Some Documents Addressing How We Might Think About Selecting Information to Be Used in the Creative Process and Possible Subsequent Modes of Organization

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## **Paragraphs on Conceptual Art**

### Sol Lewitt

Artforum (June, 1967)

The editor has written me that he is in favor of avoiding "the notion that the artist is a kind of ape that has to be explained by the civilized critic". This should be good news to both artists and apes. With this assurance I hope to justify his confidence. To use a baseball metaphor (one artist wanted to hit the ball out of the park, another to stay loose at the plate and hit the ball where it was pitched), I am grateful for the opportunity to strike out for myself.

I will refer to the kind of art in which I am involved as conceptual art. In conceptual art the idea or concept is the most important aspect of the work. When an artist uses a conceptual form of art, it means that all of the planning and decisions are made beforehand and the execution is a perfunctory affair. The idea becomes a machine that makes the art. This kind of art is not theoretical or illustrative of theories; it is intuitive, it is involved with all types of mental processes and it is purposeless. It is usually free from the dependence on the skill of the artist as a craftsman. It is the objective of the artist who is concerned with conceptual art to make his work mentally interesting to the spectator, and therefore usually he would want it to become emotionally dry. There is no reason to suppose, however, that the conceptual artist is out to bore the viewer. It is only the expectation of an emotional kick, to which one conditioned to expressionist art is accustomed, that would deter the viewer from perceiving this art.

Conceptual art is not necessarily logical. The logic of a piece or series of pieces is a device that is used at times, only to be ruined. Logic may be used to camouflage the real intent of the artist, to lull the viewer into the belief that he understands the work, or to infer a paradoxical situation (such as logic vs. illogic). Some ideas are logical in conception and illogical perceptually. The ideas need not be complex. Most ideas that are successful are ludicrously simple. Successful ideas generally have the appearance of simplicity because they seem inevitable. In terms of ideas the artist is free even to surprise himself. Ideas are discovered by intuition. What the work of art looks like isn't too important. It has to look like something if it has physical form. No matter what form it may finally have it must begin with an idea. It is the process of conception and realization with which the artist is concerned. Once given physical reality by the artist the work is open to the perception of al, including the artist. (I use the word perception to mean the apprehension of the sense data, the objective understanding of the idea, and simultaneously a subjective interpretation of both). The work of art can be perceived only after it is completed.

Art that is meant for the sensation of the eye primarily would be called perceptual rather than conceptual. This would include most optical, kinetic, light, and color art.

Since the function of conception and perception are contradictory (one pre-, the other postfact) the artist would mitigate his idea by applying subjective judgment to it. If the artist wishes to explore his idea thoroughly, then arbitrary or chance decisions would be kept to a minimum, while caprice, taste and others whimsies would be eliminated from the making of the art. The work does not necessarily have to be rejected if it does not look well. Sometimes what is initially thought to be awkward will eventually be visually

#### pleasing.

To work with a plan that is preset is one way of avoiding subjectivity. It also obviates the necessity of designing each work in turn. The plan would design the work. Some plans would require millions of variations, and some a limited number, but both are finite. Other plans imply infinity. In each case, however, the artist would select the basic form and rules that would govern the solution of the problem. After that the fewer decisions made in the course of completing the work, the better. This eliminates the arbitrary, the capricious, and the subjective as much as possible. This is the reason for using this method.

When an artist uses a multiple modular method he usually chooses a simple and readily available form. The form itself is of very limited importance; it becomes the grammar for the total work. In fact, it is best that the basic unit be deliberately uninteresting so that it may more easily become an intrinsic part of the entire work. Using complex basic forms only disrupts the unity of the whole. Using a simple form repeatedly narrows the field of the work and concentrates the intensity to the arrangement of the form. This arrangement becomes the end while the form becomes the means.

Conceptual art doesn't really have much to do with mathematics, philosophy, or nay other mental discipline. The mathematics used by most artists is simple arithmetic or simple number systems. The philosophy of the work is implicit in the work and it is not an illustration of any system of philosophy.

It doesn't really matter if the viewer understands the concepts of the artist by seeing the art. Once it is out of his hand the artist has no control over the way a viewer will perceive the work. Different people will understand the same thing in a different way.

Recently there has been much written about minimal art, but I have not discovered anyone who admits to doing this kind of thing. There are other art forms around called primary structures, reductive, rejective, cool, and mini-art. No artist I know will own up to any of these either. Therefore I conclude that it is part of a secret language that art critics use when communicating with each other through the medium of art magazines. Mini-art is best because it reminds one of miniskirts and long-legged girls. It must refer to very small works of art. This is a very good idea. Perhaps "mini-art" shows could be sent around the country in matchboxes. Or maybe the mini-artist is a very small person, say under five feet tall. If so, much good work will be found in the primary schools (primary school primary structures).

If the artist carries through his idea and makes it into visible form, then all the steps in the process are of importance. The idea itself, even if not made visual, is as much a work of art as any finished product. All intervening steps –scribbles, sketches, drawings, failed works, models, studies, thoughts, conversations– are of interest. Those that show the thought process of the artist are sometimes more interesting than the final product.

Determining what size a piece should be is difficult. If an idea requires three dimensions then it would seem any size would do. The question would be what size is best. If the thing were made gigantic then the size alone would be impressive and the idea may be lost entirely. Again, if it is too small, it may become inconsequential. The height of the viewer may have some bearing on the work and also the size of the space into which it will be placed. The artist may wish to place objects higher than the eye level of the viewer, or lower. I think the piece must be large enough to give the viewer whatever information he needs to understand the work and placed in such a way that will facilitate this understanding. (Unless the idea is of impediment and requires difficulty of vision or

#### access).

Space can be thought of as the cubic area occupied by a three-dimensional volume. Any volume would occupy space. It is air and cannot be seen. It is the interval between things that can be measured. The intervals and measurements can be important to a work of art. If certain distances are important they will be made obvious in the piece. If space is relatively unimportant it can be regularized and made equal (things placed equal distances apart) to mitigate any interest in interval. Regular space might also become a metric time element, a kind of regular beat or pulse. When the interval is kept regular whatever is irregular gains more importance.

Architecture and three-dimensional art are of completely opposite natures. The former is concerned with making an area with a specific function. Architecture, whether it is a work of art or not, must be utilitarian or else fail completely. Art is not utilitarian. When threedimensional art starts to take on some of the characteristics, such as forming utilitarian areas, it weakens its function as art. When the viewer is dwarfed by the larger size of a piece this domination emphasizes the physical and emotive power of the form at the expense of losing the idea of the piece.

New materials are one of the great afflictions of contemporary art. Some artists confuse new materials with new ideas. There is nothing worse than seeing art that wallows in gaudy baubles. By and large most artists who are attracted to these materials are the ones who lack the stringency of mind that would enable them to use the materials well. It takes a good artist to use new materials and make them into a work of art. The danger is, I think, in making the physicality of the materials so important that it becomes the idea of the work (another kind of expressionism).

Three-dimensional art of any kind is a physical fact. The physicality is its most obvious and expressive content. Conceptual art is made to engage the mind of the viewer rather than his eye or emotions. The physicality of a three-dimensional object then becomes a contradiction to its non-emotive intent. Color, surface, texture, and shape only emphasize the physical aspects of the work. Anything that calls attention to and interests the viewer in this physicality is a deterrent to our understanding of the idea and is used as an expressive device. The conceptual artist would want o ameliorate this emphasis on materiality as much as possible or to use it in a paradoxical way (to convert it into an idea). This kind of art, then, should be stated with the greatest economy of means. Any idea that is better stated in two dimensions should not be in three dimensions. Ideas may also be stated with numbers, photographs, or words or any way the artist chooses, the form being unimportant.

These paragraphs are not intended as categorical imperatives, but the ideas stated are as close as possible to my thinking at this time. These ideas are the result of my work as an artist and are subject to change as my experience changes. I have tried to state them with as much clarity as possible. If the statements I make are unclear it may mean the thinking is unclear. Even while writing these ideas there seemed to be obvious inconsistencies (which I have tried to correct, but others will probably slip by). I do not advocate a conceptual form of art for all artists. I have found that it has worked well for me while other ways have not. It is one way of making art; other ways suit other artists. Nor do I think all conceptual art merits the viewer's attention. Conceptual art is good only when the idea is good.

Sentences on Conceptual Art

1. Conceptual artists are mystics rather than rationalists. They leap to conclusions that logic cannot reach.

2. Rational judgements repeat rational judgements.

3. Irrational judgements lead to new experience.

4. Formal art is essentially rational.

5. Irrational thoughts should be followed absolutely and logically.

6. If the artist changes his mind midway through the execution of the piece he compromises the result and repeats past results.

7. The artist's will is secondary to the process he initiates from idea to completion. His wilfulness may only be ego.

8. When words such as painting and sculpture are used, they connote a whole tradition and imply a consequent acceptance of this tradition, thus placing limitations on the artist who would be reluctant to make art that goes beyond the limitations.

9. The concept and idea are different. The former implies a general direction while the latter is the component. Ideas implement the concept.

10. Ideas can be works of art; they are in a chain of development that may eventually find some form. All ideas need not be made physical.

11. Ideas do not necessarily proceed in logical order. They may set one off in unexpected directions, but an idea must necessarily be completed in the mind before the next one is formed.

12. For each work of art that becomes physical there are many variations that do not.

13. A work of art may be understood as a conductor from the artist's mind to the viewer's. But it may never reach the viewer, or it may never leave the artist's mind.

