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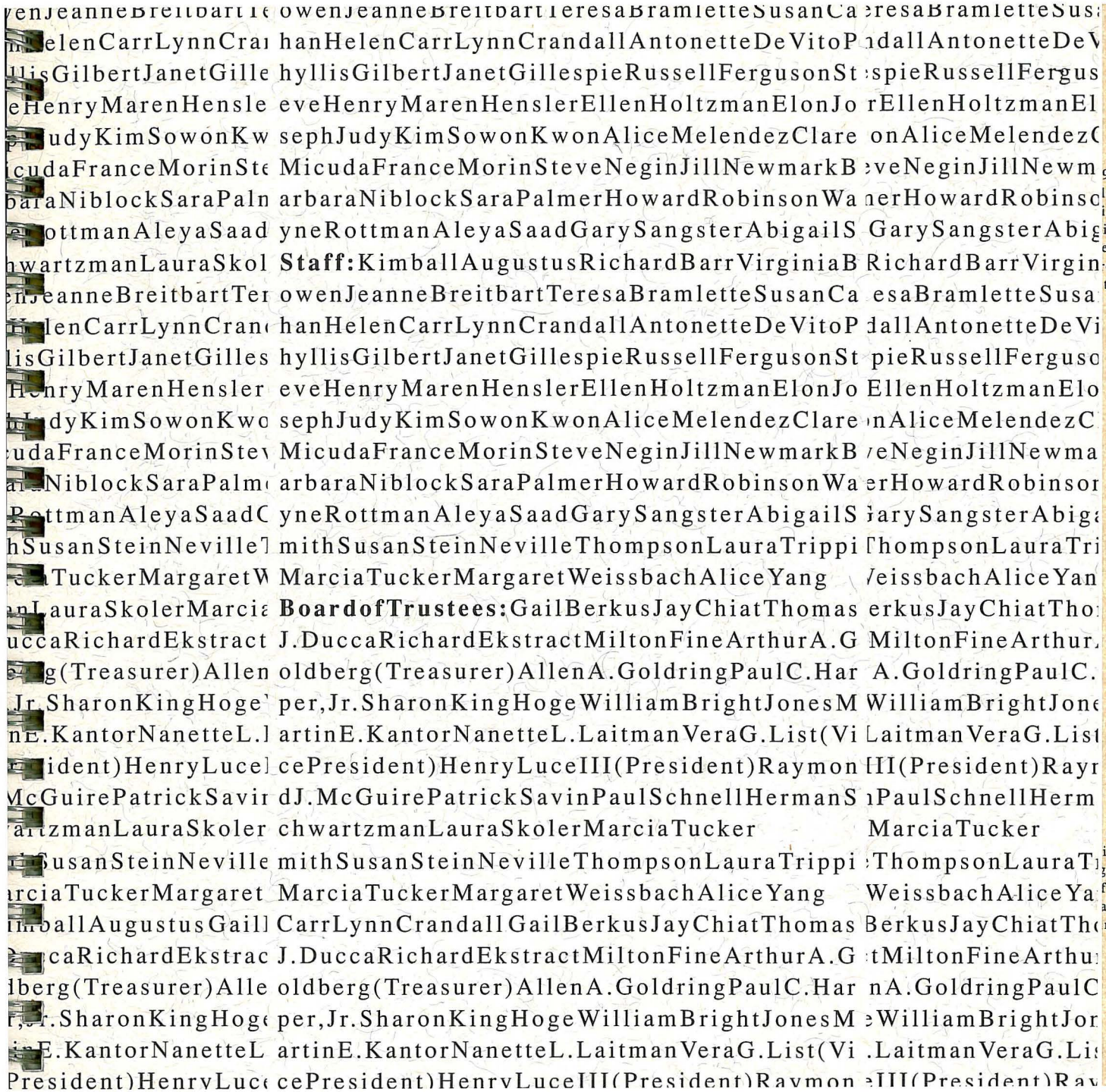

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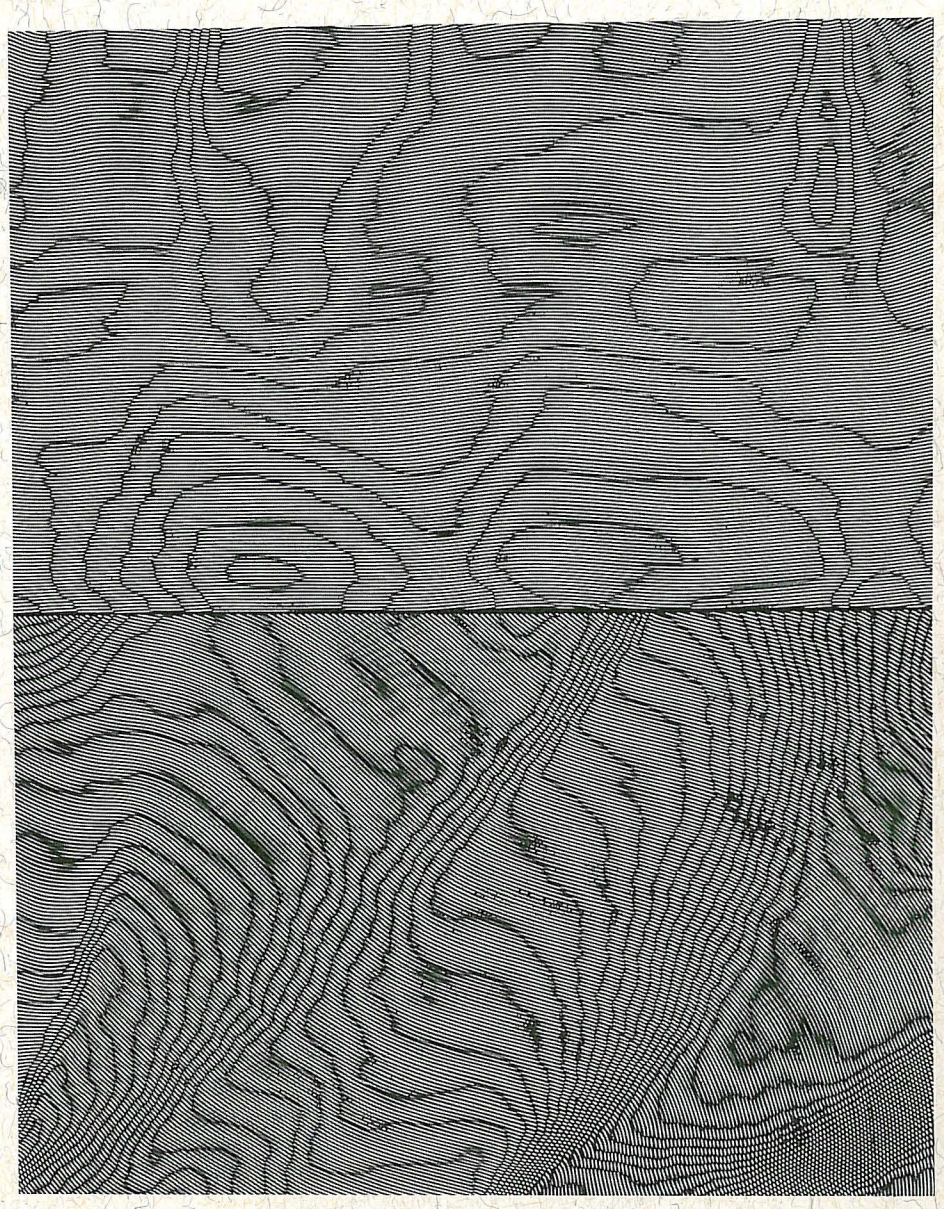

Steve DiBenedetto, *Time Wave O*, 1988. Photo: Daniel Newburg Gallery.

WERE YOU AFTER A TENSION BETWEEN LEGIBILITY AND ILLEGIBILITY IN THESE PHOTOGRAPHS?

James Welling
Interviewed by
Laura Trippi

> **JAMES WELLING.** I was trying to work beyond visibility, with notions of sense, sensuality, that which is of the senses.... I was engaged with other topics of which legibility, or representation, always plays a part: hallucinations, extreme mental states, the drawings of psychotics–castles of detail, sensual, non-quotidian, non-representaional. There were ideas about the wild, wilderness, nature, geological formations. Fabulous landscapes. Creating things that involve aspects of fiction or science fiction.

When I was working on the Aluminum Foil photographs, I understood that I was creating a program or a machine to manufacture randomness, a system to make random images. It seemed extremely simple, straightforward, and *economical,* and also yielded all these images. This one piece of metal could be constantly refolded into itself. It was both a physical way to make pictures, and an analogy for other things, like language: the way language uses the same words but is constantly repermuted and reconfigured.

> **LAURA TRIPPI.** I just read a brief essay David Joselit wrote for your show in Vienna, which discusses your recent photographs of buildings by the late 19th-century architect H.H. Richardson. Joselit cites Richardson's aim as that of "disciplining the picturesque." The phrase caught my attention in connection with your Aluminum Foil photographs and the way they sort of traffic in the picturesque or sublime.

> **JW.** I don't think we have feelings of the sublime anymore. It's a historical idea. I think these photographs do evoke a *lost* feeling of the sublime. The sublime I'm interested in is not a landscape, but more like snow on a T.V. screen. It has its own kind of beauty—if you can apply the word "beauty" to it. We're putting 19th-century terms with a mid-20th-century electronic landscape.... But the idea of electronic snow, of raw electronic states, it was a pretty powerful idea. I don't think I've ever really talked about coming out of making video tapes and going into photography. But that was one of the reasons that, when I figured out what I wanted to do with the photograph, I worked the way I worked in the video studio, on a table top, with a tripod, etc.

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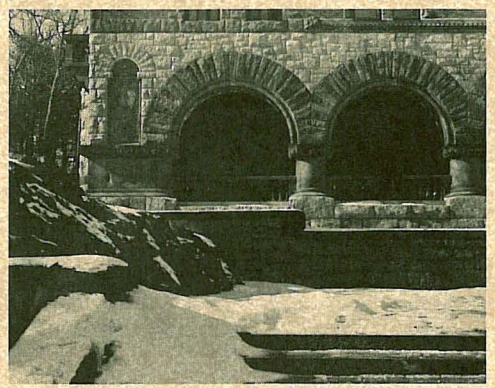
James Welling, *Beacon* (detail), 1980. Photo: Jay Gorney Modern Art.

> LT. That brings us back to the idea of "primitive experiments," of aluminum foil or draped fabric as a device for making random images. Your involvement with fractal mathematics developed out of that method, after you'd been dealing with the notion of manufacturing randomness in your photographs for some time. Why is it that you now feel so strongly about keeping a distance between your work and chaos theory?

> JW. As I began to read Mandelbrot and other articles in the mid-80s, I realized that I was concerned with these ideas not as a scientist, but as someone who was occupied with forms of visual art. That's why I really couldn't continue studying, or *begin* to study, mathematics. What I got from reading about fractals were the biographies in Mandelbrot, the biographies of the pioneers and the different figures in mathematics, the lesser figures. I thought the word "fractals" was becoming a buzz word that had no meaning anymore. The phenomenon it describes is so widespread that, once you start thinking about it, it completely loses its meaning.

There is something, though, about randomness and chaos and chance that can be perceived through all the mystification of received ideas. I think that has to do with the way my work operates, which is why it was very exciting when I began to read about chaos mathematics. I was already interested in these phenomena intuitively. The Aluminum Foil photographs can be looked at on a number of different levels: as jokes; as rereading the codes of photography; or about investigating something that provokes a perceptual response in the viewer. You're looking at this image but there's something else you're looking at also. What you see isn't what you really get. There is something else—the *effect* of photography. I'm not making you aware of looking at photographs, but there is something, some sort of "smoke" in the air. June 20, 1989



James Welling, *Ames Memorial Town Hall, North Easton, Mass., 1879-81*, 1988. Photo: Jay Gorney Modern Art.

In 1986-7, James Welling produced a series of "circle paintings" that bear a striking resemblance to the "sphere tremas" of Mandelbrot, among the least obviously "fractional" of fractal images, printed in black-and-white in the book (*The Fractal Geometry of Nature*). In Welling's paintings, the massing shapes come across at once as vaguely ominous and profoundly pop, suggestive in this context of a deadpan commentary on the "promiscuity" of fractal graphics (even, more generally, on that of simulation), the near-contagion of their allure.

MARTIN MEISEL

CHAOS DEJA-VU

A. A VIOLENT ORDER IS DISORDER; AND
B. A GREAT DISORDER IS AN ORDER. THESE
TWO THINGS ARE ONE. (PAGES OF ILLUSTRATIONS.)
—WALLACE STEVENS,
"CONNOISSEUR OF CHAOS"

"The new science of chaos" turned to a very old word in seeking a centering term that could draw together its diversity. "Chaos" would seem to fill the bill, less because of its precision as a label for the phenomena the new science has engaged (like the weather) or uncovered (like fractal relations and strange attractors), but because it makes the boldest claim. It evokes all the varieties of energetic and unpredictable turmoil in experience, and—as a science—promises to shift the frontier between what we understand as order and disorder. A lot of human activity, not only in science but in art, has been located on that frontier.

It is not the first time "chaos" has been drafted into the ranks of scientific nomenclature. The seventeenth-century chemist J.B. van Helmont, looking to name a new class of substances that appeared to him as dematerialized transformations of matter, substituted the Dutch *g* for the Greek *chi* in Xaos, and called it gas. Still, one might object that the "science of chaos" is a paradoxical misnomer, if "science" means enlarging the territories of what we can grasp and describe, and "chaos" is taken to mean absolute disorder, disorder at the limiting extreme. Finding recursive patterns and generative rules in chaos, and ways to represent both its behavior and its structure, would seem to negate the truly chaotic. Here knowing finds itself in much the same boat as imagining, for this deconstructive paradox has plagued—and stimulated—the arts through a very long engagement with the problem of representing chaos. How does one represent the unimaginable? Is not representation necessarily a taming?

In any attempt to imagine chaos one has to use indirection, and even then vestiges of order are sure to smuggle themselves in. Hear St. Augustine in about 400 A.D. on the difficulty of *really* imagining chaos:

> ...I conceived of it as having innumerable forms and diverse, and therefore indeed did I not at all conceive of it in my mind...my mind tossed up and down certain ugly and hideous forms, all out of order, but yet forms they were notwithstanding; and this I called without form...true reason did persuade me, that I must utterly uncase it of all remnants of forms whatsoever, if so be I meant to conceive a matter absolute without form: and I could not. For sooner could I imagine that not to be at all, which should be deprived of all form, than once conceive there was likely to be anything betwixt form and nothing; a matter neither formed nor nothing; formless, almost nothing.[1]

Augustine here names some of the common strategies for representing chaos: endless multiplication and diversification; creating a mere jumble among existent forms; and pursuing the path of negation, to arrive at a shadowy approximation of nothing. Although the common vernacular use of "chaos" is more suggestive of overwhelming presence than of negation and absence, the etymology of the word, its early cosmic significance, and its long association with origins and endings are fraught with the notion of nothing—a Something that is Nothing. The root of the word is the Greek verb stem *Xa*, meaning to yawn or to gape. It first shows up in Hesiod's *Theogony* (ca. seventh century

B.C.) in his account of the very beginnings: "Truly, first of all did Chaos come into being, and then broad-bosomed Gaia [Earth], a firm seat of all things forever, and misty Tartaros in a recess of broad-wayed earth, and Eros, who is fairest among immortal gods...."[2] Chaos is imagined as the precursor and enabling ground of "what is," perhaps as an instantiating discontinuity, momentous because it is a hole in the *absence* of the solid, teeming, and various All.

Absence, vacancy, undifferentiated shapelessness—the condition of next-to-nothing—are also in the nature of the first chaos as imagined in the opening verses of *Genesis* and in its interpretative tradition: "In the beginning God created the heaven and the earth. And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters." The word for "the deep" (*tehom*) is equally well translated as "the abyss"; and Calvin wrote of the words rendered as "without form" and "void" (*tohu* and *bohu*):

> The Hebrews use them when they designate anything empty and confused, or vain, and nothing worth. Undoubtedly Moses placed them in opposition to all those created objects which pertain to the form, the ornament and the perfection of the world. Were we now to take away, I say, from the earth all that God added after the time here alluded to, then we should

1. *St. Augustine's Confessions*, Loeb Classical Library (Cambridge, Mass.: Harvard University Press, 1977), II, pp. 294-95. Tr. William Watts (1631).

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Most attempts to describe cosmic chaos resort to the subtractive method, telling what it is *not*. For the artist in words, the rhetoric of negation is mightily convenient for the (non)representation of chaos. But what of the artist in images? How can he or she represent that chaos whose nature can be best imagined as what it is not?

In the representation of chaos, there is a broad division in representational strategies, between imitation and analogue; the one is an attempt to enact chaos directly, by eliminating what passes for order, and the other an attempt to map chaos through a rigorously ordered algorithm. A visual analogue for the chaos imagined as "what is not" appears in a treatise by the Renaissance physician and hermetic philosopher Robert Fludd. A syncretic exposition of the nature of the macrocosm, Fludd's *Ultriusque Cosmi* postulates, as a first anticosmic state of things, a primordial matter without qualities or limits. In a *tour de force* of visual economy, it is represented as a solid black square with, along each of its four sides, the phrase *Et sic in infinitum*, "And thus to infinity" (Fig. 1). Fludd envisages the transition to cosmos as going through a series of phases. Irradiated by the Divine light (Fig. 2), the minimal state of

2. As translated in G.S. Kirk and J.E. Raven, *The Presocratic Philosophers* (Cambridge: Cambridge University Press, 1969), pp. 24-25.

3. John Calvin, *Commentaries on the First Book of Moses Called Genesis* (1554), tr. John King (Grand Rapids: Eerdmans, 1948), Vol. I, p. 73.

Ellen Brooks, Untitled, 1989. Photo: Annina Nosei Gallery.

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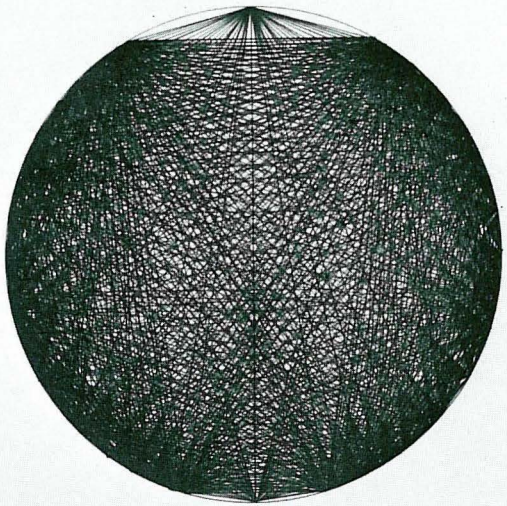

Glenn Branca, *All Possible Futures*, 1985. Collection James Welling, New York.

Diana Formisano, *Conformation*, 1987, edition of 3. Photo: Postmasters Gallery.

