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The Closed Systems

A Thesis Presented

by

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to

The Graduate School

in Partial Fulfillment of the

Requirements

for the Degree of

Master of Fine Arts

in

Studio Art

Stony Brook University

May 2007

Stony Brook University

The Graduate School

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Abstract of the Thesis

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Closed System is the body of work which I have developed during my three years of study at Stony Brook University. This thesis will elaborate upon the theoretical and practical development of four works in the *Closed System* series. The *Closed System* series began with a static art object, altering the proportion of certain elements such as scale and quantity. By introducing electronic media into the series, I have adapted software to govern the hardware component, exploring the dynamics of the typical modes through which we interact with art, material, and technology.

The contradiction between oppositions, serves as the conceptual basis which unifies the four works in the *Closed System* series. Synthesis is the process in which unresolved elements establish relationships to compose a whole. It is a force that gathers, organizes and constrains those elements into a stable and consistent assemblage. In contrast, analysis is the process of breaking down a whole into its components. While the process of synthesis contributes the structure of a whole, analysis functions towards rupturing that structure. Through the production of *Closed System* series, I engage with an organization, an order, and structure. Simultaneously, I desire to overrule the constraints which have been placed upon the works in the *Closed System* series.

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Introduction

Closed System is the body of work which I have developed during my three years of study at Stony Brook University. This thesis will elaborate upon the theoretical and practical development of four works in the *Closed System* series. The *Closed System* series began with a static art object, altering the proportion of certain elements such as scale and quantity. By introducing electronic media into the series, I have adapted software to govern the hardware component, exploring the dynamics of the typical modes through which we interact with art, material, and technology.

A system is both a whole and a composition. Structure which emerges between components governs and organizes them to construct a system. Structure restricts how components relate to and interact with each other. Once components are held, structure maintains the function and organization of systems. Synthesis is the process in which unresolved elements establish relationships to compose a whole. It is a force that gathers, organizes and constrains those elements into a stable and consistent assemblage. In contrast, analysis is the process of breaking down a whole into its components. By unpacking a whole, the process of analysis institutes the quantitative expansion of a compound into multiples.¹ While the process of synthesis contributes the structure of a whole, analysis functions towards rupturing that structure. An art object is the result of synthesis; the constituents are held together to form a holistic union. In the case of fabricating a cube from a plywood board, for example, the plywood board is initially divided into six identical squares. This is the process of analysis. Then, those squares are put together to compose a cube. This is the process of synthesis. The conceptualization of a cube, on the other hand, is also analysis. A cube is defined as the compound of six identical squares. Moreover, a pyramid is another compound between four identical triangles. The difference between a cube and a pyramid is the number of sides and the angles where these planes meet. A cube as a compound can be internally defined by the relationship between its components, and a cube as a singular form can be externally defined by comparison to other forms such as a pyramid. A relationship between multiples is our empirical imposition. Generality and difference are, for example, the relationships between multiples. Both generality

¹ Henri Bergson: Creative Evolution Trans. Arthur Mitchell (New York: The Modern Library, 1944) 403.

and difference are dependent upon and can be defined by a comparison to one another. Generality, common characteristics, synthesizes multiples by equivalence or resemblance. In contrast, difference can only be established by a comparison to generality. Uniqueness of a singular entity is what makes it individual from other entities. When a singular is unique in some way, the uniqueness is established by a comparison to its standard. Difference which results the distinction of individuals institutes analysis.

A system, as the result of synthesis, acts within a finite framework of possibilities which are governed by structures; its internal organization therefore maintains a status quo. A closed system is one which is subordinate to and is incapable of altering its existing organization and function; one whose organizing/functioning principles govern its behavior. Such a self-contained system is structurally independent of external influence; consequently its internal form remains in a predetermined state. It may be static, being in the state between precariously balanced external and internal forces and having no apparent transmission of matter/energy between the interior and exterior of the system. Or else, it may be unresponsive and unadaptive to external feedback, having no communication with its environment.² As opposed to a closed system, an open system is one which overrules its existing organization. The form of an open system can be altered by external influences which institute analysis. While the lack of external influences maintains the organization of a closed system, by responding and adapting to external influences, an open system repeats the cycle of analysis and synthesis to vary and transform its organization and function.

