BRONZES

CHAOS, NEW SCIENCE, NEW ART

Rhonda Roland Shearer

FOREWORD BY MITCHELL J. FEIGENBAUM
INTRODUCTION BY MARTIN S. JAMES

May 17–June 9, 1989

Wildenstein
19 East 64th Street, New York 10021

FOREWORD

by Mitchell J. Feigenbaum

The deep goal of physics has been to determine just what a description of an object should be. It has invariably entailed, at least, enumerating the locations of each "point" of the object in a continuum. This scheme of depiction works altogether well when the object is just a few such points, or alternatively when the object is many such points—adjoined to comprise a regular geometric figure that is composed of a small number of edges, or geometrical solids. Indeed, in order to test the rectitude of the laws of physics, one eschews all complications in order to find the simplest, most symmetrical configuration, so that all predictions can be rendered mathematically precise.

Our ambient human environment has chosen otherwise, with high symmetry and sparse simplicity the shibboleth of that which is contrived. While in principle the pointwise description of a tree with many thousands of leaves—each somewhat different from the other and none a simple geometric form—is possible, this manner of description is reserved only to a god. It is fatuous to say that since the laws are verifiably true, this description of a tree is only a technicality: the mere writing down of this wealth of precise information transcends all human resources so that the thought of any further analysis is academic. Yet the leaves have a humanly knowable content—they are neither few in number nor blitheringly many of a random variety, and we recognize them easily.

To date, we have succeeded in rendering one alternative to the pointwise enumeration of complex forms. These "fractal" objects enjoy not a simple pointwise description, but rather a simple building rule. A new feature is built out of an old feature—always by the same rule, but in proportion to the size of the original. Suffice to say that variants on this scheme have developed that indeed reconstruct some of the complexities observed in physically created objects. Nevertheless, they don't make recognizably true trees or ferns—they're always a little too regular in their complexity. Somehow, ideas must be adduced—perhaps from the observation of nature—if we are to embrace under the sway of our science the world we know so handily.

Ms. Shearer's offering prods me along just such lines. It is confronting to see, in juxtaposition, the simplicity of geometry and the non-random complexity of the forms of earthly flora. It is intellectually embarrassing to see what is so craftily allowed to the synthetic arts but forbidden to the analytic sciences. It gnawingly cries out that there is something we almost know that we have to learn. And it is beautiful and joyous.

INTRODUCTION

by Martin S. James

Sir Lawrence Gowing, in his introduction to Rhonda Shearer's 1987 show in London, compared the artist's lower Fifth Avenue loft to "some fantastically fertile conservatory where exotic growths sprout and proliferate... like the plants from which they originated." Shearer's patinated bronzes, some man-high and in great jars "out of fairy stories,... have the character not of capricious luxury but of the natural necessity of growth.... You notice qualities of form and texture that we have hardly observed in plants themselves... minute details of ribbing and veining, cockling and pimpling, at the same time as we watch the resilient curling, the arching and buckling.... We are seeing plants as form for the first time.

"Like many still-lives they have a multiplicity of meanings, botanical, decorative and social, all resolved together in the triumphant objects, challenging, intriguing and superbly easy to the eye. The arrangement of the bunches has its own demure symmetry, a pattern with a botanical source.... I do not know when there has been such efflorescence in bronze or such an enlargement of the scope for sculpture."

Alongside the upward thrusting pieces were some modest horizontal ones: low (since true to size)[1] on their dark polished base sit paired green peppers, apples in informally staggered ranks, or pears distributed in something between loose order and disarray (Random Apples, Random Pears).

It is these that contained the seed of the future: themes and elements to be developed over the next two years: self-contained, discrete organic forms; varieties of order and structure discernible in nature's system; and the plane against which relationships are displayed and gauged—now open, gridded, and raised perpendicular to our gaze.

The body of work now before us falls into six types. First, there are the *Architectonic Pieces*, Reggae, 1987 (Plate 2), and What is Curve and Right Angle?, 1987 (Plate 1). In the latter piece, the right-angled back wall establishes a perhaps urban space, through which plant life forces its way—a single wandering stem, a multiple spray. The economy of Reggae's single suspended plane contradicts nature's random profligacy. The "coconut blossom," says Shearer, "is made up of innumerable seeds, of which only a few will live to replicate the model." Each slender filament describes a separate trajectory within the overall form, some responding with gentle vibrations to the faint swaying of the tethered slab.

In the *Implied Rectangular Prisms*—City Tree, 1987 (Plate 3), and Principia, 1987 (Plate 4), the vertical plane is stated only in outline. The dematerialization and patina recall Giacometti's way of evoking the remote and archetypal. The vertical horizontal rectangles imply a vertical prism (or prisms) embodying the Golden Section, that ubiquitous ratio found in geometry, physics and natural forms, as well as in art and esthetics. Represented by the symbol Phi (numerical value 1.61803...), the Golden Section is a ratio of line segments such that a:b = (a + b):a. The same number appears in the interacting diagonals of the pentagon, in the Fibonacci series (where each member equals the sum of the two preceding ones), in the distribution of the leaves and shoots of certain plants, and in the helix of leaves on a stem ensuring illumination for each leaf.[2] The ascending rhythm of City Tree reflects such spacing.

Principia makes us aware of gravity's downward pull. The reference, of course, is to Newton's laws—once thought universal—for the behavior of masses in space.

Shearer's *Zigzag* pieces consist of Space/Time Intervals, Study No. 1, 1987 (Plate 7), and Space/Time Intervals, Study No. 2, 1987 (Plate 8). The biologist D'Arcy Thompson has stated that all living forms reflect the internal and external forces that have acted upon them through time. Shearer's zigzagging series of square frames points out phase-to-phase changes within the life cycle as well—together, no doubt, with changing relationships to the observer. With the single leaf so closely framed, we notice the negative spaces: plants maximize their energy-absorbing surface while minimizing the supporting structure (some leaves contain large holes for this reason).