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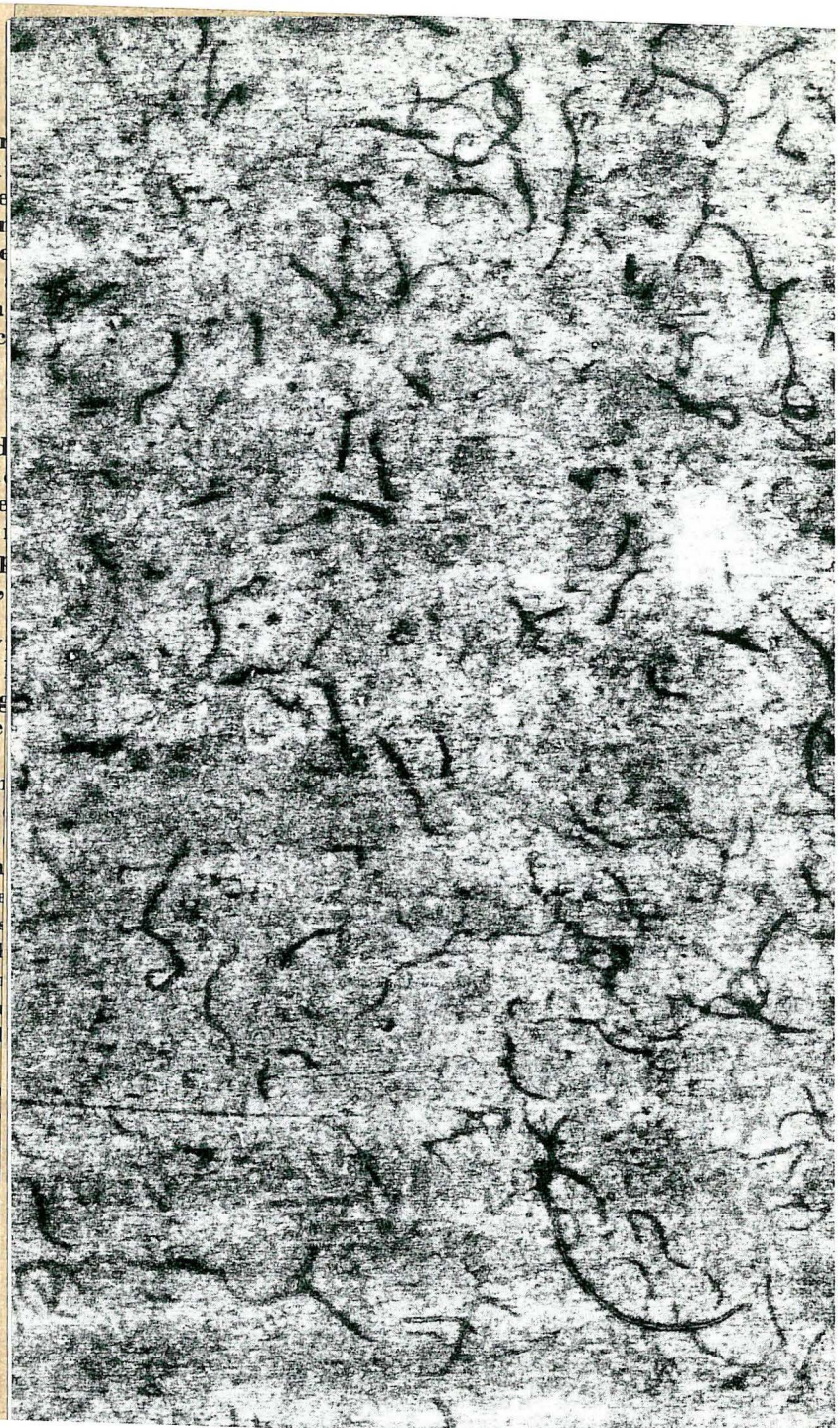


Katherine Loveday Bradshaw, Untitled, 1981, edition of 3. Collections John Cage and Madame Marcel Duchamp.

things differentiates qualities through a second and third stage, until it achieves the more familiar chaos of a jumble of the individuated elements (Fig. 3), a chaos that becomes easier to imagine as it approaches Something rather than Nothing.

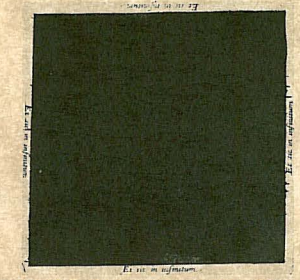


Fig. 1. Robert Fludd, *Ultriusque Cosmi*, 1617. Photo: The Folger Shakespeare Library, Washington D.C.

Representing chaos as a jumble of "what is," or even of that which underlies "what is," has used more than one strategy, in more than one medium. What is striking is how powerfully the very act of representation evokes order, an order sometimes inherent in the strategy, and sometimes in the medium and its conventions. Sometimes it seems as if order were generated, as it were, by the material world itself, through self-organization.

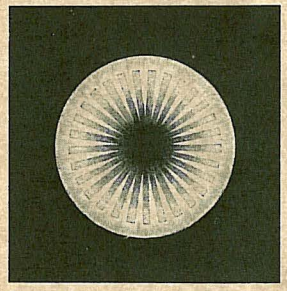


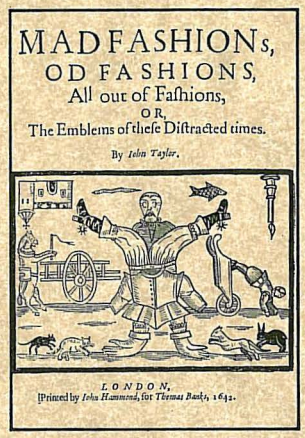
Fig. 2. Robert Fludd, *Ultriusque Cosmi*, 1617. Photo: The Folger Shakespeare Library, Washington D.C.

One commonplace strategy, especially in the Middle Ages and the Renaissance, is simple inversion: Carnival, or the World Turned Upside Down, where the existing hierarchy is stood on its head. Where inversion gives the means of invoking and representing chaos, structure is preserved, making the whole thing comfortably provisional; though in actual social and imaginative fact, Carnival inversion can give way to promiscuous levelling, and Humpty Dumpty may not be easy to restore. The title-page emblem for John Taylor's 1642 doggerel pamphlet *Mad Fashions, Od Fashions* inadvertently makes the point (Fig. 4). In its exceedingly symmetrical, systematic and reversible way, it is intended to characterize the aberrant and "antipodis'd" conditions of the time in England so that they could be corrected and turned right side up again. Instead, in 1649, the King lost his head.[4]

Fig. 3. Robert Fludd, *Ultriusque Cosmi*, 1617. Photo: The Folger Shakespeare Library, Washington D.C.

A curious instance of ordering and even self-ordering, in the matter as well as the medium, appears in an image of the primal Chaos by the Flemish artist Abraham Diepenbeek, designed originally in about 1655 for an elaborate book of engravings inspired by Ovid's *Metamorphoses* (Fig. 5).[5] The constellations are at war with each other, as are the elements. Water and fire stream in all possible directions, rocks pile up with no heed to gravity. And yet the image takes the shape of a wide ellipse within the conventional rectangular plate, and has a rough bilateral symmetry. The Zodiac, though all out of normal order, is at war,

not randomly, but logically, each sign with its opposite, six months apart. The fighting pairs fall into two arcs on either side of the diagonal marked by the sun and the moon, one of the odd months and one of the evens, in the order 1/7, 3/9, 5/11 and 2/8, 4/10, 6/12.


MAD FASHIONS,
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All out of Fashions,
OR,
The Emblems of these Distracted times.
By *John Taylor*.

LONDON,
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Fig. 4. John Taylor, title page, *Mad Fashions, Od Fashions*, 1642.

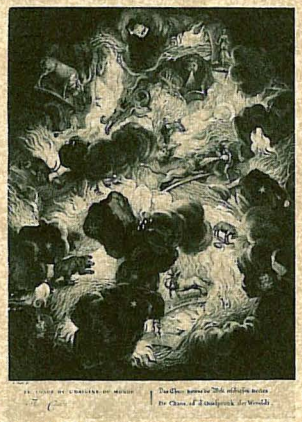


Fig. 5. Diepenbeek/Picart, engraving from *Les Tableaux du Temple des Muses*, c. 1655. Photo: Library of Congress.

If primal chaos is primal innocence as in origin legends, number is the serpent in the garden, the insidious agent of the fall. Number enters as soon as the extreme of disorder is conceived positively, as in the Chaos of a Something. But then—unlike chaos when it is conceived as next to Nothing—chaos appears in two modes: it can be imagined as a condition of unlimited plurality and diversity, or it can be imagined as a condition of extreme simplicity, of undifferentiation to the point of sameness. Here it is interesting to turn again to *Genesis* for a pair of scientific parables, narratives that propose apparently conflicting models for the transition between chaos and cosmos on the one hand, and cosmos and chaos on the other.

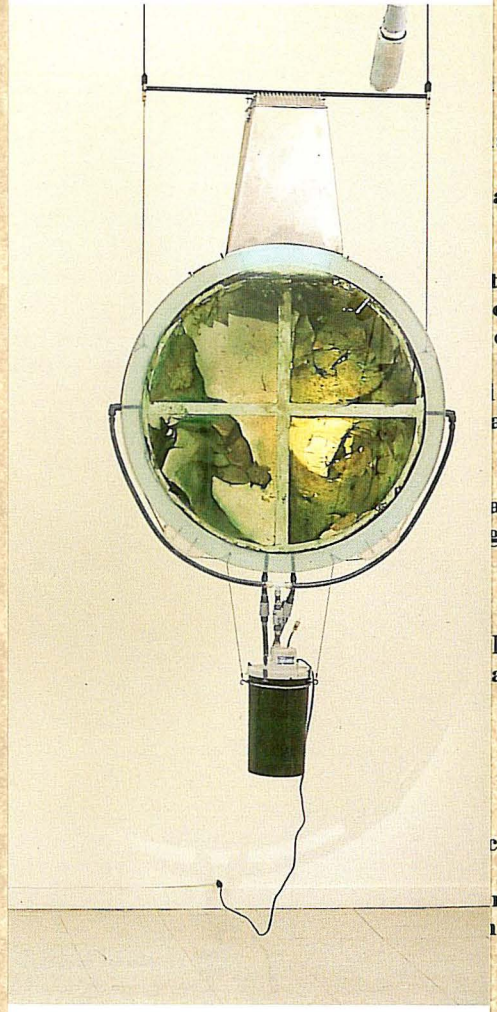
In *Genesis* as in many cosmogonies, the path that leads to cosmos from the featureless and amorphous primal state is division and multiplication, or to put it more abstractly, differentiation. The narrator of the opening section tells how—where before there was only abysmal darkness and confusion—God made light and divided the light from the darkness. Having so also initiated a differentiable succession of times or "days," He divides the waters above from the waters below with a firmament, distinguishes Heaven and Earth, the seas from the dry land, the vegetable kingdom in all its consistent variety from the ground that brings it forth. The governing verb for the first four days is "divide"; and division leads to multiplication. In fact, the word that means "create" in *Genesis* 1:1 seems to mean cut or divide when it appears elsewhere. On the other hand, the days of division and multiplication have a certain sameness about them, in the language. "Everything is numerically ordered; creation proceeds through a rhythmic process of incremental repetition; each day begins with God's

world-making utterance ('And God said...') and ends with [a] formal refrain."[6] It is not simply differentiation, and multiplicity, that goes into the making of cosmos, but numeration, which here serves to control and differentiate recurrence.

If differentiation, the creation of diversity and multiplicity where before there was a generalized unspecific sameness, is the route from chaos to cosmos in *Genesis*, it is also the route from cosmos to chaos. The final piece of metahistorical framing in *Genesis* offers the story of the Tower of Babel, the chaos of language. "Confuse" (balal) is the operative word for God's linguistic intervention, reinforced in the text by an onomastic pun on Babel (Babylon). But despite a long association between the confusion of tongues and the primal confusion, the mechanism of the return to chaos is not in fact reversal, a stirring together of elements that constituted a cosmos through division and separation, but on the contrary, more division and separation. As a result of the confusion of tongues, the languages and peoples of the earth are multiplied and differentiated as the animals were when brought forth from the earth, but with opposite intent. One print from a design by Karel van Mander (before 1604) shows the peoples of the earth now in

4. *Mad Fashions, Od Fashions, All Out of Fashions, or, The Emblems of These Distracted Times* (London: T. Banks, 1642).

5. The engraving reproduced here is by B. Picart, from *The Temple of the Muses; or, The Principal Histories of Fabulous Antiquity* (Amsterdam, 1733). The edition is translated from and based on Michel de Marolles' *Les Tableaux du Temple des Muses* (Paris, 1655).



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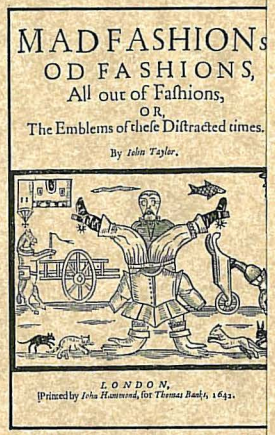
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By *John Taylor*.
LONDON,
[Printed by *John Hammond*, for *Thomas Bank*, 1642.

Fig. 4. John Taylor, title page, *Mad Fash Od Fashions*, 1642.

Fig. 5. Diepenbeek/Picart, engraving from *Les Tableaux du Temple des Muses*, c. 1655. Pl Library of Congress.

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all the variety of national costumes and racial feature, already with diverse alphabets (Greek, Hebrew, pseudo-Egyptian), monumental styles, and religions, streaming away to the four quarters of the earth while a storm threatens the magnificent counter-creation of their lost homogeneity (Fig. 6). Multiplicity and diversity are evidently not all that it takes to constitute a universe; in fact they can work to constitute its opposite. Number itself as the path between chaos and cosmos is a two-way street.

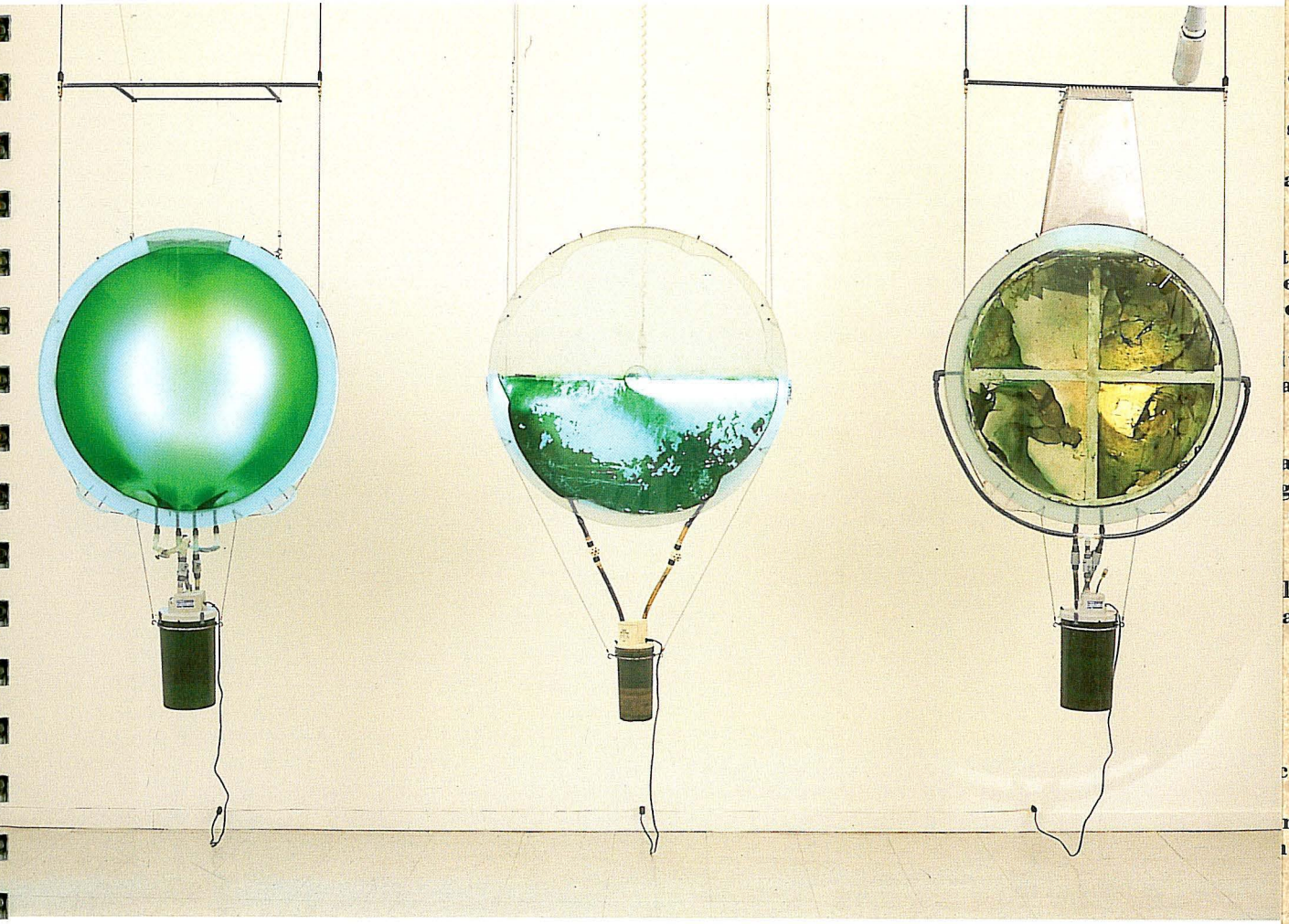
It is, of course, the perceptual and cognitive dimension, the subjective side of things that determines whether one experiences number and multiplicity as order or chaos. The best illustration

6. Robert Alter, *The Art of Biblical Narrative* (New York: Basic Books, 1981), pp. 142-43.


CONFVSIO BABYLONICA

Fig. 6. Van Mander/Dolendo, *Confusio Babylonica*, c. 1850. Photo: The Huntington Library, San Marino, Calif.

David Nyzio, left to right: *Aspect of Slice I, Diet Slice, Aspect of Slice II*, 1989. Photo: Postmasters Gallery.



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Preface

Marcia Tucker, Director

A popular way of thinking about art is that it is "a process of making order out of disorder, of ordering events in experience...it is a search for the truth."[1] In the last twenty-five years, however, a great deal of work has been done to unsettle such notions of order and disorder. During the late sixties and early seventies especially, a period of intense activity around ideas of process-as-product took place in Europe and America, opening new formal and conceptual arenas in the arts.[2]

It has been in the field of science that the most sustained and revolutionary exploration of chaos has taken place. From the point of view of those involved in the arts, perhaps the most interesting effect has been a return to the examination of the kinds of chaos we experience daily, "to the universe we see and touch....to phenomena on a human scale."[3]

This exhibition is an exploration of some of the most compelling issues raised by the new science of chaos as they relate to recent works of art, both in terms of style and substance. Our desire to understand the ways in which art is part of and reflects on other fields and disciplines, other arenas of inquiry, has led to this undertaking.

My thanks to Curator Laura Trippi, who organized the exhibition; to the staff, interns and volunteers of The New Museum who have so generously contributed talents and time above and beyond their job requirements; to those who have graciously provided the loans of so many works of art; to M&Co. for the innovative catalogue design and exhibition design concept; and above all to the artists who have addressed the subject with unpredictable and challenging results.