The works of the *Closed System* series are derived from the contradiction between synthesis (establishing an organization) and analysis (instituting an expansion). The works in this series are, on one hand, an active engagement with organizations, being compliant with structural governance, and on the other hand, the works are confined within structures, seeking to decompose such a constraint.

² James G. Miller, "Living Systems: Basic Concepts," General Systems Theory and Psychiatry, ed. William Gray and Frederick J. Duhl (London: J. & A. Churchill Ltd, 1969) 72-73.

Closed System I: Symmetry

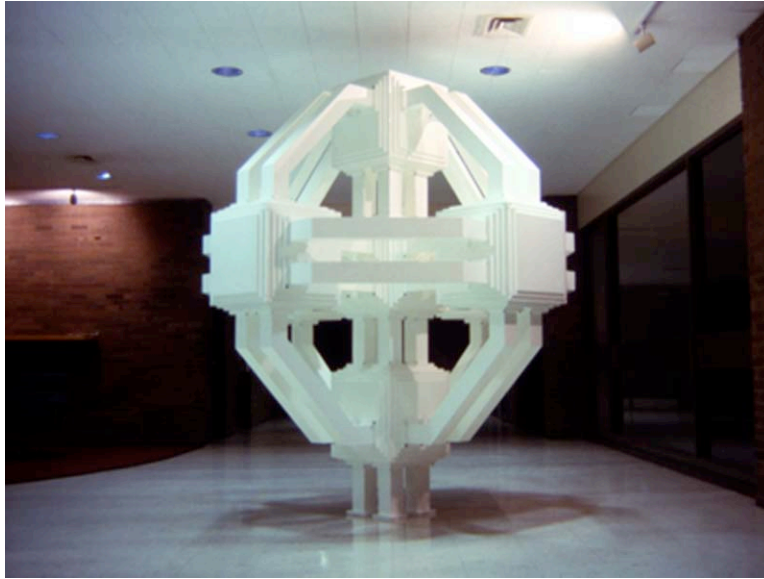


Fig.1. *Closed System I: Symmetry*. 2002. MDF Board,
H: 8'6'' x W: 7'6'' x D: 7'6''.

In 2003, I earned a BFA from C.W. Post Campus of Long Island University, where I had been primarily engaged with sculpture. During the summer of 2002, in my junior year, I produced a large-scale sculpture entitled *Closed System I: Symmetry*. (Fig.1, 2) It is a pure-white, diamond-shaped composition that imposes its large scale and weight in proportional relation to the viewer. The seamless and homogenous surface illustrates an atmosphere of sterility surrounding the work. The work is eight feet six inches in height, seven feet six inches in both width and depth, consisting of seven cubes, each twenty-two inches in size. The cubes are connected by twenty-eight beams that are one foot in length. The geometric modules are arranged in the form of symmetry which refers to general visions of a futuristic aesthetic; one void of any personal traces. During my first year at Stony Brook University, this work had been reinstalled in my studio, which measures ten feet in width, seventeen feet in depth and nine feet in height. The large scale of it left only a one foot margin around the sidewalls, causing viewers to carefully dodge around the sculpture. This

denied space prompts a certain degree of physical interaction between the viewer and work. Once the studio space is entered, the object impresses its volume and weight upon the viewer. The surrounding space is perceptually altered as the result of such a large object occupying the great proportion of the formerly negative space. The perception of this work is relative to and dependent upon the surrounding space.