Faithful to the specific as well as to the general, Shearer neither stylizes nor improvises upon plant forms: each is that of a once-living individual. Such configurations can not be simply replicated. Shearer plays down the technical side; it can nevertheless be said that the problems of casting from originals so thin, so fragile and so spatially complex made extensive experimentation necessary. Three dimensional form and surface qualities are rendered in separate operations.

While the zigzag pieces vary as to the orientation of their leaves and their relation to the frame, in both the serial mode of presentation points out the primacy of equilibrium in the life process. "The closer the organism is to death," says Shearer, "the greater its response to stress and disequilibrium."

Shearer's *Gridded Volumes*, Entelechy, 1987 (Plate 9) and Geometric Tree, 1988 (Plate 16), realize in prismatic form the spatial impulse behind the "zigzags." Entelechy, horizontal on its rugged bedrock, seems to evoke the spread of plant life over the earth's surface. Each uniform cell contains a single representative of its species—all alike in basic structure, each different in its reaction to random forces.

The ancient term "entelechy" roughly signifies a "formative agency," or "vital principle." Shearer uses it apropos of the work of Paul Klee, whom she deeply admires, and who, from childhood on, devoted himself to exploring the inner structures of the natural world.[3]

Executed a year after Entelechy and succeeding the *Planar Grids*, Geometric Tree marks a return to volume. Its ninety-six rectangles (sixteen for each of the hollow cube's six faces) form a neutral grid (e.g. Sol LeWitt), here invaded by organic processes. Shearer mentions the experience of midtown buildings seen from Central Park through a screen of trees: in the rear, urban facades—repetitive, modular, comprehensible to the mind; superimposed in front of them, screen after screen of tree trunks, boughs, twigs, flickering leaves—recognizable but mentally unclassifiable.

For deeper insight and revelation, turn to Shearer's friend Peter Stevens' *Patterns in Nature*[4], with topics such as "Random Branchings of Trees and Rivers," "Modular Trees" and "Trees and Rules." If ordinary trees flow upward from a point and the branchings follow nature's patterns, the philomorph can create a conceptual tree like this one, modular and multidirectional. Without rejecting "nature," Geometric Tree evokes such alternatives.

The *Planar Grids* series includes, in a Rectangular format: 1.618 Plus/Minus, 1988 (Plate 13), Geometric Proportions in Nature, Study No. 1, 1987 (Plate 5), Geometric Proportions in Nature, Study No. 2, 1987 (Plate 6), Eidos, 1988 (Plate 15), and in a Diamond format: Kata, 1988 (Plate 14), Diamond Grid No. 1, 1988 (Plate 11), and Diamond Grid No. 2, 1988 (Plate 12). Each *Planar Grid* is subdivided in a manner inspired by the free rhythm of Mondrian's Neoplastic compositions. Within this paradigm of the constructed world, a range of plant forms is distributed in subtly differing ways.

Grid and vegetation remain apart in the 1987 pieces: after bringing out the unique character of each specimen, the clear-cut framing causes us to peruse what Mondrian called the "mutual relationships." In the 1988 pieces (Plates 13 and 15) the plants become an unruly mob, jostling and overlapping and finally overrunning the grid itself. Where the grid occasionally falters, organic and inorganic begin to merge. In the gridded diamonds (all 1988), the vegetation tends to favor the edges, leaving a certain openness in the center, as was Mondrian's practice with this format.

The *Planar Grids* bring to mind the organically inspired metalwork that, around 1900, complemented Art Nouveau architecture: the fantastic wrought-iron grills and gates of Gaudi in Catalonia, the creations of Guimard in France, of Horta in Belgium. Theirs, however, was an art compounded of nature and fantasy: nowhere, either in applied art or independent sculpture, Shearer tells us, has the life and form of plants been accorded the study it deserves.

Finally, the *Wall Piece:* 8 and 12 Combined, 1988 (Plate 10). As with the squares in the zigzag sequence, the concern is with arrested process.

Viewed as if from above, the grid—rational, invariant—tells us where the sets fell, pushed and tossed by arbitrary forces, here externally imposed: another way of testing our interface with nature.

Mondrian most fascinates Shearer at the point when he passed from relative naturalism, through Cubism, to pure abstraction—from the flower and tree to the grid. Through these and other subjects (the church facade, the ocean), Mondrian sought to make visible the order that pervades the universe, though hidden to the uninitiated eye, and the vital force that animates all things. By focusing on the single leafless tree (already an open form) and fusing it with the surrounding space, he dissolved its separateness. This was the lesson of Cubism. But Mondrian saw each thing as a microcosm of the larger whole. By "tautening" or "tensing" the line segments and placing them in horizontal-vertical opposition, he increasingly brought to the fore the underlying quality of life and of art: the universal, invariant principle—as opposed to the mutable, confusing particularities of time and place.

By 1917-18 Mondrian could discern a metaphysical duality:

SPIRITUAL	MATERIAL
UNIVERSAL	INDIVIDUAL, PARTICULAR
CONSTANT	VARIABLE
ABSTRACT	CONCRETE

to which there corresponded a quality in the plastic means:

THE PERPENDICULAR	*RHYTHM*
RELATIONSHIP (Horizontal/Vertical)	*DIMENSION*
THE STRAIGHT	*COLOR*
THE PLANE.	

This conceptual scheme is roughly contemporary with his continuously gridded "checkerboards" and diamonds of 1917–19. Within the regular grid (the constant element) Mondrian distributed color planes or linear accents in a random manner (random being used here in an everyday sense: in a way dictated by feeling or intuition. Indeed he detested all attempts to create design by means of mathematical formulas). He later dispensed with the grid, but it is in these regularly gridded paintings that the questions of order and randomness most clearly appear.

