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STATEMENT ON INTERMEDIA

Art is one of the ways that people communicate. It is difficult for me to imagine a serious person attacking any means of communication per se. Our real enemies are the ones who send us to die in pointless wars or to live lives which are reduced to drudgery, not the people who use other means of communication from those which we find most appropriate to the present situation. When these are attacked, a diversion has been established which only serves the interests of our real enemies.

However, due to the spread of mass literacy, to television and the transistor radio, our sensitivities have changed. The very complexity of this impact gives us a taste for simplicity, for an art which is based on the underlying images that an artist has always used to make his point. As with the cubists, we are asking for a new way of looking at things, but more totally, since we are more impatient and more anxious to go to the basic images. This explains the impact of Happenings, event pieces, mixed media films. We do not ask any more to speak magnificently of taking arms against a sea of troubles, we want to see it done. The art which most directly does this is the one which allows this immediacy, with a minimum of distractions.

Goodness only knows how the spread of psychedelic means, tastes, and insights will speed up this process. My own conjecture is that it will not change anything, only intensify a trend which is already there.

For the last ten years or so, artists have changed their media to suit this situation, to the point where the media have broken down in their traditional forms, and have become merely puristic points of reference. The idea has arisen, as if by spontaneous combustion throughout the entire world, that these points are arbitrary and only useful as critical tools, in saying that such-and-such a work is basically musical, but also poetry. This is the intermedial approach, to emphasize the dialectic between the media. A composer is a dead man unless he composes for all the media and for his world.

Does it not stand to reason, therefore, that having discovered the intermedia (which was, perhaps, only possible through approaching them by formal, even abstract means), the central problem is now not only the new formal one of learning to use them, but the new and more social one of what to use them for? Having discovered tools with an immediate impact, for what are we going to use them? If we assume, unlike McLuhan and others who have shed some light on the problem up until now, that there are dangerous forces at work in our world, isn't it appropriate to ally ourselves against these, and to use what we really care about and love or hate as the new subject matter in our work? Could it be that the central problem of the next ten years or so, for all artists in all possible forms, is going to be less the still further discovery of new media and intermedia, but of the new discovery of ways to use what we care about both appropriately and explicitly? The old adage was never so

true as now, that saying a thing is so don't make it so. Simply talking about Viet Nam or the crisis in our Labor movements is no guarantee against sterility. We must find the ways to say what has to be said in the light of our new means of communicating. For this we will need new rostrums, organizations, criteria, sources of information. There is a great deal for us to do, perhaps more than ever. But we must now take the first steps.

Dick Higgins
New York
August 3, 1966

Synesthesia and Intersenses: Intermedia Dick Higgins with an Appendix by Hannah Higgins

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Much of the best work being produced today seems to fall between media. This is no accident. The concept of the separation between media arose in the Renaissance. The idea that a painting is made of paint on canvas or that a sculpture should not be painted seems characteristic of the kind of social thought--categorizing and dividing society into nobility with its various subdivisions, untitled gentry, artisans, serfs and landless workers--which we call the feudal conception of the Great Chain of Being. This essentially mechanistic approach continued to be relevant throughout the first two industrial revolutions, just concluded, and into the present era of automation, which constitutes, in fact, a third industrial revolution.

However, the social problems that characterize our time, as opposed to the political ones, no longer allow a compartmentalized approach. We are approaching the dawn of a classless society, to which separation into rigid categories is absolutely irrelevant. This shift does not relate more to East than West or vice versa. Castro works in the cane fields. New York's Mayor Lindsay walks to work during the subway strike. The millionaires eat their lunches at Horn and Hardart's. This sort of populism is a growing tendency rather than a shrinking one.

We sense this in viewing art which seems to belong unnecessarily rigidly to one or another form. We view paintings. What are they, after all? Expensive, handmade objects, intended to ornament the walls of the rich or, through their (or their government's) munificence, to be shared with large numbers of people and give them a sense of grandeur. But they do not allow of any sense of dialogue.

Pop art? How could it play a part in the art of the future? It is bland. It is pure. It uses elements of common life without comment, and so, by accepting the misery of this life and its aridity so mutely, it condones them. Pop and op are both dead, however, because they confine themselves, through the media which they employ, to the older functions of art, of decorating and suggesting grandeur, whatever the detailed content of their artist's intentions. None of the ingenious theories of the Mr. Ivan Geldoway combine can prevent them from being colossally boring and irrelevant. Milord runs his Mad Avenue Gallery, in which he displays wares. He is protected by a handful of rude footmen who seem to feel that this is the way Life will always be. At his beck and call is Sir Fretful Callous, a moderately well-informed high priest, who apparently despises the Flame he is supposed to tend and therefore prefers anything

which titillates him. However, Milord needs his services, since he, poor thing, hasn't the time or the energy to contribute more than his name and perhaps his dollars; getting information and finding out what's going on are simply toooooo exhausting. So, well protected and advised, he goes blissfully through the streets in proper Louis XIV style.

This scene is not just characteristic of the painting world as an institution, however. It is absolutely natural to (and inevitable in) the concept of the pure medium, the painting or precious object of any kind. That is the way such objects are marketed since that is the world to which they belong and to which they relate. The sense of "I am the state," however, will shortly be replaced by "After me the deluge," and, in fact, if the High Art world were better informed, it would realize that the deluge has already begun.

Who knows when it began? There is no reason for us to go into history in any detail. Part of the reason that Duchamp's objects are fascinating while Picasso's voice is fading is that the Duchamp pieces are truly between media, between sculpture and something else, while a Picasso is readily classifiable as a painted ornament. Similarly, by invading the land between collage and photography, the German John Heartfield produced what are probably the greatest graphics of our century, surely the most powerful political art that has been done to date.

