (Drawn by Virginia Greene, 1977.)

ver sheet. Gaps between the back and sides were filled with acrylic gesso, and the mat board was painted gray.

New Armature and Head Core

To provide adequate support for the gold sheet of the head, it was necessary to fill the head with a solid material. After some study, it was decided to use the new armature, not the core material, to support the weight of the beard. A support was designed that allowed the head to “float” around a Plexiglas armature that would be attached to the sound box and support the full weight of the beard. The armature was made in two pieces, which were joined with brass bolts.

Polyethylene glycol wax 6000 filled with styrene pellets was chosen for the new core. The wax was thickened with aerogel silica (Cabosil) to keep the pellets from floating to the surface. The lower part of the armature projects slightly from the neck edge, so that it can be tightened against the sound box without putting pressure on the edges of the gold sheet.

The ears and horns were filled individually and then placed on the head with Plexiglas pegs. The lapis horn tips were attached with Acryloid B-72. The forelock tiles were repositioned where necessary, and the spaces between the tesserae (on both the forelock and the beard) were filled with pigmented wax (PEG 4000 with powder pigment) to represent the original bitumen adhesive. Pigmented wax was added around the base of the horns and ears and at the corners of the beard where it meets the head to simulate the original use of bitumen (Plate 51).

Plaque

The shell inlays are set into a dark brown wax, composed of paraffin wax mixed with the remains of the original bitumen. One piece of the shell border is missing. The plaque had been



Plate 50. *The fragments of the silver sheet backing the sections of the bull's beard following conservation by Diane Davies and mounting for exhibition. The three sections of the beard can be clearly seen, as can the small silver tacks which had secured the sheet to each section. The copper nails attaching the sections to each other and the larger nails holding the beard onto the head are also visible. (Photograph by Virginia Greene, 1977.)*



Plate 51. *The bull's head after completion of conservation. (Photograph by Virginia Greene, 1977.)*

backed with a layer of a hard, gray plaster-like material. The backing was intact and in good condition. Old adhesive from the back of the plaque, and fake inlay on the sides, were removed, and the surface of the shell was cleaned. The missing piece of shell was restored with acrylic gesso.

Mounting the Head and Plaque on the Lyre

The mounting system for the head and plaque was designed to permit easy access for study and storage.

Notes

1. The Two Lyres—From Excavation to Conservation

1. University of Pennsylvania Museum of Archaeology and Anthropology (UPM) accession number CBS 17694 (field number U 10556). The silver backing for the beard was catalogued separately as CBS 17684.

2. UPM 30-12-253 (U 12355). The Boat-shaped Lyre was given its name by Woolley because of the curved profile of its sound box.

3. The complete conservation records for the two Lyres are located in the Conservation Laboratory of the University of Pennsylvania Museum of Archaeology and Anthropology.

4. See Moorey 1994 for thorough discussions of materials, their possible sources with regard to ancient Mesopotamia, and manufacturing in ancient Mesopotamia.

5. Woolley's recording at the time of excavation and his publications provided vital information concerning the two lyres that are the subject of this publication. See Woolley 1929c for his description of the complexities of the excavation of the cemetery. The field records for the excavation of Ur are in the archives of the Western Asiatic Department of the British Museum.

6. PG 755. Woolley 1934:155-60, vol. II frontispiece, pl. 21. Moorey 1977: 28-30, fig. 10. Woolley identified all Royal Cemetery graves with the prefix "PG" in order to separate them from other graves. Moorey (1977:24-27) separated the category designations into Private Graves (PG) and Royal Tombs (RT). We will use

Woolley's grave identification designation of "PG" in this publication.

7. Woolley 1934:62–71.

8. Woolley 1934:73–91.

9. Woolley 1934:113–24.

10. Gibson 1972; Mackay 1925, 1929; Moorey 1970.

11. Syntax and writing were still insufficiently developed at this early time to allow for narrative recording. Clay tablets of the period were largely for record keeping. See Nissen 1988:135–38. For this reason scholars must derive their information from the archaeological record and tablets from periods later than the Royal Cemetery.

12. The lyres: Gold Lyre, Iraq Museum, Baghdad (B 8694; U 12353); Silver Lyre, the British Museum, London (BM 121199; U 12354); Boat-shaped Lyre, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia (UPM 30-12-253; U 12355); Plaster Lyre, Iraq Museum, Baghdad (B 8695; U 12351); Lapis-bearded Lyre, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia (CBS 17694, CBS 17684; U 10556); copper bull's head with mosaic neck band and shell plaques from a lyre, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia (UPM 30-12-484,-696; U 12435); silver bull's-head and shell plaques from a lyre, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia (CBS 17065; U 10916); lyre from Lady Puabi's grave (once part of the harp/lyre), the British Museum, London (BM 121198; U 10412); copper bull's head and shell plaques from a lyre, the British Museum, London (BM 121533; U 10577).