With regard to the relationship of nature and the man-made, Mondrian held that in life and art up to now, the balance between the spiritual and the material, and between the concrete and the abstract has been one-sided, and that the balance must now be radically shifted in favor of the latter—as embodied in purely abstract art, the new architecture, the modern metropolis and the abstractions of science and technics. Most of us today would phrase the issues differently on philosophical grounds alone, and Mondrian's optimistic view of technological progress seems questionable if not absurd in the light of subsequent experience. Indeed the Romantic opposition of man and nature has been challenged and undermined by our intrusion into the natural world, to the point of threatened global catastrophe. Conversely, we have gained, though still without finality, deep if dangerous insights into the mysterious structure and order of things.

"Future is present. Not to see the future is making the present the past," reads one of Mondrian's last notes.[5] Shearer revisits the system of nature from a contemporary viewpoint, with an eye to the next century. She brings to this task a mind and sensibility enriched by her professional experiences—participation in the ecological movement, studies in the anatomy and representation of horses—as well as extensive readings in the science of form and number. Amid the clamor to utterly purge art of idealism and universals, she sounds a clear and positive note.

March, 1989.

---

1. The size of all structures is determined by gravity and cannot be arbitrarily changed. Cf. D'Arcy W. Thompson, *On Growth and Form*, Cambridge University Press, Cambridge 1961, ch. 2, "On Magnitude."

2. H.E. Huntley, *The Divine Proportion: A Study in Mathematical Beauty*, Dover, New York 1970, pp. 161-62

3. Cf. besides Klee's *Pedagogical Sketchbooks*, Richard Verdi's *Klee and Nature*, Rizzoli, New York 1984, that Shearer brought to my attention.

4. Atlantic Monthly Press, Boston 1974

5. *The New Art, The New Life: The Collected Writings of Piet Mondrian*, ed. Harry Holtzman and Martin S. James, G.K. Hall, Boston 1986, p. 375

CHAOS, NEW SCIENCE, NEW ART

by Rhonda Roland Shearer

Does one universal principle guide all of creation? Is there oneness in nature?

In every century these questions have been asked by artists, philosophers and scientists. Times of great revisions in thought can be directly attributed to great strides in science.

The last such time was at the turn of the century, when the discovery of relativity and quantum mechanics revolutionized science and created a thriving "renaissance of thought." The intellectual and creative floodgates were opened—our world views were revised and changed forever. Within this atmosphere, abstract art was born.

Malevich, Kandinsky and Mondrian were inspired by the metaphysical thinkers who based their work upon these new scientific theories, among them Madame Blavatsky (the founder of Theosophy) and P.D. Ouspensky, whose concepts involving universal geometry, the oneness of nature and the fourth dimension[1] were of great influence.

Malevich, in response, reduced nature to simple geometric shapes. These forms assumed the role of universal signs, representing an ultimate universal order.[2] Mondrian, profoundly struck by Madame Blavatsky's writing: "God geometrizes. Dots, lines, triangles, cubes, circles and finally spheres—why or how?...Because nature geometrizes universally in all her manifestations,"[3] wrote of his own interest in depicting universal harmony and the laws that govern the universe.[4] Rejecting nature as being too random and capricious, he felt that the universal was "only partially visible in perceptible nature."[5]

Mondrian's perception reflected the frontiers of scientific thought at that time. But the natural phenomena he saw as random and capricious can now be seen as order and pattern. Now there is a new science, called *chaos*.[6]

Our inability to "see order" in nature has been corrected with the knowledge of new theories of chaos, which examine the possibility that nature, though seemingly random, is imbued with universal pattern and order. What makes this point significant yet ironic is that the rejection of random phenomenal forms (rejected because of their lack of universality) is precisely the founding premise of abstraction itself.[7] By pointing out that order and universality can be found in randomness, *chaos* demonstrates that the founders of abstraction were wrong in their assumptions.

The new geometry of *chaos* was not available to these artists who first expressed the universe as circles, lines and squares. Until the 1980s, they and others went to the limits of world knowledge, cosmology and science. This point is not intended to invalidate past abstraction, but rather to demonstrate how significant the present evolvement in science and geometry is in altering our world view; providing a fertile atmosphere for the reevaluation and expansion of abstract art in the 90s and 21st century.

Geometric abstraction has become pertinent subject matter once again—on the cutting edge of both science and art, and not a passé formalist idea "atrophied with time".[8]

Geometry itself has never been a more timely subject. The pursuit of "The Oneness in Nature"—or the geometrization of nature, as was so primary to the scientific and artistic activity of the 19th century, is often dismissed as a romantic notion.[9] But with new developments such as *chaos* and *superstrings*, it is once again a concept on the forefront of modern physics.

In his general theory of relativity, Einstein discovered the geometry of gravity and dreamed of geometrizing all other forces in nature. Now, as the theories of quantum mechanics and gravity are joined for the first time, "it has become possible," according to physicist Dr. Richard Brandt, "for scientists to express all forces of nature in one unified geometrical *superspace*."[10]

The fresh concepts from new science will involve the re-evaluation of past explorations in abstraction—circles, lines and squares now infused with new life from fractals, scaling, closed strings and *supersymmetry*.[11]

The sculptures in this exhibition represent a step in this reunion of contemporary art and science.

Plant forms are used to explore the randomness and geometry in nature. As topographical maps, plant forms offer a localized dimension of universal forces within space—which can be read like a trace or imprint in visible matter. Mondrian's approach of "always further" is the spirit of art and science—by experimenting and looking for breakthroughs to create deeper understanding, we thus expand man's vision of the world.[12]

---

1. P.D. Ouspensky, *A New Model of the Universe*, Vintage Books Edition, 1970, p. 90. Also, for a thorough discussion of the subject, *The Spiritual in Art—Abstract Painting 1890-1985*, Los Angeles County Museum of Art Catalogue, 1986.

2. Kasimir Malevich, The Non-Objective World, Paul Thesbald & Company, Chicago, 1959.

3. *The Spiritual in Art*, p. 147.

4. Harry Holtzman and Martin S. James, eds. and translators, *The New Art—The New Life, The Collected Writings of Piet Mondrian*, G.K. Hall & Co., Boston, 1986.