An art object manifests its presence in a material state. The materiality of an art object is the primary constituent which engages the viewer's perception. It is the interface where the physicality of an art object first interacts with the viewer's senses, the impression that an art object evokes, hence later allowing for cognition and conceptualization to occur. With the identical cubes in three-dimensional grid composition, being installed in a space which narrowly exceeds the perceptual dimensions of the work, it demonstrates the correlation between materiality and spatiality. While space, in principle, infinitely continues in all directions until it is defined by a physical boundary, the materiality of an object can only exist within space. I had believed the materiality and tactility to be the primary factor contributing to the viewer's perception of an art object.

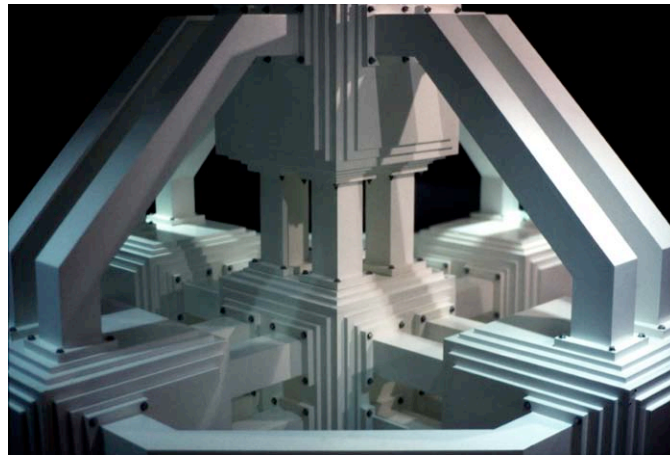


Fig.2. *Closed System I: Symmetry* (Detail).

The *Closed System I: Symmetry* is a concrete art object. Abstract art and concrete art are mutually exclusive alternatives which can be defined in relation to each other. The “abstract” is the “entity” extracted from the concrete. As such it is discrete, referring to and substituting for an original object. Conventionally, abstract art is viewed as liberation from the literal depiction of an original. It involves the process of reduction where characteristics, often the details are taken away, while the evidence of an original still remains. The “abstract” is the

internalization of the concrete, therefore human-made and subsequent to the concrete. While the concrete is a form itself, the “abstract”, on the other hand, involves no form. Such an obscure “entity” manifests its presence without the containment of a form. Preceding the “abstract”, the concrete appears as a form. It is a presence without specifying itself: a container without its content. The concrete is a so-called object which is any entity existing not initially within an observer, but appearing to one from the outside. The concrete is therefore the cause of one's perception and cognition. Concrete art involves an attempt to reproduce the characteristics of original objects as literally as possible. It is a Realist proposition in which the subject matter may be presented without interpretation and alteration, heavily dependent upon an original. The concrete externalizes itself in a material state, which literally occupies space and evokes a sensory experience before a comprehension is formed. The “abstract” is then a sensation, the reflection and alteration of the concrete.

All art objects are artifacts. Art is culture, the secondary creation derived from nature. Nature is a set of primary and intrinsic forms and principles. While an art object is the appropriation and alteration of nature, it comes into being with an artist's intention. Intention is the drive which synthesizes the primitive materials into a new whole. While an artist transforms the “abstract” into another visual form, an art object is a material and conceptual synthesis. Language, for example, is an artificial system to represent one's cognition and conceptualization of the concrete. In a reductive sense, each word is a form which represents what it refers to. The concrete is a preexisting form, which causes the “abstract.” Having no formal appearance, the “abstract” is an “entity” before its being identified with a preexisting form. The “abstract” is embodied into a container (a combination of figures and characters) to manifest itself.