The harps: Harp with mosaic border, the British Museum, London (BM 123675; U 11781); harp from Lady Puabi's grave (once part of the harp/lyre), the British Museum, London (BM 121198; U 10412).

2. The Boat-shaped Lyre

1. See Woolley (1929a:15–24; 1929b:320; 1934:255–56) for reports on the excavation of the Lyre.

2. Lawergen (1998:43) has suggested that, as representations are not always clear, lyres may diverge from this classification.

3. Woolley described similar conservation treatments for the Boat-shaped Lyre and the Silver Lyre (Woolley 1934:122); however, the fragility of the silver sheet dictated placement of the Boat-shaped Lyre in a plaster support (Woolley 1934:122, 256, n. 1). Woolley also reported that attempts at silver reduction had been made but halted (Woolley 1934:122).

Silver conservation was documented at the University of Pennsylvania Museum as well. Records describe the use of electrolytic processes (Letter dated April 17, 1929 from Mr. Horace Jayne, Director of the University of Pennsylvania Museum to Sir Frederick Kenyon, Director of the British Museum, Expedition Records: Ur, Box 2, Folder: correspondence 1929, Archives of the University of Pennsylvania Museum of Archaeology and Anthropology). Also see Graham 1929.

Conservation of objects from Ur was again documented at the University of Pennsylvania Museum in 1942 and 1944. The monthly report for November 1942 mentions a reconstruction of the silver pipes and the report for October 1944 their exhibition. The “Ram-in-the-Thicket” was described as “carefully repaired” and exhibited in the report for September 1944 (Léon Legrain, Section Reports, Archives of the University of Pennsylvania Museum of Archaeology and Anthropology). It appears that other changes were also made to the exhibition. It is possible that objects not specifically mentioned in the reports were treated as well.

An attempt had been made to restore the silver sheet on the front of the Boat-shaped Lyre but not on the reverse. Most of the recent information has come from this surface. Work had also been performed on the badly corroded remains of the copper tree at some time.

4. See Appendix A. A special mount suitable for storage and display was made by Howard Clemenko of the Museum's Exhibits Department in consultation with Objects Conservator Tamsen Fuller, Senior Conservator Virginia Greene, Exhibit Designer John Murray, and the author.

5. "A lyre is a stringed instrument in which the strings run over a resonating chamber to a yoke consisting of two arms and a crossbar. In a harp, all the strings lie in the same plane stretched across an open frame at an angle to the resonator" (de Schauensee 1998:21). See also Collon 1980–83:571.

6. Canon Francis Galpin, who had written previously on the Lyre (Galpin 1929), wrote to Dr. Léon Legrain, Curator of Near Eastern Collections, in 1932, discussing whether the instrument was a harp or a lyre but not questioning whether it was a single instrument. He included two suggestions for stringing the instrument, only one of which survives (letter dated 10 February 1932; Administrative Records, Near Eastern Section, Correspondence, Folder: E-G, 1926-42; Archives of the University of Pennsylvania Museum of Archaeology and Anthropology). In 1955 Galpin again discussed the Lyre (Galpin 1955).

In the late 1960s S. Nan Shaw, an independent London conservator, examined the Lyre at the request of Dr. Robert H. Dyson, Jr. She concluded that it was a single instrument and that the stag was integral to it but thought that the upright passed through the stag's body (unpublished report to R. H. Dyson, Jr., late 1960s). In 1965, British musicologist Joan Rimmer examined the Lyre while on a visit to the Museum. In a letter to Dr. Dyson she discussed her reasons for believing the instrument had been incorrectly restored. She felt it was an amalgamation of two instruments—a harp and a lyre—and that the stag probably belonged to the lyre (letter dated 30 November 1965; see also Rimmer 1969:15 and n.8).

In 1969 Dr. R. D. Barnett, then Keeper of Western Asiatic Antiquities at the British Museum, also discussed the uniqueness of the instrument, but concluded, based on *in situ* photographs and the object itself, that Woolley was correct in saying that it was one instrument (Barnett 1969:100–101).

Other scholars have discussed and questioned the Lyre over time as well (Barnett 1969: 101.)

7. Barnett (1969:98–100, pls. XIIc,d) presents the history of the identification of the two instruments, including reproductions

and transcriptions of Woolley's field cards and sketches. Plate XVII shows a sketch of how the fragments of the two instruments would look if separated. See Kilmer 1998: fig. 8 for the reconstruction of Lady Puabi's harp.

8. Field notes 1929 season. Courtesy Trustees of the British Museum, London. See also Woolley 1929b:fig. 1 opp. p. 319, 1934: pl. 112, for photographs of the Lyre following excavation, which clearly shows all its parts.

9. Plaster poured into the void left by the disintegrated wood produced a cast of the sound box of this lyre (Woolley 1934:169, 256–57, pl. 118).