14. The words of one artist to another may induce an idea chain, if they share the same concept.

15. Since no form is intrinsically superior to another, the artist may use any form, from an expression of words (written or spoken) to physical reality, equally.

16. If words are used, and they proceed from ideas about art, then they are art and not literature; numbers are not mathematics.

17. All ideas are art if they are concerned with art and fall within the conventions of art.

18. One usually understands the art of the past by applying the convention of the present, thus misunderstanding the art of the past.

19. The conventions of art are altered by works of art.

20. Successful art changes our understanding of the conventions by altering our perceptions.

21. Perception of ideas leads to new ideas.

22. The artist cannot imagine his art, and cannot perceive it until it is complete.

23. The artist may misperceive (understand it differently from the artist) a work of art but still be set off in his own chain of thought by that misconstrual.

24. Perception is subjective.

25. The artist may not necessarily understand his own art. His perception is neither better nor worse than that of others.

26. An artist may perceive the art of others better than his own.

27. The concept of a work of art may involve the matter of the piece or the process in which it is made.

28. Once the idea of the piece is established in the artist's mind and the final form is decided, the process is carried out blindly. There are many side effects that the artist cannot imagine. These may be used as ideas for new works.

29. The process is mechanical and should not be tampered with. It should run its course.

30. There are many elements involved in a work of art. The most important are the most obvious.

31. If an artist uses the same form in a group of works, and changes the material, one would assume the artist's concept involved the material.

32. Banal ideas cannot be rescued by beautiful execution.

33. It is difficult to bungle a good idea.

34. When an artist learns his craft too well he makes slick art.

35. These sentences comment on art, but are not art.

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## the serial attitude

### mel bochner

What order-type is universally present wherever there is any order in the world? The answer is, serial order. Any row, array, rank, order of precedence, numerical or quantitative set of values, any straight line, any geometrical figure employing straight lines, and yes, all space and all time.

- Joshua Royce, Principles of Logic

Serial order is a method, not a style. The results of this method are surprising and diverse. Edward Muybridge's photographs, Thomas Eakins' perspective studies, Jasper Johns' numerals, Alfred Jensen's polyptychs, Larry Poons' circles, dots and ellipsoids, Donald Judd's painted wall pieces, Sol LeWitt's orthogonal multi-part floor structures all are works employing serial logics. This is not a stylistic phenomenon. Variousness of the above kind is sufficient grounds for suggesting that rather than a style we are dealing with an attitude. The serial attitude is a concern with how order of a specific type is manifest.

Many artists work "in series." That is, they make different versions of a basic theme; Morandi's bottles or de Kooning's women, for example. This falls outside the area of concern here. Three basic operating assumptions separate serially ordered works from multiple variants:

1 — The derivation of the terms or interior divisions of the work is by means of a numerical or otherwise systematically predetermined process (permutation, progression, rotation, reversal).

2 - The order takes precedence over the execution.

3 — The completed work is fundamentally parsimonious and systematically self-exhausting.

Serial ideas have occurred in numerous places and in various forms. Muybridge's photographs are an instance of the serialization of time through the systematic subtraction of duration from event. Muybridge simultaneously photographed the same activity from 180°, 90°, and 45° and printed the three sets of photographs parallel horizontally. By setting up alternative reading logics within a visually discontinuous sequence he completely fragmented perception into what Stockhausen called, in another context, a "directionless time-field."

Robert Rauschenberg's *Seven White Panels* and Ellsworth Kelly's orthogonal eightfoot-square *Sixty-Four* are anomalous works of the early 1950s. Both paintings fall within a generalized concept of arrays, which is serial, although their concerns were primarily modular. Modular works are based on the repetition of a standard unit. The unit, which may be anything (Andre's bricks, Morris's truncated volumes, Warhol's soup cans) does not alter its basic form, although it may appear to vary by the way in which units are adjoined. While the addition of identical units may modify simple gestalt viewing, this is a relatively uncomplex order form. Modularity has a history in the "cultural methods of forming" and architectural practice. Frank Stella has often worked within a modular set, although in his concentric square paintings he appears to have serialized color arrangement with the addition of random blank spaces. Some of the early black paintings, like *Die Fahne Hoch*, employed rotational procedures in the organization of quadrants.

Logics which precede the work may be absurdly simple and available. In Jasper Johns' number and alphabet paintings the prime set is either the letters A-Z or the numbers 0–9. Johns chose to utilize convention. The convention happened to be serial. Without deviating from the accustomed order of precedence he painted all the numbers or letters, in turn, beginning again at the end of each sequence until all the available spaces on the canvas were filled. The procedure was self-exhausting and solipsistic. Other works of Johns are noteworthy in this context, especially his *Three Flags*, which is based on size diminution and, of course, the map paintings. His drawings in which all the integers 0–9 are superimposed are examples of a straightforward use of simultaneity.

An earlier example of simultaneity appears in Marcel Duchamp's *Nude Descending a Staircase*. Using the technique of superimposition and transparency he divided the assigned canvas into a succession of time intervals. Due to the slight variation in density it is impossible to visualize specific changes as such. Alternations are leveled to a single information which

subverts experiential time. Duchamp has said the idea was suggested to him by the experiments

of Dr. Etienne Jules Marey (1830–1904). Marey, a French physiologist, began with ideas derived from the work of Muybridge, but made a number of significant conceptual and mechanical changes. He invented an ingenious optical device based on principles of revolution similar to Gatling's machine gun. This device enabled him to photograph multiple points of view on one plate. In 1890 he invented his "chronophotograph," which was capable of recording, in succession, 120 separate photos per second. He attempted to visualize the passage of time by placing a clock within camera range, obtaining by this method a remarkable "dissociation of time and image."

Types of order are forms of thoughts. They can be studied apart from whatever physical form they may assume. Before observing some further usages of seriality in the visual arts, it will be helpful to survey several other areas where parallel ideas and approaches also exist. In doing this I wish to imply neither metaphor nor analogy.

*My desire was for a* conscious control *over the new means and forms that arise in every artist's mind.* 

#### - Arnold Schoenberg

Music has been consistently engaged with serial ideas. Although the term "serial music" is relatively contemporary, it could be easily applied to Bach or even Beethoven. In a serial or Dodecaphonic (twelve tone) composition, the order of the notes throughout the piece is a consequence of an initially chosen and ordered set (the semitonal scale arranged in a definite linear order). Note distribution is then arrived at by permuting this prime set. Any series of notes (or numbers) can be subjected to permutation as follows: 2 numbers have only 2 permutations (1, 2; 2, 1); 3 numbers have 6 (1, 2, 3; 1, 3, 2; 2, 1, 3; 2, 3, 1; 3, 1, 2; 3, 2, 1); 4 numbers have 24; . . . 12 numbers have 479,001,600.

Other similarly produced numerical sequences and a group of pre-established procedures give the exact place in time for each sound, the coincidence of sounds, their duration, timbre and pitch.

The American serial composer Milton Babbit's *Three Compositions for Piano* can be used as a simplified example of this method (see George Perle's Serial Composition and Atonality for a more detailed analysis). The prime set is represented by these integers: P = 5, 1, 2, 4. By subtracting each number in turn from a constant of such value that the resulting series introduces no numbers not already given, an inversion results (in this case the constant is 6): I = 1, 5, 4, 2. A rotational procedure applied to P and I yields the third and fourth set forms: Rp = 2, 4, 5, 1; Ri = 4, 2, 1, 5.

Mathematics – or more correctly arithmetic – is used as a compositional device, resulting in the most literal sort of "programme music," but one whose course is determined by a numerical rather than a narrative or descriptive "programme."

- Milton Babbit

The composer is freed from individual note-to-note decisions which are self-generating within the system he devises. The music thus attains a high degree of conceptual coherence, even if it sometimes sounds "aimless and fragmentary."

The adaptation if the serial concept of composition by incorporating the more general notion of permutation into structural organization – a permutation the limits of which are rigorously defined inb terms if the restrictions place on its self-determination constitutes a logical and fully justified development, since both morphology and rhetoric are governed by one and the same principle.

-Pierre Boulez

The form itself is of very limited importance, it becomes the grammar of the total work.

- Sol Lewitt

Language can be approached in either of two ways, as a set of culturally transmitted behavior patterns shared by a group or as a system conforming to the rules which constitute its grammar.

- Joseph Greenberg, Essays in Linguistics

In linguistic analysis, language is often considered as a system of elements without assigned meanings ("uninterpreted systems"). Such systems are completely permutational, having grammatical but not semantic rules. Since there can be no system without rules of arrangement, this amounts to the handling of language as a set of probabilities. Many interesting observations have been made about uninterpreted systems which are directly applicable to the investigation of any array of elements obeying fixed rules of combination. Studies of isomorphic (correspondence) relationships are especially interesting.

Practically all systems can be rendered isomorphic with a system containing only one serial relation. For instance, elements can be reordered into a single line, i. e., single serial relation by arranging them according to their coordinates. In the following two-dimensional array, the coordinates of C are (1, 3), of T (3, 2):

- R P D L B T
- C U O

Isomorphs could be written as: R, L, C, P, B, U, D, T, O or R, P, D, L, B, T, C, U, O. An example of this in language is the ordering in time of speech to correspond to the ordering of direction in writing. All the forms of cryptography from crossword puzzles to highly sophisticated codes depend on systematic relationships of this kind.

The limits of my language are the limits of my world.

- Ludwig Wittgenstein

(...)

The structure of an artificial optic array may, but need not, specify a source. A wholly invented structure need not specify anything. This would be a case of structure as such. It contains information but not information about, and it affords perception but not perception of.