It is generally assumed that an artist is the origin of an artwork. An artist is the author of a work from the beginning of its existence. Whether or not an artist is capable of creating, there is no doubt that the artist is the cause of the artwork. The art work therefore is attributed to the artist. To make this clear, the creation is the appropriation and recombination of preexisting objects. It is a pseudo-creation which originates in its precedence rather than the artist. What the artist can claim for the work is the authorship of its alteration. *Closed System I: Symmetry* is composed by a set of cubes as basic modules, and these components are held together by symmetry as the organizing principle, constituting a form as a whole. The work involves the appropriation of mathematical principles without an alteration. Geometric forms, as constituted by mathematic principles, are preexisting and associated with axioms which are, though unjustifiable, commonly accepted as self-evident, predetermined, and unchangeable, demanding a specific interpretation. The homogeneity of surface detail is essential, as the presence of irregular marks on the surface would destroy the uniformity of these modular forms. By using the same materials and mechanical processes, I duplicate each unit as identically as possible. Manufacturing is the process in

which an object is mechanically replicated; where raw materials are fabricated into large quantities of standardized products. In the assembly line, materials pass through various steps to construct uniform components by which, as long as materials and processes remain consistent, so too does the final outcome. All manufacturing processes are executed through a set of hierarchal instructions where deviation from the standard characteristics results in a defective product. In the works of the *Closed System* series, I mechanically fabricate individual components through a closed-loop production line. The application of geometric forms, instead of freehand or arbitrary forms, is a self-imposed constraint placed upon the *Closed System I: Symmetry* which serves as a parallel to the principles imposed upon closed systems while closed systems are submissive to predetermined circumstances.

Closed System II: Obsessive Compulsive



Fig. 3. *Closed System II: Obsessive Compulsive*. 2004.
Plywood, Duct tube, Duct collar,
H: 8' 10'' x W: 16' 8' x D: 16' 8'.

The first large-scale work I produced in 2004 at Stony Brook University, the *Closed System II: Obsessive Compulsive* (Fig. 3, 4), resembles an enormous synthetic cocoon. The uncanny air purifier appeared as a dominant entity inside the MFA Melville Library Gallery, confronting a viewer with its massive scale and volume which becomes, like *Closed System I: Symmetry*, oppressive in the restricted inner space of the gallery. The work consists of a black central diamond-shaped chamber, eight feet ten inches in height and eight feet eight inches in both width and depth, which is large enough to accommodate viewers within. Four black cubes, thirty-two inches in all dimensions, are suspended from the ceiling surrounding the central chamber. Each cube is connected to the four sides of the diamond shaped structure through one twelve-inch diameter duct and sixteen six-inch diameter ducts. These cubes contain ventilators, circulating air within the enclosed space of the work to constantly purify the inner air with built-in air filters. The outline of the black sculpture is obscured due to the dark interior space of the gallery and the network of flexible duct work which envelopes the form. The undulating network of tubular ducts resembles organic forms, contrasting with the very nature of the industrial materials used to

construct them. The tubes are caused to shake and rustle by the air circulating inside, contributing to the eerily organic effect and ominously animating the mysterious form. All of the ceiling tiles of the gallery had been removed and the existing duct components in the gallery had now become part of surroundings. The combination of the sculpture and the infrastructure of the gallery with the animated appearance of this moaning and vibrating machine may imply a parasite technology working its way into the core of the building.



Fig. 4. *Closed System II: Obsessive Compulsive* (Detail).

The *Closed System II: Obsessive Compulsive* is a dynamic system by integrated mechanical components. The operation of machines requires external energy and by transforming the form of forces, they execute internal actions. Machines, being capable of recurrently executing the same task and the single function involves only the continual maintenance of the internal status quo, are a form of closed systems. While an external force is the drive for the action of systems, structure controls the action of systems, confining it within a framework. Structure which governs the behavior of system, whether organic or mechanical, can be subdivided into base structure and superstructure.³ The base-structure is an inherent set of functioning/organizing principles underlying all systems which associate with a material concretion. The base-structure unconditionally affects

³ Karl Marx: A Contribution to the Critique of Political Economy, Trans. S.W. Ryazanskaya (New York: International Publisher, 1970) 20-21.

the behavior of systems and its role is predetermined and fixed, closed to any alteration, and it remains independent from external factors. In contrast, the superstructure is the subsequent principles of the base-structure which are empirically imposed upon systems. The superstructure may take precedent over and substitute for the role of the base-structure, and will conditionally affect the behavior of individual systems. The superstructure may be unique to individual systems; the form and function of the systems enacted under the superstructure may vary and shift. As the superstructure develops, its rules of operation often become the privileged functioning rules.