The ready-made or found object, in a sense an intermedium since it was not intended to conform to the pure medium, usually suggests this, and therefore suggests a location in the field between the general area of art media and those of life media. However, at this time, the locations of this sort are relatively unexplored, as compared with media between the arts. I cannot, for example, name work which has consciously been placed in the intermedium between painting and shoes. The closest thing would seem to be the sculpture of Claes Oldenburg, which falls between sculpture and hamburgers or Eskimo Pies, yet it is not the sources of these images themselves. An Oldenburg Eskimo Pie may look something like an Eskimo Pie, yet is neither edible nor cold. There is still a great deal to be done in this direction in the way of opening up aesthetically rewarding possibilities.

In the middle 1950s many painters began to realize the fundamental irrelevance of abstract expressionism, which was the dominant mode at the time. Such painters as Allan Kaprow and Robert Rauschenberg in the United States and Wolf Vostell in Germany turned to collage or, in the latter's case, dé-collage, in the sense of making work by adding or removing, replacing and substituting or altering components of a visual work. They began to include increasingly incongruous objects in their work. Rauschenberg called his constructions "combines" and went so far as to place a stuffed goat--spattered with paint and with a rubber tire around its neck--onto one.

Kaprow, more philosophical and restless, meditated on the relationship of the spectator and the work. He put mirrors into his things so the spectator could feel included in them. That wasn't physical enough, so he made enveloping collages which surrounded the spectator. These he called "environments." Finally, in the spring of 1958, he began to include live people as part of the collage, and this he called a "happening."

The proscenium theater is the outgrowth of seventeenth-century ideals of social order. Yet there is remarkably little structural difference between the dramas of Davenant and those of Edward Albee, certainly nothing comparable to the difference in pump construction or means of mass transportation. It would seem that the technological and social implications of the first two industrial revolutions have been evaded completely. The drama is still mechanistically divided: there are performers, production people, a separate audience and an explicit script. Once started, like Frankenstein's monster, the course of affairs is unalterable, perhaps damned by its inability to reflect its surroundings. With our populist mentality today, it is difficult to attach importance--other than what we have been taught to attach--to this traditional theater. Nor do minor innovations do more than provide dinner conversation: this theater is round instead of square, in that one the stage revolves, here the play is relatively senseless and whimsical (Pinter is, after all, our modern J.M. Barrie--unless the honor belongs more properly to Beckett). Every year fewer attend the professional Broadway theaters. The shows get sillier and sillier, showing the producers' estimate of our mentality (or is it their own that is revealed?). Even the best of the traditional theater is no longer found on Broadway but at the Judson Memorial Church, some miles away. Yet our theater schools grind out thousands on thousands of performing and production personnel, for whom jobs will simply not exist in 20 years. Can we blame the unions? Or rents and real estate taxes? Of course not. The subsidized productions, sponsored at such museums as New York's Lincoln Center, are not building up a new audience so much as recultivating an old one, since the medium of such drama seems weird and artificial in our new social milieu. We need more portability and flexibility, and this the traditional theater cannot provide. It was made for Versailles and for the sedentary Milords, not for motorized life-demons who travel 600 miles a week. Versailles no longer speaks very loudly to us, since we think at 85 miles an hour.

In the other direction, starting from the idea of theater itself, others such as myself declared war on the script as a set of sequential events. Improvisation was no help; performers merely acted in imitation of a script. So I began to work as if time and sequence could be utterly suspended, not by ignoring them (which would simply be illogical) but by systematically replacing them as structural elements with change. Lack of change would cause my pieces to stop. In 1958 I wrote a piece, *Stacked Deck*, in which any event can take place at any time, as long as its cue appears. The

cues are produced by colored lights. Since the colored lights could be used wherever they were put and audience reactions were also cuing situations, the performance-audience separation was removed and a happening situation was established, though less visually oriented in its use of its environment and imagery. At the same time, Al Hansen moved into the area from graphic notation experiments, and Nam June Paik and Benjamin Patterson (both in Germany at the time) moved in from varieties of music in which specifically musical events were frequently replaced by nonmusical actions.

Thus the happening developed as an intermedium, an uncharted land that lies between collage, music and the theater. It is not governed by rules; each work determines its own medium and form according to its needs. The concept itself is better understood by what it is not, rather than what it is. Approaching it, we are pioneers again, and shall continue to be so as long as there's plenty of elbow room and no neighbors around for a few miles. Of course, a concept like this is very disturbing to those whose mentality is compartmentalized. Time, Life, and the High Priests have been announcing the death of happenings regularly since the form gained momentum in the late fifties, but this says more about the accuracy of their information than about the liveliness of the form.

We have noted the intermedia in the theater and in the visual arts, the happening, and certain varieties of physical constructions. For reasons of space we cannot take up here the intermedia between other areas. However, I would like to suggest that the use of intermedia is more or less universal throughout the fine arts, since continuity rather than categorization is the hallmark of our new mentality. There are parallels to the happening in music, for example in the work of such composers as Philip Corner and John Cage, who explore the intermedia between music and philosophy, or Joe Jones, whose self-playing musical instruments fall into the intermedium between music and sculpture. The constructed poems of Emmett Williams and Robert Filliou certainly constitute an intermedium between poetry and sculpture. Is it possible to speak of the use of intermedia as a huge and inclusive movement of which dada, futurism and surrealism are early phases preceding the huge ground swell that is taking place now? Or is it more reasonable to regard the use of intermedia as an irreversible historical innovation, more comparable, for example, to the development of instrumental music than, for example, to the development of romanticism?

1981

In 1965, when the above words were written, the intention was simply to offer a means of ingress into works which already existed, the unfamiliarity of whose forms was such that many potential viewers, hearers, or readers were "turned off" by them.