5. Hans L.C. Jaffé, *Mondrian*, Harry N. Abrams Inc., New York, pp. 26-27, 40-41, 48.

6. James Gleick, *Chaos, Making a New Science*, Viking Penguin Press, New York, 1987, p. 6.

7. Jaffé, p. 41, "In this rejection of the phenomenal forms of nature, which in point of fact, is the decisive step of the new abstract art."

8. Peter Halley, *Collected Essays 1981-87*, Bruno Bischofberger Gallery, Zurich, "The Crisis in Geometry," p. 75.

9. Robert Rosenblum, *Modern Painting and the Northern Romantic Tradition, Friedrich to Rothko*, Harper & Row, New York, 1975, p. 178.

10. Quoted from discussions with Dr. Richard Brandt, Professor of Physics, New York University.

11. Gleick; Paul Davies, *The Cosmic Blueprint, New Discoveries in Nature's Creative Ability to Order the Universe*, Orion Productions, 1988. Stephen W. Hawking, *A Brief History of Time from the Big Bang to Black Holes*, Bantam Books, New York, 1988.

12. Jaffé, p. 41.

Plates

1.
What is Curve and Right Angle?, 1987, Bronze (Lost wax, Fabrication),
79½" x 34" x 19¼"

2.
Reggae, 1987, Bronze (Lost wax, Fabrication),
77" x 36¼" x 42"

3.
City Tree, 1987, Bronze (Lost wax, Fabrication),
46¼" x 19½" x 21"

4.
Principia, 1987, Bronze (Lost wax, Fabrication),
75⅛" x 29" x 46½"

5.
Geometric Proportions in Nature, Study No. 1, 1987, Bronze (Lost wax,
Fabrication), 27" x 36½" x 3"

6.
Geometric Proportions in Nature, Study No. 2, 1987, Bronze (Lost wax,
Fabrication), 25½" x 41" x 4¼"

7.
Space/Time Intervals, Study No. 1, 1987, Bronze (Lost wax,
Fabrication), 8" x 26⅛" x 5"

8.
Space/Time Intervals, Study No. 2, 1987, Bronze (Lost wax,
Fabrication), 6½" x 18¼" x 5"

Plates

9.
Entelechy, 1987, Bronze (Lost wax, Fabrication),
9¾″ x 31″ x 22″

10.
8 and 12 Combined, 1988, Bronze (Lost wax, Fabrication),
59″ x 86¼″ x 3¾″

11.
Diamond Grid No. 1, 1988, Bronze (Lost wax, Fabrication),
43⅛″ x 42⅜″ x 20″

12.
Diamond Grid No. 2, 1988, Bronze (Lost wax, Fabrication),
43″ x 42½″ x 20″

13.
1.618 Plus/Minus, 1988, Bronze (Lost wax, Fabrication),
28½″ x 44½″ x 5¼″

14.
Kata, 1988, Bronze (Lost wax, Fabrication),
89″ x 56¾″ x 17½″

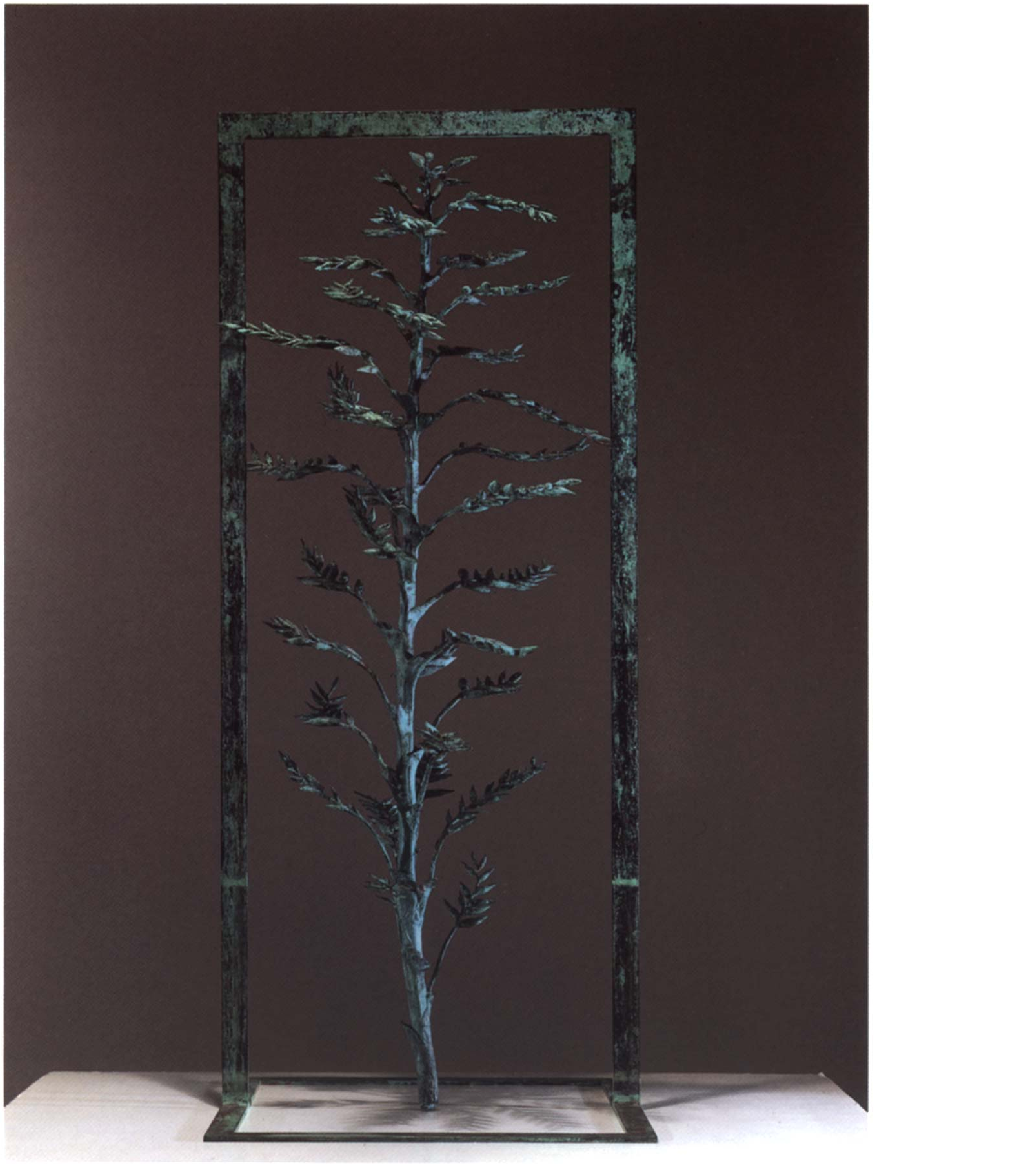
15.
Eidos, 1988, Bronze (Lost wax, Fabrication),
73″ x 67″ x 5½″