10. A sample taken from the sheeting covering the sound box was analyzed through MASCA (Museum Applied Science Center for Archaeology), University of Pennsylvania Museum of Archaeology and Anthropology. The results are as follows:

Ur Lyre #30-12-253C: PIXE Analysis (Sept. 22nd, 1994)

Ag, 99.0%; Cu, 0.056%; Pb, 0.0037% Au, < 0.0083%

As, <0.0070%; Cl, <0.072%; S, 0.0087%

The "islands" of silver in the metallographic sections A and B were heavily corroded, as indicated by Cl-contents of 2.1% and 27.3%, respectively. Sample C is therefore regarded as the only one that truly represents the original state of the metal.

Dr. Stuart Fleming
Scientific Director, MASCA
November 1994

See Plenderleith 1934:293 for an analysis of the silver rein ring upon which a gold donkey was mounted, giving the silver content for that rein ring as 93.5%. See also Moorey 1977:239 and for analyses of two other silver objects from Ur, one of which gives the silver content as 95%, the other as Major; and pages 232–240 for a discussion of silver and its possible sources for ancient Mesopotamia.

11. See Chapter 2 and Appendix B.

12. Woolley 1934:250, 253 describes "minute silver nails."

13. Tacks, usually but not always with small heads, of the same or contrasting metals, were often used to secure metal sheath-

ing to the core from which an object had been made. For instance, small gold tacks secured the sheathing of the British Museum's "Ram-in-the-Thicket" and the University of Pennsylvania Museum's Lapis-bearded Lyre, but silver ones were used on the "Ram" in the University of Pennsylvania Museum. Large-headed silver tacks were used for the bull's head decorating the sound box of the lyre from the composite harp/lyre from the Lady Puabi's grave in the British Museum, among others.

14. PG 1130. Woolley 1934:167, fig. 43.

15. An excellent description of Lady Puabi's harp, which had gold-covered copper keys, may be found in Woolley 1929a:11, 13, pl. 109 (where it is shown as part of the composite harp/lyre). None of the copper keys from the harp in PG 1130 survive, but they are recorded in the field notes and in the drawing published by Woolley (1934:167, fig. 43).

16. Woolley 1934, pls. 76a, 114. The possible discrepancy in the placement of the upright has been previously recognized (Barnett 1969:97 citing Rimmer 1969).

17. Letter from Joan Rimmer to Dr. Robert H. Dyson, Jr., dated 30 November 1965.

18. Galpin noted a width of 2" to 2 1/2" (about 5 to 6.5 cms) for the tops of "ordinary sound boxes" and stated that "a boat-shaped sound box for a harp would naturally be wider, as the strings would not have to pass over the sides." (Letter to Dr. Legrain dated 10 February 1932; Administrative Records: Near Eastern Section: L. Legrain Correspondence, Folder: E-G, 1936-42; Archives of the University of Pennsylvania Museum of Archaeology and Anthropology.)

19. Fuller conservation notes 1/19/94, 2/18/94, 2/21/94, computer diagram #10.

20. Samples were sent to Dr. Jessica Johnson, Texas Memorial Museum, the University of Texas at Austin, Materials Conservation Laboratory, but they proved to be too heavily contaminated with wax used in early conservation to be identified.

However, wood from the Silver Lyre in the British Museum, described as “found on the back of the silver,” has been “provisionally identified...as a fine-textured soft-wood of a species unknown, probably a conifer” (Barnett 1969:98).

21. Woolley 1934:253 suggested this break in the border pattern as the point of attachment for the strings. He thought the strings might have been tied to a wooden rod inserted into the slit.

22. Discussion with Dr. Anne Kilmer during her visit to the University of Pennsylvania Museum in 1995 resulted in agreement that this could indeed have been the case (see Kilmer 1998:18). Woolley (1934:253) also suggested attachment of strings to a small bar for insertion into a similar opening in the Lapis-bearded Lyre.

23. See de Schauensee 1998, fig. 5b, which shows how strings are wound over bundles of fiber wrappings on a modern African lyre.

24. Hatt 1959:64–65 identifies the stag as a roe deer (*Capreolus capreolus capreolus* Linnaeus). The roe deer was not native to the alluvial plain of southern Mesopotamia but rather to open plateau areas farther north. See also Van Buren 1939.

25. The samples were prepared by Dr. Jessica Johnson, Materials Conservation Laboratory, Texas Memorial Museum, University of Texas at Austin. The woods were identified by Dr. Naomi Miller, Research Specialist, MASCA, University of Pennsylvania Museum of Archaeology and Anthropology, February 4, 1994.

26. Dr. John Curtis, letter to the author dated 31 July 1998.

27. CBS 15886. Hall and Woolley 1927:84–86, pl. XXVII.

28. Woolley 1934:255. Tamsen Fuller treatment report 3/12/94 (Conservation Laboratory, University of Pennsylvania Museum of Archaeology and Anthropology).