The world was filled at that time with concrete poems, happenings, sound poetry, environments, and other more or less novel developments; unless the public had a way of seeing into the work by causing it to stand still for a moment and be classified, the work was likely to be dismissed as "avant-garde: for specialists only." To any dedicated nonspecialist this could be frustrating--one wanted to know well the art of one's time, since one wanted to hear one's own voice or self at work, without the interventions of history and historical judgements; this was art whose horizons would closely match one's own.

The vehicle I chose, the word "intermedia," appears in the writings of Samuel Taylor Coleridge in 1812 in exactly its contemporary sense--to define works which fall conceptually between media that are already known, and I had been using the term for several years in lectures and discussions before my little essay was written. Furthermore, as part of my campaign to popularize what was known as "avant-garde: for specialists only," to demystify it if you will, I had become a publisher of a small press, Something Else Press (1964-1974), which brought out editions of many primary sources and materials in the new arts (as well as reissuing works of the past which seemed to merit new attention--works by Gertrude Stein, the dadaists, the composer Henry Cowell, etc.). It seemed foolish simply to publish my little essay in some existing magazine, where it could be shelved or forgotten. So it was printed as the first Something Else Newsletter and sent to our customers, to all the people on our mailing list, to people to whom I felt the idea would be useful (for example, to artists doing what seemed to me to be intermedial work and to critics who might be in a position to discuss such work). All in all, I gave away some 10,000 copies of the essay, as many as I could afford; and I encouraged its republication by anyone who asked for permission to do so. It was reprinted seven or eight times that I knew of, and it still lives on in print in various books, not just of mine, but where it has been anthologized along with other texts of the time or as part of surveys.

The term shortly acquired a life of its own, as I had hoped. In no way was it my private property. It was picked up; used and misused, often by confusion with the term "mixed media." This last is a venerable term from art criticism, which covers works executed in more than one medium, such as oil color and guache. But by extension it is also appropriate to such forms as the opera, where the music, the libretto, and the mise-en-scene are quite separate: at no time is the operagoer in doubt as to whether he is seeing the mise-en-scene, the stage spectacle, hearing the music, etc. Many fine works are being done in mixed media: paintings which incorporate poems within their visual fields, for instance. But one knows which is which.

In intermedia, on the other hand, the visual element (painting) is fused conceptually with the words. We may have abstract calligraphy, concrete poetry, "visual poetry"

(not any poem with a strong visual element, but the term is sometimes used to cover visual works in which some poem appears, often as a photography, or in which the photographed visual material is presented as a sequence with a grammar of its own, as if each visual element were a word of a sentence, as in certain works by Jean-François Bory or Duane Michaels).

Again, the term is not prescriptive; it does not praise itself or present a model for doing either new or great works. It says only that intermedial works exist. Failure to understand this would lead to the kind of error of thinking that intermedia are necessarily dated in time by their nature, something rooted in the 1960s, like an art movement of the period. There was and could be no intermedial movement. Intermediality has always been a possibility since the most ancient times, and though some well-meaning commissar might try to legislate it away as formalistic and therefore antipopular, it remains a possibility wherever the desire to fuse two or more existing media exists. One can avoid it; one can be like Rosalind Krauss, a much respected critic who said in a lecture at Iowa City in 1981, "I am devoted to the idea of trying to bury the avant-garde," which she does by attacking it, ignoring it and its implications, or, even worse, presenting theory as such an end in itself that any sort of artwork becomes, at best, an unimportant appendage to the theory. But there is always an avant-garde, in the sense that someone, somewhere is always trying to do something which adds to the possibilities for everybody, and that that large everybody will some day follow this somebody and use whatever innovations were made as part of their workaday craft. "Avant-garde" is merely a conventional metaphor drawn (in the mid-nineteenth century) from the military, in which an avant-garde moves in advance of the main body of troops. "Avant-garde" is relative, not absolute. A conservative poet can be at least morally avant-garde by moving in the direction of ever-greater integrity and purity, of vividness or metaphor and excellence of line. Others seek to follow, even when they cannot; and thus the metaphor retains its relevance.

But when one is thinking of the avant-garde of forms and media, one is often thinking of artists who, for whatever reason, question those forms and media. They can reject some (e.g., André Breton's predecessors in French dada rejected the novel, and they were avant-garde, while André Breton chose to move toward some kind of novel as a possibility, thus provoking a break between his group, which in due course became the surrealists, and the other--and the new group, too, was avant-garde). They can create others. And often this creation of new media is done by the fusion of old ones; this was very common in the late 1950s and early 1960s, with the formal fusions I have already mentioned. No work was ever good because of its intermediality [1]. The intermediality was merely a part of how a work was and is; recognizing it makes the work easier to classify, so that one can understand the work and its significances.

Further, there is a tendency for intermedia to become media with familiarity. The visual novel is a pretty much recognizable form to us now. We have had many of them in the last 20 years. It is harping on an irrelevance to point to its older intermedial status between visual art and text; we want to know what this or that visual novel is about and how it works, and the intermediality is no longer needed to see these things. Same with visual poetry and sound poetry (or "text-sound," if one prefers that term). In the performance arts, once there was the happening which was close to "events"; some happenings artists did fluxus, and some did not. At least one fluxus artist, Alison Knowles, evolved in her work until she found herself doing what other new artists--many of whom took great pains to distinguish what they were doing from happenings, events, and fluxus--were calling, variously, "art performance" or "performance art." Where do we look for to find the continuity of these? To their intermediality: they are all the same intermedium, a conceptual fusion of scenario, visuality and, often enough, audio elements. But will the intermediality explain the uniqueness or value of the very best of art performance (or performance art)? I think not. Some works will become landmarks and will define their genre, while the others will be forgotten. At best the intermediality was needed to suggest their historical trajectory, to see their sometimes obscure pedigree (as one might use it, with happenings, to point toward the heritage of happenings from dada or futurist manifestations). But if the work is ever to become truly important to large numbers of people, it will be because the new medium allows for great significance, not simply because its formal nature assures it of relevance.