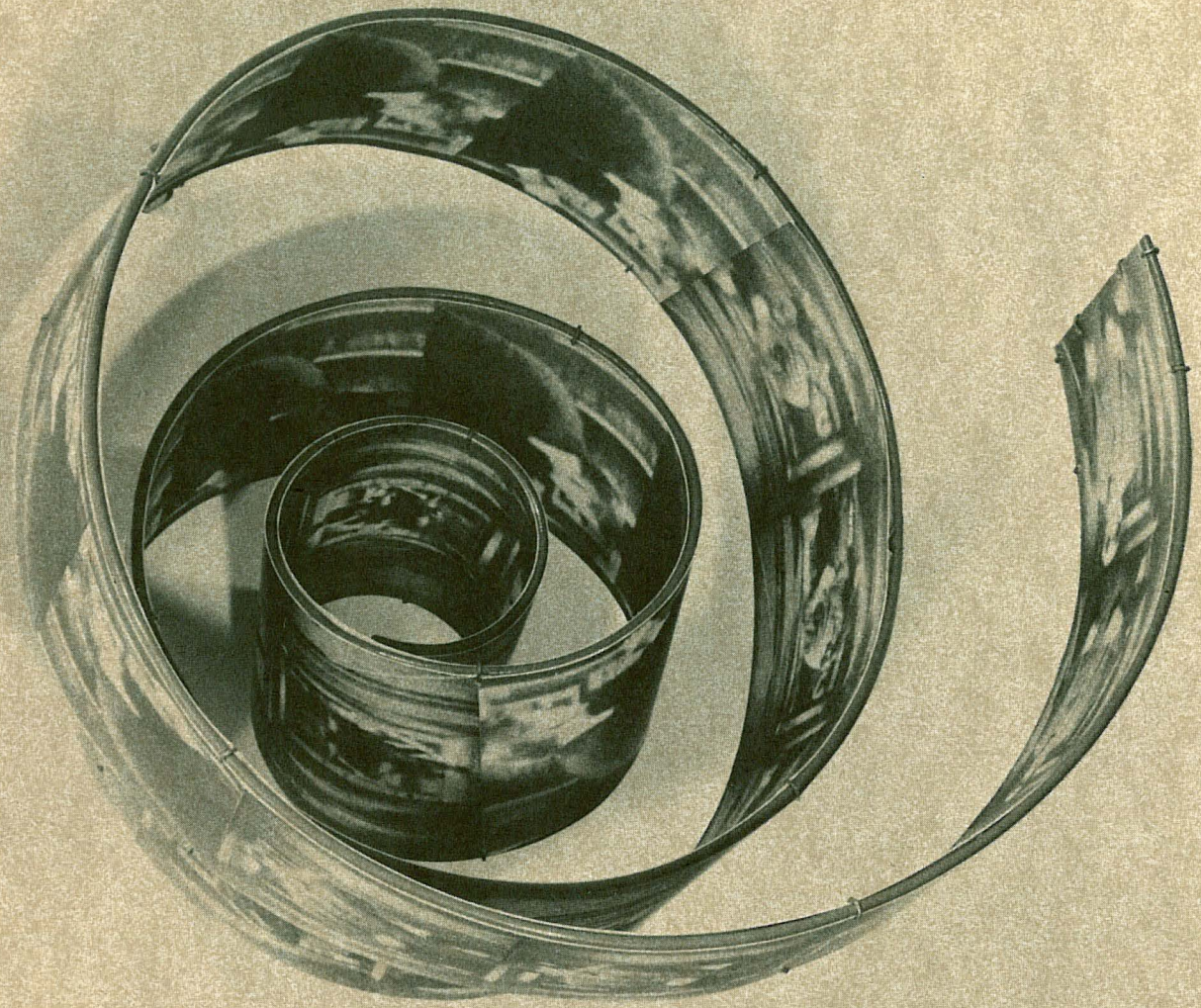
The New York State Council on the Arts has generously contributed to the exhibition and to Christian Marclay's *Tape Fall*, while the Jerome Foundation has helped support both the Marclay installation and the installation by Kathryn Clark and Ann Hamilton. To these organizations, we are grateful. Special thanks also to the Luce Foundation for making the exhibition design possible, to Carol and Arthur Goldberg for providing assistance on a crucial component of the show, and to Richard Ekstract for helping Out with video.

We are delighted to have been able to work with Kevin Maginnis of KAOS, and Klaus Ottmann, curator of the companion exhibition *Strange Attractors: The Spectacle of Chaos in Chicago.* That both organizations should have been working on similar concepts, but virtually different exhibitions, at the same time seems entirely appropriate to the subject at hand. We are pleased to have been able to join forces by presenting these shows under one rubric in New York and Chicago simultaneously.

1. Gustave Harrow, "Creativity and Control," *Journal of Arts Management and Law* (Summer 1986): 74.

2. In particular, *When Attitudes Become Form*, organized by Harald Szeeman, Kunsthalle, Berne, March - April, 1969; *Op Losse Schroeven: Situaties en Cryptostructuren*, Stedelijk Museum, Amsterdam, March - April 1969; *Anti-Illusion: Procedures/Materials*, organized by Marcia Tucker and James Monte, Whitney Musuem of American Art, New York, May - July, 1969; and *557,087*, organized by Lucy Lippard, Seattle Art Museum, September - October, 1969.

3. James Gleick, *Chaos: Making A New Science* (New York: Viking Penguin, 1987), p. 7.



Sokhi Wagner, *Film Curl I*, 1988. Photo: Christine Burgin Gallery.

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might be a short animated film, Zbigniew Rybczinski's *Tango* (1982).[7] The film, some eight minutes long, begins with a furnished room, a fixed interior with a missing fourth wall, like a stage set seen from a moderately high angle. First a soccer ball bounces into the room through the open window in the rear wall. A boy appears (Fig. 7), looks about, climbs in after the ball, snags it, and slides out the window head first. Then it happens again; and again. Meanwhile a woman carrying a crying infant enters one of the three doors, sits at the table, pops out a breast, nurses the infant, rises, lays it in a crib near the window, and goes out. And again. Meanwhile a thief slips through the window, as oblivious of the others as they of him (Fig. 8), flattens against the wall, steals a bundle from the top of the shelves, and slips out. Then a man in a hat and coat comes through another door and puts the bundle on the shelves where the thief will steal it. Other figures and actions accumulate: a grandmotherly figure sets soup on the table; a grandfatherly figure sits, eats, and removes the plate. A nude in shoes enters, (Fig. 9) puts on a dress and panties, and leaves. A plumber carries in a toilet, sets it down, then picks it up and carries it through. An old woman in black lies down on the bed, crosses her arms on her breast and is seen to by a man with a black briefcase; then she gets up and goes. Every action is made repeatable, and once begun, it is repeated, all to the sound of a tango beat, endlessly recurring.

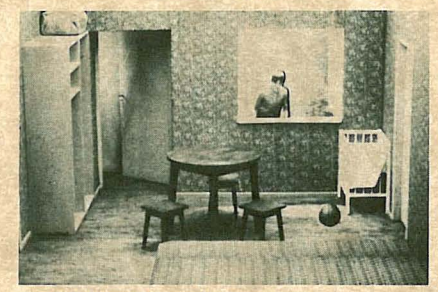

Fig. 7. Zbigniew Rybczynski, *Tango*, 1982.
Photo: International Film Exchange Ltd.

Fig. 8. Zbigniew Rybczynski, *Tango*, 1982.
Photo: International Film Exchange Ltd.

Fig. 9. Zbigniew Rybczynski, *Tango*, 1982.
Photo: International Film Exchange Ltd.

Before we are through, there has been an incremental accumulation of

about thirty people, moving about and around each other, entering, acting, and leaving, like pieces of clockwork in their periodicity, except that their movements are syncopated like the music and their numbers increase. There is an incremental accumulation also in the recurring sounds: the boy cries, shuts up, and cries; a man falls off the table while changing a lightbulb and yells; a pair of lovers, grappling on the bed, makes passionate noises.

It is the experience of the perceiver that is most instructive in all this. The perceiver is like a juggler whose partner is throwing plates at him: first two plates in the air, then four, then six, all going round together. Every addition demands a more complex awareness and a more divided attention until suddenly it all collapses. The system crashes in one's head despite the fact (in *Tango*) that one never doubts the systematic character of the phenomena. The multiplicity of the elements and the diversity of the recurrences are more than the mind can hold in a comprehensive pattern, and all at once it is experienced as chaos.

Quite as interesting here as the observer's role in generating chaos, as the quantitative aspect, as the part played by sensory and intellectual overload, as the suddenness of the collapse and transformation, is the observer's compensatory response. In the film, having lost a comprehensive grasp of the whole, one is likely to fasten attention on a region, or on a few elements, arbitrarily chosen, whose recurrence continues to be perceived as a pattern. These provide a stay against vertigo, and evidence of the order and regularity of the whole, which is now actually a matter of faith. Making such an island of stability means focusing one's attention at the expense of the rest, so much so that when the thirty-odd figures, coming and going, very rapidly diminish to just a few, and then one, it always comes as a surprise. (The old woman in black, in her last resurrection, picks up the ball and exits, leaving an empty stage.)

Most of the figures in *Tango* are oblivious of each other, most of the actions independent of each other. The only significant patterning is recurrence, the only directionality, numerical increase. There is no structure of subordination to further organize the parts, no pervasive interactive causality, no functions within an overarching purpose. One cannot in the immediate throes of apperception impose a narrative on the sequence of events. One can, of course, retrospectively impose a comprehensive interpretation, as a proposition on what the

7. *Tango*, written, photographed, and directed by Zbigniew Rybczynski, music by Janusz Hajduk, short Film Studio "Se-ma-for"/Film Polski production, 1982.

film is "about": alienation and solipsism in modern society; the housing shortage in Poland; or as the American advertising has it, "A Metaphoric Picture of Human Fate." Interpretation is the effort to make sense of the chaos, to subsume it, to displace it, to make it go away. But such thematic propositions, even the more plausible ones, do not on repetition of the direct experience of the film's succession of images alter the experience. That is, they do not prevent the onset of chaos, perceptual-cognitive collapse.[8]

The chaos of the many, of multitudinousness, perhaps comes more easily to the modern imagination than the chaos of indifferentiation, of the one. But in the chaos of the many, multitudinousness and indifferentiation after a point seem to converge. Multitudinousness comes to be experienced, not as number, but as numberlessness. Number, on the other hand, has served as an imaginative tool for dispelling chaos, or distancing it, or working magic against it, from the beginning. Counting things, however, has meant diminishing or ignoring their infinite differences. Mensuration—which depends, not just on comparison, but on the establishment of a unit of comparison—has entailed reducing multivalence to the mere fact of sameness. Through counting and measuring, identity, or discrete individuality, being oneself and not other, admits the possibility of interchangeability—but it also lays down the groundwork for differentiation. Without identity there is no basis for enumeration; but without number there is no path of connection between the one and the many. When the possibility of a universe of experience resting on a permanent ground of chaos is imagined in ancient Greece, Sophocles frames the question as a challenge to the principle of identity, on being oneself and not other; and he answers it by showing the path between the one and the many.

What is at stake for human beings in the imagination of chaos? Why its persistence in the face of so much ambivalence and unsuitable mental equipment? There are clues in the opposing terms that regularly frame its representation: chance and necessity; formlessness and form; heterogeneity and homogeneity; diffusion and coherence; promiscuity and segregation; random and recurrent; the many and the one. But the real energies that have powered the imagination of chaos come from deeper

8. The *Tango* phenomenon would probably be understood in cognitive psychology as a function of "attention." In the language of one textbook, "attention is conceived of as being a very limited mental resource." The writer adduces spatial and animate metaphors, as of a narrow workspace that gets too crowded, or a small company of single-minded task-demons, or (from

Peter Nagy, *Circus Morte*, 1989. Photo: Jay Gorney Modern Art/Ken Schles.

energetics) a limited electric current: "Given the fixed energy supply, attention would only be allocable to so many tasks. (If allocated to more, the performance would degrade or a fuse would blow)." John R. Anderson, ***Cognitive Psychology and its Implications*** (San Francisco: Freeman, 1980), p. 26.

levels, inhabited by feelings about liberty and security, desire and constraint, violence within and without; by the appetite for life itself and the fear of the loss of self, of dissolution and death. These energies show themselves with some frequency in the representations of chaos, with memorable effect: in, for example, the arguments over the existence of the void; in the numerous modern representations of terminal entropy; and in what has been called "the excremental vision," a revulsion from death and decay, and from the body itself. In much cosmogonic myth, the underworld is where the remains of ancient Chaos are exiled and confined, and there they erect a parodic kingdom of the Dead. But if what is called the excremental vision links chaos to death and dissolution and loss of self in many instances, it works quite differently in others. In, for example, Rabelais' *Gargantua* and Jarry's *Ubu Roi*, the excremental is the immoderate antidote to a costive propriety and sterile pedantry; and chaos is the expression, not of the end of function and coherence and the return to nothing, but of vitality. There the imagination of chaos is the assertion of life over form.

The Wooster Group, *L.S.D. (...Just the High Points...)*, 1984. Photo: Nancy Campbell.

The Adventure in Technos Dystopium

1. Intellectual adventure: searching for the meaning of things and their order.

2. Restless deconstruction of metaphors.

3. Matching visual pleasure with the myth of intellectual history.

4. Digging through the layers of archeological sediment and reorganizing them.

5. Adventure: to lift up the layers and take pleasure in reordered or chaotic meaning.

6. Adventure with the knowledge piled up in the institution, the institution which preserves the meaning of order.

7. The horrific pleasure of walking in empty museums.

8. The instruments seducing one to stay with them.

9. Everything comes to the surface to do its flirting and you walk into the adventure as though nothing else exists, and the desire is strong and you know: this is the most challenging duel, this is the question of survival. **And then seduction occurs.**

Orshi Drozdik

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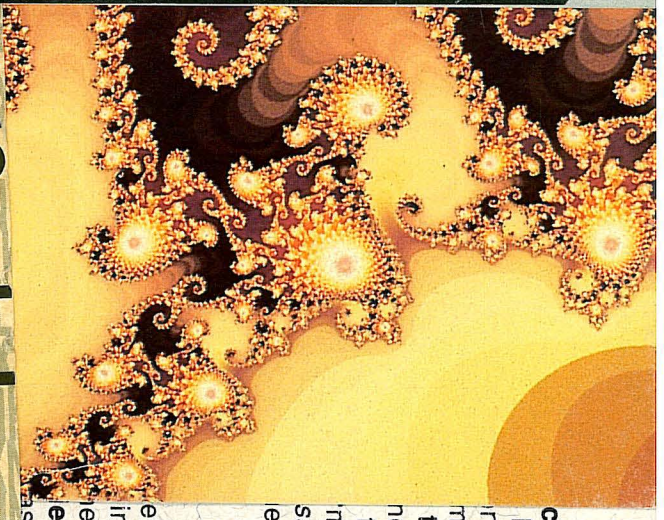

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Carter Hodgkin, *Viral Cultures*, 1989. Photo: Orcutt Photo.

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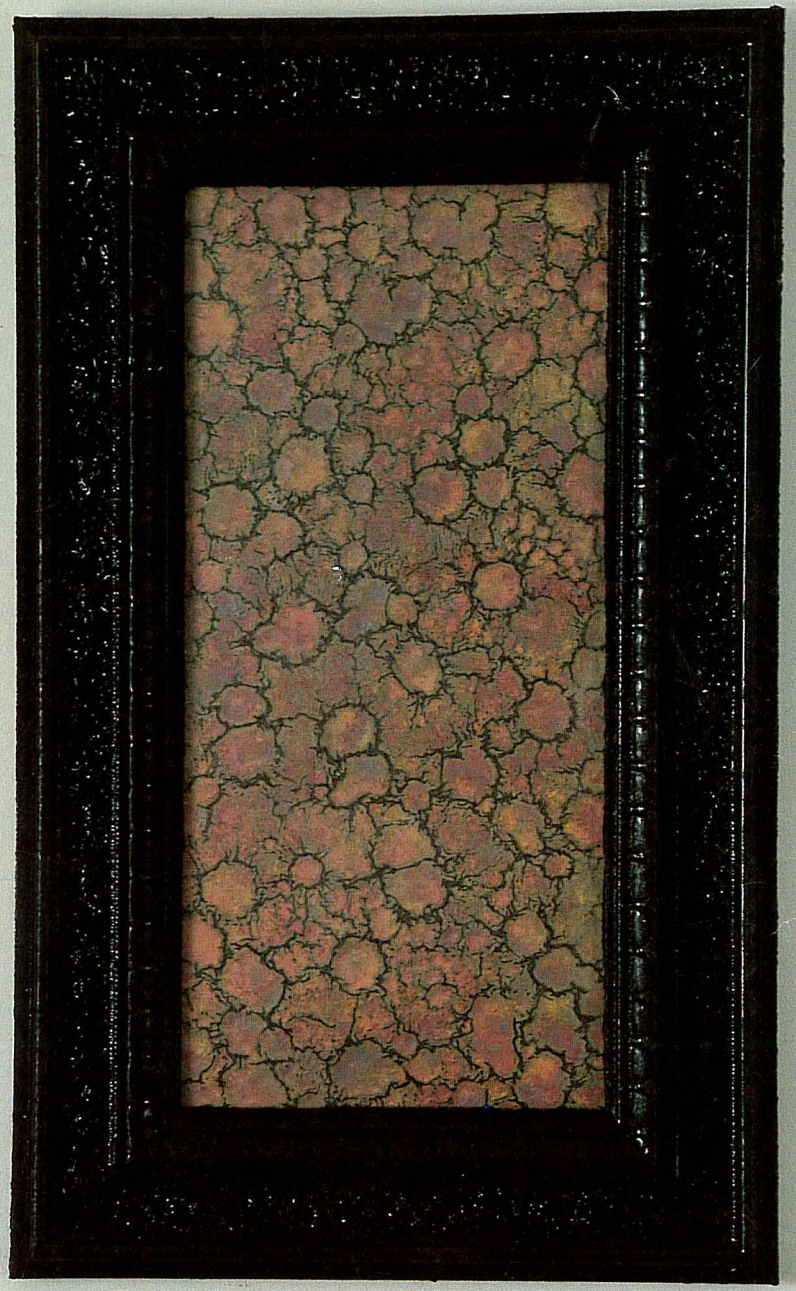
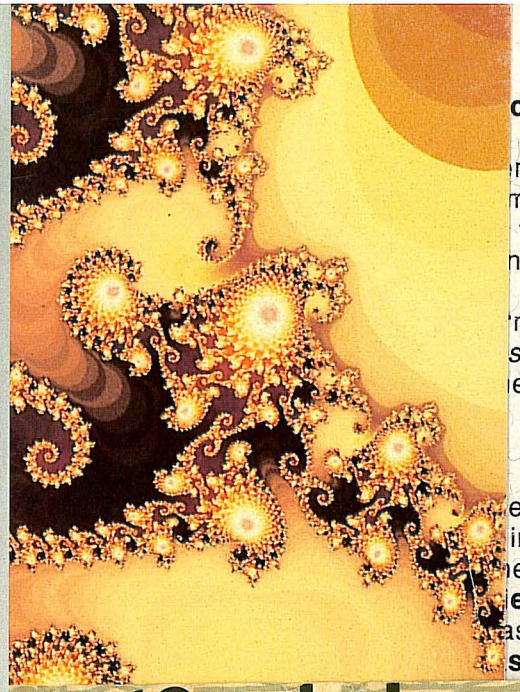


Dan Reynolds, Untitled, 1989. Collection Prudential Insurance Company, New York.



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Alastair Noble, *Aludel (Les Vases Communicants)*, 1988.

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ously investigate the breakdown of order in the realm of the social, where narrative necessity and violent incursions are taken together into account. The sensitive interdependence of all areas of the cultural field becomes an urgent theme. Here, one's position in the landscape of the social plays a determining role in the sorting out of one's relation to order or chaos. What is banished to the cracks and crevices of a given cultural paradigm appears (from within the dominant order) as a chaotic pocket of waste. Situating themselves in such "pockets," these works present themselves in the guise of the archeological find to exercise the action of resistance and critique. As the flow of information and mass media culture goes increasingly global, and the techniques of the sciences grow ever more refined, it is precisely the patches of sociological "static"—of difference and of the capacity for critique—whose survival and ongoing reinvention is crucial to the production of culture.