Principles enforced upon the behavior of systems are paralleled with principles which govern animal behavior in the *Closed System II: Obsessive Compulsive*. The behavior of animals is, to some extent, predetermined inherently by instinct. Instinct is the base-structure, a set of functioning principles which is permanent and consistent, and can neither be acquired nor influenced by empirical factors. Instinct is the inborn disposition that generates preset patterns in the actions of all animals. While acting as the primary drive for animal behavior, instinct consists of a number of beneficial traits which ensure the survival and propagation of animals. In Psychology, Conditioning is the term for the scientific investigation of animal behavior and learning. Ivan Pavlov, a Russian psychologist, proposed his experiments and accumulated observations, Conditioned Reflex and Unconditioned Reflex. These are patterns in animal behavior, linking a stimulus and its responsive behavior. Unconditioned Reflex demonstrates that instinct, being essentially "hard wired" into animal behavior, is the primary factor which determines the reaction to external stimuli. In contrast, Conditioned Reflex involves an empirically learned law which also governs the animal behavior. When a neutral stimulus, one not yet associated with any responsive behavior, is recurrently presented with an unconditioned stimulus, it eventually becomes a conditioned stimulus and elicits a conditioned response.⁴ A well-known example of Pavlovian Conditioning is the experiment with his dog which involves the correlation between food as an external stimulus and salivation as a response to the stimulus. When a neutral stimulus such as an audible tone is recurrently presented with food (right before food is presented), it eventually becomes an additional condition, which through association, will cause the dog to salivate with or without the presence of food. In this example, the Unconditioned Stimulus, hunger is the base-structure which is unconditionally enforced. The conditioned stimulus, an audible tone, functions as the empirically associated superstructure which likewise drives the dog's behavior. While an Unconditioned Reflex demonstrates an innate association, universal to all animals, Conditioned Reflex demonstrates an empirical association, unique and

⁴ Ivan P. Pavlov: Conditioned Reflexes: An Investigation of the Physiological Activity of the Cerebral Cortex, Trans. G.V. Anrep (New York: Dover Publications, INC, 1960) 25-26.

variable to individual animals. The feedback system in which conditions are formulated occurs within superstructure, which unlike instinct, is formed only as a pseudo-creation of base-structure, natural law. Once principles have been reformed through experiential means, a new set of governing principles has been overlaid upon the principles of base-structure; these are the principles of superstructure.

The mechanism of Conditioning can be found in human behavior as well. For instance, Obsessive Compulsive Disorder (OCD) is caused by an anxiety that compels individuals to perform recurrent actions. Obsessions are defined as unpleasant ideas, thoughts or impulses which create an irrational sensation of threat. Compulsions are defined as repetitive behaviors in effort to avoid or reduce the anxiety created by the obsessive threat.⁵ One common model of OCD involves the correlation between a fear towards contamination and a defensive behavior in response to it. However, the fear is often derived from an illogical reasoning, and consequently a compulsive behavior is performed without rational justification. Conditioned Reflex functions in animal behavior in much the same way that obsession governs human behavior through compulsive acts: the difference being the irrational nature of the compulsion. The action spurred by the obsessive threats becomes an involuntary compulsion upon which the afflicted must act. In *Closed System II: Obsessive Compulsive*, the ventilators induce artificial airflow through the ducts that purify, preserve, and condition the confined inner air with a built-in filtration system. This work serves as the physical incarnation of the Obsessive Compulsive model where the action is compelled by the obsession which overrules rational thought.

⁵ Stanley J. Rachman and Ray J. Hodgson, Obsessions and Compulsions (Englewood Cliffs, NJ: Prentice-Hall, INC, 1980) 10-11.

Closed System III: Genetic Code



Fig. 5. *Closed System III: Genetic Code*. 2005.
Fluorescent light bulb, Electrical box,
Electrical conduit, Plywood,
H: 4' x W: 24' x D: 16'.