This, then, is the caveat inherent in using the term intermedia: it allows for an ingress to a work which otherwise seems opaque and impenetrable, but once that ingress has been made it is no longer useful to harp upon the intermediality of a work. No reputable artist could be an intermedial artist for long--it would seem like an impediment, holding the artist back from fulfilling the needs of the work at hand, of creating horizons in the new era for the next generation of listeners and readers and beholders to match their own horizons too. What was helpful as a beginning would, if maintained, become an obsession which braked the flow into the work and its needs and potentials. One often regrets the adherence of an artist to a set of dogma: the "movement artist" is a case in point--he adheres to the teachings of his or her movement, long after these have passed their relevance. There is the "late" futurist, the "late" abstract expressionist, the "late" pop artist. To be late in that sense is somehow to create a sort of academicism, good for providing examples to a class ("Okay, class, now this week I want each of you to do a pop art painting"), perhaps useful for heuristic purposes but not likely to open up new horizons for the artist or his viewers, listeners, or readers.

And with this I would leave the matter of intermedia. It is today, as it was in 1965, a

useful way to approach some new work; one asks oneself, "what that I know does this new work lie between?" But it is more useful at the outset of a critical process than at the later stages of it. Perhaps I did not see that at the time, but it is clear to me now. Perhaps, in all the excitement of what was, for me, a discovery, I overvalued it. I do not wish to compensate with a second error of judgment and to undervalue it now. But it would seem that to proceed further in the understanding of any given work, one must look elsewhere--to all the aspects of a work and not just to its formal origins, and at the horizons which the work implies, to find an appropriate hermeneutic process for seeing the whole of the work in my own relation to it.

APPENDIX BY HANNAH HIGGINS

Intermedia

Higgins' "Intermedia Chart" resonates with temporally dynamic sociograms, where human interactions are highly differentiated and radically decentralized and based primarily on the specific needs of a given body, in this case artists. According to a model like this, historic and contemporary experience is diverse, causally flexible and permissive of the as-yet-unknown.

The chart depicts intersections between fluxus and related work and makes no attempt at linear chronology. Fluid in form, the chart shows concentric and overlapping circles that appear to expand and contract in relationship to the "Intermedia" framework that encompasses them. It is an open framework that invites play. Its bubbles hover in space as opposed to being historically framed in the linear and specialized art/anti-art framework of the typical chronologies of avant-garde and modern art.

Glasslass

"Glasslass" (above) is a poem about slithering assonance and the naked page. The sounds of the esses slither, seemingly seamlessly surrounding the inside of the readers' mouths. Esses spill sexily across the page's soft skin, savoring the fancy glass lass.

The Opaque and the Transparent

For the last 20 years of his life, Higgins was, primarily, a scholar/painter. He extended his understanding of intermedia toward the past in the form of historic writings on George Herbert's pattern poems (1977), a translation of Novalis (1978, 1984), a

history of Pattern Poetry (1987) and a book on Giordano Bruno (with Charles Doria, 1991). These scholarly pursuits constitute the historic basis of what he explored through the interdisciplinary and exhaustive sequence of paintings that include The Opaque and the Transparent (above). In one catalog, Daniel Charles called this the "logical and coherent" outcome of Higgins' work. As intermedia objects, these paintings belong equally to the graphic arts, poetry, music and performance. In this image, looking at and looking through are juxtaposed as a reflective resonance that constitutes a fragment and a whole simultaneously. Typical of his work generally, this image reforms its seemingly iconoclastic aims by reconstituting fragments as productive of a humanistic sense of the unity of every time, place and modality.

Piece for Meredith Monk's Apartment

My father and Meredith Monk were dear friends who greatly admired each other's work and occasionally performed together in the middle and late 1960s. As a child I remember taking lessons at Meredith's studio. I include Piece for Meredith Monk's Apartment here (above) because, when they saw each other at the Walker in 1998, there was so much love between them that they just sat and smiled at each other for some minutes. That is, I think, a big part of why artists dedicate works to each other.

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 all, 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 any 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 three-dimensional 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 to 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 eight-foot-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 Babbitt'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: $R_p = 2, 4, 5, 1$; $R_i = 4, 2, 1, 5$.

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 Babbitt

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 of 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 in terms of the restrictions placed 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.) (. . .)

This text was published in Artforum, 6:4 (December 1967), pp. 28–33.