Concerned with time and unpredictability, Christian Marclay's *Tape Fall* deals with the conversion of information into sheer material waste, and thus brings the exhibition full circle. We are, in short, enveloped in an atmosphere of the

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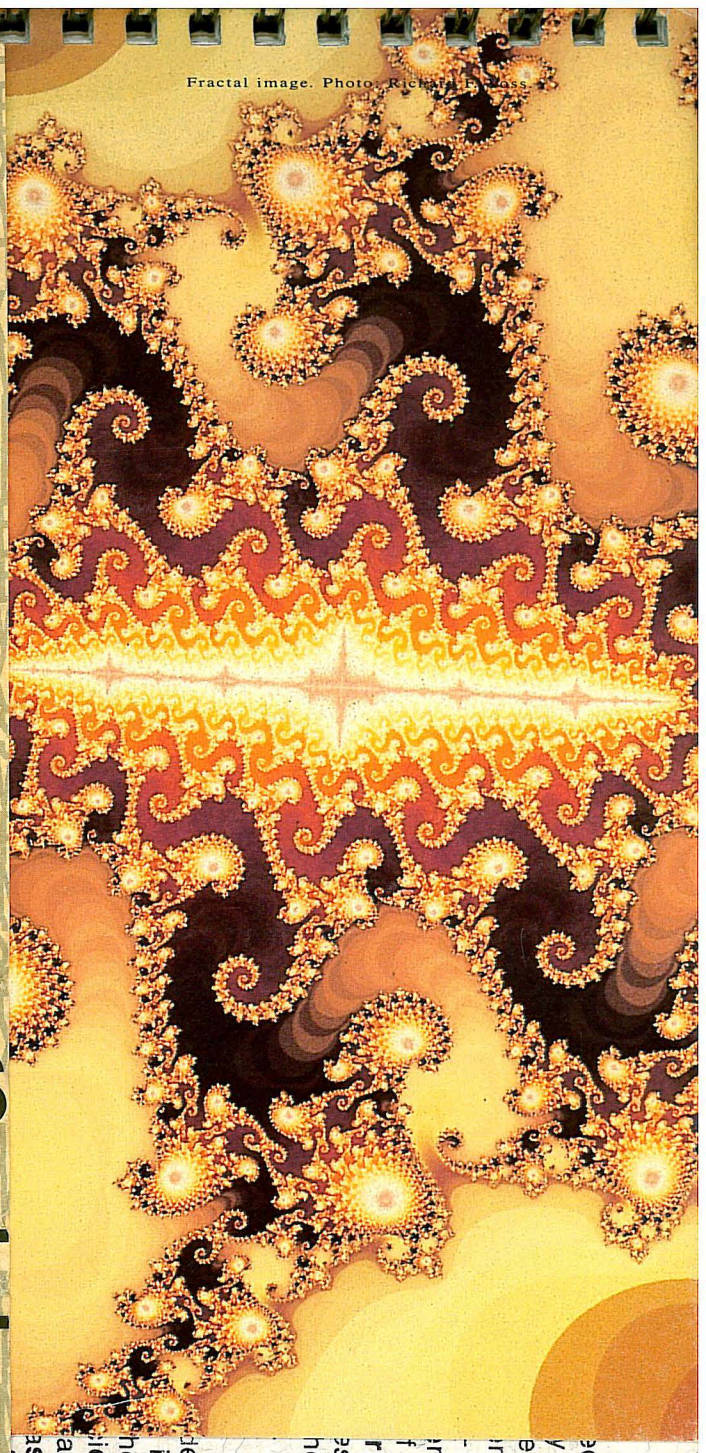
chaotic—a climate that could be characterized as a quantum



Fractal image. Photo: Richard Voss

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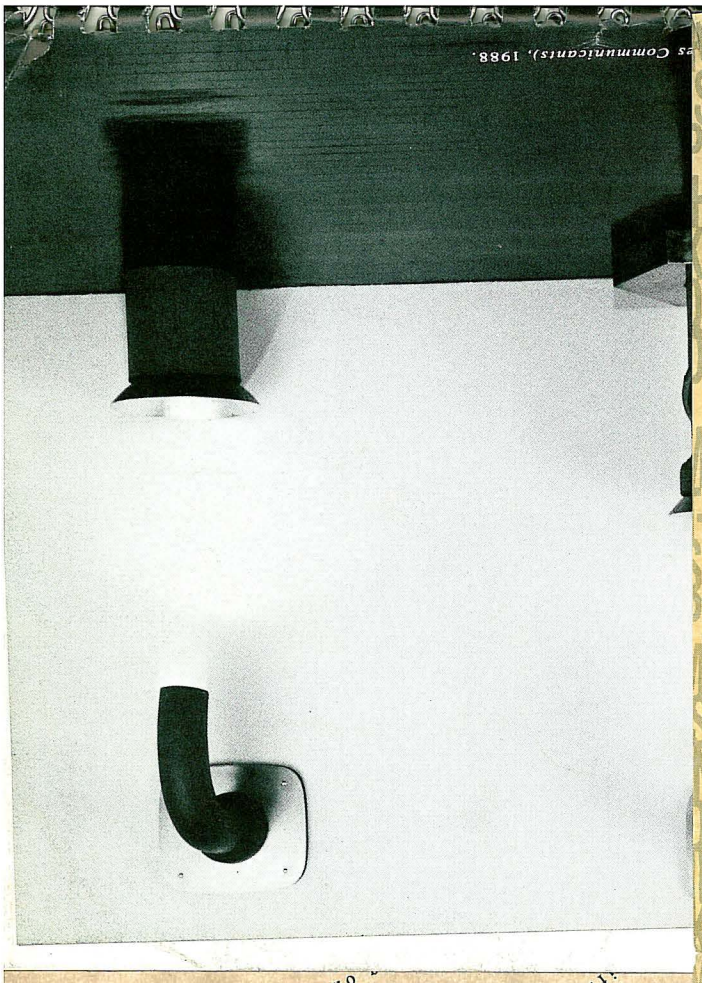
leap in the age of information—embarked on a collective "adventure," to borrow a phrase from the artist Orshi Drozdik, "in technos dystopium." Drozdik's work, like that of Jon Tower, takes systems of scientific knowledge as its theme. Both call attention to the part that belief and practice play in shaping the discourse of science, to its grounding in a wider net of values and beliefs, and to the built-in obsolescence of its operative paradigms. At the same time, this work underscores the part that science itself plays in shaping our experience and understanding of everyday events. Against the field of the body (Drozdik) or the social (Tower), where "nature" and "culture" intersect, scientific knowledge constructs its categories, inculcated through habits of social, personal, and professional practice. Metaphors are coined, smuggled back and forth in border regions between disciplines, and disperse in all directions. If fields of experience are ordered in the process, they also emerge dismembered and, in part, erased. Gesturing quite specifically in the direction of a *prevailing climate,* Tower's untitled "drawings from The New Museum" also indicate the odd interface of technological means of ordering and unpredictable systems, such as the weather, that is the hallmark of chaos science.

With its reliance on computer simulation, its themes of discontinuity, unpredictability, fragmentation, and chance, chaos science at once participates in, and provides models for describing, a more widespread shift in the realm of culture. Like postmodernism in the arts and poststructuralism in the humanities, chaos science traces its lineage to the sixties. Even the images of its "fractal" graphics—fundamental building blocks of an extraordinary new branch of geometry—evoke the atmosphere of the sixties, calling up psychedelia and altered states, a period of profound upheaval. Along with the incursion of the media, the market, and mass culture on the domain of the arts, has come the concerted decomposition of traditions of Western thought that emphasize closure and the rational mechanics of "solids," or static categories. Similarly, chaos science concentrates on the dynamic and often chaotic properties of fluid flow, carrying with it a kind of liquidation of linear trajectories.



Replaying the Beatles's landmark *Sergeant Pepper's Lonely Hearts Club Band* above an abandoned packing crate—referring at once to the sixties and to the loss of the "real" historical referent—Jon Kessler's *1967* sets the stage for an investigation of chaotic states. Glenn Branca's work with the harmonic series, exploring the nonlinear and fractal organization of musical tone, summarizes the mood at this threshold of change in the climate of culture at large:

> *In Western culture, the system of categorizing, identifying, and ordering tone—"equal temperament"—is generally accepted as an absolute and complete system of music. In reality it is an idiosyncratic, limited approach to the ordering of tone which has become so completely absorbed that we have become partially deaf to music that does not exist within its boundaries.... But sound is unstable, as is matter. Vibration is in a constant state of movement and change.*

The work of Glenn Branca, Steve DiBenedetto, Dana Duff, Peter Nagy, Walter Robinson, and James Welling represent an interest in a kind of repetition in which the repeated is never the same, where "logical operators" give rise to random patterns and disorderly complexity, even the irrational. Sometimes degenerating into noise or dust, sometimes resolving into unforeseen configurations, these works often look to mechanical means to intervene in the intentionality of the compositional process. Feedback flickers and fills the screen, shooting static through the system of received habits of visual practice. Zooming in on the material makeup of electronic transmission, such work ends up echoing Op out of an overriding interest in the video "pixel," in the perceptual and cognitive effects of new technologies which break down form to a flow of bits and dots.

With the play of patterning across media, geometry is fractured, vertigo tempted and sustained. Ornament and surface become substance, a volatile field of fluid always in transition, contoured by the "decorative" effects of noise, degeneration, the contagion of hybridizing systems of simulation. In the works of Laura Emrick, Zoe Leonard, Dan Reynolds, Andres Serrano, and Sokhi Wagner, the emphasis on patterning falls toward surfaces folded or imploded, flows of highly charged information, the warping and distorting and cavorting of various systems of social encoding.

sponsored by Philip Morris Companies, Inc. Special funding for *Pipe Fair* was provided in part by the New York State Council on the Arts. Additional funding for *Pipe Fair* and the installation by Kathryn Clark and Ann Hamilton was provided by the Jerome Foundation.

cavorting of various systems of social encoding.

Where order breaks down, new information emerges. Using the media of living or chemical systems, the work of Eve Laramée and David Nyzio takes the concern with fluid pattern into a domain of mini-ecologies. Quasi-scientific experiments and their indeterminate traces become "paintings" that paint themselves, depicting the delicate balance of order and chaos in physical systems, reclaiming mundane phenomena for serious consideration. Approaching the properties of physical systems from the side of state-of-the-art technology, the fractal fantasies of $(Art)^n$ (a collaborative group of artist/scientists) betray the peculiar rapprochement of art and science in a technological present where the visual field is saturated by the dynamic mechanics of video graphics.

In a chaos of the "natural" and the "manmade" dense regions of surface intersections emerge, where no one interpretive system holds. Diana Formisano, Carter Hodgkin, Jill Levine, Steve Miller, Joseph Nechvatal, Alastair Noble, and the videos of Leslie Thornton chart the topography of a new landscape, permeated by the liquid aspects of technology and simulation. Twisting the commercial vision of vast networks of information, codes cross paths and run amok in arbitrary admixtures. "Painting" and even perception itself is perforated and stretched, while eruptions of noise underscore the decay and random generation of formulations in diverse languages—from medical microphotography to video games, from fractal graphics to computer translations of painting and photography. With Ellen Brooks and Oliver Wasow, the concern with landscape modulates toward "naturalism," with a distinctly post-apocalyptic, post-appropriation manner of inflection. The tide of implied narrative washes back through the field, evincing the visual rhetoric of a technological sublime. Narrativity itself becomes an object of study in the flux of simulation.

Patches of static in the space of technology are met by patches of static in the space of the social. Katherine Loveday Bradshaw, Ann Hamilton and Kathryn Clark, David Hammons, Cady Noland, David Smith, Grace Williams and Litina, as well as the videos of Tony Cokes and Paul Garrin, all vari-

Strange Attractors: Signs of Chaos has been funded in part by a grant from the New York State Council on the Arts. Additional funding was provided by the Lois Foundation, Carol and Arthur Goldberg, and Robert Shiffler. Christian Marclay's *Tape Fall* is being presented as part of the New Music America Festival, which is part of the Brooklyn Academy of Music's Next Wave Festival, sponsored

Fractal image. Photo: Richard F. Voss.

Fractal landscape. Photo: Richard F. Voss.

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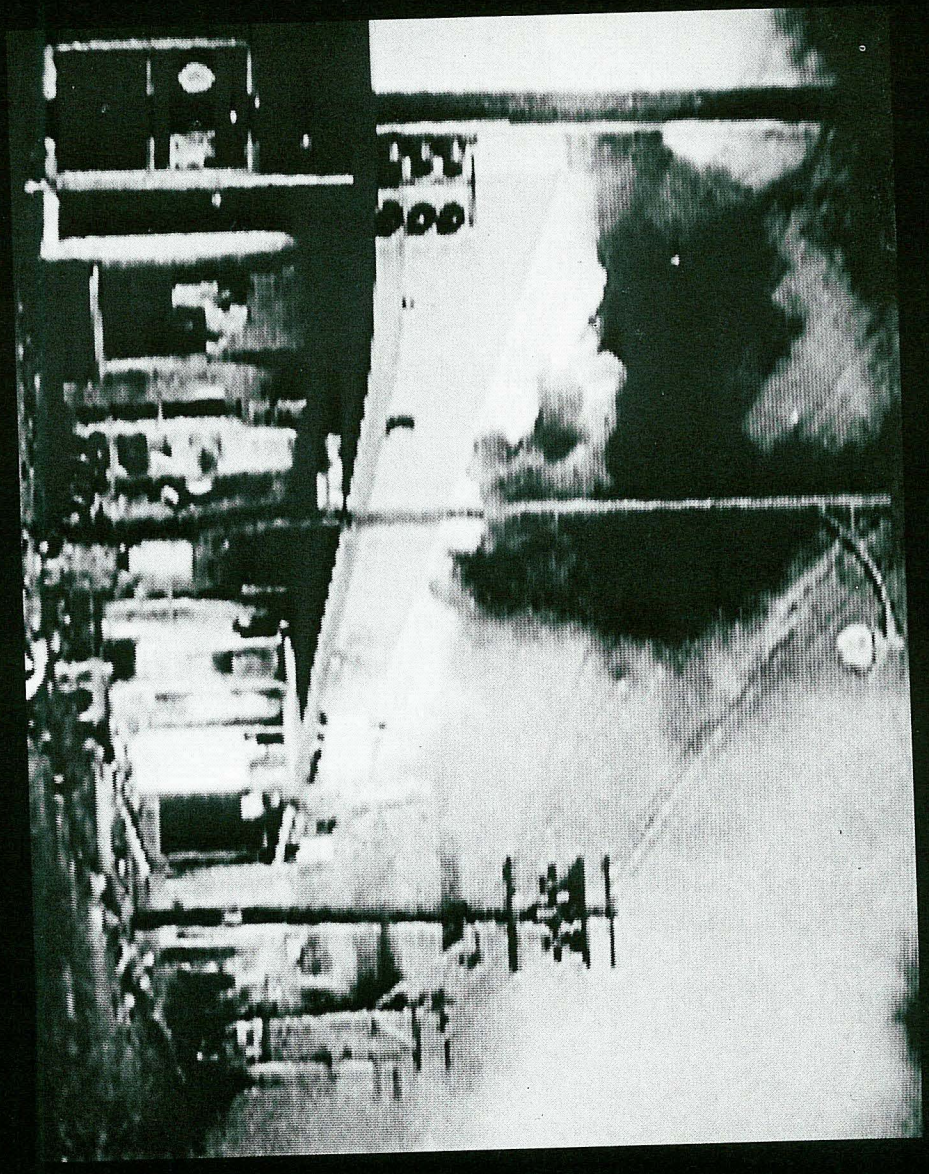

Tony Cokes, *Black Celebration*, 1988. Photo: American Film Institute Video Festival.

ARTISTS: (Art)^n, Katherine Loveday Bradshaw, Glenn Branca, Ellen Brooks, John Cage, Tony Cokes, Colpitts & Milazzo, The Critical Art Ensemble, Steve DiBenedetto, Orshi Drozdik, Dara Duff, Laura Emrick, Diana Formisano, Ann Hamilton and Kathryn Clark, David Hammons, Carter Hodgkin, Jon Kessler, Eve Andrée Laramée, Zoe Leonard, Sherrill Levine, Christian Marclay, Steve Miller, Peter Nagy, Joseph Nechvatal, Alastair Noble, Cady Noland, David Nyzio, Dan Reynolds, Walter Robinson, Andres Serrano, David Smith, Jon Tower, Sokhi Wagner, Oliver Wasow, James Welling, Grace Williams and Litsna, The Wooster Group, and additional performance and video artists.

TABLE OF CONTENTS: Laura Trippi, *Fractured Fairy Tales, Chaotic Regimes*. John Cage, *What you say...* (excerpt). Reprinted from *Formations*, vol. 4, no. 1, spring-summer 1987. Used by permission of the author and the publisher. Gary Indiana. *Chaos Plus* (excerpts). Reprinted from *The Village Voice*, October 7, 1986, p. 79. Used by permission of the author. Luce Irigaray, *The "Mechanics" of Fluids* (excerpts). Reprinted from Luce Irigaray, *This Sex Which Is Not One*, translated by Catherine Porter. Copyright © 1985 by Cornell University. Used by permission of the publisher, Cornell University Press. James Welling interviewed by Laura Trippi. Martin Meisel. *Chaos Déjà Vu*. Orshi Drozdik, *The Adventure in Technos Dystopium*. All photographs courtesy of the artist, unless otherwise indicated.

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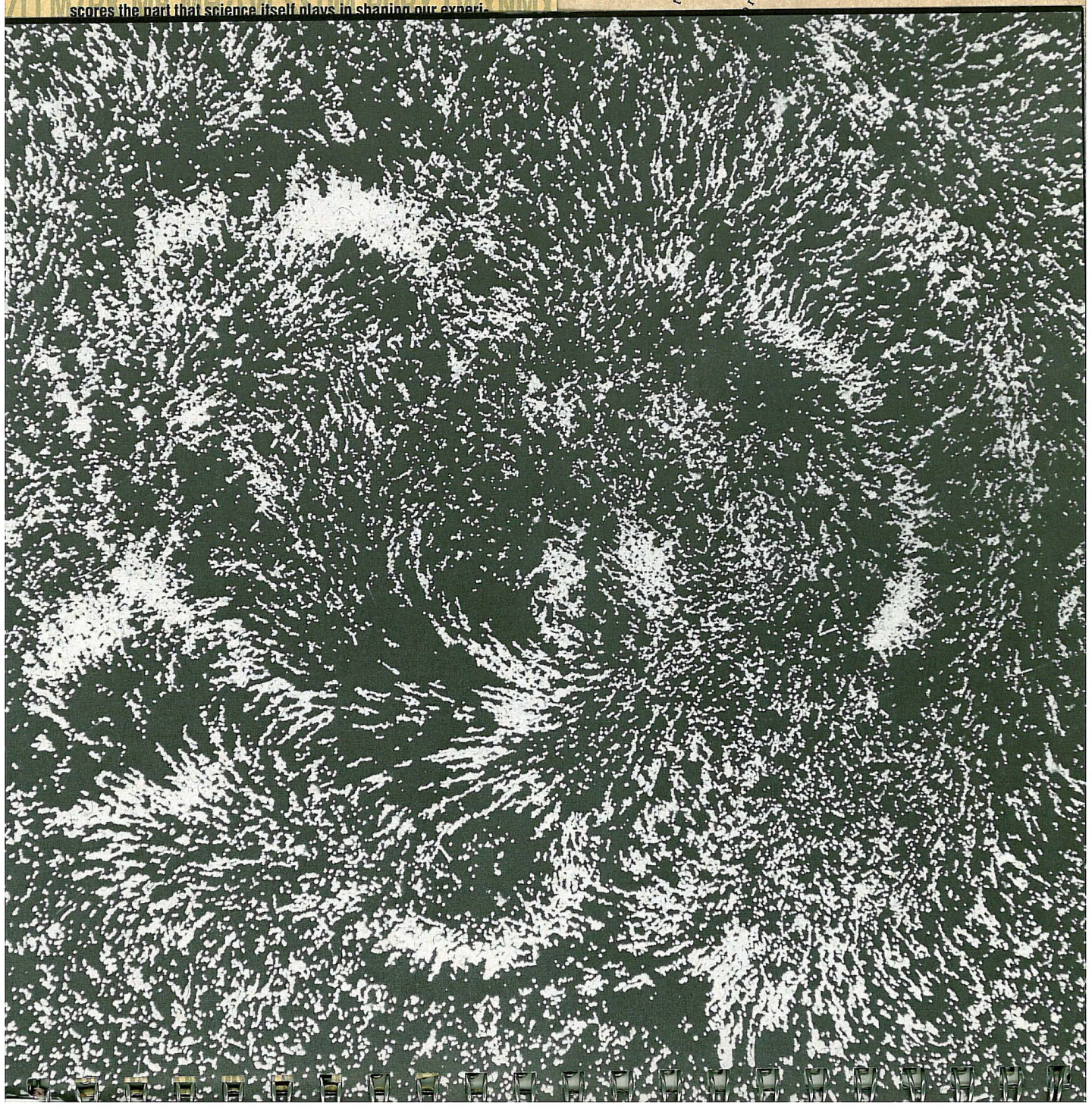

Dana Duff, *Magnetism: Mesmerism and Hypnotism #2*, 1988. Photo: Milford Gallery.

ACKNOWLEDGEMENTS

This exhibition would not have been possible without the collaboration during its initial stages of the late William Olander, who died of AIDS on March 18 of this year. To Bill I owe both the thoughtful inspiration for the show and support through its earliest months of development, but also gratitude of a more far-reaching though less identifiable kind — for the remarkable, irreverent example that he set for me, and the memory of his generous encouragement in general.