29. Vincent C. Pigott also thought that the metal covering the head was thick hammered sheet metal. He believed that the

metal was not thick enough to have been cast (personal communication). The silver covering the silver bull's head from a lyre (CBS 17065) and a lion's head from a piece of furniture (CBS 17064), although heavily conserved, appear to be of similar thickness. Both were found in Lady Puabi's grave and are in the collections of the University of Pennsylvania Museum.

30. Tamsen Fuller treatment report 3/12/94. (Conservation Laboratory, University of Pennsylvania Museum of Archaeology and Anthropology.)

3. The Lapis-bearded Lyre

1. Letter from the Secretary of the University of Pennsylvania Museum to Mr. H. R. Hall, the British Museum, dated April 17, 1929. (Expedition Records: Ur, Box 2, Folder: Correspondence 1929, Archives of the University of Pennsylvania Museum of Archaeology and Anthropology.)

2. This record is partially preserved. Letter from Dr. John Curtis to Diane Davies dated 26th April 1977.

3. Field information about the Lapis-bearded Lyre, meticulous drawings of the Silver Lyre (BM 121199) and related information were provided at Dr. Dyson's request by Dr. Edmund Sollberger, Keeper of the Department of Western Asiatic Antiquities, and Dr. John Curtis, who now holds that position. These were invaluable in making new scale drawings and the production of the new sound box possible. (Archives of the University of Pennsylvania Museum of Archaeology and Anthropology.)

4. A bull's horn made of gold sheet pressed or hammered over a bitumen coating covering the now-lost core was found at the nearby site of al'Ubaid (Hall and Woolley 1927:30, pl. V:4).

5. Analysis for the Conservation Laboratory, University of Pennsylvania Museum, of a sample of gold sheet from the neck of CBS 17694 (U 10556) provided by J. V. White, LRSM Analytical Facility of the University of Pennsylvania, on February 28, 1977, yielded the following information:

	Emission Spectroscopy <i>Est. % weight</i>	Atomic Absorption <i>% weight</i>
Gold	80	77.5
Silver	10–20	20.67
Copper	1–5	1.48
Platinum	0–1	0.26
Iron	0–1	0.06
Magnesium	trace	0.005
Calcium	trace	—
Silicon	trace	—
Plutonium	trace	—

See Woolley 1934:294, table III for early analyses of selected gold and electrum objects from the Royal Cemetery; Moorey 1994:217–32, for a discussion of gold in ancient Mesopotamia.

6. UPM accession numbers CBS 17065, CBS 17064.

7. UPM accession number CBS 15815, TO 431.

8. UPM accession number CBS 15294. The object for which this beard was made had apparently disintegrated and was not found during excavation.

9. Crocker 1997; Crocker and Kilmer 1984; Duchesne-Guillemin 1963, 1965; Gurney 1968, 1994; Kilmer 1960, 1965, 1984, 1993–1997, 1995, 1998, 2000; Kilmer and Tinney 1996, 1997; Smith and Kilmer 2000; Wulstan 1968.

10. The reconstruction of Lady Puabi's harp provides a three-dimensional example (Kilmer 1998: fig. 8).

11. Kilmer 1995:2601–2613 gives an excellent summary of ancient music and its applications, and the history of musical instruments in the ancient Near East. See also Kilmer 1993-1997:463–82; Sjöberg et al. 1984:75–78.

12. CBS 10996 in the University of Pennsylvania Museum, and U 3011 from Ur (Kilmer 1960, 1965). See also Crockett 1997; Gurney 1968; Duschene-Guillemin 1965; Kilmer 1998, with a glos-

sary of musical terms on p. 19; Kilmer and Tinney 1996, 1997; Smith and Kilmer 2000.

13. Letter from Dr. John Curtis to the author dated 31 July 1998.

14. Personal communication, Karl Krantz, Vice President for Animal Management, The Zoological Society of Philadelphia.

15. Personal communication, A. D. Kilmer.

References

- Administrative Records: Near Eastern Section 1926–42,
Museum Archives, University of Pennsylvania
Museum of Archaeology and Anthropology.
- Administrative Records: Director's Office. Museum Archives,
University of Pennsylvania Museum of Archaeology
and Anthropology.
- Barnett, R. D.
1969 "New Facts about Musical Instruments from
Ur." *Iraq* 31, pt. 2: 96–103.
- Collon, D.
1980–83 "Leier; B: Archäologisch." *Reallexikon der
Assyriologie und Vorderasiatischen Archäologie*
6:576–582.
- Crocker, R. L.
1997 "Mesopotamian Tonal Systems." *Iraq* 59:189–202.
- Crocker, R. L., and A. D. Kilmer
1984 "The Fragmentary Music Text from Nippur." *Iraq*
46, pt. 2: 81–86.
- de Schauensee, Maude
1998 "The 'Boat-shaped Lyre': Restudy of a Unique
Musical Instrument from Ur." *Expedition* 40(2): 20–28.
- Duchesne-Guillemin, Marcelle
1963 "Découverte d'une gamme babylonienne." *Revue de
musicologie de Paris* 49:3–17.