My first electronic media-based work, *Closed System III: Genetic Code* (Fig.5,6), was produced in 2005 through collaboration with a computer programmer, Mike Lamb of Stony Brook University's Center for Excellence in Learning and Teaching. This work is an oscilloscope-like two-dimensional grid, consisting of thirty-two four-foot long fluorescent light bulbs. Those modules are connected directly to the electrical boxes. Together with electrical conduits, the flat grid filled the floor of the MFA Melville Library Gallery. The stripped-down materials and their configuration evoke in a viewer the desolate relationship to bare structure – the infinite and vacant distances between and within objects. Each fluorescent light bulb is operated by software to blink on and off in a pattern directly corresponding to the binary data of the software. The irony is that the software of this work is responsive to external inputs; however, I chose to invert the role of the software to instruct itself with its own binary data, hence causing the system to operate in a closed-loop internal activity. As the hardware submissively performs according to the software, the software operates the

hardware by translating its own programs.

Since 2005, I have adapted electronic media into the *Closed System* series which has resulted in a shift of my primary concern from hardware to software. However, hardware remains essential in that it is the physical object which is being operated by the software component. It is precisely the imperative of the hardware to respond to the commands of the software. Although a machine is designed for executing particular tasks, a computer has distinguished itself from other mechanical devices with the complexity of its tasks. A computer is a multi-functional machine. Software is a metaprogram which, though within the framework of its capacity, holds an ability to modify the function of hardware.



Fig. 7. *Closed System III: Genetic Code* (Side View).

The work explores the parallel between computer software and genes as a set of instructions. Genes are base-structures, the primary design instructions for the biological and cognitive development of a living organism. A variety of environmental influences, occurring in superstructure, may secondarily affect the organism's physical growth. The driving mechanisms of an organism's evolution are, for instance, Genetic Variation and Natural Selection. Mutation is a cause of Genetic Variation, where new traits are introduced to the population of an organism. Mutations are known to occur through errors during cell replication or the exposure to radiation and viruses. Natural Selection is the feedback process,

causing beneficial mutations to reoccur as it weeds out deleterious mutations.⁶ This leads to the evolution of an organism, in turn ensuring its survival and reproduction. For example, instinct is the beneficial trait which will ensure the fitness of populations. In contrast, deleterious mutations which often cause the death of cells are removed through Natural Selection. Ecologist/Computer Scientist, Thomas Ray's work involves the exploration of artificial life cycle in a virtual realm. Began in 1990, *Tierra* is his ongoing scientific experiment in which internet-based work literally simulates evolutionary process. The genome of synthetic organisms in the work consists of sequences of machine code (binary code). The simulation of artificial evolution begins with an ancestor which is capable of self-replicating to increase the population. Genetic Variation is caused most often by mutations, random errors during cell replication, which generate new binary sequences. Within the process of self-replication, individual cells which make more errors are less likely to survive in the gene pool. Due to the Genetic Variation, populations with altered functionality can emerge.⁷

A closed system is one which is independent from external influences and is unable to override its existing organization and function. The software of both *Closed System III: Genetic Code* and *Tierra* operate without external influences. The software of *Tierra* is a metaprogram, being capable of generating a new sequence of binary code by simulating the evolutionary development within the realm of the software. Nonetheless, it is incapable of overwriting its own instructions, which is a form of closed systems. Software which holds an ability to modify its organization and function, whether partially or completely is a self-metaprogram. The self-metaprogram is capable of overwriting its instructions/programs which originally govern the system. The self-metaprogram is an open system which I propose to integrate into the *Closed System* series.

⁶ Theodore H. Eaton, JR, Evolution (New York: W.W. Norton & Company, INC, 1970) 42-43.

⁷ Thomas Ray, et al., "What Tierra Is," Tierra Home Page, 11 Dec. 2006
<<http://www.nis.atr.jp/~ray/tierra/whatis.html>>.