Many others have contributed to the process of organizing this exhibition. For their participation, and for sharing their work and ideas, I want to warmly thank all the artists. Tibor Kalman and Marlene McCarty of M&Co., providing an extraordinary design for the catalogue and design concept for the exhibition, have been fantastic collaborators. To John Cage, Orshi Drozdik, Gary Indiana, Luce Irigaray, Martin Meisel, and James Welling, I want to express my appreciation for their contributions to the catalogue. Tod Mijanovich, Norma Moruzzi, Mario Mousse, and Tim Yohn all assisted enormously with my essay, not to mention the invaluable in-house advice of Alice Yang. Rosetta Brooks, Chistopher Cox, Randal Davis, Cynthia Hedstrom, Ken Kirby, Grace Stanislaus, and Richard Voss offered valuable ideas and information. For their generous assistance, a warm thanks to Richard Ekstract, Carol and Arthur Goldberg, and Hank Luce III, among others. To the lenders and the galleries, I want to extend thanks for their cooperation. It has been a pleasure working with Klaus Ottmann and Kevin Maginnis to create a thematic bridge between this show and their exhibition, "Strange Attractors: The Spectacle of Chaos."

At The New Museum, my colleagues have assisted in countless ways. Above all, Alice Yang has worked tirelessly coordinating every aspect of exhibition and catalogue production, contributing incisive and thoughtful ideas every step of the way, including editing each entry in the catalogue. The Project Team served both as an invaluable sounding board for my ideas, especially in their early stages, and as a patient and enterprising resource throughout the curatorial process: Susan Cahan and Russell Ferguson offered particularly insightful questions and considerations, while Clare Micuda, Barabara Niblock, Wayne Rottman, Cindy Smith, and Susan Stein have seen the exhibition through all its stages, enriching it immeasurably. Teresa Bramlette and David Sweet worked closely with me coordinating research. Patricia Thornley and Mark Kloth provided valued continuity and advice. Jill Newmark has managed like the "pro" that she is in all registrarial matters, while Ginny Bowen has stepped with aplomb into the task of overseeing the installation. Sara Palmer has been a boon in the area of Public Affairs, while Toni DeVito furnished more than simply the support of an excellent and cheerful Director of Development. Finally, I want to thank Marcia Tucker and Ellen Holtzman for their confidence and guidance, and the entire staff for their participation. LAURA TRIPPI, CURATOR

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Steve Miller, *Gradual and Willing Accommodation*, 1988. Collection A.G. Rosen, New Jersey. Photo: fiction/nonfiction.

Fractured Fairy Tales, Chaotic Regimes

Laura Trippi

I had this phrase in my head,
"What? Is this dancing?" "What is this? Dancing?"
. . . . [T]he only thing left of *The Crucible* had to be the line
"What is this dancing?" and there had to be a dance.
—Elizabeth LeCompte

The ideas embedded in the language and images of "chaos science" strike a familiar, strangely seductive chord. Like the shapes and figures of its "fractal" geometry, our daily experience is fragmented; fraught with arbitrary juxtapositions, patterns of perception and social practice are assaulted by an onrush of information. "Reception," Walter Benjamin wrote as early as 1936, is "in a state of distraction, which is increasingly noticeable in all fields of art and is symptomatic of profound changes in apperception. . . ."[1] Faced with the demands of new computer and video technologies, we collectively confront a quantum leap in the state of distraction identified by Benjamin as a corollary of the emergence of film and photography. Leisure time, work, and art, our bodies and so also our selves — all are absorbed into the breathing and buzzing surreality of simulation culture, of global information networks and cybernetic machines.

"Chaos science" is an umbrella term for two related and emerging fields: fractal geometry and the study of complex dynamical systems. If its computer-generated video graphics strike in us a sympathetic chord — images of a randomized geometry and systems in chaotic states — perhaps it is because of our immersion in an atmosphere turbulent with new technologies. The guiding myths and models of modernity have been hopelessly infiltrated and frayed, and even the once invigorating concept of "crisis" itself seems to have collapsed. This is a journey into space — the "phase space" of turbulence and "sensitive dependence"; of "multidimensional degrees of freedom"; of the decay, creation, and random fluctuation of information. It began as an experiment, a gamble, an *essay* in the sense of an attempt or try, a search for the strangely fractured fairy tales of an emerging regime.

Border Regions

Benoit Mandelbrot's compendium and guidebook, The *Fractal Geometry of Nature*, was published in 1983. In 1985, Goethe House New York sponsored the first exhibition of fractal graphics, produced by scientists and offered in unaltered photo-reproductions as art.[2] By the mid-eighties, the shapes and formulas of fractal geometry had begun to appear in the work of practicing artists. But forces other than the discourse of science seem to have prepared the ground for the expropriation of its latest images and ideas.

The term "fractal," a variant of "fractional," points to the idea both of fragmentation and irregularity. An emerging branch of geometry, the study of fractals breaks with the Euclidean tradition of idealized forms. With an infinite nesting of pattern within pattern, repeating across scales, fractal images open onto an area devoid of fixed coordinates. Because the mathematical operations that produce fractal "landscapes" depend on the introduction of chance (random number generation), each repetition of a given pattern asserts a fractional difference from all others. The notion of boundary, too, is confounded. On closer look, the line dividing two regions reveals unexpected complexity. In the literature, this is sometimes expressed as the

"competition of several centers for domination of the plane":

> Occasionally a third competitor profits from the dispute of two others to establish its area of influence. It can [also] happen that one center dominates the entire plane—but there are still... isolated [areas] which are not subjected to its attraction.[3]

The richness of the fractal domain arises largely out of these "border skirmishes." Instead of a clear line of demarcation, one finds an endless regress of detail: surfaces that give way on inspection to more surface, boundaries that never resolve.

As postmodernism, poststructuralism, multi-cultural questionings of the canon, feminism, post-linear historiography, and now even a post-Euclidean geometry wreak havoc with received habits of thought and practice across a variety of fields, a picture of cultural rupture presents itself, patterned and pockmarked by complex competitions for domination of the plane. But forces other than those of "discourse" *either* in the sciences *or* in the arts would seem to have prepared the ground for such a cultural rift.

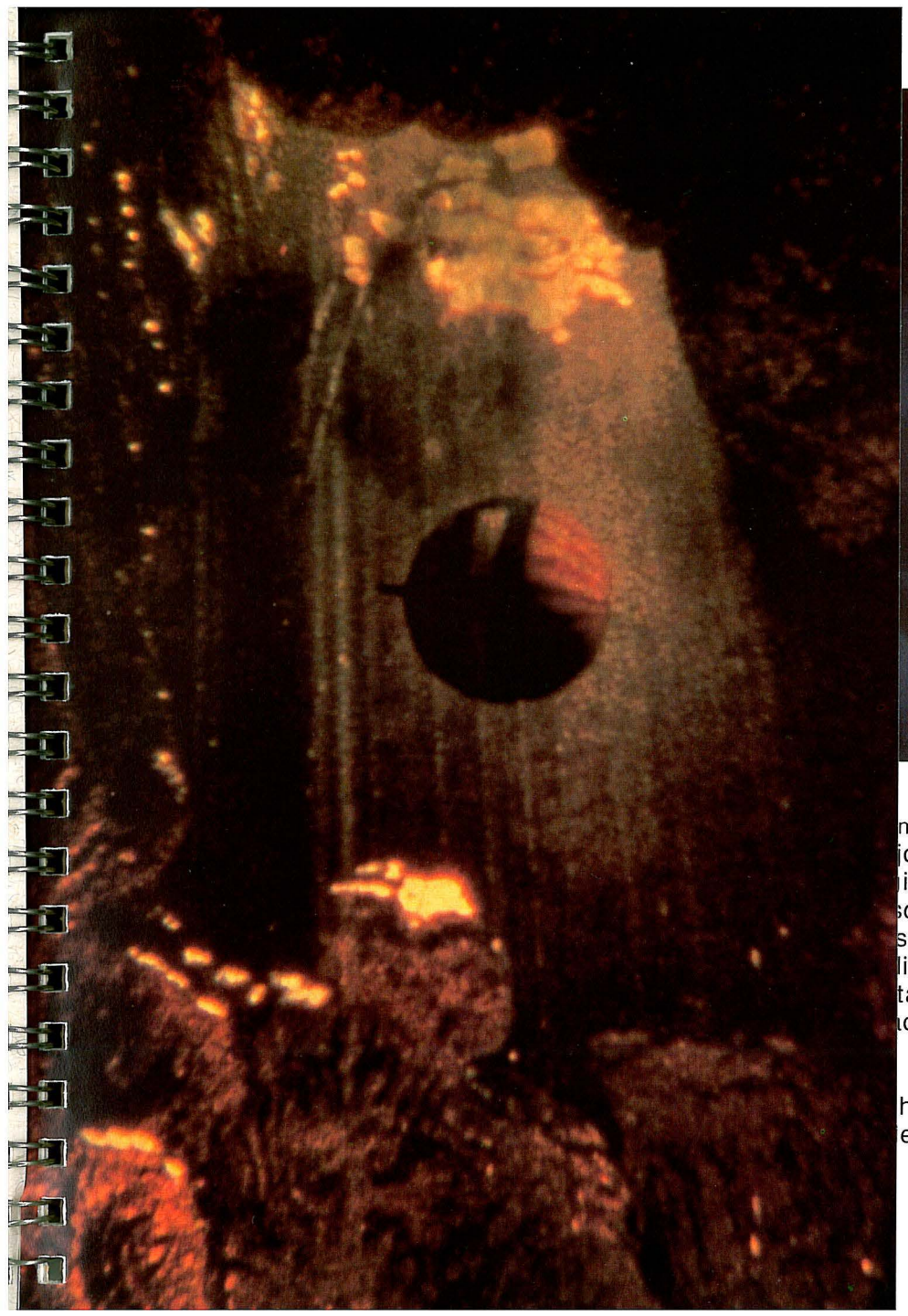
Milestones in Chaos

"I wanted to break it down slowly in the course of the piece," says Wooster Group director Elizabeth LeCompte of the 1984-5 production *L.S.D. (...Just the High Points...)*, "to let it disintegrate over time. The structure of *L.S.D.* would be the disintegration of *The Crucible*, linguistically."[4] The second work in the trilogy "The Road to Immortality," *L.S.D.* slams its audience into an experiential register in which the *stakes* of the deconstructive enterprise, its jolts and spasms, become concrete. *L.S.D.* maps three stories from as many historical periods into one uneasy, open-form narrative area. Arbitrary in relation to "plot," the piece fastens instead on the cracks and fissures of each source — the Salem witch trials by way of Arthur Miller, the Senate McCarthy hearings, the life and times of Timothy Leary — simultaneously situating itself in the technological present. On a stage set with multiple video monitors, an array of microphones and other electronics, with actors insistently attached to texts of a variety of kinds (playscripts, books of the period, transcripts, a Walkman the audience cannot hear), *L.S.D.* cranks up the values of the different dramatic variables to the point where the piece implodes, discharging a barrage of gibberish, buzzers, and accusations, testimony of all types, wails, documents flung into the air ... and dancing. But that is only the end of Part II. Parts III and IV unwind into what might be called an altogether other *phase space*, a pandemonium whose tempo is at once elegiac and unnerving, a strangely ordered entropy poised at the edge of understanding.

Figuring Phase Space

Complexity science is to time in the physical sciences as fractal geometry is to space: in the terms of Thomas Kuhn, a "revolution," an exchange of operative paradigms. With its concentration on the properties of fluid motion, it joins together fields whose common theme is the study of *flows* of *information* — weather patterns, population growth, epidemiology, prices on the international exchange, but also brain waves, the pumping action of the heart, stellar oscillations. All are *open*, *dissipative* systems, meaning that they take in energy from outside which leaves in the form of heat, and that they generate *entropy*, the measure of disorder that accumulates. Like fractal geometry, complexity science relies on computer technology to produce its simulations of physical systems. These are generally of two types: phase space, which plots the successive

Oliver Wasow, Untitled, 1989. Photo: Josh Baer Gallery.



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The Coming of Urgent Indeterminacy

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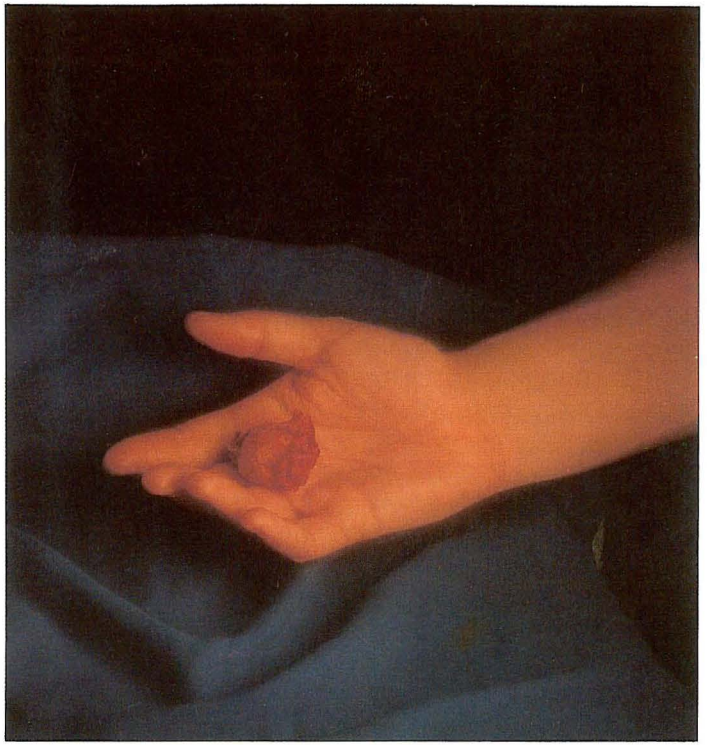
states (or phases) of a system in an abstract "multidimensional" space, and sophisticated linear graphs (*bifurcation diagrams*).

Phase space has as many "dimensions" as a given system has degrees of freedom, with each variable (heat, speed, viscosity, for example) functioning as a coordinate. A point in phase space represents the total state of the system at a particular point in time. If a dissipative system runs out of steam, its course through phase space spirals to a point, where it stops. If instead it moves periodically through the same sequence of states, it traces a periodic orbit (or *limit cycle*). In each case, the system has been attracted to a certain figure in phase space, in the first instance, a fixed point attractor, in the second, a limit cycle.

With a dramatic increase in the value of the variable(s) driving the system, however, the course through phase space can suddenly leave the limit cycle, jumping to a wider region of phase space, circulating wildly. This phase transition marks the onset of turbulence, where prediction proves impossible. In phase space, however, its trajectory careens through a region that gradually, surprisingly, begins to take shape. It will never visit the same point twice, but traces an intricate path:

> The delicacy is of a rather specific kind.... [A]ny section of such an attractor, when blown up, reveals itself to be just as exquisitely detailed as was the larger picture from which it was taken.... [T]here is an infinite regress of detail, a never ending nesting of pattern within pattern....[5]

The shape is fractal, and its formation in phase space is often compared with the repeated stretching and folding of dough. This plastic, topological transforma-



Kathryn Clark, *Untitled Diptych (Yellowstone and Rose)*, 1988.

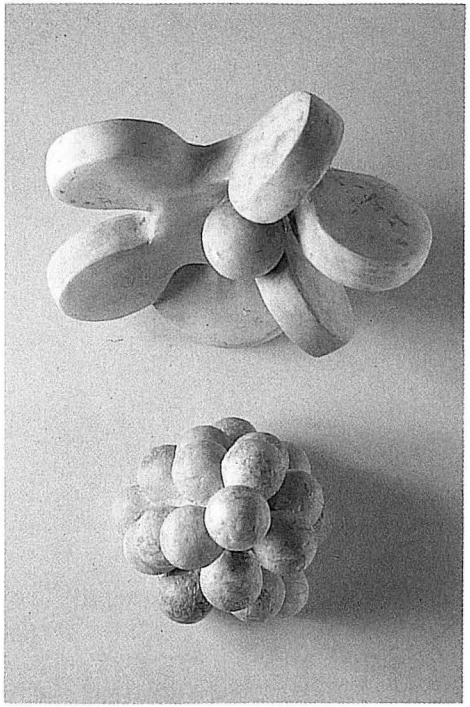
tion of phase space characterizes the third class of phase space figures. The system has found its *strange attractor* and entered a *chaotic regime*.

Concentrating on phase transitions, the study of dynamical systems notes a more or less abrupt change of behavior as some parameter — "degree of freedom" — reaches a critical value. Linear temporal flow is translated into a figural dimension. Wrapping infinite difference into a bounded region of phase space, the strange attractor twists and wraps and jumps and creases endlessly, not tending toward a final culmination. It could be said that if the system seems to jolt or explode from a periodic orbit into a chaotic regime, once it has reached the wider region that describes the limit of its strange attractor, it *implodes* as it "settles onto" its new orbit, exhibiting an oddly compelling property of stable instability, predictable unpredictability, determinate indeterminacy: deterministic chaos.

The Coming of Urgent Indeterminacy

In his 1903 study, "The Three Body Problem in Celestial Mechanics," Henri Poincaré argued that on

mathematical grounds Newton's laws of planetary motion overstated the case for the stability of the solar system. (Underscoring the extent to which these ideas contradicted dominant theory, Poincaré himself set aside his findings, saying: "These things are so bizarre that I cannot bear to contemplate them.")[6] While the laws held good for a system of just *two* bodies, the introduction of a *third* has the potential of destabilizing the system and rendering orbits erratic, unpredictable. In the network of orbits, *hysteresis* is induced, denoting the failure of a system to return to its more tranquil state once the cause of the change in its behavior has been removed. Be that as it may, two ideas appear in Poincaré's study that were to form the cornerstones of complexity science under the rubric "sensitive dependence." There is a fundamental indeterminacy or uncertainty in our knowledge of the conditions of a given system at a given point in time. Second, this uncertainty (construed as a necessary "error" in measurement) has the capacity of growing exponentially, overtaking an orderly evolution of the system. Small perturbations may be amplified, eradicating the possibility of long-range prediction.



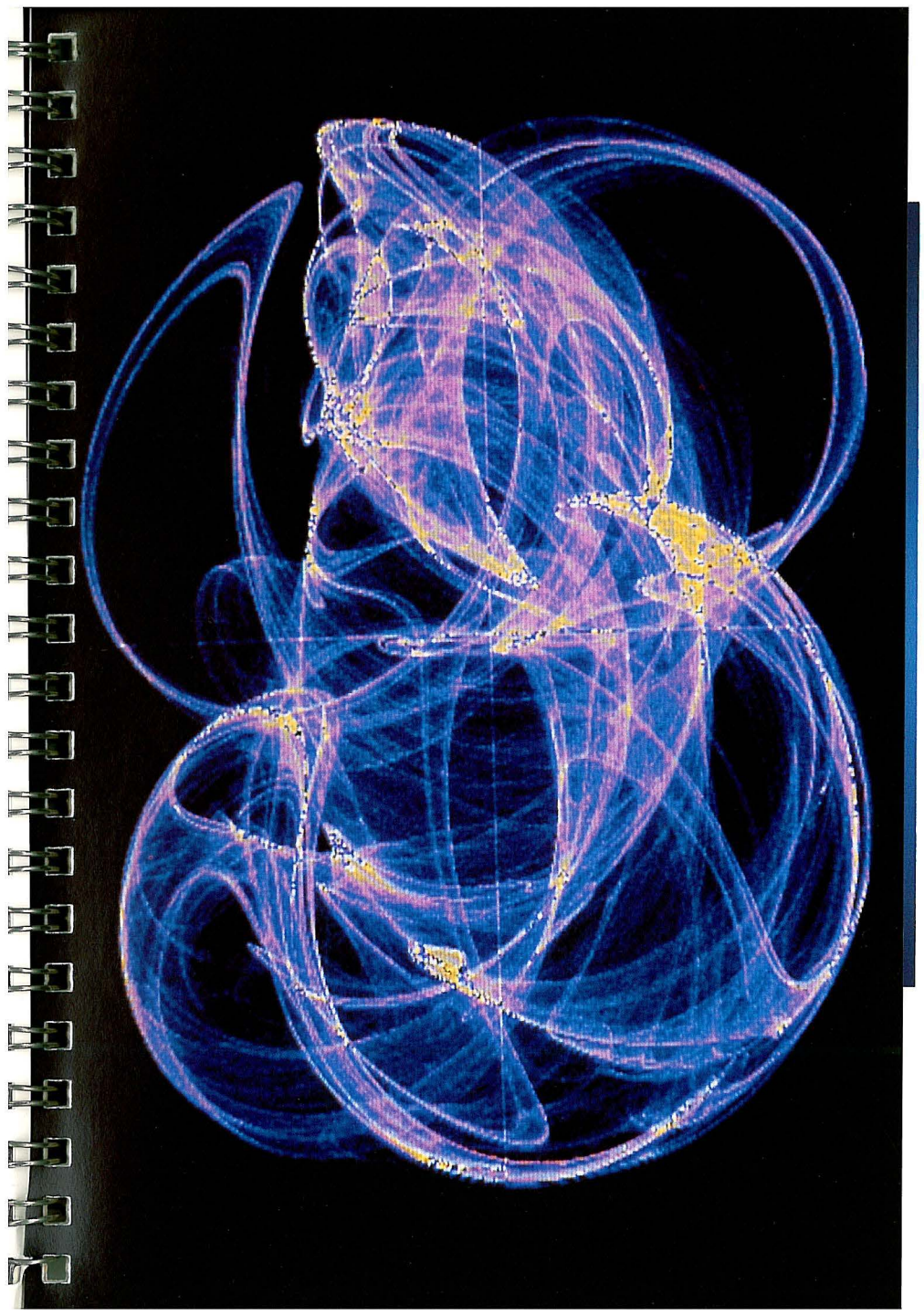
Jill Levine, *Disney*, 1988. Photo: fiction/nonfiction. (Art)^n, *Strange Attractor*, 1989. Photo: Feature Gallery.