- James J. Gibson, The Senses Considered as Perceptual Systems

Perspective, almost universally dismissed as a concern in recent art, is a fascinating example of the application of prefabricated systems. In the work of artists like Ucello, Durer, Piero, Saendredam, Eakins (especially their drawings), it can be seen to exist entirely as methodology. It demonstrates not how things appear but rather the workings of its own strict postulates. As it is, these postulates are serial.

Perspective has had an oddly circular history. Girard Desargues (1593–1662) based his non-Euclidean geometry on an intuition derived directly from perspective. Instead of beginning with the unverifiable Euclidean axiom that parallel lines never meet, he accepted instead the visual evidence that they do meet at the point where they intersect on the horizon line (the "vanishing point" or "infinity" of perspective). Out of his investigations of "visual" (as opposed to "tactile") geometry came the field of projective geometry. Projective geometry investigates such problems as the means of projecting figures from the surface of three-dimensional objects to two-dimensional planes. It has led to the solution of some of the problems in mapmaking. Maps are highly abstract systems, but since distortion of some sort must occur in the transformation from three to two dimensions, maps are never completely accurate. To compensate for distortion, various systems have been devised. On a topographical map, for example, the lines indicating levels (contour lines) run through points which represent physical points on the surface mapped so that an isomorphic relation can be established. Parallels of latitude, isobars, isothermal lines and other grid coordinate denotations, all serialized, are further cases of the application of external structure systems to order the unordered.

Another serial aspect of mapmaking is a hypothesis in topology about color. It states that with only four colors all the countries on any map can be differentiated without any color having to appear adjacent to itself. (One wonders what the results might look like if all the paintings in the history of art were repainted to conform to the conditions of this hypothesis.) (...)

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# the serial attitude mel bochner



Mel Bochner - Blah

Mel Bochner was one of the first conceptual artists to use language and text in his work and continues to do so today. The text becomes the painting and at first glance, the colors and composition take a back seat to the message, but in fact it is the aesthetics of the words that promote the message within.

tim ruppert

"What order-type is universally present wherever there is any order in the world? The answer is, serial order. What is a series? Any row, array, rank, order of precedence, numerical or quantitative set of values, any strait line, any geometrical figure employing straight lines, and yes, all space and all time."

-Josiah Royce, Principles of Logic



"The serial attitude is a concern with how order of a specific type is manifest."



Eadweard Muybridge - Horse Jumping - 1877

Able to understand the complexities by capturing fragmented frames of the movement

"Instance of the serialization of time through the systematic subtraction of duration from event. By setting up alternative reading logics within a visually discontinuous sequence he completely fragmented perception."

# Modular Works



Andy Warhol - Campbell's Soup Cans - 1962

"Modular works are based on the repetition of a standard unit. The unit which may be anything does not alter its basic form, although it may appear to vary by the way in which units are adjoined."

"If you take a Campbell's Soup can and repeat it fifty times, you are not interested in the retinal image. According to Marcel Duchamp, what interests you is the concept that wants to put fifty Campbell's Soup cans on a canvas."



Marcel Duchamp - Nude Descending a Staircase - 1912

It maps the motion and energy of the body as it passes through space.

Influenced by the multiple exposure photography documented by Eadweard Muybridge closely resembled the multiple exposure photography documented in Ead

"Using the technique of superimposition and transparency he divided the assigned canvas into a succession of time intervals. Due to the slight variation in density it is impossible to visualize specific changes as such. Alternations are leveled to a single information which subverts experiential time."

# Serialism and Music

"In a serial composition the order of the notes throughout the piece is a consequence of an initially chosen and ordered set."

"The composer is freed from individual note-to-note decisions which are self-generating within the system he devised."

"The music thus attains a high degree of conceptual coherence."



# Projective Geometry Example : Mapmaking Order the Unordered



Projective geometry investigates the means of projecting figures from the surface of three-dimensional objects to two-dimensional planes.

Maps are highly abstract systems

They are never completely accurate because they are transforming three dimensional sphere into two dimensional plane





still in use today.

Goode's Homolosine

an equal area map with

good shapes, but has

"interrupted" oceans.



Van der Grinten a compromise projection, when shown in full size it is a circle.



Winkle a compromise projection used by many mapmakers today.

## Database as a Genre of New Media

### Lev Manovich

#### The Database Logic

After the novel, and subsequently cinema privileged narrative as the key form of cultural expression of the modern age, the computer age introduces its correlate - database. Many new media objects do not tell stories; they don't have beginning or end; in fact, they don't have any development, thematically, formally or otherwise which would organize their elements into a sequence. Instead, they are collections of individual items, where every item has the same significance as any other.

Why does new media favor database form over others? Can we explain its popularity by analyzing the specificity of the digital medium and of computer programming? What is the relationship between database and another form, which has traditionally dominated human culture - narrative? These are the questions I will address in this article.

Before proceeding I need to comment on my use of the word database. In computer science database is defined as a structured collection of data. The data stored in a database is organized for fast search and retrieval by a computer and therefore it is anything but a simple collection of items. Different types of databases - hierarchical, network, relational and object-oriented - use different models to organize data. For instance, the records in hierarchical databases are organized in a treelike structure. Object-oriented databases store complex data structures, called "objects," which are organized into hierarchical classes that may inherit properties from classes higher in the chain. [2] New media objects may or may not employ these highly structured database models; however, from the point of view of user's experience a large proportion of them are databases in a more basic sense. They appear as a collections of items on which the user can perform various operations: view, navigate, search. The user experience of such computerized collections is therefore quite distinct from reading a narrative or watching a film or navigating an architectural site. Similarly, literary or cinematic narrative, an architectural plan and database each present a different model of what a world is like. It is this sense of database as a cultural form of its own which I want to address here. Following art historian Ervin Panofsky's analysis of linear perspective as a "symbolic form" of the modern age, we may even call database a new symbolic form of a computer age (or, as philosopher Jean-Francois Lyotard called it in his famous 1979 book Postmodern Condition, "computerized society"), [3] a new way to structure our experience of ourselves and of the world. Indeed, if after the death of God (Nietzche), the end of grand Narratives of Enlightenment (Lyotard) and the arrival of the Web (Tim Berners-Lee) the world appears to us as an endless and unstructured collection of images, texts, and other data records, it is only appropriate that we will be moved to model it as a database. But it is also appropriate that we would want to develops poetics. aesthetics, and ethics of this database.

Let us begin by documenting the dominance of database form in new media. The most obvious examples of this are popular multimedia encyclopedias, which are collections by

their very definition; as well as other commercial CD-ROM titles which are collections as well - of recipes, quotations, photographs, and so on. [4] The identity of a CD-ROM as a storage media is projected onto another plane, becoming a cultural form of its own. Multimedia works which have "cultural" content appear to particularly favor the database form. Consider, for instance, the "virtual museums" genre - CD-ROMs which take the user on a "tour" through a museum collection. A museum becomes a database of images representing its holdings, which can be accessed in different ways: chronologically, by country, or by artist. Although such CD-ROMs often simulate the traditional museum experience of moving from room to room in a continuous trajectory, this "narrative" method of access does not have any special status in comparison to other access methods offered by a CD-ROM. Thus the narrative becomes just one method of accessing data among others. Another example of a database form is a multimedia genre which does not has an equivalent in traditional media - CD-ROMs devoted to a single cultural figure such as a famous architect, film director or writer. Instead of a narrative biography we are presented with a database of images, sound recordings, video clips and/or texts which can be navigated in a variety of ways.

CD-ROMs and other digital storage media (floppies, and DVD-ROMs) proved to be particularly receptive to traditional genres which already had a database-like structure, such as a photo-album; they also inspired new database genres, like a database biography. Where the database form really flourished, however, is on the Internet. As defined by original HTML, a Web page is a sequential list of separate elements: text blocks, images, digital video clips, and links to other pages. It is always possible to add a new element to the list all you have to do is to open a file and add a new line. As a result, most Web pages are collections of separate elements: texts, images, links to other pages or sites. A home page is a collection of personal photographs. A site of a major search engine is a collection of numerous links to other sites (along with a search function, of course). A site of a Webbased TV or radio station offers a collections of video or audio programs along with the option to listen to the current broadcast; but this current program is just one choice among many other programs stored on the site. Thus the traditional broadcasting experience, which consisted solely of a real-time transmission, becomes just one element in a collection of options. Similar to the CD-ROM medium, the Web offered fertile ground to already existing database genres (for instance, bibliography) and also inspired the creation of new ones such as the sites devoted to a person or a phenomenon (Madonna, Civil War, new media theory, etc.) which, even if they contain original material, inevitably center around the list of links to other Web pages on the same person or phenomenon.

The open nature of the Web as medium (Web pages are computer files which can always be edited) means that the Web sites never have to be complete; and they rarely are. The sites always grow. New links are being added to what is already there. It is as easy to add new elements to the end of list as it is to insert them anywhere in it. All this further contributes to the anti-narrative logic of the Web. If new elements are being added over time, the result is a collection, not a story. Indeed, how can one keep a coherent narrative or any other development trajectory through the material if it keeps changing?