Closed System IV: Intelligence

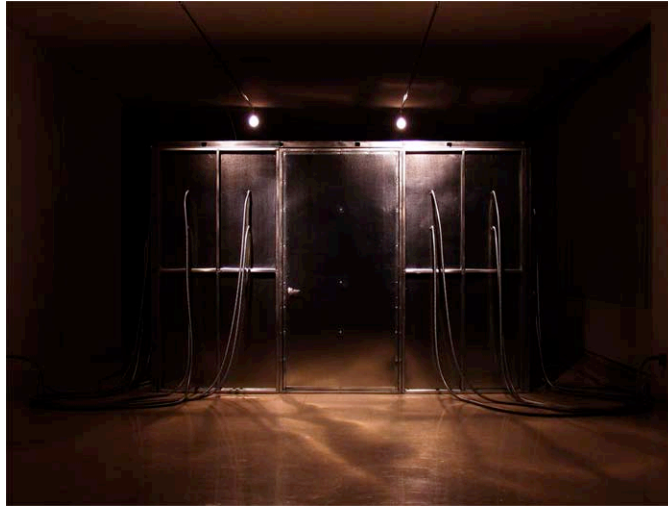


Fig. 7. *Closed System IV: Intelligence*. 2006.
Galvanized steel, Electrical box, Electrical conduit,
Compact fluorescent light bulbs,
H: 8' x W: 12' x D: 8'.

The *Closed System IV: Intelligence* (Fig.7, 8) was produced in 2006 for my thesis exhibition in the Staller Art Gallery at Stony Brook University. The use of industrial materials in the construction of the work bears a resemblance to a large commercial refrigerator, being devoid of warmth for the viewer. It is a semi-reflective metal room with a door in front, twelve feet in width, eight feet in both depth and height. The wall panels and the door are fabricated with metal studs and twenty-five-gauge, galvanized steel sheets. The interior room provides an intimate space where the viewers are detached and isolated from the surrounding gallery atmosphere. Upon entering the room, a real-time interaction is facilitated through the use of a computer program which simulates human communication. As the viewer may choose to communicate with the program by typing on a keyboard placed on a pedestal in the middle of the room, the program verbally responds to the viewer's textual input. The thirty-two compact fluorescent lights which are mounted parallel to the floor on the inside walls of the room, blink in a sequence, visually representing the volume of the program's responses. Once the

subject of any given sentence is identified, the program is triggered into action, searching its data for the appropriate preset response. The program can only converse successfully within these predetermined limitations and, as a result, is incapable of authentic and agentic communication. However, through communicating with the program, the viewer also realizes oneself appropriating, recombining, and modeling oneself according to preexisting terms and their significations within the boundaries of language.



Fig. 8. *Closed System IV: Intelligence* (Inside View).

Language institutes both liberalization and restriction. Language is the system of representation which facilitates our conceptual grasp of external objects through meaning. Concept, as our cognition and comprehension of externals, is shaped through cultural influence and agreement. Context is the environment of concept; the surrounding circumstances associated with concept affect its signification. With the aid of language, we hold an ability to voluntarily, though temporally, choose our own actions and reactions, rather than being compelled by constraints such as instinct, by rationalizing and conceptualizing the relationship between an action and its consequence. However, language exists prior to our acquisition. As it consists of a sequence of signs, a sign is a composition between a form and its signification.⁸ A word, for instance, is a discrete substitute for what

⁸ Ferdinand de Saussure: Course in General Linguistics. Trans. Wade Baskin (New York: The Philosophical Library, INC, 1959) 65-69.

it refers to. It manifests itself as a form which determines the appearance of its content. In contrast, content is a signification which does not appear without the containment of a form. Language is a collection of preexisting forms which we appropriate and recombine to identify our thoughts. Language restricts our mind within an infinite set of terms and a limited set of grammatical principles.