Deterministic chaos contradicts fundamental assumptions about the linkage between determinism and predictability: there is a rule governing the system, but instead of generating an ordered series, it generates unpredictable behavior with a high degree of complexity. If such ideas presaged a "revolution" to science of the 1960s, they were already informing compositional practice in the arts by the 1950s. The work of John Cage, in particular, is exemplary in this regard.

In a lecture on "Indeterminacy," delivered in 1958 and published in the collection *Silence* in 1961, Cage argues that "[t]o ensure indeterminacy with respect to its performance, a composition must be determinate of itself."[7] Here, a performer "responds to cues" rather than to an ordinary score; he or she is provided with a set of rules and a repertoire of possible responses:

> The function of each performer...is comparable to that of a traveler who must constantly be catching trains the departures of which have not been announced but which are in the process of being announced. He must be continually ready to go, alert to the situation, and responsible. If he notices no cue, that fact itself is a cue... (p. 39).

Composition becomes a determinate operation for generating randomness and complexity, as the effect of new social and technological habits are registered on the compositional field. In fact, Cage compares the performer with "a photographer who on obtaining a camera uses it to take a picture. The composition permits an infinite number of these. . . " (p. 36). Emphasis



strange attractor. By an alternate means of computer diagram, complexity science finds that this leap in fact leads through the scenario of period-doubling: points of stability become unstable as the value of a given variable is raised, and split into two. At a critical point, the period-doubling reaches an extreme degree and gives way to the *bifurcation cascade*, the threshold that marks the onset of turbulence. "Chaos is spontaneously generated, creating randomness from purely deterministic origins."[8] In phase space, an elegant, filigreed structural stability emerges; bifurcation diagrams, however, give a different twist to the story. Once the system has entered a chaotic regime, windows of order arise spontaneously. In the midst of entropy, a self-ordering principle appears. The tendency of dissipative systems toward ever-increasing disorder is displaced by intermittent calls to order, emanating from *within* the horizons of the chaotic.

In the nonlinearity of the equations, a kind of irrational drive takes hold. Uncertainty increases until ultimately "there is simply no causal connection between past and future."[9] The through-line of causality gives way:

> Every nonlinear rule leads to branch points, to forkings in the path at which the system may take one branch or another. Decisions are made whose consequences cannot be

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is thrown onto *composition as process*, through an appeal to operations that enable the performer to "let go of his feelings, his taste, his automatism, his sense of the universal," and to identify instead with "no matter what eventuality" (p. 39).

Cage concludes with a commentary on the changing nature of time, terming it "a watch which moves not mechanically but variably":

> The musical recognition of the necessity of time is tardy with respect to the recognition of time on the part of broadcast communications, radio, television, not to mention magnetic tape, not to mention travel by air, departures and arrivals from no matter what point at no matter what time, to no matter what point at no matter what time, not to mention telephony ... (p. 40).

Collapsing, folding, and stretching in what is *practically a spatialization*, time takes on a new plasticity, becoming a clock whose movements "it is not possible to foresee." The "urgency and indeterminacy" of Cagean improvisation — of composition as process — is here plotted onto a horizon shaped by the demands of an emerging technology. One could almost say that the lecture "Indeterminacy" constitutes a call for *cultural* performers "alert to the situation, and responsible." If Cage's particular topic is musical composition "indeterminate with respect to its performance," his discussion provides a neat summary of various attitudes and approaches to improvisation, irrespective of the media involved.

In phase space, as we saw, the trajectory of a system entering a chaotic state leaps suddenly and erratically outside its periodic limit cycle, and into the region of its

Jon Kessler, *Last History Lesson*, 1987. Photo: Luhring Augustine Gallery.

strange attractor. By an alternate means of computer diagram, complexity science finds that this leap in fact leads through the scenario of period-doubling: points of stability become unstable as the value of a given variable is raised, and split into two. At a critical point, the period-doubling reaches an extreme degree and gives way to the *bifurcation cascade*, the threshold that marks the onset of turbulence. "Chaos is spontaneously generated, creating randomness from purely deterministic origins."[8] In phase space, an elegant, filigreed structural stability emerges; bifurcation diagrams, however, give a different twist to the story. Once the system has entered a chaotic regime, windows of order arise spontaneously. In the midst of entropy, a self-ordering principle appears. The tendency of dissipative systems toward ever-increasing disorder is displaced by intermittent calls to order, emanating from *within* the horizons of the chaotic.

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> Every nonlinear rule leads to branch points, to forkings in the path at which the system may take one branch or another. Decisions are made whose consequences cannot be

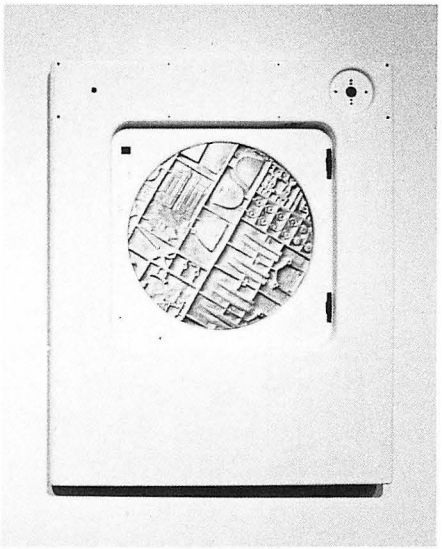
> predicted, because each decision has the character of an amplification.
>
> The smallest differences are blown up and have far-reaching effects. Causality holds at every instant, but it doesn't carry over a sequence of branchings.[10]

Deterministic chaos offers a model of change for which our current vocabulary is conspicuously lacking: development, evolution, advancement, progress, even unfolding (though this seems to approach the idea) all carry with them the sense of a final cause toward which each intervening event tends. Other than these, we have digression, deviation, deflection, departures, swerves, and lapses — terms to which Foucault in fact looked for describing what, in the action of history, he also called "the singular randomness of events."[11]

Viewpoints of a Triply-Split Subject

The highwater mark of process art came and went with the seventies. Traversing a dispersal of the aesthetic (in a move somewhat misleadingly dubbed "dematerialization"), artistic practice re-emerged in an expanding field of market operations and speculation. A realm of increasingly conspicuous consumption, it is also — and equally conspicuously — one of "investment" (sometimes even *entertainment*), pure and simple. What appeared in theory as a clean break with the modernist past, emerges in practice as a tangle of diverse operations, often dragging criticism itself into the fray of finely wrought "transactions."

In the case of Cage's lecture, situated within the cultural moment of the late fifties, the horizon of the aesthetic arena was characterized by a bewildering onslaught of demands, of information and new technologies. The corresponding transformation of regular, measured time into a plastic, even spastic flow, seemed to broadcast crucial compositional implications. By now, in the late eighties, the state of technology has drastically changed. In the place of Cage's almost quaint "telephony," we have *telecommunications*, an ever-increasing yield of new and newer technologies: the portability and pervasiveness of video — camcorders and global MTV — but also computer networks, cash machines, call waiting, fiber optics, world news tonight or at any time of day, memory chips and microelectronics, computerized checkout counters, laser discs, the promised arrival of HDTV and the suddenly ubiquitous Fax, computerized trading on the international exchange. The number of cues and available options, to borrow Cage's only partly metaphoric model, has multiplied at an almost exponential rate. With this, time seems not so much to flow forward as to eddy and swirl, proceed by jump-cuts, both backward into the future and forward into the past.



Laura Emrick, *Westinghouse*, 1989.

As art entered the eighties, no sooner had opposing

streams of neo-expressionism and picture theory art been identified — each with a more-or-less programmatic logic of semantic flows and valences peculiarly its own — than a *third* tributary came into view.[12] While artists of the first group entrenched themselves in the fixed-point of an individualism already in actuality exhausted, those of the second have circled the grounds of art on a vigilant, strategic nightwatch of appropriation, arrayed against the reifying imperatives of practices of representation. The introduction of this third "body" of artists, however, running the gamut from "neo geo" to commodity art, from post-appropriation simulation to a quasi-conceptual (and yet emotionally charged) environmentalism, has worked to destabilize the entire system.

The trajectory of art history, proceeding in the past by way of incremental alternations between classic and baroque, abstraction and representation — a series, in short, of bifurcations — stepped up the tempo of its oscillations to the point where, in the eighties, alternation gave way to a kind of *cascade* of "post" and "neo" stylistic variations. On the shoals of a collapsing capacity for critical distance, the course of art has churned and scattered — carrying criticism with it, which perhaps is the worst example — passing into an arbitrary flux of formal and conceptual mutations, of "hyper-simulated critical forms" and "hybrid neutralizations."[13]

The discourse of postmodernism sets up within the aesthetic a situation of extreme urgency and indeterminacy. Now more than ever, as they say on T.V., we would seem to feel the force of Cage's call for performers in the aesthetic *cum* cultural arena with "a mind in one piece." In art as in criticism, we have witnessed the escalation of a turmoil often highly theoretical in form and inflection. With its art malls, uncertain frames

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The smallest differences are blown up and have far-reaching effects. Causality holds at every instant, but it doesn't carry over a sequence of branchings.[10]

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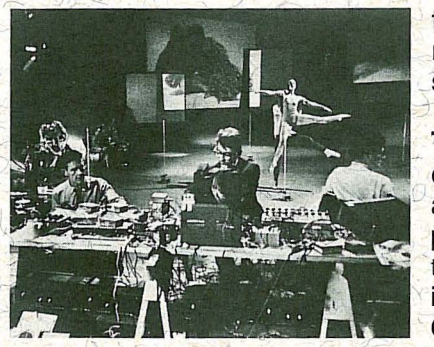
Ann Hamilton, *Still Life*, installation for *The Home Show*, Santa Barbara Contemporary Arts Forum, 1988. Photo: Wayne McCall.
Zoe Leonard, Untitled, 1989.

of reference, and wildly complex competitions for domination of the plain, this turbulence of tongues is often apparently and *willfully* "permanently incompatible" with itself, with art, and most certainly with its audience.[14] Rational practice and discourse in the arts have collapsed across a threshold, at the extreme limit of that long-frozen moment which circumscribes the projects of modernism. Too sophisticated to invoke outmoded models (other than with the flourish of a high ironic style), profoundly sensitized to the complexities and uncertainties of current conditions in culture, artists, curators, and critics alike find their loyalties torn, divided between the paradigm of a critical practice past and the demands of the marketplace, with "value" itself glorified and jeopardized by the new "real estate" of art.

In 1986, Hal Foster wrote that art today is "a mixed enterprise": speaking, on the one hand, of the appropiationist critique of representation (the second stream of artists), and, on the other, of post-appropriation simulationism (among the third), he concludes that "finally both

may be but ramifications of a much more practical and thorough 'critique' and 'simulation' – that of capital." [15] Here, even "endgame" strategies no longer hold. The range and extent of our present difficulty can perhaps best be measured by reference to the exhibition catalogue *Endgame*, where Yves-Alain Bois closes the essay, "Painting: The Task of Mourning, " with a signally *opaque* definition of painting's new "non-pathological" task, taken here as a token for artistic practice in general:

> Painting might not be dead. Its vitality will only be tested once we are cured of our mania and our melancholy.... [My] bet is that the potential for painting will emerge in the conjunctive deconstruction of the three instances which modernist painting has dis-associated (the imaginary, the real and the symbolic), but predictions are made to be wrong.[16]



Subjectivity has recently suffered, theoretically speaking, assaults from three sides: that of the Lacanian split subject, that of a neo-Marxist "internalized contradictions" of capital, and that of a Foucaultian critique of subjectivity. Bois cleverly collapses the viewpoint of this currently standard three-fold critique into one, parenthetically triply-split subject, on which his entire conclusion turns. Calling attention at the outset to the specially sensitive nature of our position at the end of a millennium, the essay opens with a critique of apocalyptic pronouncements: "there is no single paradigm of the apocalyptic," it admonishes, "in each instance, one must examine the *tone* of the apocalyptic discourse."[17] The solution, though, that the essay offers as the way out of an aesthetic dead end — this "conjunctive deconstruction" of that which "modernist painting" has rent into three — only serves to *heighten* the very anxiety that the formulation would seem to seek to allay.

The discourse of postmodernism sets up within the aesthetic (sometimes to the point of shrillness) a situation of *extreme* urgency and indeterminacy. Contemplating the breakdown of "a crisis-mentality and a crisis-paradigm," Collins & Milazzo have written, in a similar vein, of "a geophysical, virtually funereal, link between the internal domain of the dying Subject and the external realm of the definitive but transcendentally depleted Object."[18] Now more than ever we would seem to feel the force of Cage's call for performers with "a mind in one piece"! As Kathy Halbreich notes of the Wooster Group (calling their work a "three-dimensional collage in real and electronic time"), "this hybrid reflects the dis-

Merce Cunningham, *Variations V*, 1965. Music by John Cage. Photo: Cunningham Dance Foundation Inc.

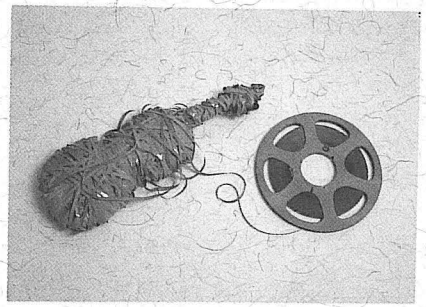
tracted and convoluted ways we communicate," the "day's barrage of *simultaneous, often contradictory*, information."[19] The state of subjecthood (albeit defined here in dualistic terms) would seem to have been irrevocably shattered — fragmented and fractured — carrying with it, so it appears, the field of art as we know it. Efforts such as that to rehabilitate the sublime, with terms like "postmodern," "technological," and even "*hysterical*" tacked on to modify sublimity, only serve to underscore the *dissolution of subjectivity* accomplished at the onset of this new regime.[20]

Chaotic Regimes

Economics borrows its notions of "flow" from physics, and with that its mathematics, and from the beginning has been bound up with the development of complexity science. In a figurative aside from the main line of his argument in the article "Strange Attractors," the mathematical physicist David Ruelle offers a provocative picture of an economics informed by the science of chaos:

> One imagines easily that strange attractors may play a role in economics, where periodic processes (economic cycles) are well known. In fact, let us suppose that the macroeconomical evolution equations contain a parameter μ, describing, say, the level of technological development. By analogy with hydrodynamics we would guess that for small μ, periodic or quasiperiodic cycles may develop. For high μ, chaotic behavior with sensitive dependence on initial conditions would be present.[21]

This "metaphorical but . . . suggestive" model implies something like a quantum leap into a new phase in the history of the economy. Driven by an exponential rise in the value of the single variable "technological development" (operating in a feedback loop, fueling itself), Ruelle's economic model undergoes a phase transition. As periodic cycles grow unstable and split into two, the economy enters a chaotic regime. Wildly unpredictable locally — turbulent, discontinuous, hysteretic — it is globally "stable" at the same time, a change in state that is also, irreversably, a change in phase space shape.



Christian Marclay, *Violin*, 1988. Photo: Tom Cugliani Gallery.

"Turbulent motion," writes Robert Shaw in "Strange Attractors, Chaotic Behavior, and Information Flow," is "governed by information generated continuously out of the flow itself. . . preclud[ing] both predictability and reversibility."[22] Ruelle's economic aside points to the idea that capitalism has indeed changed shape, overflowing the boundaries between productive and reproductive or leisure space, overflowing the Euclidean geometries of a fixed system of social relations, subsuming the entirety of time to a logic of maximum circulation — in particular the almost instantaneous circulation of information. Following the line of argument developed by Eric Alliez and Michel Feher in their essay, "The Luster of Capital," this transformation stems in part from the revolts of the sixties, and brings with it a renegotiation of the terms — the narrative terms — in which capitalism is conceived:

> [A]n economic crisis always appears as an abnormal situation inevitably leading to an after-crisis: either a "healthy" capitalism or the advent of socialism.
>
> However, the current articulation of both a new regulatory mode of

> economic activity and of a new regime of capital accumulation ... tends to turn this so-called "crisis" into an ordinary, if not permanent state of affairs.[23]

What gathered and took shape in the guise of a crisis, promising to pass to a resolution, arrives instead as a liquidation of the very time-space of capitalist social relations. An apocalyptic model gives way to a new formation, setting the stage for a sea change in the climate of culture. Humans and machines become equivalent, "assimilat[ed] . . . as cogwheels or relays in a vast machinic network for the productive circulation of information" (p. 316).