#### **Data and Algorithm**

Of course not all new media objects are explicitly databases. Computer games, for instance, are experienced by their players as narratives. In a game, the player is given a well-defined

task - winning the match, being first in a race, reaching the last level, or reaching the highest score. It is this task which makes the player experience the game as a narrative. Everything which happens to her in a game, all the characters and objects she encounters either take her closer to achieving the goal or further away from it. Thus, in contrast to the CD-ROM and Web databases, which always appear arbitrary since the user knows that additional material could have been added without in any way modifying the logic of the database, in a game, from a user's point of view, all the elements are motivated ( i.e., their presence is justified). <sup>[5]</sup>

Often the narrative shell of a game ("you are the specially trained commando who has just landed on a Lunar base; your task is to make your way to the headquarters occupied by the mutant base personnel...") masks a simple algorithm well-familiar to the player: kill all the enemies on the current level, while collecting all treasures it contains; go to the next level and so on until you reach the last level. Other games have different algorithms. Here is an algorithm of the legendary "Tetris": when a new block appears, rotate it in such a way so it will complete the top layer of blocks on the bottom of the screen making this layer disappear. The similarity between the actions expected from the player and computer algorithms is too uncanny to be dismissed. While computer games do not follow database logic, they appear to be ruled by another logic - that of an algorithm. They demand that a player executes an algorithm in order to win.

An algorithm is the key to the game experience in a different sense as well. As the player proceeds through the game, she gradually discovers the rules which operate in the universe constructed by this game. She learns its hidden logic, in short its algorithm. Therefore, in games where the game play departs from following an algorithm, the player is still engaged with an algorithm, albeit in another way: she is discovering the algorithm of the game itself. I mean this both metaphorically and literally: for instance, in a first person shooter, such as "Quake," the player may eventually notice that under such and such condition the enemies will appear from the left, i.e. she will literally reconstruct a part of the algorithm responsible for the game play. Or, in a diffirent formulation of the legendary author of Sim games Will Wright, "Playing the game is a continuos loop between the user (viewing the outcomes and inputting decisions) and the computer (calculating outcomes and displaying them back to the user). The user is trying to build a mental model of the computer model." <sup>[6]</sup>

What we encountered here is an example of the general principle of new media: the projection of the ontology of a computer onto culture itself. If in physics the world is made of atoms and in genetics it is made of genes, computer programming encapsulates the world according to its own logic. The world is reduced to two kinds of software objects which are complementary to each other: data structures and algorithms. Any process or task is reduced to an algorithm, a final sequence of simple operations which a computer can execute to accomplish a given task. And any object in the world - be it the population of a city, or the weather over the course of a century, a chair, a human brain - is modeled as a data structure, i.e. data organized in a particular way for efficient search and retrieval. [7] Examples of data structures are arrays, linked lists and graphs. Algorithms and data structures have a symbiotic relationship. The more complex the data structure of a computer program, the simpler the algorithm needs to be, and vice versa. Together, data structures and algorithms are two halves of the ontology of the world according to a computer.

The computerization of culture involves the projection of these two fundamental parts of computer software - and of the computer's unique ontology - onto the cultural sphere. If CD-ROMs and Web databases are cultural manifestations of one half of this ontology - data structures, then computer games are manifestations of the second half - algorithms. Games (sports, chess, cards, etc.) are one cultural form which required algorithm-like behavior from the players; consequently, many traditional games were quickly simulated on computers. In parallel, new genres of computer games came into existence such as a first person shooter ("Doom," "Quake"). Thus, as it was the case with database genres, computer games both mimic already existing games and create new game genres.

It may appear at first sight that data is passive and algorithm is active - another example of passive-active binary categories so loved by human cultures. A program reads in data, executes an algorithm, and writes out new data. We may recall that before "computer science" and "software engineering" became established names for the computer field, it was called "data processing." This name remained in use for a few decades during which computers were mainly associated with performing calculations over data. However, the passive/active distinction is not quite accurate since data does not just exist - it has to be generated. Data creators have to collect data and organize it, or create it from scratch. Texts need to written, photographs need to be taken, video and audio need to be recorded. Or they need to be digitized from already existing media. In the 1990s, when the new role of a computer as a Universal Media Machine became apparent, already computerized societies went into a digitizing craze. All existing books and video tapes, photographs and audio recordings started to be fed into computers at an ever increasing rate. Steven Spielberg created the Shoah Foundation which videotaped and then digitized numerous interviews with Holocaust survivors; it would take one person forty years to watch all the recorded material. The editors of Mediamatic journal, who devoted a whole issue to the topic of "the storage mania" (Summer 1994) wrote: "A growing number of organizations are embarking on ambitious projects. Everything is being collected: culture, asteroids, DNA patterns, credit records, telephone conversations; it doesn't matter." [8] Once it is digitized, the data has to be cleaned up, organized, indexed. The computer age brought with it a new cultural algorithm: reality-> media-> data-> database. The rise of the Web, this gigantic and always changing data corpus, gave millions of people a new hobby or profession: data indexing. There is hardly a Web site which does not feature at least a dozen links to other sites, therefore every site is a type of database. And, with the rise of Internet commerce, most large-scale commercial sites have become real databases, or rather front-ends to company databases. For instance, in the Fall of 1998, Amazon.com, an online book store, had 3 million books in its database; and the maker of leading commercial database Oracle has offered Oracle 8i, fully intergrated with the Internet and featuring unlimited database size, natural-langauge queries and support for all multimedia data types. [9] Jorge Luis Borges's story about a map which was equal in size to the territory it represented became re-written as the story about indexes and the data they index. But now the map has become larger than the territory. Sometimes, much larger. Porno Web sites exposed the logic of the Web to its extreme by constantly re-using the same photographs from other porno Web sites. Only rare sites featured the original content. On any given date, the same few dozen images would appear on thousands of sites. Thus, the same data would give rise to more indexes than the number of data elements themselves.

#### **Database and Narrative**

As a cultural form, database represents the world as a list of items and it refuses to order this list. In contrast, a narrative creates a cause-and-effect trajectory of seemingly unordered items (events). Therefore, database and narrative are natural enemies. Competing for the same territory of human culture, each claims an exclusive right to make meaning out of the world.

In contrast to most games, most narratives do not require algorithm-like behavior from their readers. However, narratives and games are similar in that the user, while proceeding through them, must uncover its underlying logic - its algorithm. Just like a game player, a reader of a novel gradually reconstructs an algorithm (here I use it metaphorically) which the writer used to create the settings, the characters, and the events. From this perspective, I can re-write my earlier equations between the two parts of the computer's ontology and its corresponding cultural forms. Data structures and algorithms drive different forms of computer culture. CD-ROMs, Web sites and other new media objects which are organized as databases correspond to the data structure; while narratives, including computer games, correspond to the algorithms.

In computer programming, data structures and algorithms need each other; they are equally important for a program to work. What happens in a cultural sphere? Do databases and narratives have the same status in computer culture?

Some media objects explicitly follow database logic in their structure while others do not; but behind the surface practically all of them are databases. In general, creating a work in new media can be understood as the construction of an interface to a database. In the simplest case, the interface simply provides the access to the underlying database. For instance, an image database can be represented as a page of miniature images; clicking on a miniature will retrieve the corresponding record. If a database is too large to display all of its records at once, a search engine can be provided to allow the user to search for particular records. But the interface can also translate the underlying database into a very different user experience. The user may be navigating a virtual three-dimensional city composed from letters, as in Jeffrew Shaw's interactive installation "Legible City." [10] Or she may be traversing a black and white image of a naked body, activating pieces of text, audio and video embedded in its skin (Harwood's CD-ROM "Rehearsal of Memory.") [11] Or she may be playing with virtual animals which come closer or run away depending upon her movements (Scott Fisher et al, VR installation, "Menagerie.") [12] Although each of these works engages the user in a set of behaviors and cognitive activities which are quite distinct from going through the records of a database, all of them are databases. "Legible City" is a database of three-dimensional letters which make up the city. "Rehearsal of Memory" is a database of texts and audio and video clips which are accessed through the interface of a body. And "Menagerie" is a database of virtual animals, including their shapes, movements and behaviors.

Database becomes the center of the creative process in the computer age. Historically, the artist made a unique work within a particular medium. Therefore the interface and the work were the same; in other words, the level of an interface did not exist. With new media, the content of the work and the interface become separate. It is therefore possible to create different interfaces to the same material. These interfaces may present different versions of

the same work, as in David Blair's <u>Wax Web</u>. [13] Or they may be radically different from each other, as in Moscow WWW Art Centre. [14] This is one of the ways in which the general principle of <u>variability</u> of new media manifests itself. <u>The new media object</u> <u>consists of one or more interfaces to a database of multimedia material</u>. If only one interface is constructed, the result will be similar to a traditional art object; but this is an exception rather than the norm.

This formulation places the opposition between database and narrative in a new light, thus redefining our concept of narrative. The "user" of a narrative is traversing a database, following links between its records as established by the database's creator. An interactive narrative (which can be also called "hyper-narrative" in an analogy with hypertext) can then be understood as the sum of multiple trajectories through a database. A traditional linear narrative is one, among many other possible trajectories; i.e. a particular choice made within a hyper-narrative. Just as a traditional cultural object can now be seen as a particular case of a new media object (i.e., a new media object which only has one interface), traditional linear narrative can be seen as a particular case of a hyper-narrative.