- 1965 "Note complémentaire sur la découverte de la gamme babylonienne." *Studies in Honor of Benno Landsberger on His Seventy-fifth Birthday, April 21, 1965. Assyriological Studies* 16:268–72. Appendix to Kilmer 1965.

Dyson, Robert H., Jr.

- 1977 "Archival Glimpses of the Ur Expedition in the Years 1920 to 1926." Selected by Robert H. Dyson, Jr. *Expedition* 20(1): 5–23.

Expedition Records: Ur. Museum Archives, University of Pennsylvania Museum of Archaeology and Anthropology.

Galpin, Francis

- 1929 "The Sumerian Harp of Ur, c. 3500 B.C." *Music and Letters* 10(2): 108–23.
- 1955 *The Music of the Sumerians and Their Immediate Successors, the Babylonians and Assyrians. Collections d'études musicologiques, Vol. 33. Sammlung musikwissenschaftlicher Abhandlungen, Bd. 33.* Strasbourg: Strasbourg University Press.

Gibson, McGuire

- 1972 *The City and Area of Kish.* Miami, FL: Field Research Projects.

Graham, A. Kenneth

- 1929 "Scientific Notes on the Finds from Ur." *The [University of Pennsylvania] Museum Journal* 20(4): 246–57.

Gurney, O. R.

- 1968 "An Old Babylonian Treatise on the Tuning of the Harp." *Iraq* 30, pt. 2: 229–233.
- 1994 "Babylonian Music Again." *Iraq* 56:101–106.

Hall, H. R., and C. L. Woolley

1927 *Ur Excavations*. Vol. I: *al'Ubaid*. London: Oxford University Press.

Hatt, Robert T.

1959 *The Mammals of Iraq*. Miscellaneous Publications 106, Museum of Zoology, University of Michigan. Ann Arbor.

Jenkins, Jean

1969 "A Short Note on African Lyres in Use Today." *Iraq* 31, pt. 2: 103, pl. XVIII.

Kilmer, Anne Draffkorn

1960 "Two New Lists of Key Numbers for Mathematical Operations." *Orientalia* 29:273–308.

1965 "The Strings of Musical Instruments: Their Names, Numbers, and Significance." *Studies in Honor of Benno Landsberger on His Seventy-Fifth Birthday, April 21, 1965*, *Assyriological Studies* 16:261–68.

1980–83 "Leier; A: Philologisch." *Reallexikon der Assyriologie und Vorderasiatischen Archäologie* 6:571–76.

1984 "A Music Tablet from Sippar(?): BM 65217 + 66616." *Iraq* 46, pt. 2: 69–80.

1993–97 "Musik. A. I. In Mesopotamien." *Reallexikon der Assyriologie und Vorderasiatischen Archäologie* 8:463–82.

1995 "Music and Dance in Ancient Western Asia." In *Civilizations of the Ancient Near East*, Vol. 4, ed. in chief Jack M. Sasson, pp. 2601–2613. New York: Charles Scribner's Sons.

1998 "The Ancient Musical Instruments from Ur and Ancient Mesopotamian Music." *Expedition* 40(2): 12–19.

2000 "Continuity and Change in the Ancient Mesopotamian Terminology for Music and Musical Instruments." In *Studien zur Musikarchäologie 2*; ed. Ellen Hickmann, Ingo Laufs, Ricardo Eichmann. Orient-Archäologie, Bd. 7, pp. 113–19.

Kilmer, Anne Draffkorn, Richard L. Crocker, and Robert R. Brown

1976 *Sounds of Silence: Recent Discoveries in Ancient Near Eastern Music*. Berkeley, CA: Bit Enki Publications. 24-page booklet with 12" stereo disc.

Kilmer, Anne, and Steve Tinney

1996 "Old Babylonian Music Instruction Texts." *Journal of Cuneiform Studies* 48:49–56.

1997 "Correction to Kilmer/Tinney "Old Babylonian Music Instruction Texts," JCS 48 (1996)." *Journal of Cuneiform Studies* 49:118.

Kramer, Samuel Noah

1963 *The Sumerians: Their History, Culture, and Character*. Chicago: University of Chicago Press.

Lawergren, Bo

1998 "Distinctions among Canaanite, Philistine, and Israelite Lyres, and Their Global Lyrical Contexts." *Bulletin of the American Schools of Oriental Research* 309:41–68.

Lawergren, Bo, and O. R. Gurney

1987 "Sound Holes and Geometrical Figures." *Iraq* 49:37–52.

Legrain, L.

- 1936 *Archaic Seal Impressions*. Ur Excavations Vol. 3. Joint Expedition of the British Museum and of the Museum of the University of Pennsylvania to Mesopotamia. London: Oxford University Press for the Trustees of the Two Museums.
- 1944 "The Babylonian Collections of the University Museum." *University of Pennsylvania Museum Bulletin* 10(3-4).