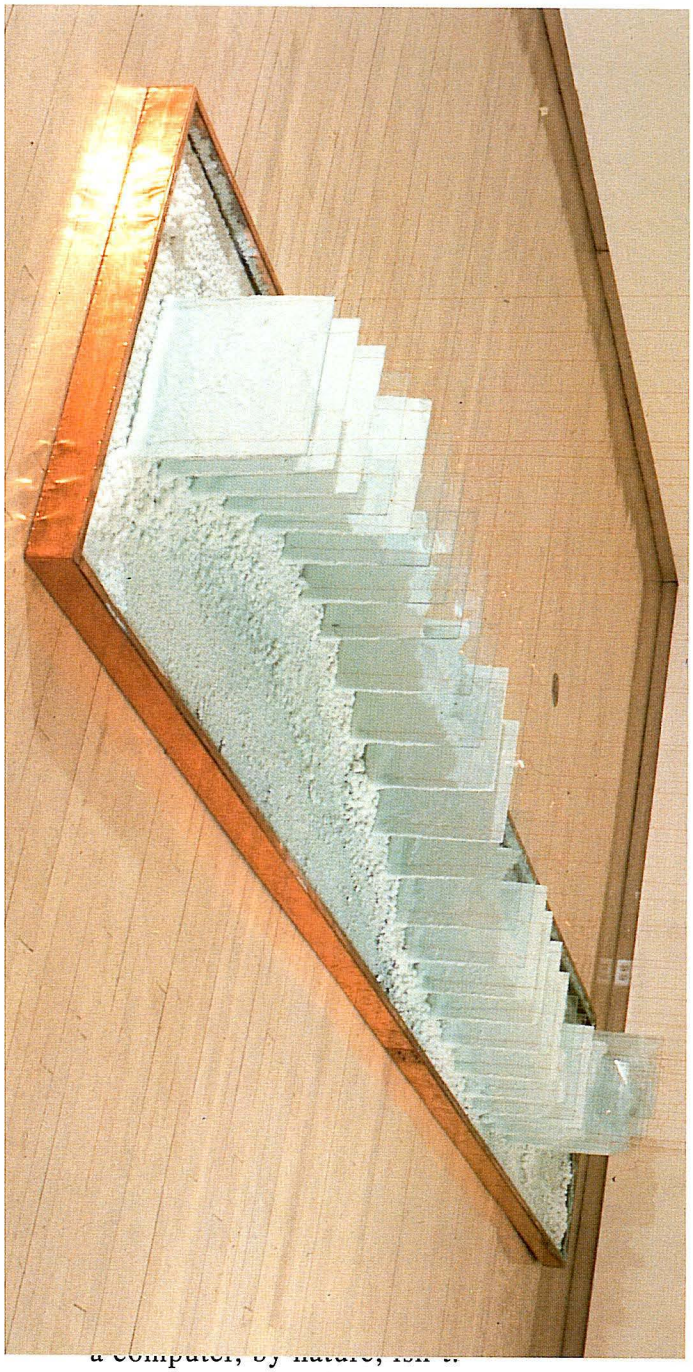
In *Making a New Science*, James Gleick describes the "revolution" chaos science has wrought, in the fields of science, in terms that may be as inadvertent as they appear apt: "One account of nature replaces another. Old problems are seen in a new light and other problems are recognized for the first time. Something takes place that resembles a whole industry retooling for a new production."[24] The metaphor is striking, and its implications are at one and the same time exhilarating and frightening. In an essay contributed to the catalogue for the Goethe House exhibition, *Frontiers of Chaos*, Herbert Franke all but argues that the cultural function of the new science — of fractal graphics and phase space maps —is *tutorial* in subtle, cybernetic, and far-reaching ways:

> If we employ language as a means of communication, a linear medium arranged as a time-series, we automatically favor linear organizing principles, e.g. causality or historical process. Visual languages allow us on the other hand to see those very important connections which manifest themselves as loop processes, interactions, communications networks, and so forth. Perhaps our inability to think in terms of networks is due in no small measure to our restriction to the descriptive system of verbal language.[25]

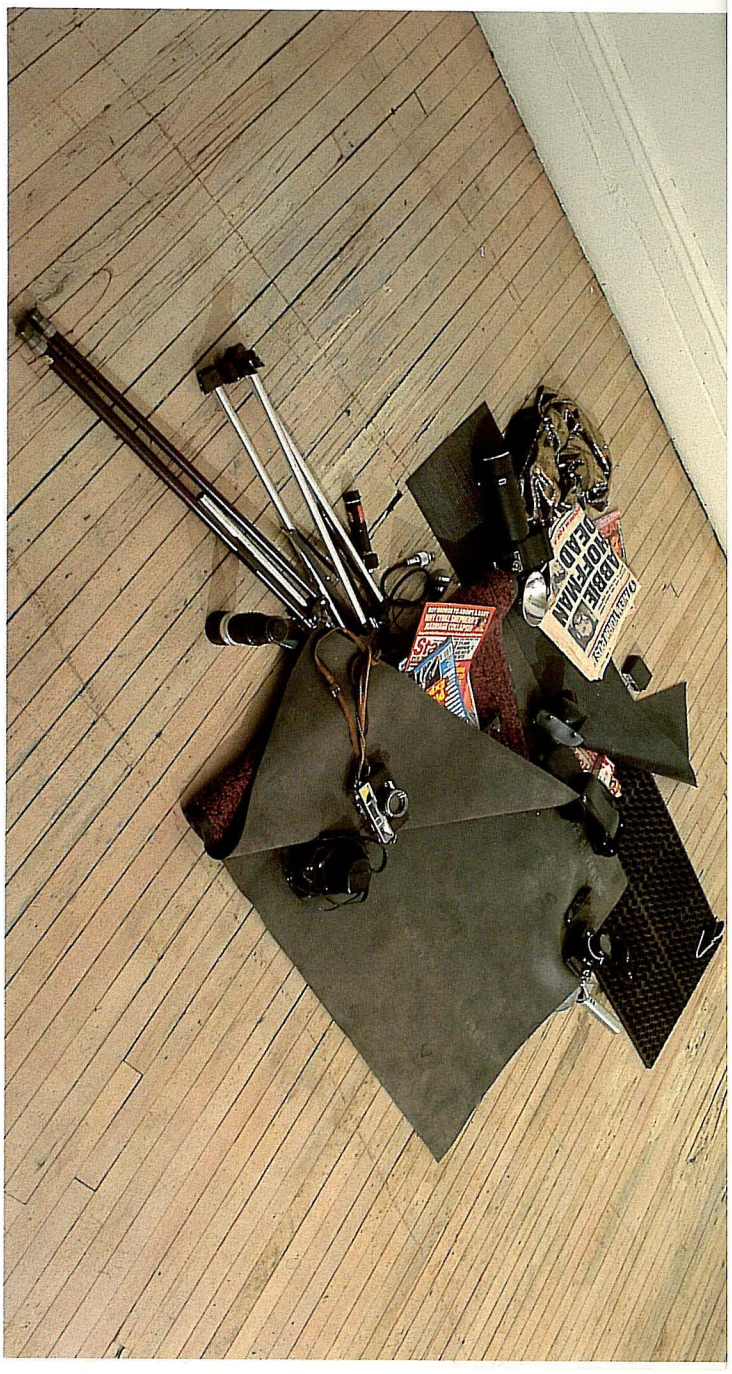
Our collective incapacity for thinking "in terms of networks" is only equalled by the earnestness of our efforts to do so, as if the patterns traced by technology itself served as a kind of figural key to an emerging mode of social and economic exchange.[26] Witness, for example, our concerted conversion to an ideology of "networking," with its own analogous operations of "flows," "loop processes," human cogs or relays, and vexed or digitized "interactions." Or again, consider the luminous but really rudimentary depictions of AT&T's global information network, with its imaginary circuits smoothly humming. We might, though, also consider one last proposition from Allie z and Feher. In this emerging phase, they argue, capitalism "leads to the dereliction of people and spaces that cannot be `plugged in' to the network" (p. 316). It is in these "vacant spaces and bodies . . . only affected by the *flow of wasted time*" that the true chaos of the cultural moment would be seen to reside.[27]

In 1987, an issue of *File Megazine* (sic) appeared, entitled "The Journal of the New Mortality: Mourning and Melancholia." The editorial introduction by General Idea notes: "In the current situation we are all struggling to develop a visual language which can cope with the demands of the moment" — the demands, that is, of a moment in which losses and *chaos of all kinds* have called into question the ground on which aesthetic practice in the past has relied.[28] From the collapse of the autonomy of the aesthetic, artistic practice (and even the exhausted, highly suspect art object) re-emerges at once humbled and exalted in its status as a

Eve Andrée Laramée. *If Water Would Flow Through This Room*, 1987.



Cady Noland, *Celebrity Trash Spill*, 1989. Photo: American Fine Arts Co.



a computer, by nature, isn't.

paradigm of "interest" and "investment." In a dispersed arena of speculation and charged electronic transfers, of corporate sponsorship and governmental control, the issue for art seems to grow increasingly urgent and indeterminate. "Distraction," Walter Benjamin wrote as early as 1936:

> and concentration form polar opposites which may be stated as follows: A man who concentrates before a work of art is absorbed by it.... In contrast, the distracted mass absorbs the work of art.... The public is an examiner, but an absent-minded one.[29]

Benjamin argues that "the tasks which face the human apparatus at the turning points of history cannot be solved by optical means, that is, by contemplation, alone." With a newly–inflected emphasis on processes of circulation and production, art becomes a measure of the shift in apperception, but also takes on the difficult function of *distracting* our collective state of distraction.

The exponential increase in the value of the cultural variable, technology, gives to Benjamin's "absent-mindedness" an unexpected spin:

> Dear Reader:
>
> When you need information to help you make important decisions in your life, where do you find it? How do you even know what's out there? And, how can you get your hands on it, fast?[30]

If the new science offers a set of seeing-eye tools for transiting to an unimagined form of collective subjective experience, the question concerning technology remains one of *who is absorbing whom*. Artistic practice is issued a strange new challenge, a kind of awful but domestic imperative. While there is no ordinary score, a determinate array of strategies makes itself available, as a figure in phase space begins to take shape. At once elegant and unpredictable — elegiac perhaps, unnerving — it is a "venture" that does not progress, but instead cycles endlessly on an erratic orbit, shot through with the energy of saturated video graphics, exerting a well-nigh disconcerting and mesmeric appeal.

Endnotes

1. Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in Hannah Arendt, editor, *Illuminations: Walter Benjamin* (New York: Schocken Books, 1969), pp. 217-252, p. 240.

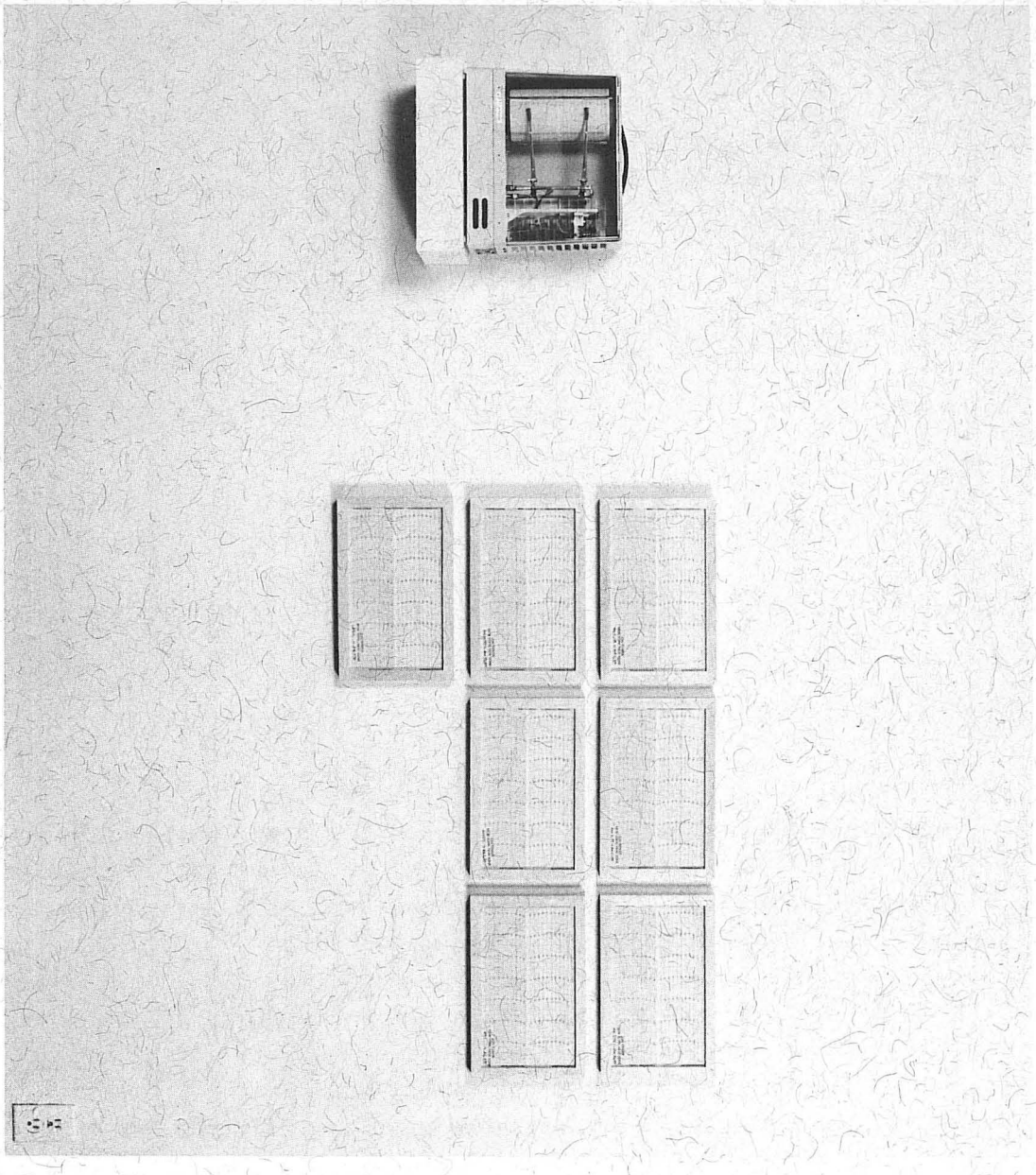
2. *Frontiers of Chaos*, see note #3. See also excerpts from Gary Indiana's review of the exhibition, reprinted below.

3. Peitgen and Richter, "Frontiers of Chaos," in *Frontiers of Chaos: Computer Graphics Face Complex Dynamics*, exhibition catalogue (Bremen: Forschungsgruppe Konplexe Dynamik, Universitat Bremen, 1985), pp. 61-100, pp. 72, 66.

4. Elizabeth LeCompte, interview with David Savran, in David Savran, *Breaking the Rules: The Wooster Group* (New York: Theatre Communications Group, 1986), p. 195.

5. Douglas R. Hofstadter, "Metamagical Themas: Strange Attractors," *Scientific American* 245, no. 5 (November 1981): 22-41; 37.

Jon Tower, *Untitled (Studio Drawings May 31-July 18)*, 1989.



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6. Henri Poincaré quoted in John Briggs and F. David Peat, *Turbulent Mirror: An Illustrated Guide to Chaos Theory and the Science of Wholeness* (New York: Harper & Row, 1989), p. 29.

7. John Cage, "Indeterminacy," the second of three lectures on "Composition," in *Silence: Lectures and Writings by John Cage* (Middletown: Weslyn University Press, 1961), pp. 35-40, p. 38.

8. David Campbell *et al.*, "Experimental Mathematics: The Role of Computation in Nonlinear Science," *Communications of the ACM* 28, no. 4 (April 1985): 374-384; 377.

9. James Crutchfield *et al*, "Chaos," *Scientific American* 255, no. 6: 46-56; 53.

10. Peitgen and Richter, *ibid.*, pp. 61-62.

11. Michel Foucault, "Nietzsche, Genealogy, History," in Paul Rabinow, editor, *Foucault: A Reader* (New York: Pantheon Books, 1984), pp. 76-100, p. 88.

12. See for example Tricia Collins and Richard Milazzo, *Hyperframes: A Post-Appropriation Discourse*, vol. 1 (Paris: Editions Antoine Candau, 1989), pp. 13-14.

13. Tricia Collins and Richard Milazzo, *Hybrid Neutral: Modes of Abstraction and the Social*, exhibition catalogue (New York: Independent Curators, Inc., 1988), p. 8.

14. *Ibid.*, p. 13.

15. Hal Foster, "Signs Taken for Wonders," *Art in America* 74, no. 6 (June 1986): 80-139; 139.

16. Yves-Alain Bois, "Painting: the Task of Mourning," in *Endgame: Reference and Simulation in Recent Painting and Sculpture*, exhibition catalogue (Cambridge: The MIT Press, 1986), pp. 29-49, p. 29; emphasis mine.

17. Bois, *ibid.*, p. 47.

18. Collins and Milazzo, *Hyperframes*, pp. 11, 21.

19. Kathy Halbreich, "Real Abstract Theatre: The Wooster Group," *Parkett* 17 (1988): 98-104; 100; emphasis mine.

20. On this, see for example Fredric Jameson's often-cited "Postmodernism, or The Cultural Logic of Late Capitalism," *New Left Review*, no. 146 (July-August 1984): 53-92.

21. David Ruelle, "Strange Attractors," in Predrag Cvitanovic, editor, *Universality in Chaos* (Bristol: Adam Hilger, Ltd, 1984), pp. 37-48, pp. 47-48.

22. Robert Shaw, "Strange Attractors, Chaotic Behavior, and Information Flow," *Zeitschrift fur Naturforsch* 36a (1981): 80-112; 106.

23. Eric Alliez and Michel Feher, "The Luster of Capital," *Zone* 1/2 (n.d.): 314-22; 315.

24. James Gleick, *Chaos: Making A New Science* (New York: Viking Penguin, 1987), p. 39.

25. Herbert Franke, "Refractions of Science into Art," *Frontiers of Chaos*, *ibid.*, pp.45-52, p. 47.

26. On this, again see James's "The Cultural Logic of Late Capitalism," *ibid.*,where aesthetic production is seen to imitate the dominant mode of production at a given historical moment, and technology serves as a shorthand for the information networks of multinational capitalism. Jameson goes on to argue that it is in these terms that the "postmodern sublime can alone be adequately theorized" (p. 80). See also Foster, *ibid.*, esp. note #14.

27. Alliez and Feher, *ibid.*, p. 317; emphasis mine.

28. General Idea, Editorial, *File Megazine* 27 (Toronto: Spring, 1987): 6-8.

29. Benjamin, *ibid.*, p. 240.

30. "America Needs Information," promotional mailing for AT&T Information On Call℠ (1989), p. 2.

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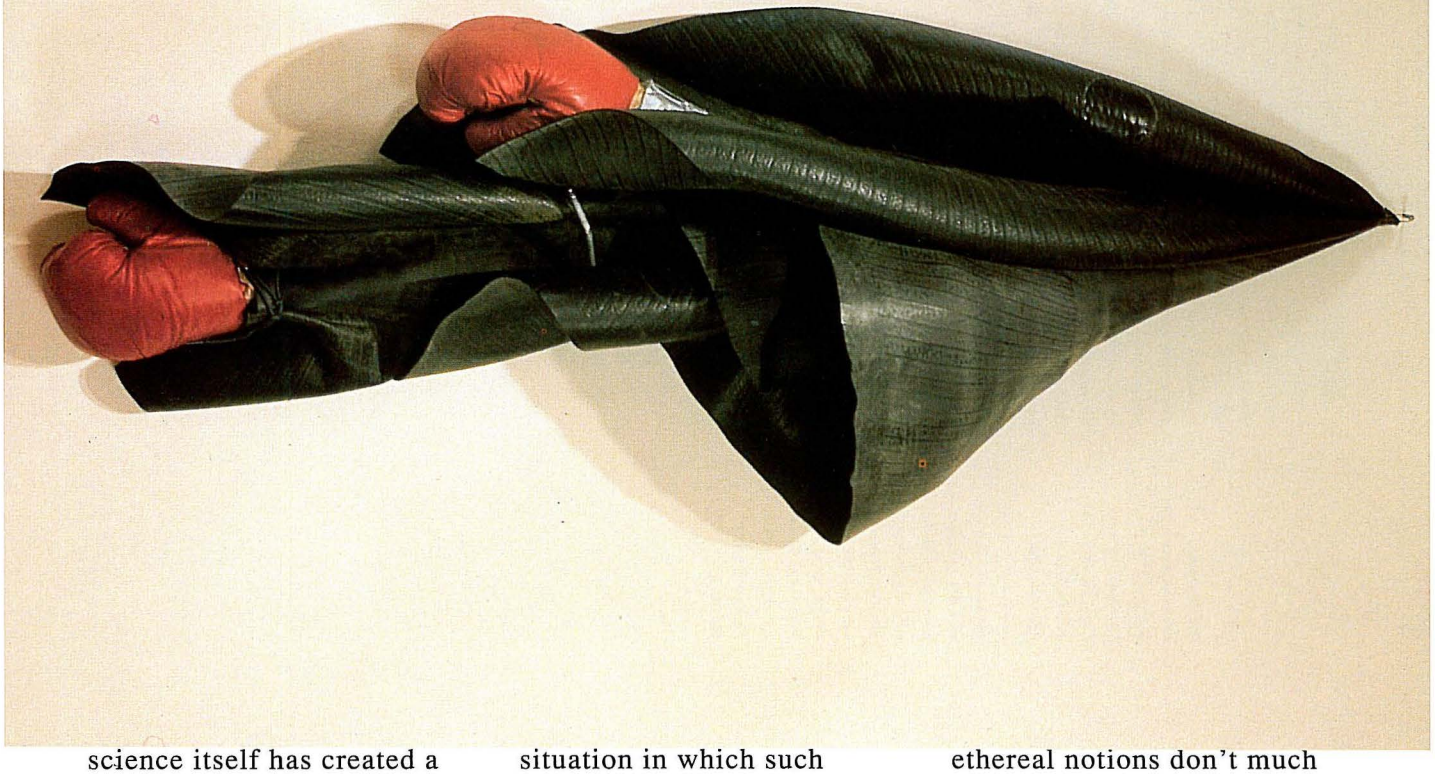
Critical Art Ensemble, *Always Already* (detail), 1989.