16.
Geometric Tree, 1988, Bronze (Lost wax, Fabrication),
26″ x 26″ x 26″

1. ***What is Curve and Right Angle?,*** *1987, Bronze (Lost wax, Fabrication), 79½" x 34" x 19¼"*

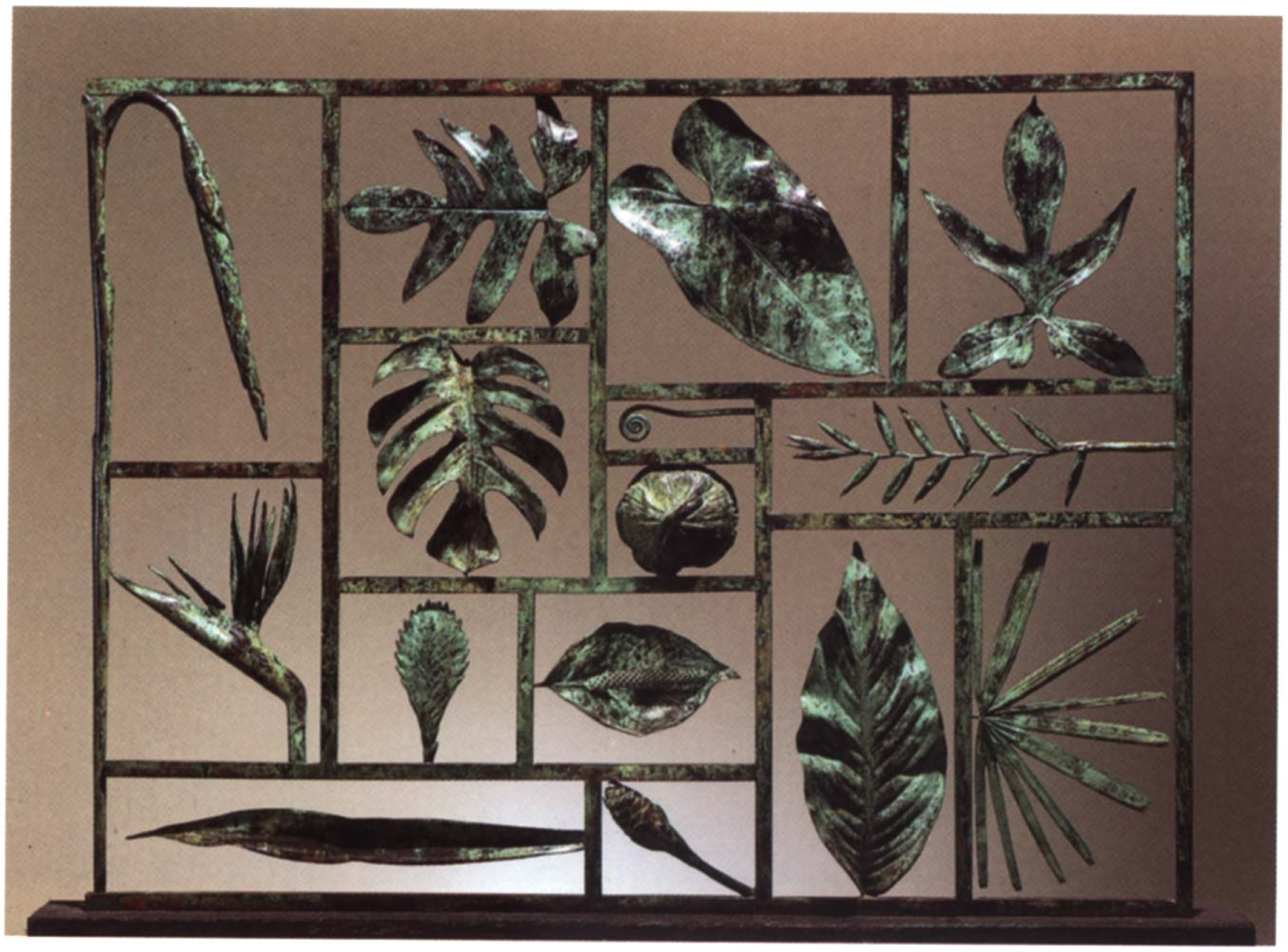
2. ***Reggae,*** *1987, Bronze (Lost wax, Fabrication), 77" x 36¼" x 42"*