the serial attitude
mel bochner

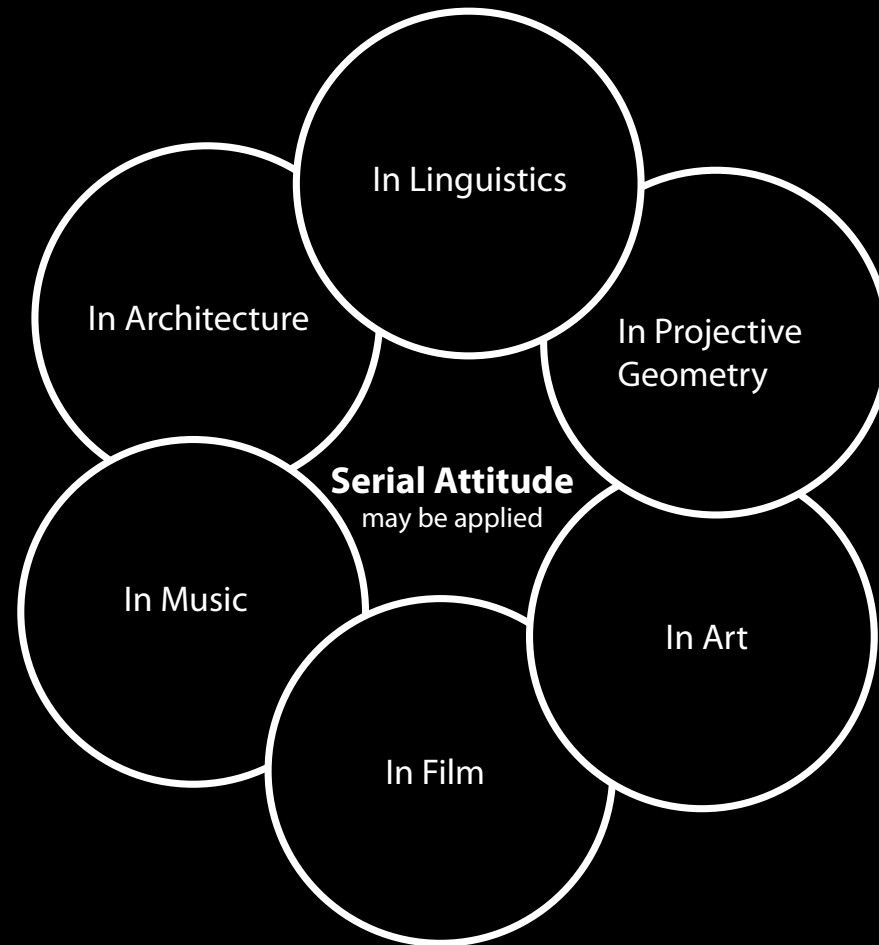


Mel Bochner - *Blah*

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.

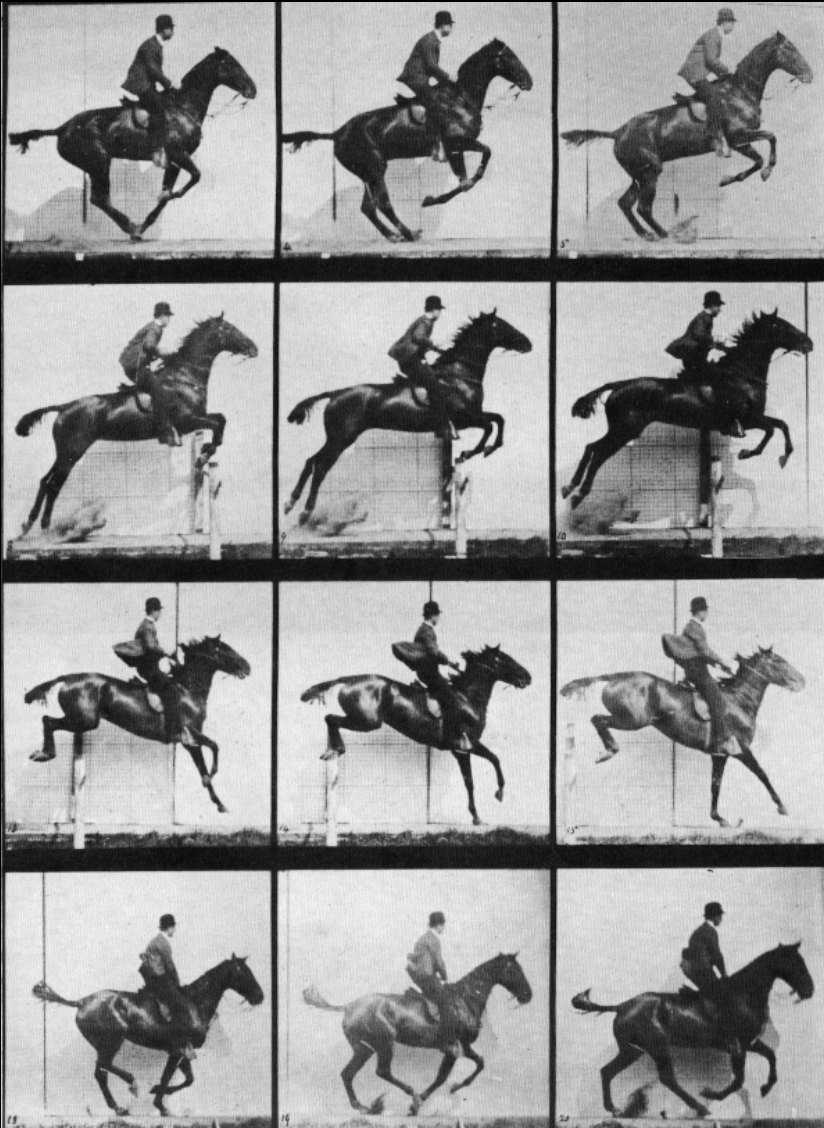
“What order-type is universally present wherever there is any order in the world? The answer is, serial order. What is a series? Any row, array, rank, order of precedence, numerical or quantitative set of values, any strait line, any geometrical figure employing straight lines, and yes, all space and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

-Josiah Royce, *Principles of Logic*



Serial ideas have occurred in numerous places and in various forms.

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



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.”

Eadweard Muybridge - *Horse Jumping* - 1877

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.”

Example 4. Track 24. 47.

Andante $\text{♩} = 56$ Violin concerto Berg

solo vln *pp ma espr.* *rall* *morendo*

21 *a tempo* *pp*

Example 5. Track 25.