David Hammons, *Champ*, 1988. Photo: Exit Art.



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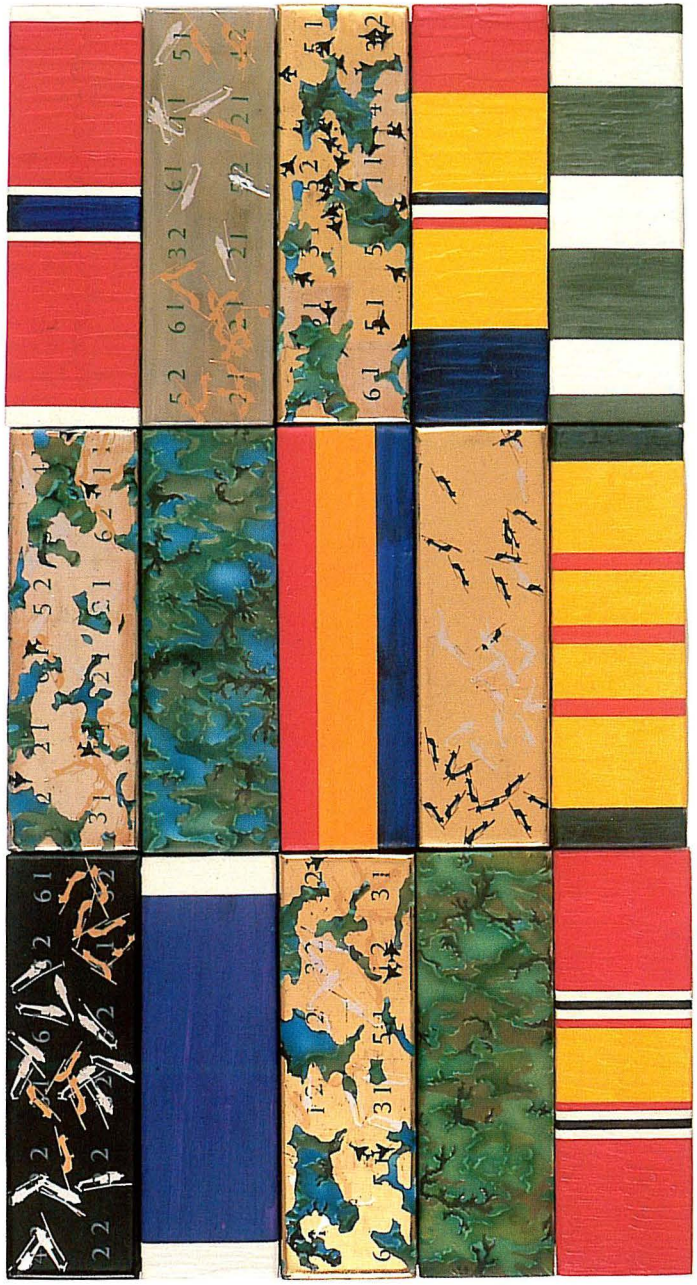
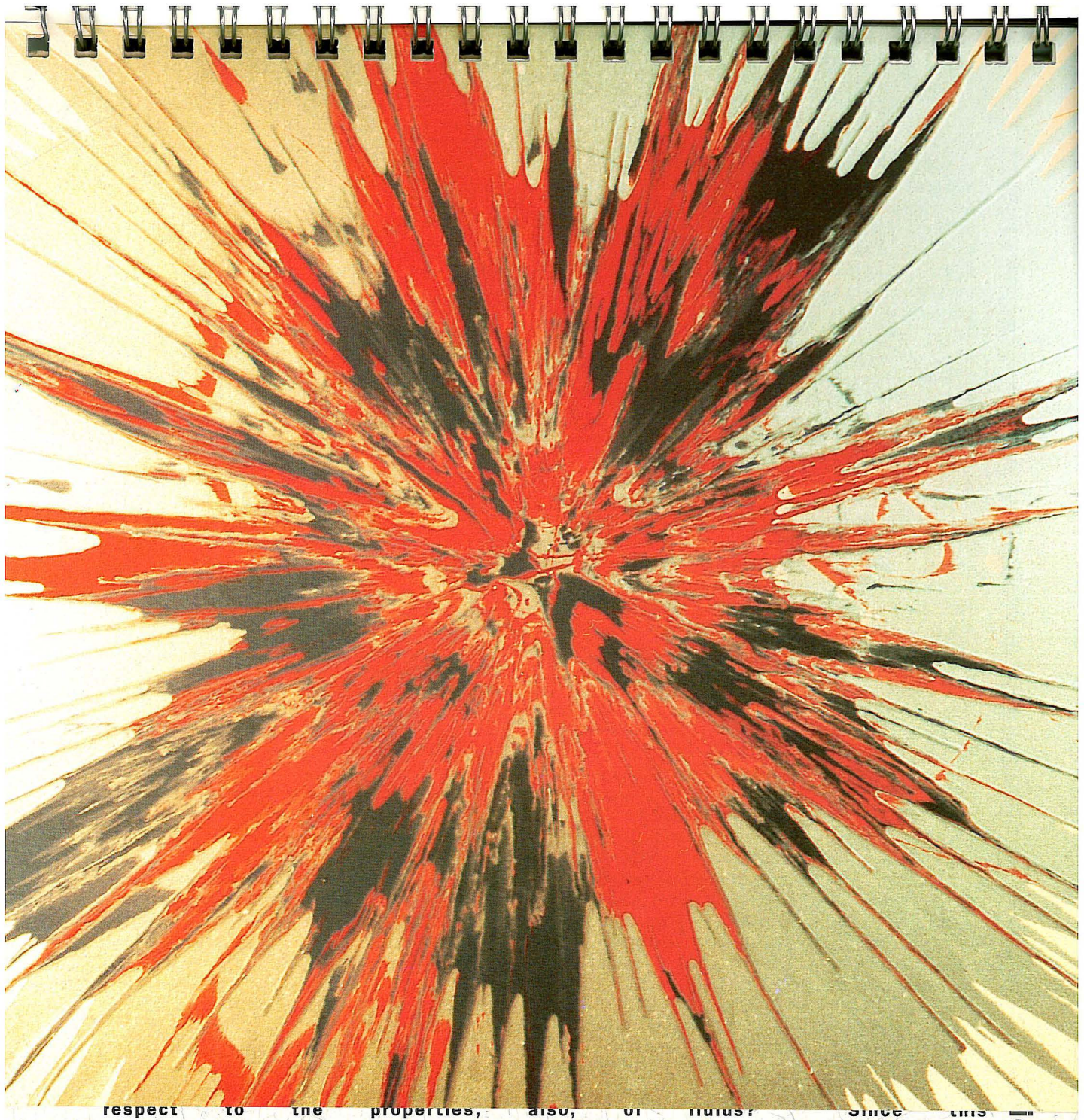


David Smith, Untitled, 1989. Photo: P.P.O.W.

CHAOS PLUS EXCERPTS GARY INDIANA

computer screen is this beautifully colored semipotato. Let's say the three-
of Jupiter with one of its moons. With fractal geometry dimensional model on the
and get an idea of what the potato is really like, or an Or, a metonymic space photo
what a moon and a planet would look like. you can punch up the image
blowup your potato chip and zoom in on its surface with a enhancement that looks like
the other trick), thereby producing a blowup. And, With the computer, you can
blowup and get a blowup of a piece of the blowup. If you little square cursor (this is
what happens when you do this with regular photographic you can zoom in on the
computer can figure out the structure of things that would ever saw *Blow-Up,* you recall
these successive images are sharply defined. But. Along equipment. But, because the
sprouts. You get strands. You get " devil polymers. " normally lose definition,
chaos. The fractal photographs at with symmetries, you get
gorgeous, something between microphotography and spin Deformed sets. You get
and islands and spirals and curlicues. They look like Goethe Institute are
jewels, sunspots, snowflakes. It's nice to just look at them paintings. Lots of whorls
about them.... ...after all, isn't art about the beautiful natural things:
about harmony, and particularly about harmony's without thinking anything
dissonance? Well, yes, and especially, no. I am sorry to beautiful order in things,
science itself has created a situation in which such symbiotic partner,
apply. Just as fractal geometry reveals the element of disorder bring this up, but applied
(and I really do hate using the word) for the past 50 years has ethereal notions don't much
science to genuinely improve our lives. We are slaves of in mathematical picturing, art
research. Even a small child presented with a new scientific reflected the failure of
its application in some incredible weapons system.... state-exploited scientific
discovered that the human brain is not, in fact, very much marvel will readily imagine
notion dear to scientists. So computers cannot really Recent memory research has
brains that learn to function like computers will eventually like a computer at all, a
In any case, you can feed all sorts of things into a system function "like a brain," and
back; it doesn't bother me *as a critic* if you want to call it art. find themselves shorting out.
found that art is *perversely erotic*, and I know by my and get all sorts of things
a computer, by nature, isn't. But as a person, I've always
terminal that this is one thing

Joseph Nechvatal, *Flux-Schiz*, 1989. Photo: Brooke Alexander Gallery.
Walter Robinson, *Mad Impulses*, 1985. Photo: Metro Pictures.



respect to the properties, also, of fluids? Since this "object" refers back most generally to a state that is theirs? Milk, luminous flow, acoustic waves, ... not to mention the gasses inhaled, emitted, variously perfumed, of urine, saliva, blood, even plasma, and so on. But these are not the "object *a*"s enumerated in the

ids hav

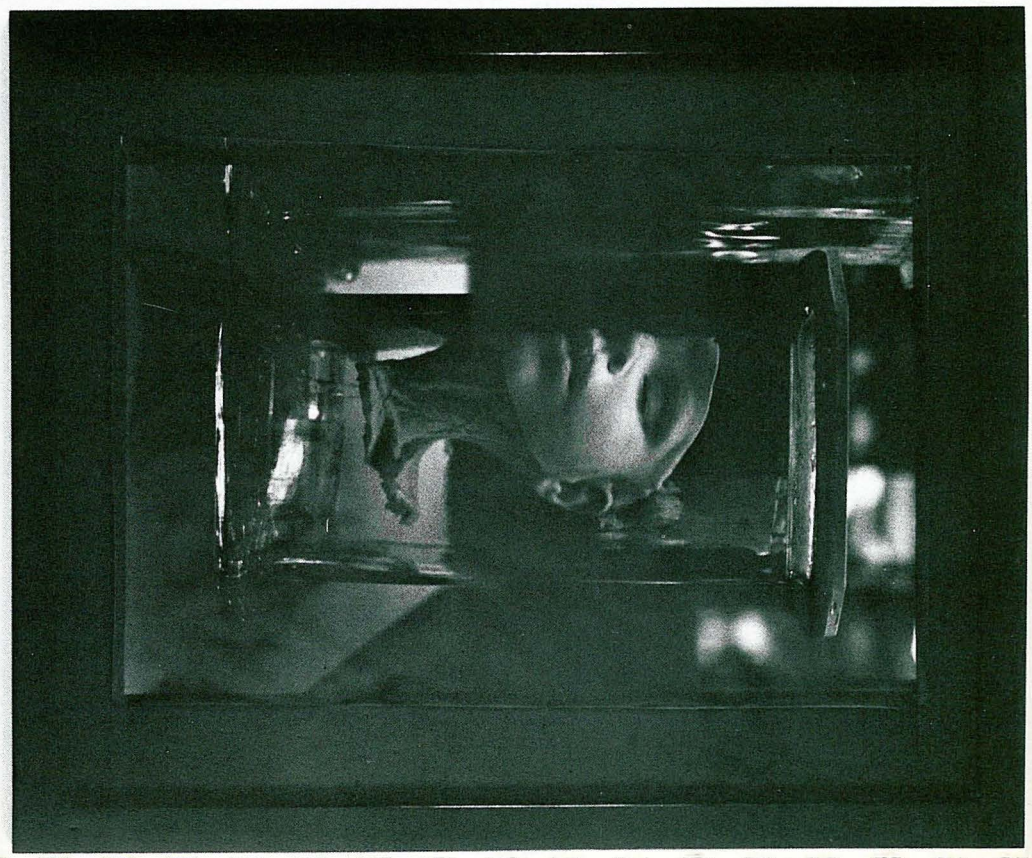
Solid mechanic

The "Mechanics" of Fluids excerpts *Luce Irigaray*

It is already getting around—at what rate? in what contexts? in spite of what resistances?—that women diffuse themselves according to modalities scarcely compatible with the framework of the ruling symbolics. Which doesn't happen without causing some turbulence, we might even say some whirlwinds, that ought to be reconfined within solid walls of principle, to keep them from spreading to infinity....

So we shall have to turn back to "science" in order to ask it some questions. Ask, for example, about its *historical lag in elaborating a "theory" of fluids*, and about the ensuing aporia even in mathematical formalization....

Now if we examine the properties of fluids, we note that [the]



Orshi Drozdik, *The Black Mirror,* 1988. Photo: Tom Cugliani Gallery.

of these "movements" corresponding to zero supposes in them an infinite speed, which is *physically unacceptable.* Certainly these "theoretical" fluids have enabled the technical—also mathematical—form of analysis to progress, while losing a certain relationship to *the reality of bodies in the process....*

...how, so long as this prerogative lasts, can any articulation of sexual difference be possible? *Since what is in excess with respect to form—for example, the feminine sex—is necessarily rejected as beneath or beyond the system currently in force....*

And yet that woman-thing speaks. But not "like," not "the *same,*" not "identical with itself" nor to any x, etc. Not a "subject," unless transformed by phallocentrism. It speaks "fluid," even in the paralytic undersides of that economy. Symptoms of an "it can't flow any more, it can't touch itself..." Of which one may understand that she imputes it to the father, and to his morphology.

Yet one must know how to listen otherwise than in good form(s) to hear what it says. That it is continuous, compressible, dilatable, viscous, conductible, diffusable,... That it is unending, potent and impotent owing to its resistance to the countable; that it enjoys and suffers from a greater sensitivity to pressures; that it changes—in volume or in force, for example—according to the degree of heat; that it is, in its physical reality, determined by friction between two infinitely neighboring entities—dynamics of the near and not of the proper, movements coming from the quasi contact between two unities hardly definable as such (in a coefficient of viscosity measured in poises, from Poiseuille, *sic*), and not energy of a finite system; that it allows itself to be easily traversed by flow by virtue of its conductivity to currents coming from other fluids or exerting pressure through the walls of a solid; that it mixes with bodies of a like state, sometimes dilutes itself in them in an almost homogeneous manner, which makes the distinction between the one and the other problematical; and furthermore that it is already diffuse "in itself," which disconcerts any attempt at static identification....

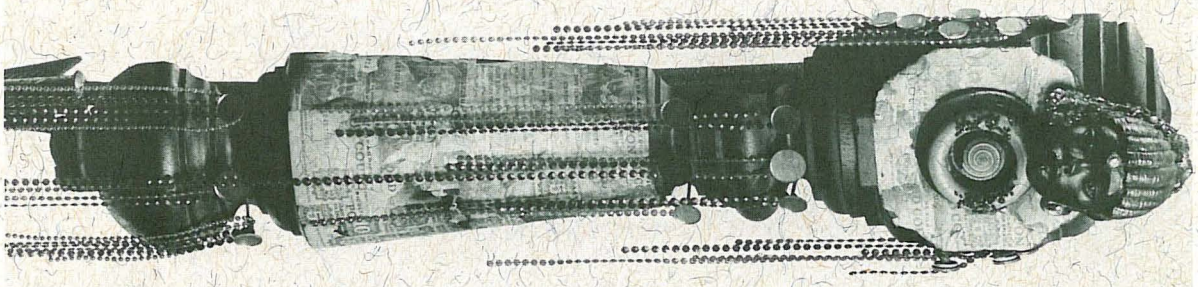
And the object a? How can it be defined with respect to the properties, also, of fluids? Since this "object" refers back most generally to a state that is theirs? Milk, luminous flow, acoustic waves, ... not to mention the gasses inhaled, emitted, variously perfumed, of urine, saliva, blood, even plasma, and so on. But these are not the "object *a*"s enumerated in the

elationship of very long standing, one against which fluids hav

theory. The experts will so state. Response: will feces—variously disguised—have the privilege of serving as the paradigm for the object *a*? Must we then understand this modeling function—more or less hidden from view—of the object of desire as resulting from the passage, a successful one, from the fluid to the solid state? *The object of desire itself...would be the transformation of fluid to solid?* Which seals—this is well worth repeating—*the triumph of rationality.* Solid mechanics and rationality have maintained a relationship of very long standing, one against which fluids have never stopped arguing....

Since historically the properties of fluids have been abandoned to the feminine, *how is the instinctual dualism articulated with the difference between the sexes?* How has it been possible even to "imagine" that this economy had the same explanatory value for both sexes? Except by falling back on the requirement that "the two" be interlocked in "the same."

e never stopped arguing.



Grace Williams, Untitled, from *The Village of Enchantment* series, 1978.

Strange Attractors: Signs of Chaos

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Why is geometry often described as "cold" and "dry"? One reason lies in its inability to describe the shape of a cloud, a mountain, a coastline, or a tree. Clouds are not round, mountains are not cones, coastlines are not circles, and bark is not smooth, nor does lightning travel in a straight line. /More generally, I claim that many patterns of Nature are so irregular and fragmented, that, compared with Euclid—a term used in this work to denote all of standard geometry—Nature exhibits not simply a higher degree but an altogether different level of complexity. The number of distinct scales of natural patterns is for all practical purposes infinite. The existence of these patterns challenges us to study these forms that Euclid leaves aside as formless, to investigate the morphology of the "amorphous." Mathematicians have disdained this challenge, however, and have increasingly chosen to flee from nature by devising theories unrelated to anything we can see or feel. /Responding to this challenge, I conceived a new geometry of nature and implemented its uses in a number of diverse fields. It describes many of the irregular and fragmented patterns around us, and leads to full-fledged theories, by identifying a family of shapes I call fractals. The most useful fractals involve chance and both their irregularities and their irregularities are statistical. Also, the shapes described here tend to be scaling, implying that the degree of their irregularity and/or fragmentation is identical at all length scales. Some fractal sets are curves or surfaces, others are disconnected "dusts," and yet others are so oddly shaped that there are no good terms for them in either the sciences or the arts. The reader is urged to sample them now, by browsing through the book's illustrations. /Many of these illustrations are of shapes that had never been considered previously, but others represent known constructs, often for the first time. Indeed, while fractal geometry as such dates from 1975, many of its tools and concepts had been previously developed, for diverse purposes altogether different from mine. Through old theorems inserted in this new building structure, fractal geometry was able to "borrow" exceptionally extensive, rigorous foundations, and soon led to many compelling new questions in mathematics. /Nevertheless, this work pursues neither abstraction nor generality for its own sake, and is neither a textbook nor a treatise in mathematics. Like many Essays, it tends to digressions and interruptions. /There are many mathematically "easy" sections throughout, especially toward the very end. Browse and skip at least at first and second reading. /... There is a saying in Latin that "to name is to know." Nonetheless, Until I took up their study, the sets adduced to in the preceding sections were not important enough to require a term to denote them. However as the monsters were deranged and harnessed, and as many new "monsters" began to arise, the need for a term became increasingly apparent. It became acute when the first predecessor of this Essay had to be given a title. I coined fractal from the Latin adjective fractus. The corresponding Latin verb frangere means "to break" to create irregular fragments. It is therefore sensible—and now appropriate for our needs!—that, in addition to fragmented (as in fraction or refraction), fractus should also mean "irregular, both meanings preserved in fragment... /In sum, the present Essay describes the solutions I propose to a host of concrete problems, including very old ones, with the help of mathematics that is in part, likewise very old, but that (aside from applications to Brownian motion) had never been used in this fashion. The cases this mathematics allows us to tackle, and the extensions these cases require, lay the foundation of a new discipline. Scientists will (I am sure) be surprised and delighted to find that not a few shapes they had to call grainy, hydralike, in-between, pimply, pocky, ramified, seaweedy, wiggly, strange, tangled, tortuous, waggly, wispy, wrinkled, and the like, can