This "technical," or "material" change in the definition of narrative does not mean that an arbitrary sequence of database records is a narrative. To qualify as a narrative, a cultural object has to satisfy a number of criteria, which literary scholar Mieke Bal defines as follows: it should contain both an actor and a narrator; it also should contain three distinct levels consisting of the text, the story, and the fabula; and its "contents" should be "a series of connected events caused or experienced by actors." [15] Obviously, not all cultural objects are narratives. However, in the world of new media, the word "narrative" is often used as all-inclusive term, to cover up the fact that we have not yet developed a language to describe these new strange objects. It is usually paired with another over-used word interactive. Thus, a number of database records linked together so that more than one trajectory is possible, is assumed to be constitute "interactive narrative." But to just create these trajectories is of course not sufficient; the author also has to control the semantics of the elements and the logic of their connection so that the resulting object will meet the criteria of narrative as outlined above. Another erroneous assumption frequently made is that by creating her own path (i.e., choosing the records from a database in a particular order) the user constructs her own unique narrative. However, if the user simply accesses different elements, one after another, in a usually random order, there is no reason to assume that these elements will form a narrative at all. Indeed, why should an arbitrary sequence of database records, constructed by the user, result in "a series of connected events caused or experienced by actors"?

In summary, database and narrative do not have the same status in computer culture. In the database / narrative pair, database is the unmarked term. [16] Regardless of whether new media objects present themselves as linear narratives, interactive narratives, databases, or something else, underneath, on the level of material organization, they are all databases. In new media, the database supports a range of cultural forms which range from direct translation (i.e., a database stays a database) to a form whose logic is the opposite of the logic of the material form itself - a narrative. More precisely, a database can support narrative, but there is nothing in the logic of the medium itself which would foster its generation. It is not surprising, then, that databases occupy a significant, if not the largest, territory of the new media landscape. What is more surprising is why the other end of the spectrum - narratives - still exist in new media.

Notes:

1. This article develops ideas which were first presented by me at "Chips and Bits" Symposium, UCLA School of Film and Television, May 1997. The role of database in new media was further explored in the symposium "Computing Culture: Defining New Media Genres" which I organized the Center for Computing in the Arts (CRCA) at the University of California, San Diego, May 1-2, 1998. See

http://jupiter.ucsd.edu/~culture/symposium.html.

2. "database" Britannica Online. http://www.eb.com:180/cgi-bin/g?

DocF=micro/160/23.html [Accessed 27 November 1998].

 Jean-Francois Lyotard, <u>The Postmodern Condition: A Report on Knowledge</u>, trans. Geoff Bennington and Brian Massumi (Minneapolis: University of Minnesota Press, 1984), 3.
As early as 1985 Grolier, Inc. issued text-only "Academic American Encyclopedia" on CD-ROM. First multimedia encyclopedia was "Compton's MultiMedia Encyclopedia" published in 1989.

5. David Bordwell and Kristin Thompson define motivation in cinema in the following way: "Because films are human constructs, we can expect that any one element in a film will have some justification for being there. This justification is the motivation for that element." Here are some examples of motivation: "When Tom jumps from the balloon to chase a cat, we motivate his action by appealing to notions of how dogs are likely to act when cats are around." "The movement of a character across a room may motivate the moving of the camera to follow the action and keep the character within a frame." David Bordwell and Kristin Thompson, <u>Film Art: an Introduction. 5th Edition</u> (New York: The McGraw-Hill Companies, Inc., 1997), 80.

6. Chris McGowan and Jim McCullaugh, <u>Entertainment in the Cyber Zone</u> (New York: Random House, 1995), 71.

7. This is true for a procedural programming paradigm. In a object-oriented programming paradigm, represented by such computer langauges as Java and  $C^{++}$ , algorithms and data structures are modeled together as objects.

8. Mediamatic 8, no. 1 (Summer 1994), 1860.

9. http://www.amazon.com/exec/obidos/subst/misc/company-info.html/,

http://www.oracle.com/database/oracle8i/, accessed Nov. 28, 1998. 10.

http://artnetweb.com/guggenheim/mediascape/shaw.html

11. Harwood. Rehearsal of Memory, CD-ROM (London: Artec and Bookworks, 1996.) 12. http://www.telepresence.com/MENAGERIE,

accessed October 22, 1998.

13. http://jefferson.village.virginia.edu/wax/, accessed September 12, 1998.

14. http://www.cs.msu.su/wwwart/, accessed October 22, 1998.

15. Mieke Bal, <u>Naratology: Introduction to the Theory of Narrative</u> (Toronto: University of Toronto Press, 1985), 8.

16. The theory of marketdness was first developed by linguists of the Prague School in relation to phonology but subsequently applied to all levels of linguistic analysis. For example, "bitch" is the marked term and "dog" is unmarked term. Whereas the "bitch" is used only in relation to females, "dog" is applicable to both males and females.

# The Sounds of Silence

# John Cage and 4'33"

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(Abridged by N.B.Aldrich, 2011)

### **Brief Description and the Historic First Performance**

"Good people of Woodstock, let's run these people out of town" (artist at the premiere performance of 4'33'')<sup>1</sup>.

The first performance of John Cage's 4'33" created a scandal. Written in 1952, it is Cage's most notorious composition, his so-called "silent piece". The piece consists of four minutes and thirty-three seconds in which the performer plays nothing. At the premiere some listeners were unaware that they had heard anything at all. It was first performed by the young pianist David Tudor at Woodstock, New York, on August 29, 1952, for an audience supporting the Benefit Artists Welfare Fund -- an audience that supported contemporary art.

Tudor placed the hand-written score, which was in conventional notation with blank measures, on the piano and sat motionless as he used a stopwatch to measure the time of each movement. The score indicated three silent movements, each of a different length, but when added together totaled four minutes and thirty-three seconds. Tudor signaled its commencement by lowering the keyboard lid of the piano. The sound of the wind in the trees entered the first movement. After thirty seconds of no action, he raised the lid to signal the end of the first movement. It was then lowered for the second movement, during which raindrops pattered on the roof. The score was in several pages, so he turned the pages as time passed, yet playing nothing at all. The keyboard lid was raised and lowered again for the final movement, during which the audience whispered and muttered. <sup>2</sup>

Cage said, "People began whispering to one another, and some people began to walk out. They didn't laugh -- they were just irritated when they realized nothing was going to happen, and they haven't forgotten it 30 years later: they're still angry." <sup>3</sup> Maverick Concert Hall, the site of the first performance, was ideal in allowing the sounds of the environment to enter, because the back of the hall was open to the surrounding forest. When Tudor finished, raising the keyboard lid and himself from the piano, the audience burst into an uproar -- "infuriated and dismayed," according to the reports.<sup>4</sup> Even in the midst of an avant garde concert attended by modern artists, *4'33"* was considered "going too far"<sup>5</sup>.

### **History and Philosophy**

Before writing 4'33" Cage had written many musical compositions in the 1930s and 1940s. Most of these had evocative, romantic titles, like *Amores*, *Daughters of the Lonesome Isle*, and *The Perilous Night*. Many of these early works were for prepared piano, a Cage invention that made the piano into a kind of miniature gamelan orchestra. He had already become well known as a musical innovator, one on the cutting edge of the American avant garde. Cage was one of the first composers to write

electronic music, with his "Imaginary Landscapes". And in 1937 he predicted the future of electronic music in his lecture, "The Future of Music, Credo". He was also one of the first Western composers to compose music solely on the basis of rhythm, using what were previously regarded as noises. Here, suddenly, in 1952, was a piece whose title was just a number from a clock and in which the performer played nothing. It was an historic turning point for the composer, one from which he would never turn back.

4'33'', pronounced "four minutes, thirty-three seconds", (Cage himself referred to it as "four, thirtythree") is often mistakenly referred to as Cage's "silent piece". He made it clear that he believed there is no such thing as silence, defined as a total absence of sound. In 1951, he visited an anechoic chamber at Harvard University in order to hear silence. "I literally expected to hear nothing," he said. Instead, he heard two sounds, one high and one low. He was told that the first was his nervous system and the other his blood circulating. This was a major revelation that was to affect his compositional philosophy from that time on. It was from this experience that he decided that silence defined as a total absence of sound did not exist. "Try as we may to make a silence, we cannot," he wrote. "One need not fear for the future of music." <sup>6</sup>

To Cage, silence had to be redefined if the concept was to remain viable. He recognized that there was no objective dichotomy between sound and silence, but only between the intent of hearing and that of diverting one's attention to sounds. "The essential meaning of silence is the giving up of intention," he said. <sup>7</sup> This idea marks the most important turning point in his compositional philosophy. He redefined silence as simply the absence of *intended* sounds, or the turning off of our awareness. "Silence is not acoustic," he said, "It is a change of mind. A turning around." <sup>8</sup> He was later to identify this with Eastern thought. "In India they say that music is continuous; it only stops when we turn away and stop paying attention."<sup>9</sup> In 1988, in a conversation with William Duckworth, Cage affirmed the connection of this idea with 4'33". "No day goes by without my making use of that piece in my life and in my work. I listen to it every day. . . . I don't sit down to do it. I turn my attention toward it. I realize that it's going on continuously. More than anything, it is the source of my enjoyment of life. . . . Music is continuous. It is only we who turn away."<sup>10</sup> Cage often referred to it as his most important piece, and it was his favorite. "I always think of it before I write the next piece." <sup>11</sup>

The first reference to 4'33'' came about in a talk that Cage gave at Vassar College in 1947 or 1948. It was part of an interdisciplinary conference, coming at the time when he was beginning his study of oriental philosophy. He said that there ought to be a piece that had no sounds in it. <sup>12</sup> Although the germ of an idea was there, it would be five years before he would actually write it. The next year Cage wrote that he wanted to "compose a piece of uninterrupted silence and sell it to Muzak Co. It will be three or four and a half minutes in length -- those being the standard lengths of 'canned music' -- and its title will be *Silent Prayer*."<sup>13</sup> This statement is particularly interesting in light of what Cage later said about the composition of 4'33'', which I will return to shortly.