Allegretto gioviale Lyric Suite Berg

violin 1 $\text{♩} = 100$ *poco f* *f* *fp*

mf *p* *poco rit* *p* *cresc.* *f*

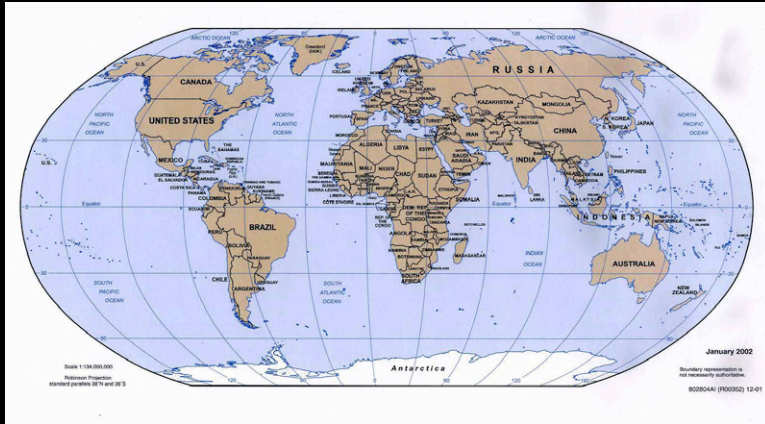
a tempo *pizz* *arco* *p* *arco* *pizz* *arco* *f* *mf* *arco* *f* *pizz*

arco *p* *mf* *cresc.* *f* *sul G* *poco più tranquillo* *molto f* *fp*

Projective Geometry

Example : Mapmaking

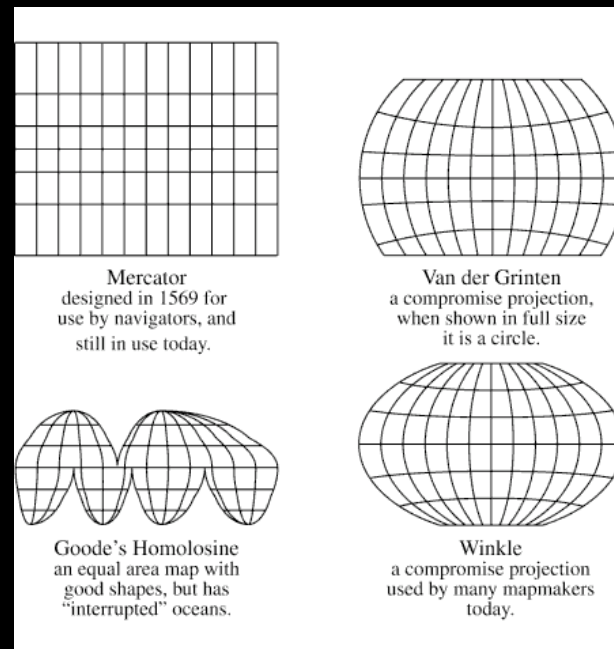
Order the Unordered



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



Introduction to *The Music of John Cage*

From *The music of John Cage*, published by Cambridge University Press.
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John Cage was a composer; this is the premise from which everything in this book follows. On the face of it, this would not appear to be a statement of much moment. Cage consistently referred to himself as a composer. He studied composition with Henry Cowell, Adolph Weiss, and Arnold Schoenberg. He spoke often of having devoted his life to music. He wrote hundreds of compositions that are published by a prominent music publishing house, which have been recorded, and which are performed regularly worldwide. He received commissions from major orchestras, chamber ensembles, soloists, and at least one opera company. He is mentioned in every up-to-date history of music. The only monograph devoted to him was in a series of “studies of composers.” Of course John Cage was a composer: everything in his life points to this inescapable fact.

And yet, I must begin this book by defending the obvious. For, even though his credentials are clearly those of a composer, Cage has, as often as not, been treated as something else. It has been stated on various occasions by various authorities that Cage was more a philosopher than a composer, that his ideas were more interesting than his music. Cage, says one history of twentieth-century music, “is not to be considered as a creator in the ordinary sense.”¹ Another critic wonders whether Cage, after deciding that “he was not going to be one of the world’s great composers,” refashioned himself into “one of the leading philosophers and wits in twentieth-century music.”² The degree to which this has become the standard way of dealing with Cage is revealed in a story told by Kyle Gann: a writer for the *New York Times* was told by his editors that he could not refer to Cage as “the most important and influential composer of our time,” but rather had to identify him as a “music-philosopher.”³

For the *Times* editors, as for so many others, the problem with treating Cage as a composer is clearly a problem with his work after 1951. His compositions for percussion and prepared piano written in the 1940s have never been difficult for critics—his *Sonatas and interludes* of 1948 has even been called a masterwork. In 1951, however, Cage began to use chance operations in the course of his composition, and it is here that things go awry. His adoption of chance techniques is almost always seen as a rejection: a jettisoning of everything traditionally musical. External forces of irrationality (such as Zen Buddhism) are invoked as the cause of this break. Under such influences, it is believed, Cage decided to substitute the throw of dice for his own tastes, so that he could ultimately remove any trace of his personality from the composed work. By 1952, Cage had written *4' 33"*, the silent piece; thus, in the words of one writer, “the authority of the composer [had been] extinguished.”⁴

The crux of the problem, then, has been a failure to find some way of dealing with Cage-the-composer, his musical compositions, and his chance operations all at the same time. When faced with music composed using chance, critics have drawn a blank. How can one understand a randomly-made composition? What can one say about such a thing? To criticize it would be to criticize a random act; how does one judge the toss of a coin? The way out of this dilemma has traditionally been to ignore the music and dwell upon “the ideas behind it.” For if Cage has left his music to chance, if he has thus extinguished his authority as a composer, then all that remains an idea—the idea of inviting randomness into his work. The pieces are thus about this idea of chance and are not concerned with anything even remotely musical. These are “conceptual” works in which, as one author writes, “the philosophical underpinnings are clearly more significant than any mere sound.”⁵ Cage’s importance lies in his having originated these ideas, but the results are not music and are not to be evaluated as music. “Here the

issues are all philosophical,” says a noted composer of Cage’s work, “because composing itself has been entirely devalued.”⁶ Thus Cage has become “a philosopher, not a composer.”