*3. **City Tree,** 1987, Bronze (Lost wax, Fabrication), 46¾" x 19½" x 21"*



*4. **Principia,** 1987, Bronze (Lost wax, Fabrication), 75⅛" x 29" x 46½"*

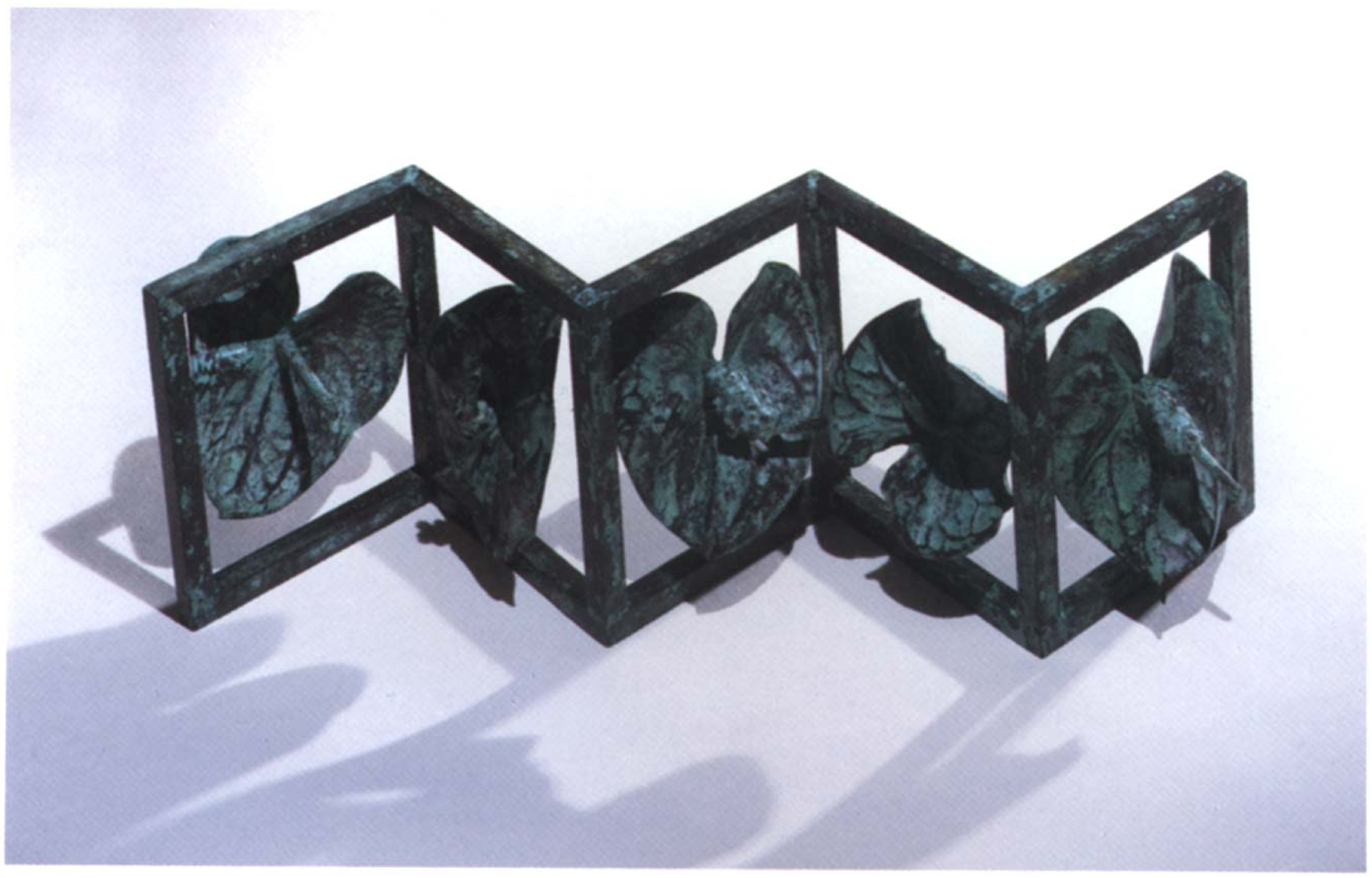
5. ***Geometric Proportions in Nature, Study No. 1,*** *1987, Bronze (Lost wax, Fabrication), 27" x 36½" x 3"*



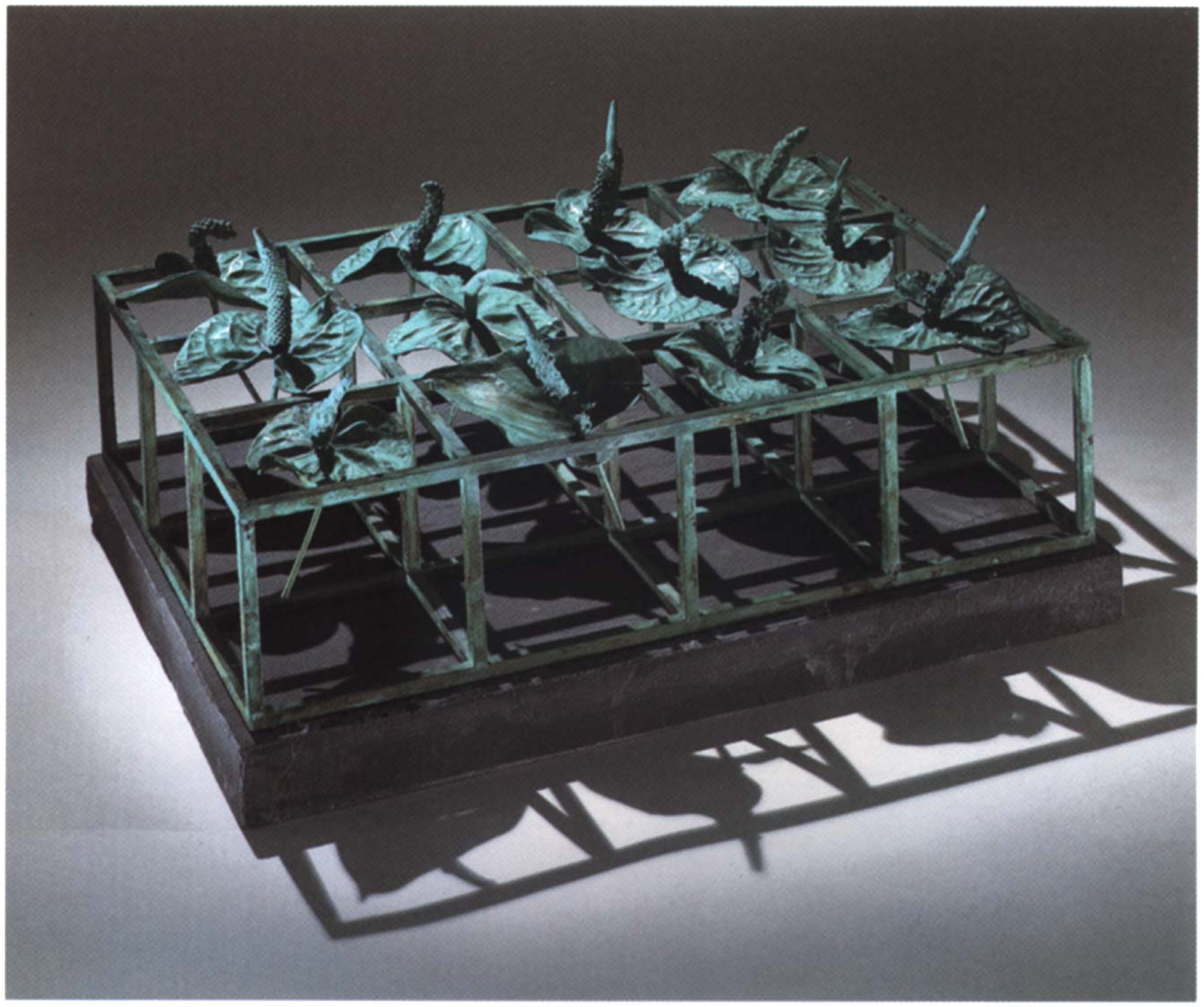
6. ***Geometric Proportions in Nature, Study No. 2,*** *1987, Bronze (Lost wax, Fabrication), 25½" x 41" x 4¾"*