The origin of the concept of 4'33", i.e., a silent frame filled with non-intentional environmental sounds, is debatable. But when Cage was a Fellow at Wesleyan's Center of Advanced Studies (1960-61), he was asked to compile a list of books having the greatest influence on his thought. One of these was Luigi Russolo's, the Italian Futurist, *The Art of Noises* (1916). Cage referred to *The Art of Noises* in his 1948 lecture at Vassar. In this book there is a chapter that presages 4'33", i.e., "The Noises of Nature and Life". Russolo begins by poetically describing many of the sounds of nature. Then comes a remarkable statement:

And here it can be demonstrated that the much poeticized silences with which the country restores nerves shaken by city life are made up of an infinity of noises, and that these noises have their own

timbres, their own rhythms, and a scale that is very delicately enharmonic in its pitches. It has been neither said nor proven that these noises are not a very important part (or in many cases the most important part) of the emotions that accompany the beauty of certain panoramas, the smile of certain countrysides!

But let us leave nature and the country (which would be a tomb without noises) and enter a noisy modern city. Here, with machines, life has created the most immense, the most varied sources of noise. But if the noises of the country are few, small, and pleasing, then those of the city ... Oh! To have to listen to noises from dawn to dusk, eternal noise! <sup>14</sup>

An even earlier predecessor of 4'33" harks back to fin de siècle Paris (1882-1896), at Montmartre's *le Chat Noir*, where Erik Satie, an idol of Cage's, performed. Satie was a friend of the artist/humorist Alphonse Allais (1854-1905); both performed late at night at the legendary Paris cabaret. For an 1884-85 exhibit of *Expositions des Arts Incohérents*, organized by Jules Lèvy "for people who did not know how to draw", Allais did a totally white painting titled "Anaemic Young Girls Going to Their First Communion through a Blizzard". He also did a totally black painting entitled "Negroes Fighting in a Cave at Night". These paintings predate the famous completely white and black abstract paintings of Robert Rauschenberg by nearly seventy years. More relevant here is Allais' "Funeral March" for the last rites of a deaf man, consisting of 24 measures of entirely blank music manuscript, except for a whimsical tempo mark of "Lento rigolando" <sup>14b</sup>. This score is probably very similar to the original manuscript for 4'33" (now lost), yet precedes it by more than half a century. In the notes, Allais explains that the composition must be concerned entirely with measurements, rather than with sounds, adding to its remarkable precedence of 4'33".

But the similarities of this funeral march to 4'33" are only superficial. The intent and concept of Allais' Funeral March was entirely different from 4'33". For one, Allais the humorist intended his work to be a joke. Cage was very serious about 4'33" and was careful to specify that it was not a joke. Secondly and more importantly, Allais' composition was really meant to be silent, being for a deaf man. Cage's work is not silent at all. It embraces the whole world of unintentional sound; i.e., it is full of sounds.

Why would anyone write music in which nothing is performed? Some people assume that Cage did it to shock. Others have regarded it as a deliberate affront or insult, either to the audience or as an attack on music as an art form. Still others thought it was the act of a fool, a charlatan, or that it was too easy. But, with a thoughtful examination of Cage's motives, one finds that none of these is correct.

We can quickly dispose with the last objection, because 4'33" wasn't at all easy for Cage to write. Although it was initially conceived in 1947, the piece wasn't written until 1952, and then only after long and careful deliberation. He said, "I knew it would be taken as a joke and a renunciation of work, whereas, I also knew that if it was done it would be the highest form of work."<sup>12</sup>

It wasn't until 1951 that Cage was inspired to proceed by seeing the white, empty paintings freshly done by his friend, Robert Rauschenberg. "I responded immediately," he said, "not as objects, but as ways of seeing. I've said before that they were airports for shadows and for dust, but you could also say that they were mirrors of the air."<sup>15</sup> "When I saw those, I said, 'Oh yes, I must; otherwise I'm lagging, otherwise music is lagging."<sup>16</sup> Cage felt that Rauschenberg's painting gave him "permission" to proceed with the composition of the "silent piece". <sup>17</sup>

Interestingly, he created an elaborate way to make the piece by using charts and chance operations, building it up note by note. It seems that he deliberately made writing it difficult in order not to appear foolish even to himself. It was, indeed, a courageous act, especially in 1952.

Cage repeatedly stated that he was not interested in shocking or insulting audiences. "I have never

gratuitously done anything for shock." 18

Cage was hardly a fool. He was the valedictorian of his class at Los Angeles High School, and was constantly lauded thereafter for his intelligence. The sculptor, Richard Lippold remarked, "John has the most brilliant intellect of any man I've ever met, and for years he's been trying to do away with it."<sup>19</sup> "I love John's mind," Pierre Boulez said, "but I don't like what it thinks."<sup>20</sup> Cage was reluctant to write 4'33'', because "I didn't want to appear foolish". So, we can safely discard the notion that Cage's motivations were foolish. The reasons for writing 4'33'' lie elsewhere and are quite serious.

### The Turning Point

"My work became an exploration of non-intention."<sup>21</sup>

In 1932, Cage met Henry Cowell whom he showed some of his experiments with a twenty-five tone row technique he had developed himself. Cowell urged him to study with Arnold Schoenberg, which he did in 1935-36<sup>22</sup>. Schoenberg was not encouraging about Cage's compositional talent. When Cage told him that he had no feeling for harmony, Schoenberg replied that because of this he would always confront a wall through which he could not pass.<sup>23</sup> Since Cage had already promised Schoenberg that he would devote himself to music, he decided that he would devote his life to "beating my head against that wall." <sup>24</sup> This was a subtle pun, for it was then that Cage tried to reject harmony as an important structural aspect in his music and turned instead to rhythm.

Shortly thereafter, Cage worked with Otto Fischinger on one of his abstract films. Fischinger told Cage that "Everything in the world has its own spirit, and this spirit becomes audible by setting it into vibration."<sup>25</sup> Cage was very excited by this notion and began tapping, scraping, and rubbing things in his environment. This led to his first percussion orchestra and a number of new percussion works. From this Cage concluded that noises were just as musical as so-called "musical sounds", i.e., sounds made by conventional musical instruments. "John was writing many percussion works and performing them in the Bay area in the late 1930s".<sup>26</sup> Although today we have come to accept the idea that noises can be included in music, at the time it was radical.

During the 1940s, when Cage was writing percussion and prepared piano pieces, he became concerned with a new change. He noticed that although he had been taught that music was a matter of communication, when he wrote a sad piece people laughed, and when he wrote a funny one they started



crying. From this he concluded that "music doesn't really communicate to people. Or if it does, it does it in very, very different ways from one person to the next."<sup>27</sup> He said, " No one was understanding anybody else. It was clearly pointless to continue that way, so I determined to stop writing music until I found a better reason than 'self expression' for doing it."<sup>28</sup> He had determined that the purpose of music could not be communication or self-expression. What then, was its purpose?

The answer came about 1946, when an Indian student, Gita Sarabhai, arrived to study Western counterpoint with Cage in exchange for lessons on Indian music. He asked her what the purpose of music was in India. She replied that her teacher thought that the purpose of music was to quiet the mind, thus making it susceptible to divine influences. Cage was tremendously struck by this. His friend, the composer Lou Harrison, found a similar statement in a seventeenth-century treatise on English music by Thomas Mace. "I also came to see that all art before the Renaissance, both Oriental and Western, had shared this same basis, that Oriental art had continued to do so right along, and that the Renaissance idea of self-expressive art was therefore heretical."<sup>29</sup> He then determined to find out what was a "quiet mind" and what were "divine influences". For eighteen months he immersed himself in the philosophy of East and West, and began studying Zen Buddhism with Daisetz T. Suzuki. "I had the impression that I was changing -- you might say growing up. I realized that my previous understanding was that of a child."<sup>30</sup>

A quiet mind, he determined, was one free of dislikes; but, since dislikes require likes, it must be free of both likes and dislikes. "You can become narrow minded, literally, by only liking certain things and disliking others, but you can become open-minded, literally, by giving up your likes and dislikes and becoming interested in things."<sup>31</sup> The "divine influences" were the sounds and events that were free to everyone, i.e., those of nature. Cage's study of Buddhism also led him to the conclusion that "Sounds should be honored rather than enslaved. Every creature, whether sentient (such as animals) or nonsentient (such as stones and air), is the Buddha. Each being is at the center of the universe."<sup>32</sup> So, the function of music is not to entertain or communicate, but to be a process of discovery, to become aware and sensitized to the environmental sounds that are all around us, and to be free from personal taste and manipulation. The following statement by Cage summarizes this point of view:

Art may be practiced in one way or another, so that it reinforces the ego in its likes and dislikes, or so that it opens that mind to the world outside, and outside inside. Since the forties and through the study with D.T. Suzuki of the philosophy of Zen Buddhism, I've thought of music as a means of changing the mind. I saw art not as something that consisted of a communication from the artist to an audience but rather as an activity of sounds in which the artist found a way to let the sounds be themselves. And, in being themselves, to open the minds of people who made them or listened to them to other possibilities than they had previously considered.<sup>33</sup>

Thus, music lost its purpose of communication and expression. This traditional Eastern idea of living in harmony with nature contrasts sharply with the Western practice of control and manipulation of the environment, which an increasing opinion today sees as the cause of the deterioration of the planet and the quality of modern life.