Mackay, Ernest

- 1925 *Report on the Excavation of the "A" Cemetery at Kish, Mesopotamia*. Pt. 1, *Memoirs* 1(1). Chicago: Field Museum of Natural History.
- 1929 *A Sumerian Palace and the "A" Cemetery at Kish, Mesopotamia*. Pt. 2, *Memoirs* 1(2). Chicago: Field Museum of Natural History.

Moorey, P. R. S.

- 1970 "Cemetery A at Kish: Grave Groups and Chronology." *Iraq* 32, pt. 2: 86–128.
- 1977 "What Do We Know about the People Buried in the Royal Cemetery?" *Expedition* 20(1): 24–40.
- 1982 *Ur 'of the Chaldees': A Revised and Updated Edition of Sir Leonard Woolley's Excavations at Ur*. Ithaca, NY: Cornell University Press.
- 1994 *Ancient Mesopotamian Materials and Industries: The Archaeological Evidence*. Oxford: Clarendon Press.

Nissen, Hans

- 1988 *The Early History of the Ancient Near East 9000–2000 B.C.* translation by Elizabeth Lutzeier, with Kenneth Northcott. Chicago: University of Chicago Press.

Plenderleith, H. J.

1934 "Metals and Metal Technique," in C. Leonard Woolley, *The Royal Cemetery*. Ur Excavations Vol. 2. Joint Expedition of the British Museum and the University of Pennsylvania to Mesopotamia. London: Oxford University Press for the Trustees of the Two Museums, pp. 284–98.

Pollock, Susan Marsha

1983 "The Symbolism of Prestige: An Archaeological Example from the Royal Cemetery of Ur." Ph.D. dissertation, University of Michigan.

1991 "Of Priestesses, Princes and Poor Relations: The Dead in the Royal Cemetery of Ur." *Cambridge Archaeological Journal* 1(2): 171–89.

Rakic, Yelena

1998 "Rescue and Restoration: A History of the Philadelphia "Ram Caught in a Thicket." *Expedition* 40(2):51–62.

Rimmer, Joan

1969 *Ancient Musical Instruments of Western Asia in the Department of Western Asiatic Antiquities, the British Museum*. London: The Trustees of the British Museum.

Sjöberg, Åke W., ed., with the collaboration of Hermann Behrens, Barry L. Eichler, Margaret W. Green, Erle Leichty, and Darlene M. Loding

1984 *The Sumerian Dictionary of the University Museum of the University of Pennsylvania*. Vol. 2. Philadelphia: The Babylonian Section of the University Museum.

Smith, J. C., and A. D. Kilmer

2000 "Laying the Rough, Testing the Fine (Music Notation for CBS 10996)." In *Studien zur Musikarchäologie I*, ed. Ellen Hickmann and Ricardo Eichmann. *Orient-Archäologie*, Bd. 6, pp. 127–40.

Van Buren, Elizabeth Douglas

- 1939 "The Fauna of Ancient Mesopotamia as Represented in Art." *Analecta Orientalia* 18.

West, M. L.

- 1994 "The Babylonian Musical Notation and the Hurrian Melodic Texts." *Music and Letters* 75(2): 161–79.

Woolley, C. Leonard

- 1929a "Ur of the Chaldees: More Royal Tombs." *The [University of Pennsylvania] Museum Journal* 20(1): 7–35.
- 1929b "Excavations at Ur, 1928–9." *The Antiquaries Journal* 9(4): 305–39.
- 1929c "Difficulties of Scientific Treasure-Hunting: Retrieving Works of Ancient Art Crushed in the Soil at Ur." *Illustrated London News* 175 (4718, September 21): 504–507, 528.
- 1934 *The Royal Cemetery. Ur Excavations Vol. 2. Joint Expedition of the British Museum and of the Museum of the University of Pennsylvania to Mesopotamia.* London: Oxford University Press for the Trustees of the Two Museums.

Wulstan, David

- 1968 "The Tuning of the Babylonian Harp." *Iraq* 30, pt. 2: 215–28.

Index

Figure references are indicated in **bold**;
plate references are indicated in *italic*.