7. ***Space/Time Intervals, Study No. 1,*** *1987, Bronze (Lost wax, Fabrication), 8″ x 26⅛″ x 5″*

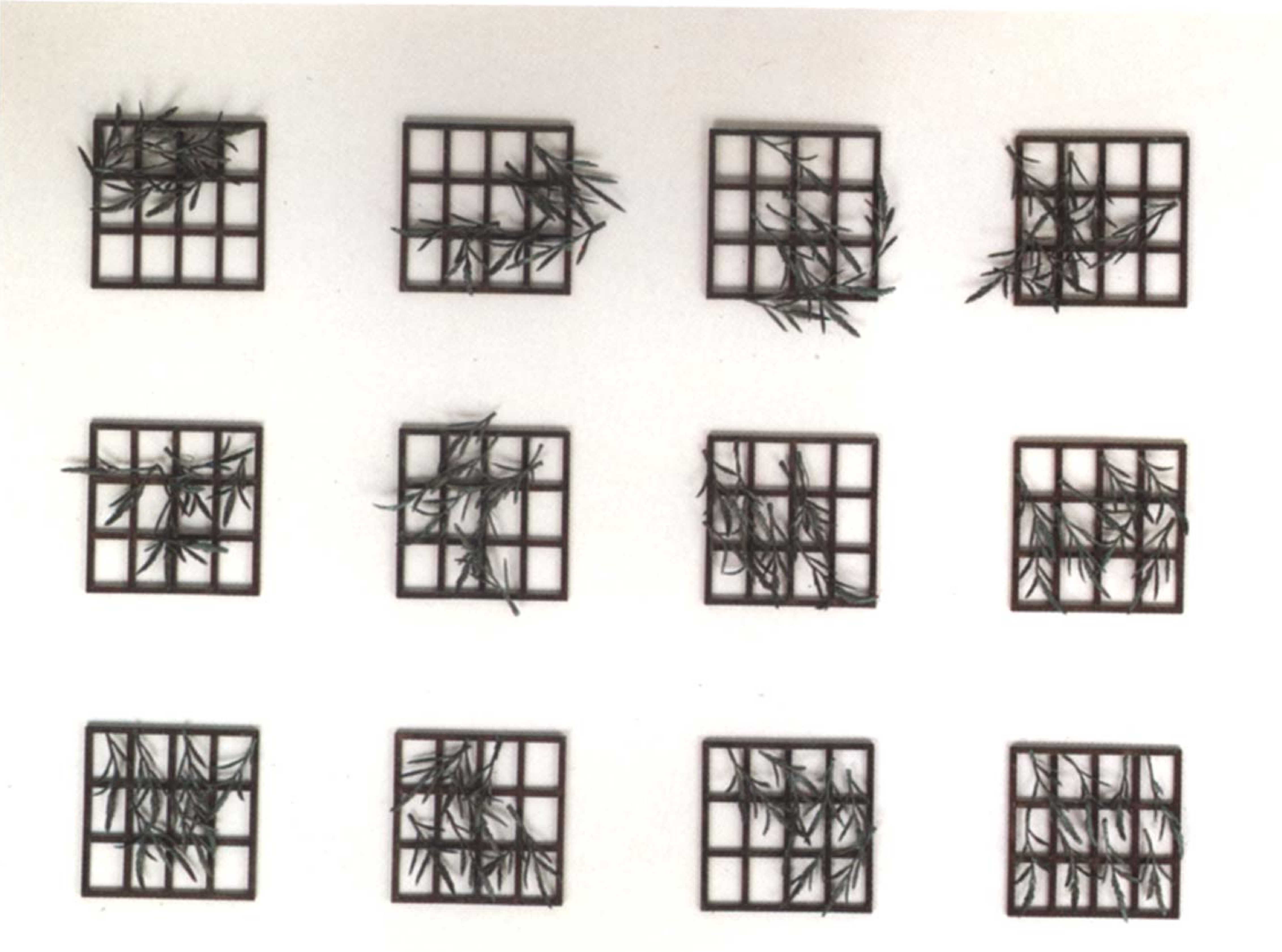
8. ***Space/Time Intervals, Study No. 2,*** *1987, Bronze (Lost wax, Fabrication), 6½" x 18¾" x 5"*