But, how is this harmony with nature to be manifested in music? Cage found the answer to this question from the works of Ananda Coomaraswamy: "Art is to imitate nature in her manner of operation." This is not to be confused with imitating nature's *appearance*. How does nature operate? According to one current scientific theory, natural phenomena, at least on a microcosmic scale, are not based upon a mechanical, deterministic model, but one based on indeterminacy and chance, such as in quantum mechanics and chaos theory. Cage did refer to art following the lead of science, and the convergence is an interesting one, especially since he chose to use indeterminacy and chance in making

his music from the time of 4'33" on.

Another step toward this aesthetic was taken with Cage's dictum that art and life should no longer be separate, but one and the same. "Art is not an escape from life, but rather an introduction to it."<sup>34</sup> He said that "it is time to turn the environment into art."<sup>35</sup> This led to his concept of *interpenetration*. According to Cage, music could no longer be considered new or "experimental" unless it incorporated *interpenetration*. Previously, sounds that were outside the composer intentions were considered alien intrusions, unwelcome "noises". But works that welcome and include sounds outside of the composer's and performers' intentions are those that include *interpenetration*. This concept was first introduced by Erik Satie in his *musique d'ameublement*, or "furniture music" and was later taken up commercially by Muzak. *4'33"* is the ultimate example of interpenetration.

With these things in mind, 4'33" can more easily be comprehended as a serious artwork. Chance was used to free the composer from controlling sounds and exercising his personal tastes and choices, his memories, his likes and dislikes. Using chance was literally an imitation of nature's manner of operation. The "silence" of 4'33" opened the field of "divine influences," i.e., the sounds that are not made intentionally, but are already there around us, free to be heard and free to penetrate the art. Thus, nature and life literally become the art. As such, they are direct analogs to Rauschenberg's white paintings. 4'33" is an airport for sounds rather than for shadows. Further, "The performance should make clear to the listener that the hearing of the piece is his own action -- that the music, so to speak is his, rather than the composer's."<sup>36</sup> The composer's responsibility shifts from self-expression to opening a window for the sounds of the environment. Cage was asked why it was necessary to create such music when it is already there? His answer indicates his didactic purpose: "Many people taking a walk would have their heads so full of preconceptions that it would be a long time before they were capable of hearing or seeing. Most people are blinded by themselves."<sup>37</sup> Thus, the goal of the composer is revealed to be primarily that of the missionary. "Music is about changing the mind -- not to understand, but to be aware."<sup>38</sup>

Many people in our society now go around the streets and in the buses and so forth playing radios with earphones on and they don't hear the world around them. They hear only what they have chosen to hear. I can't understand why they cut themselves off from that rich experience which is free. I think this is the beginning of music, and I think that the end of music may very well be in those record collections.<sup>39</sup>

However, there is also an artistic and personal reason for writing music of this aesthetic, which is revealed in Cage's astonishing confession:

Not having, as most musicians do, an ear for music, I don't hear music when I write it. I hear it only when it is played. If I heard it when I was writing it, I would write what I've already heard; whereas since I can't hear it while I'm writing it, I'm able to write something that I've never heard before.<sup>40</sup> .... And if I did hear something before it was audible, I would have had to take solfege, which would have trained me to accept certain pitches and not others. I would then have found the environmental sounds off tune, lacking tonality. Therefore, I pay no attention to solfege.<sup>41</sup>

It is worth dwelling on this for a moment, because the significance of this statement is not normally understood. It represents a truly radical break with all traditional ways of making music. Normally, a composer hears something and then writes it, or at least works with the sound of some basic ideas, developing them into a composition. Solfege and ear training in general are considered requirements for a training musician in music curricula around the world. Cage said here that it is not just unnecessary, but undesirable. He confessed here that he could not hear what he was writing. This would normally be considered a handicap to a composer, to say the least. He did not hear music before, during, or even after he wrote it. He wrote the music in order to hear how it (the notation) sounded, and which he did not hear until it was performed. Thus, Cage was not working compositionally with sound

itself, but with mathematical structures that would embody and animate sounds. He was working out intellectual conceptions of which he had no idea of how they would sound. The sensory, then, was a product of this intellection.

Cage also cited his inability to determine and control the preparations used in his prepared piano pieces as a point that helped to turn him toward the use of chance. He said that he discovered that, because every piano is different, the sounds of the preparations could not entirely be determined no matter how much one would try to control them, and that this was not such a bad thing.

A final aspect of Cage's philosophy that bears on 4'33" concerns his determination to use music as a metaphor for the way a society should behave. "I was intent on making something that didn't tell people what to do."<sup>42</sup> To Cage, the incessant beat that keeps much of our conventional music together was analogous to a kind of military organization, and tonality itself, the dominance of a central tone, was like a dictatorship. So was the conductor of an orchestra. Thus, his late music tends to avoid these things.

Cage even attributed ecological significance to 4'33":

We, as a human species, have endangered nature. We acted against it, we have rebelled against its existence. So, our concern today must be to reconstitute it for what it is. And nature is not a separation of water from air, or of the sky from the earth, etc., but a "working together", or a "playing together" of those elements. That is what we call ecology. Music, as I conceive it, is ecological. You could go further and say that it IS ecology.<sup>43</sup>

In 1962, Cage wrote a 4'33" No. 2, which is also titled 0'00", "to be performed in any way by anyone". It is a completely different piece. The score, entirely verbal, states, "In a situation provided with maximum amplification (no feedback), perform a disciplined action, with any interruptions, fulfilling in whole, or in part, an obligation to others. No two performances are to be of the same action, nor may any action be the performance of a 'musical composition'. No attention is to be given to the situation (electronic, musical theatrical)." This is a quasi-theatrical work, and its primary distinction in sound is the provision of maximum amplification and an indefinite length. The title 0'00" refers to unmeasured time. "I'm trying to find a way to make music that does not depend on time  $\dots$  [It's] nothing but the continuation of one's daily work  $\dots$ . What the piece is trying to say is that everything we do is music, or can become music through the use of microphones, so that everything I'm doing apart from what I'm saying, produces sound."<sup>44</sup>

The *Music of Changes* (1951), written using the *I Ching* or *Book of Changes*, is often cited as the turning point in Cage's aesthetic and method, namely to that using chance. Cage said that it was written contemporaneously with 4'33", but the *Music of Changes* is a more conventional work and one that is certainly easier to take seriously. Although composed with chance operations, it is scored and played in a conventional way by conventional instruments. 4'33", however, opens the world of environmental sound, and Cage invented a new notational system for its notation. It is not played in a conventional way, and it is not played by conventional instruments, but rather its "instruments" are the sounds of the environment. 4'33" uses the whole field of completely unintentional sounds, of interpenetration, of which the *Music of Changes* uses none. 4'33" is indeterminate, but the *Music of Changes* is not (see "Composition"). Thus, 4'33" embraces Cage's radical new aesthetic more completely than any of his other works, and, as such, it is the true pivotal point of his aesthetic change.

Cage's work prior to 4'33'' is based on a radically different aesthetic from those that came after it. Thus, 4'33'' marks a change in musical philosophy that is unprecedented during his lifetime, and possibly unprecedented in the history of music.

#### Notes

- 1. Revill 1992, 166
- 2. Tomkins 1965, 119
- 3. Cage conversation with Michael John White (1982), in Kostelanetz 1988, 66
- 4. Revill 1992, 166
- 5. Tomkins 1965, 119
- 6. Cage, "Experimental Music" (1957) in Cage 1961, 8
- 7. Cage at the University of Cincinnati (1968), in Kostelanetz 1988, 189
- 8. Cage, in Revill 1992, 164; see also Cage "Experimental Music" (1957) in Cage 1961, 14
- 9. Cage conversation with Michael Zwerin (1982), in Kostelanetz 1988, 44
- 10. Cage conversation with William Duckworth, in Duckworth 1995, 13-15
- 11. Cage conversation with Stephen Montague (1982), in Kostelanetz 1988, 66
- 12. Cage, "A Composer's Confessions (1948) in Kostelanetz, 1993, 43
- 13. Cage 1981, 43
- 14. Russolo 1916, 43
- 14b. Gillmor 1988, 66. Originally published in Alphonse Allais, *Oeuvres posthumes*, v.2, Paris, *La Table Ronde*, 1966, 376-381
- 15. Cage 1990, 26
- 16. Cage conversation with Alan Gillmor & Roger Shattuck (1973), in Kostelanetz 1988, 67
- 17. Revill 1992, 164
- 18. Cage, in letter to P.H. Lang, in Kostelanetz 1971, 117
- 19. Tomkins 1965, 74
- 20. Tomkins 1965, 120
- 21. Cage, "An Autobiographical Statement" in Kostelanetz, 1993, 241
- 22. Cage "A Composer's Confessions" (1948), in Kostelanetz 1993, 31
- 23. Cage, in conversation with Jeff Goldberg (1976), in Kostelanetz 1988, 5
- 24. Cage conversation with Jeff Goldberg (1976), in Kostelanetz 1988, 5
- 25. Cage, in Revill 1992, 52
- 26. Dick Higgins 1998
- 27. Cage conversation with Cole Gagny & Tracy Caras (1980), in Kostelanetz 1988, 120
- 28. Cage conversation with Maureen Furman (1979), in Kostelanetz 1988, 215
- 29. Cage, in Tomkins 1965, 99
- 30. Cage, in Tomkins 1965, 100
- 31. Cage conversation with Ev Grimes (1984), in Kostelanetz 1988, 231
- 32. Cage conversation with Joseph H. Mazo (1983), in Kostelanetz 1988, 232
- 33. Cage conversation with Bill Womack (1979), in Kostelanetz 1988, 42
- 34. Cage conversation with Stanley Kaufman (1966), in Kostelanetz 1988, 211
- 35. Cage conversation with Robin White (1978), in Kostelanetz 1988, 212
- 36. Cage, in Gena 1982, 22
- 37. Cage conversation with Lisa Low (1985), in Kostelanetz 1988, 45
- 38. Cage conversation with Michael John White (1978), in Kostelanetz 1988, 212
- 39. Cage conversation with Ev Grimes (1984), in Kostelanetz 1988, 235
- 40. Cage conversation with David Cope (1980), in Kostelanetz 1988, 85
- 41. Cage conversation with Don Finegan (1969), in Kostelanetz 1988, 227
- 42. Cage conversation with Alan Gillmor (1976), in Kostelanetz 1988, 74
- 43. Cage 1981, 229
- 44. Cage conversation with Lars Gunnar Bodin & Bengt Emil Johnson, in Kostelanetz 1988, 69-70
- 45. Cage conversation with Jeff Goldberg (1974), in Kostelanetz 1982, 65
- 46. Cage conversation with John Kobler (1968), in Kostelanetz 1982, 69-70
- 47. David Tudor in a telephone interview with William Fetterman (1989), in Fetterman 1996, 72
- 48. MusikTexte Ap 1997, 69-72
- 49. MusikTexte Ap 1997, 69-72
- 50. MusikTexte Ap 1997, 69-72
- 51. Cage 1990, 20-21
- 52. Pritchett 1993, 78-88