- al'Ubaid 7, 38, 42, 43, 65, 66, **1**, 20
 bull inlay (CBS 15815; T.O. 307)
 65, 33*a,b*
 bull's horn, gold (114323) 112
 bull, copper (CBS 15886;
 T.O. 427) 38, 20
 column, inlaid (T.O. 431) 65
 lion's head, with bitumen core
 (114315) 42, 63, 65
 Nin-hursag, temple of 42, 66,
 20
- Baker, Mary Louise 24
balag 72
Barnett, R. D. 108, 110–111
bitumen 4, 112 (see also Boat-shaped
 Lyre, bitumen; Lapis-bearded
 Lyre, bitumen)
Boat-shaped Lyre (30-12-253;
 U 12355) 1, 2, 13, 15, 16–49, 63,
 65, 68, 70, 72, 76, 106, 107, 108,
 109, 110, 111–112, Appendix A,
 5–7, *frontispiece*, 7–19*a,b*,
 21*a,b*–23*a,b*, 39–43
 bitumen 26, 38, 42–43, 47, 7,
 21*a,b*, 22
 conservation 1, 2, 17–18, 29, 42,
 45, 47, 105, 107,
 Appendix A, 23*a,b*, 39–43
 construction 20–35, 108, 111, **6**,
 7–15, 40, 42
 excavation 1, 17, 45, 78, 79, 5, 3,
 5, 7*a,b*
 identification 18, 47, 108
 metallographic analyses, 20, 109
 microprobe 32, 35
 pseudomorphs 32, 70, 16*a,b*
 radiography 21, 26, 29, 42, 79,
 8, 10–12, 14, 19*a, b*, 21*a, b*
 sheathing 17, 18, 20–21, 26, 29,
 32, 35, 38, 42, 63, 111–112,
 7*a,b*, 10–15, 17–19*a,b*, 21*a,b*,
 23*a,b*, 39, 40, 42, 43
 sound box 2, 17, 18, 20, 21, 26, 29,
 32, 35, 38, 45, 47, 72, 76,
 110, **6**, 13–15, 17, 22, 23,
 39, 40
 stag, construction (body) 20, 21,
 26, 29, 35, 38, 42, 65, 5, 10,
 13, 17–19*a,b*, 43
 stag, construction (head) 20, 21,
 35, 42, 62, 63, 111, 7,
 frontispiece, 8, 9, 21*a,b*
 stringing 18, 20, 26, 29, 32, 35, 68,
 70, 108, 111, **6**, 15,
 16*a,b*, 23*a*
 tone 35, 74, 76
 tree 18, 20, 47, 5, 17, 22, 23*a,b*
 tuning 29, 35, 70
 uprights 18, 20, 21, 26, 29, 45,
 8–11, 18*a,b*, 19*a*, 42
 yoke 17, 18, 20, 26, 32, 35, 5,
 12, 16*a,b*, 17
- British Museum 4, 7, 21, 29, 32, 38,
 51, 54, 76, 106, 107, 108, 110–111
Bull-headed Lyre (see Lapis-bearded
 Lyre)
bull's head, silver (CBS 17065;
 U10412) 42, 63, 110–111
- conservation (see Boat-shaped Lyre,
 conservation, see Lapis-Bearded
 Lyre, conservation)
contemporary evidence,
 representational
 harps 70, 72, 6*b*
 lyres 17, 32, 58, 68, 70, 72, 76,
 6*a*, 29
contemporary evidence, textual
copper stag figures (BM 122610;
 U 12356) 13, 18, 47, 5, 5
cymbals 13
 harps, uses 70, 72
 lyres, uses 70, 72, 74
 lyres, materials for 17, 76, 77
 lyres, sounds of 35, 76

- lyres, stringing of 58, 74
 lyres, tuning 35, 70, 74
 music 72, 74
- Davies, Diane 61
 Dyson, Robert H., Jr. 1, 51, 108, 112
- Early Dynastic III 9
- Failaka 72
 Feisal, King 7
 Fleming, Stuart 109
 flute 13
 foundation cylinder 4
 Fuller, Tamsen 18, 47, Appendix A
- Galpin, Canon Francis 108, 110
 Gold Lyre (B 8694; U 12353) 26, 32, 42, 111 5, 3, 5
 Gordon, George Byron 7
 graves, "private" 9, 105
 graves, "royal" 4, 9, 105
 Great Death Pit (PG 1237) 13, 5, 3, 4
 Greene, Virginia 18, 61, Appendix B
- harp, defined 108, 6b
 harp, from harp/lyre (BM 121198; U 10412) 13, 18, 20, 21, 26, 32, 106, 108, 110, 113
 harp, from PG 1130 (BM123675; U 11781) 21, 106, 110
 harp, of Lady Puabi (BM 121198; U 10412) see harp, from harp/lyre
 harp, stringing 26, 108, 6b
 harp/lyre (BM 121198; U 10412) 13, 18, 20, 106, 108
 House, James 54
- inlay, shell (CBS 15294; U177b) 65, 34
 Iraq Museum 26, 32, 106
- Joint Expedition of the British Museum and the Museum of the University of Pennsylvania* 1, 7
- Kenyon, Sir Frederick 7, 107
 Kilmer, Anne Draffkorn 32, 35, 58, 70, 74, 111, 113–114, 38
 King's Grave (PG 789) 9, 51, 4, 4
 Kish 13, 1
- Lady Puabi, grave of (PG 800) 7, 13, 18, 29, 42, 110, 111–112, 3, 4
 Lapis-Bearded Lyre (CBS 17694, CBS 17684; U 20556) 1, 2, 9, 15, 21, 42, 45, 50–70, 105, 106, 109–110, 111–112, Appendix B, 4, 1, 8, 24, 25a,b, 26, 27, 29–32a,b, 44–51
 analyses, metallographic 63, 112–113
 bitumen, 51, 58, 63, 65, 88, 89, 47
 conservation 1, 2, 51, 58, 61, 63, 65, 68, 105, Appendix B, 8, 44–51
 construction, beard 58, 61, 63, 65, 68, 88, 94–95, 98, 100, 8, 25a, 48–50
 construction, ears 61, 63, 89, 32a,b
 construction, eyes 42, 45, 63, 65, 88, 89, 94, 47
 construction, head 42, 51, 58, 61, 63, 65, 88, 89, 95, 8, 25a,b, 30, 31a,b, 45, 46, 49, 51
 construction, horns 61, 63, 89, 25a, 44, 46
 excavation 9, 15, 51, 54, 58, 61, 87, 4, 4, 25a,b, 26, 30
 identification 51, 54, 25b, 26
 plaque 51, 58, 61, 68, 100, 103, 25a, 27, 29, 30
 radiography 21, 26, 42–43, 61, 63, 79, 88, 8–12, 14, 19a,b, 21a,b, 31a,b
 sound box 1, 51, 54, 58, 68, 74, 76, 112, 1, 24–26, 29
 sound box, new reconstruction 1, 54, 58, 68, 70, 76, 112, 26, 27