The grammar of language is another restriction, forcing order, pattern, and organization upon words to formulate logical sentences. While a word is a substitute form which represents its signification, a sentence is a synthesis of words according to the principles of grammar. Linguist Noam Chomsky proposed the theory of Universal Grammar in his book, *Aspects of the Theory of Syntax* in 1965. Universal Grammar is the blueprint of all possible grammars. It is an enumeration of a broad description that makes a grammar recognizable to an individual. According to Chomsky, children are born with the Faculty of Language, the innate ability to recognize and learn a grammar, and certain linguistic expectations. These expectations, the set of all possible variations among languages, are the intrinsic state of grammars, not yet in existence. When children are exposed to a particular grammar, they compare it to their linguistic expectations. Once a variant is recognized, it is selected for the grammar, and other variants are excluded.⁹ Universal Grammar is the base-structure which restricts the formation of all grammars. In contrast, a language-specific grammar can be developed within superstructure through empirical observations and accumulated experiences. As a language-specific grammar is empirical, it can be altered over time within the framework of Universal Grammar.

The software of the *Closes System IV: Intelligence* is capable of recurrently responding to its given inputs. However, its responses are restricted within a predetermined realm. It neither rationally comprehends the meaning of inputs nor does it willingly choose outputs. As such, it is a closed system.

⁹ Noam Chomsky, *Aspects of the Theory of Syntax* (Cambridge, MA: The MIT Press, 1965) 6-9.

Conclusion

The four works in the *Closed System* series are compositions. Those systems as syntheses are material and conceptual assemblages. Structure which exists between components restricts the organization and function of systems. In a static system, structure is its organization which suspends components in equilibrium between external and internal forces. In a dynamic system, structure is its function, governing the interaction between components which confines the possible behaviors of systems in a certain boundary. A closed system, like other systems, is the result of synthesis. It is a system which is submissive to its structure, therefore incapable of altering its organization and function. In contrast to a closed system, an open system is one which is able to override its preexisting structure. It is responsive to external influences and adaptive to feedbacks.

Closed System I: Symmetry is a static art object, consisting of a set of identical cubes. There is no apparent exchange of matter/energy through the interior and exterior of the system; it is therefore structurally stable and unchangeable. Symmetry as the organization, suspends those cubes in a balance, maintaining a static relationship between them. *Closed System II: Obsessive Compulsive* is a dynamic system through the adaptation of an external energy source. With an external force, mechanical components are capable of recurrently executing a singular task. However, it is closed to communication. Through the introduction of electronics, *Closed System III: Genetic Code* integrates software component which instructs the behavior of hardware. However, it is a form of one-way communication system which interacts with itself. *Closed System IV: Intelligence* involves a two-way communication: able to input and output information between its observer in real time. Nevertheless, its responses to the external inputs are predetermined and fixed: incapable of overriding its preset circumstances.

The contradiction between oppositions, serves as the conceptual basis which unifies the four works in the *Closed System* series. Synthesis is the process that gathers and organizes elements into a whole. As constituted of those elements, the structure constrains the composition. Analysis is the process of breaking down a whole into its components. By decomposing the organization, the process institutes a structural alteration. This contradiction is often paralleled in the *Closed System* series with two desires which one simultaneously holds. One desire is to liberate oneself from constraints which are imposed by any organizations. This is the desire to establish oneself as an individual. The other desire is to identify oneself with the norm, to become a fully assimilated member of a group. This is the desire to defend oneself from instability. Whether these

desires are instinctive or empirical, one must struggle within this duality, as it is the nature of self. When one element appears, it demands the opposing element. A problem is monologue, the neglect of an opposition, which leads to favoritism where one point of view is privileged over another. It is the true/false ideology, placing oneself in “right” side and excluding others as “wrong.” Contradictions between oppositions must remain unresolved, maintaining the state of flow and neutrality in which oppositions are put in a dialogue with each other. Through the production of *Closed System* series, I engage with an organization, an order, and structure. Simultaneously, I desire to overrule the constraints which have been placed upon the works in the *Closed System* series.

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