*9. **Entelechy,** 1987, Bronze (Lost wax, Fabrication), 9¾" x 31" x 22"*



10. ***8 and 12 Combined,*** *1988, Bronze (Lost wax, Fabrication), 59" x 86¼" x 3¾"*



11. ***Diamond Grid No. 1,*** *1988, Bronze (Lost wax, Fabrication), 43⅛" x 42⅜" x 20"*

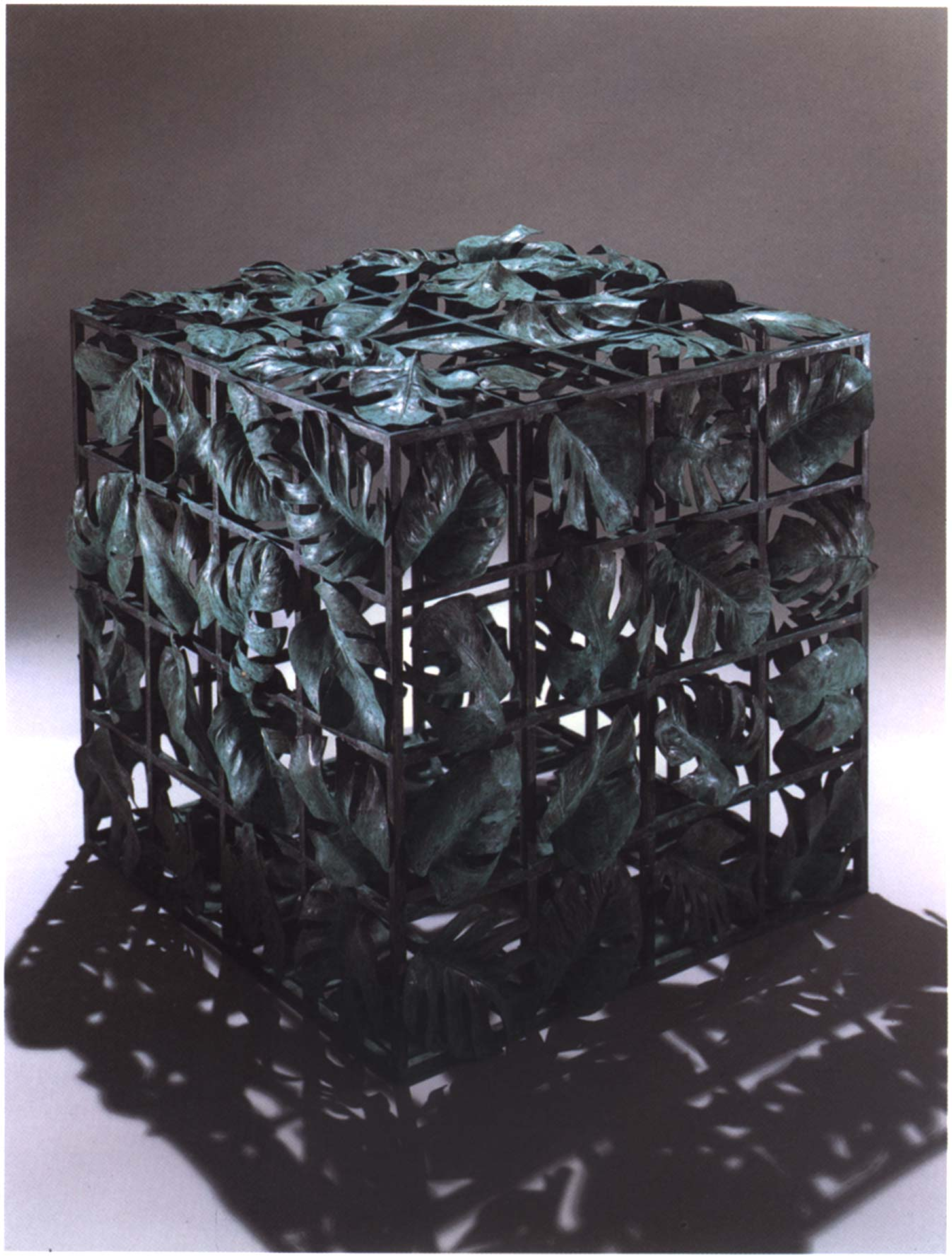
12. ***Diamond Grid No. 2,*** *1988, Bronze (Lost wax, Fabrication), 43″ x 42½″ x 20″*

*13. **1.618 Plus/Minus,** 1988, Bronze (Lost wax, Fabrication), 28½" x 44½" x 5¼"*

*14. **Kata,** 1988, Bronze (Lost wax, Fabrication), 89" x 56¾" x 17½"*

15. ***Eidos,*** *1988, Bronze (Lost wax, Fabrication), 73" x 67" x 5½"*

*16. **Geometric Tree,** 1988, Bronze (Lost wax, Fabrication), 26" x 26" x 26"*



ACKNOWLEDGMENTS

Assistants:
Andrew Baxter
Elizabeth Pelella
Susan Drzewicki
Sue Ellen Estelle

Foundry:
Argos Art Casting Company

Photography:
Bronzes, Lee Boltin
Artist photo, Susan Richman

Catalog Design:
J.C. Suarès

Special thanks to Richard Brandt, Mitchell J. Feigenbaum, Martin S. James, Kathleen Gates, Linda Gates, Jane Martin

Printed in the U.S.A.
by Fleetwood Litho

ACKNOWLEDGMENTS

Assistants:
Andrew Baxter
Elizabeth Pelella
Susan Drzewicki
Sue Ellen Estelle

Foundry:
Argos Art Casting Company

Photography:
Bronzes, Lee Boltin
Artist photo, Susan Richman

Catalog Design:
J.C. Suarès

Special thanks to Richard Brandt, Mitchell J. Feigenbaum, Martin S. James, Kathleen Gates, Linda Gates, Jane Martin

Printed in the U.S.A.
by Fleetwood Litho