The treatment of Cage as a philosopher has had some unfortunate consequences. Foremost among these has been the tendency to see all of his work after 1951—work which presumably shares the same idea about randomness—as an undifferentiated mass of “chance music.” The reduction of Cage’s music to this one-dimensional approach is made simpler by the nature of chance itself. Critics frequently assume that the compositions are formless and without distinguishing characteristics since they believe them to be, in effect, barely more than random noise. If everything in them is determined by chance, then there can be no stylistic difference between one work and another any more than there can be a difference between one list of random numbers and another. “Instead of a music of definable identity,” says one writer, “we have conceptions whose essence is a lack of identity.”⁷ This failure to see any differences among Cage’s chance works has led to their being treated in a superficial fashion; histories of his work tend to pass rapidly over the works composed after 1951, with a few brief descriptions and generalizations. Cage’s critics have seemed to take the attitude that if Cage didn’t care which sounds became part of his so-called compositions, then why should we bother to listen carefully?

It is this attitude and this approach that I reject in the strongest possible way. In the first place, the claim that Cage’s chance pieces do not have distinct identities is complete nonsense. To state that one can not tell the difference between *Music of changes*, *Music for piano*, *Winter music*, *Cheap imitation*, and *One—all chance-composed works for piano*—is an act of either profound ignorance or willful misrepresentation. But beyond such an obvious error, the traditional view of Cage fails to answer the question: Why did he do it? If all that Cage was left with after 1951 was the idea of chance, then why did he continue to compose? Cage stated on many occasions that he did not like to repeat himself, that he preferred to make a fresh discovery with each new piece. How do we reconcile this with the textbook image of Cage-the-philosopher, pondering the same tired question for forty years? The portrayal of Cage as only a philosopher fails because it cannot serve as the foundation for a believable account of his work. It demeans the composer by presenting a flat, cartoonish version of his life, totally devoid of depth and insight.

Cage-as-philosopher is thus an image that will not bear close scrutiny; we thus must seek a new image, a new role for Cage. It is in this respect that I am, in this book, returning to the obvious: that Cage was a composer. It is not difficult, in fact, to picture Cage in this role: consider, for example, the story of his composition of *Apartment house 1776*, as told in an interview with David Cope.⁸ The work was a commission to commemorate the bicentennial of the American Revolution; Cage thus wanted “to do something with early American music that would let it keep its flavor at the same time that it would lose what was so obnoxious to me: its harmonic tonality.” Cage decided to take 44 pieces of four-part choral music by William Billings and other early American composers and then to alter them—turn them into new music. In his first version of the pieces, Cage simply subtracted notes from the originals. For each measure, he used chance to answer the question of how many of the four voices would remain. The results of this process did not suit him: “When I got to a piano and tried them out, they were miserable. No good at all. Not worth the paper they were written on. It was because the question was superficial.” Cage then changed his method by adding silence as a possible answer to his question (in the first version, at least one voice always remained). The results were still “not good.” Finally he changed the question itself. He counted the number of notes in a given voice of the piece, and then used chance to select from these. Supposing there were fourteen notes in a line, chance operations might select notes one, seven, eleven, and fourteen. In such a case, Cage would take the first note from the original and extend it until the seventh note (removing all the intervening notes); all the notes from the seventh to the eleventh would be removed, leaving a silence. Then the eleventh note would be extended

to the fourteenth, followed by another silence. Each of the four lines thus became a series of extended single tones and silences. This was the version that Cage settled upon:

“The cadences and everything disappeared; but the flavor remained. You can recognize it as eighteenth century music; but it’s suddenly brilliant in a new way. It is because each sound vibrates from itself, not from a theory. . . . The cadences which were the function of the theory, to make syntax and all, all of that is gone, so that you get the most marvelous overlappings.”

This is a description of a composer at work. In composing these 44 pieces for Apartment house 1776, Cage had a goal that was clearly defined. His first attempts at making the piece in accordance with his goals were failures. Cage evaluated these intermediate results, making refinements and modifications to his way of working. Through this process, he eventually produced a finished product that he judged beautiful, “brilliant,” “marvelous.” This is Cage, the composer, exercising his craft. The rejection of the first two versions of the pieces was not based on any random factor at all—it was not a matter of one set of random numbers being more “beautiful” than another. Instead, the focus of Cage’s work was on the framework within which chance operated—the questions that he asked. “The principle underlying the results of those chance operations is the questions,” Cage told Cope. “The things which should be criticized, if one wants to criticize, are the questions that are asked.”

From his description of his experience in composing Apartment house 1776, Cage makes it clear that some questions are better than others, produce better music. Why did he reject those first methods of composition? Cage tells us that the first two sets of questions were rejected because the individual tones of the original Billings pieces were still locked up by the vertical structure of the tonal harmony—the harmonic structure was antithetical to his musical goals. In the ultimate arrangement, the tones of the four individual voices are extended beyond their original durations, so that they thus break the bonds of the harmony. Each tone is also surrounded on both sides by a silence. Together, these two factors—the breaking up of harmonies and the floating of individual sounds in silences—create the effect of each tone being exactly itself, separate from all the others: “each sound vibrates from itself.”