- stringing 58, 68, 70, 111, 27
 tone 35, 54, 74, 76, 77
 uprights 54, 26, 27
- Legrain, Léon 51, 107
- lion's head, silver (CBS 17064;
 U 10465) 42, 63, 111–112
- Loftus, W. K. 4
- lyre
 asymmetrical 17, 6a
 boat-shaped 7
 box 51, 6a
 defined 108, 6a
 sizes 70, 72, 6a, 27, 29, 37
 sound 35, 58, 74, 76
 symmetrical 17
- lyre, from harp/lyre 13, 18, 20, 106,
 108, 110
- Lyre bearer 70, 6a
- lyres, African 32, 68, 70, 111, 36
- MacLean, Edward 54
- Madeira, Percy 1
- Martin, Mervin 54
- Mesopotamia 2
- Miller, Naomi F. 111
- music, Sumerian 70, 72, 74, 76, 77,
 113, 38
- musicology 70, 74, 113
- Nabonidus 4
- Nippur 7, 74, 1
- Plaster Lyre (B 8695; U 12351) 20, 58,
 68, 70, 106, 35, 37
- Puabi, Lady (see also, Lady Puabi,
 grave of) 7
- "Private" graves 9, 105
- Rainey, Froelich 1
- Ram-in-the-Thicket figures (30-12-
 702; U 12357B; BM 122200;
 U 12357A) 13, 38, 45, 47, 107,
 109–110, 5
- raw materials, imported 2, 37
- raw materials, local 4
- Rimmer, Joan 29, 108, 110
- roe deer 35, 76, 111
- Royal Cemetery (see also individual
 graves) 4, 7, 9, 13, 15, 21, 51, 54,
 76, 77, 105, 2, 3, 2, 4
 musical instruments in 13, 15,
 106
- "Royal" graves 9, 105
- sammu* 72
- Shaw, S. Nan 108
- Shu'bad (see Puabi, Lady)
- Silver Lyre (BM 121199; U 12354) 21,
 26, 29, 32, 35, 54, 58, 68, 70, 76,
 106, 110–111, 5, 3, 5, 28, 57
- sistrum 29
- Sumer 2, 1
- Taylor, J. E. 4
- Tell al Mukkayar (Mound of Pitch) 4
- "thin string" 70, 36
- tuning methods 35, 70, 74
- University of Pennsylvania Museum
 of Archaeology and
 Anthropology 1, 7, 9, 18, 21, 38,
 51, 65, 78, 79, 87, 105, 106, 107,
 109
- Ur 2, 4, 7, 15, 1
 economy 2
 excavation, history of 4, 7, 9, 51,
 106
 identification of 4
 location 2, 4, 7, 1
 organization of 2, 4, 13, 2, 2
 trade 2, 4
- Valle, Pietro della 4
- White, J. V. 112
- wood 2, 4, 15, 20, 29, 35, 42, 51, 58,
 68, 77, 79, 95, 110–111, 25a, 40
- Woolley, C. Leonard (Sir Leonard) 1,
 7, 9, 13, 15, 17, 18, 20, 38, 42, 51,
 54, 58, 61, 63, 65, 68, 77, 78, 79,
 106–107, 1, 3, 7a,b, 25a,b, 37

3 1198 03998 9509



N/1198/03998/9509X

ISBN 0-924171-88-X