53. Cage, 1961, 59 54. Pritchett 1993. 83 55. Revill, 1992, 135 56. Cage, 1961, 36 57. Cage 1990, 21 58. Cage 1990, in Fetterman, 1996, 72 59. Cage in conversation with Ev Grimes, in Music Educators Journal, Nov 1986, 48 60. MusikTexte Ap 1997, 69-72 61. Cage, 1982, 7 62. Cage, 1982, 7 63. Irwin Kremen in personal correspondence with the author, June 17, 1997 64. Cage 1990, 26 65. Cage conversation with Niksa Glio (1972), in Kostelanetz, 1988, 100 66. MusikTexte, 69-72 67. Fetterman, 1996, 83 68. Cage conversation with William Duckworth, in Duckworth, 1995, 15 69. Fetterman, 1996, 80 70. Revill 1992, 178 71. Cage 1990, 23 72. Cage 1981, 153

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# Digital Synaesthesia

An experimental action is one the outcome of which is unforeseen. Being unforeseen, this action is not concerned with its excuse. Like the land, like the air, it needs none.

- John Cage, Composition As a Process

Separation itself is part of the unity of the world... - Guy Debord, Society of the Spectacle

One simple definition of aesthetics might be: the study of beauty. While obviously something that is, in specific terms, culturally in flux, beauty as defined by Webster's New Collegiate Dictionary is that "guality" or aggregate of qualities in a person or thing that gives pleasure to the senses or pleasurably exalts the mind or spirits." This definition sets up a two-staged system of stimulation and perception wherein stimulation is an external feature that, when detected by the senses, triggers an internal function of perceptual qualification (What is it? Is it good or bad? (or, in the context of detecting beauty, does it exalt the mind?)). We respond to external stimuli and categorize the responses in the context of a common aesthetic environment. Something may be too bright or too loud or too mundane or, conversely, wonderfully colored or a comfortable volume or intriguingly structured, all within a context of individual sensory capacities (physical, emotional and intellectual) and environmental and cultural norms (American broadcast television standards find nudity unacceptable whereas the Classical Greeks found it the height aesthetic representation).

Synaesthesia, again in Webster's, is "a subjective sensation or image of a sense other than the one being stimulated." Another way of thinking about it is multi-sensory perception from a single stimulus. There are many fascinating instances of people who are considered synaesthetes. Some see specific colors associated with hearing specific pitches, thus augmenting their ability to identify the pitch. A. R. Luria famously presents in his book, *The Mind of the Mnemonist*, the case of S, a man who became intellectually and socially dysfunctional due to an overwhelmingly pronounced synaesthesia that produced in him, for every stimulus, a potential flood of memories or perceptual responses. S notes, for example, that the clanging of a trolley bell produces pain in his teeth, or "If I read when I eat, I have a hard time understanding what I'm reading - the taste of food drowns out the sense."

This kind of multi-sensory stimulation has a strong history as an artistic pursuit. As the term has been traditionally used, artistic synaesthesia has a goal of providing multiple complementary manifestations of a single concept or expression. In this thinking, theatre exhibits some pronounced synaesthetic elements in its design with costumes, sets, etc., all in the service of the essence of the production. Sound and dance have collaborated similarly over the centuries, forming an almost symbiotic artistic bond. Film scoring comes to mind as an example of a predominant contemporary version of this form of synaesthetic composition (though, as in theatre, overall production design in film works in this way as well). The composer is charged with creating an alternate informational model to transmit the ideas or emotions of a scene, using music to simultaneously amplify the script and action to the audience. This model of artistic synaesthesia, however, is problematic as it becomes an inversion of our definition. What is actually being constructed for the audience is not a diversity of *perceptions* from a single stimulus, but instead, a pointed collection of aesthetically driven stimuli reinforcing a single idea, a single artistic perception. We all will culturally understand that the overly consonant string section and the slightly foggy lens are indicating "tenderness" for us as the hero and heroin discover their mutual affection. Compositionally, the perception comes first, then the carefully contrived means of stimulation.

Synaesthetic composition, as the term has been used, is a model for unity or conformity wherein the various artistic mediums reinforce one specific telling or understanding via their diverse channels. This one-frommany model directly contradicts our original premise of the synaesthetic experience. The synaesthete lives in a many-from-one world of experience where multiple perceptions (such as simultaneous sensations of color and pitch) are generated from a single stimulus, not one in which a variety of stimuli generate, or reinforce, a single perception. He or she experiences different senses competing with or complementing each other in a diverse perceptual episode. It is here that a very recent (by historical standards) tool for the artist might pose a new and alternate way of exploring synaesthetic composition, one that more accurately avails the composer to the original idea: that a single stimulus can be simultaneously translated to a variety of diverse physical, psychological and cultural perceptions. That tool is the computer.

Unlike previous technologies, to do what it does (perform computational tasks) the computer reduces all incoming information (think stimulus) to a shared, common representation: numbers. These numbers are subsequently moderated by mathematical processes and reconstituted once again as outgoing information. Language, perhaps the closest previous model for parsing out information, is not nearly as formal or absolute in its procedural requirements; the syntax of the computer accepts no variation or digressive individuality. This computational process formally disconnects the original *context* of the information coming in from that of the information later coming out. The computer doesn't care about information as functional source material, only as data to be manipulated. The transference from analogue information (such as a sound wave (again, think stimulus)) to a packet of numbers *representing* that information neutralizes the information modally. The table of numbers created is not specific to the (in this case, sound) stimulus, but specific to the computers method of operation. A table of numbers will not be understood to be inherently audio data, video data, text data, weather data, traffic pattern data or any other kind of data until it is reconstituted as specific information in a context that can be understood or experienced by the user of the computer (such as software drawing waveforms from the numbers and hardware (amplifier and speakers) creating soundwaves in space from those drawn waveforms).

This computer-specific process of receiving information, neutralizing it and repackaging it for export allows the digital artist a new and direct method for synaesthetic composition. Even though the incoming stimulus might be a sound, which the computer then translates into a table of numbers, that table of numbers can subsequently be exported as audio information (output to speakers), visual information (output to a screen of some kind) or environmental information (controlling light, heat, air movement, etc.), or whatever else. In this way, returning to our cinematographic model of designing a "tender love scene", the information that is generated from the recorded scene itself (thinking stimulus) can potentially be "transcoded" into an accompanying sound score. By applying the table of numbers the computer created when digitizing the video (or the spoken text for that matter), an audio score can be generated using the exact same digital information (new *perception* of the digitized *stimulus*). One obvious difference here is that the final artistic product will inherently lack conformity to existing cultural or compositional norms, meaning the overly consonant string stuff will not naturally occur as the result of this process. But then, it won't naturally occur in real life either, it is a convention used to steer the audience, a countermand to individualized perception.

It is here the sensual diversity of synaesthetic composition comes to life. The artistic possibilities of what might occur range across the digital universe, with all of them manifestations gleaned *directly from the initial stimulus*, like the voices of differing opinions surrounding a topic. The original stimuli are transformed into a variety of unique potential perceptions. The artist employing the techniques of digital synaesthesia is provided with the opportunity to explore the sensory diversity of competition and complementation, much as S experienced various (and often conflicting) perceptions resulting from the same stimulus. Whether the final result is dysfunctional or not is dependent on the skill, insight and goals of the artist who is regulating the process. This is indeed the from-one-many compositional model.

Almost fifty years ago, in his address *Experimental Music*, John Cage wrote (regarding the "possibilities of magnetic tape"), that "we are, in fact, technologically equipped to transform our contemporary awareness of nature's manner of operation into art." Digital synaesthesia, the from-one-many model of diversity described above, can be thought of as a way for the New Media artist to engage this Cagean prerogative and embrace a more organic compositional model. This process will also neatly provide, as a by-product, a requisite exploration of the many ways meaning is generated and inferred, both by the artist and by the culture at large. In this way, it may pose a valuable composition/design alternative to intuitively recycling and reshuffling popular cultural indicators as a means of artistic expression.

N.B.Aldrich 2005