This effect brings to mind the idea of “sounds being themselves,” a common theme in Cage’s work. What is made crystal clear in the story of his composition of Apartment house 1776 is that this idea is musical and not merely philosophical. That Cage chose one set of questions over another was purely a matter of taste and style. The frameworks for Cage’s chance systems were crafted with an ear towards what sorts of results they would produce, so that the questions he asked form the basis of his own distinctive musical style. If either of the first two chance systems that Cage derived for this work had been used, the resulting 44 pieces would still be valid chance compositions—they would still adhere to Cage’s supposed “philosophy.” But it is only the third and final set of questions that could produce music that was Cage’s, that had his style. John Cage evaluated his compositional questions on a strictly musical basis, and so should we.

To understand the music of John Cage, then, one not only needs to know something of the mechanics of his work, but one also needs an image of John Cage the composer—his sensibility, his musical style. As with any composer, this style changed over the years, and not just in 1951, either (in this book, I suggest 1957, 1962, and 1969 as major years of change in Cage’s career, but there are others, and mine are not meant to imply a hard division of his work into periods). But constant throughout, from the earliest works to the last, was Cage’s joy in composing: his exercising of his musical imagination, whether through the expressive “considered improvisation” of works such as the Sonatas and interludes, or through the design of elaborate chance-driven systems as in *Music of changes*, or through the simpler methods of his last works, the “number” pieces. In listening to these

compositions, we are witness to the work of a man with a unique and very beautiful sense of musical style.

Cage once indicated that he wished critics would be “introducers”: people who could take music and, by writing about it, turn it “into something you can deal with.” This has been the model I have tried to follow in this book. By keeping uppermost in my mind the image of Cage composing, I have tried to write about his music in such a way that, in some sense, it will remain unexplained, but which will still make it into something that can be dealt with by each listener in his own way. In the end, there is no substitute for the direct experience of Cage’s music itself: this book should be seen as opening a door into that work rather than presenting the final word on it. If you feel it necessary to listen to one or more of the pieces I discuss in the course of this study, then I will consider myself a success. Certainly nothing pleased Cage more than for others to enter along with him into his musical world.

Notes

- (1) Eric Salzman, *Twentieth-Century Music: An Introduction*, 3rd ed. (Englewood Cliffs: Prentice Hall, 1988), p. 160. Return
- (2) Donal Henahan, “The Riddle of John Cage”, *The New York Times*, 23 August 1981, p. D-17. Return
- (3) Kyle Gann, “Philosopher No More”, *The Village Voice*, 25 August 1992, p. 77. Return
- (4) Paul Griffiths, *Cage*, *Oxford Studies of Composers* No. 18 (London: Oxford University Press, 1981), p. 28. Return
- (5) John Rockwell, *All-American Music: Composition in the Late Twentieth Century* (New York: Alfred A. Knopf, 1983), p. 52. Return
- (6) Charles Wuorinen, “The Outlook for Young Composers”, *Perspectives of New Music* 1/2 (Spring 1963), p. 60. Return
- (7) Salzman, *Twentieth-Century Music*, p. 163. Return
- (8) Cope’s interview with Cage appeared in *The Composer*, Volume 10/11, pp. 6-22. The description of Apartment house 1776 occurs on p. 8.

In the logician's voice:

an algorithm is

a finite procedure,

written in a fixed symbolic vocabulary,

governed by precise instructions,

moving in discrete steps, 1, 2, 3,...

*whose execution requires no insight, cleverness,
intuition, intelligence or perspicuity,*

and that sooner or later comes to an end.

David Berlinski

"but is it composing?"

Traditionally, the composer manipulates (mediates) sound materials the result of which is a completed, self-contained art object, which is then presented as such to an audience. The composer may utilize his/her intuition, or may devise and employ a system (an algorithm) which generates the artwork, or may use a little of both.

This latter approach, the algorithm, which concerns us here, may be described generally as belonging to a DESIGN THEN DO model. In this type of composition, intuition may still play an important role: the composer must listen to the functioning of the algorithm and, through interacting with this feedback via controllers, alter the output of the algorithm until desired aural results are achieved. In this situation, what has changed is not so much composition, but the composer's relationship to the music: the composer is more engaged in listening than in construction: construction, composition in the traditional sense, is done when the system (the algorithm) is fully designed. All attention is then placed on the functioning, or the revealing, of the process in sound. The process of interacting with feedback may take place in the studio (for a cd), or in real-time (performance). It is at this point that one reaches the state expressed in Robert Rowe's concept of "machine listening," or in Stockhausen's notion of "composer as medium."

For classic examples of generative algorithms, one could look at the 12-tone matrix approach of Schoenberg, or the multi-parametric matrices of the serialists (early Boulez, Stockhausen, Babbitt), or the early multi-parametric chance pieces of John Cage.

Randall Neal, 2003

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 (Nietzsche), 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 develop 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 have 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 Web-based TV or radio station offers a collection 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). [5]

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 different formulation of the legendary author of Sim games Will Wright, "Playing the game is a continuous 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." [6]

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 be 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-language 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 Jeffrey 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 Wax Web.^[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 variability of new media manifests itself. The new media object consists of one or more interfaces to a database of multimedia material. 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].
3. Jean-Francois Lyotard, The Postmodern Condition: A Report on Knowledge, trans. Geoff Bennington and Brian Massumi (Minneapolis: University of Minnesota Press, 1984), 3.
4. 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, Film Art: an Introduction. 5th Edition (New York: The McGraw-Hill Companies, Inc., 1997), 80.
6. Chris McGowan and Jim McCullaugh, Entertainment in the Cyber Zone (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 languages 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, Naratology: Introduction to the Theory of Narrative (Toronto: University of Toronto Press, 1985), 8.
16. The theory of markedness 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.