

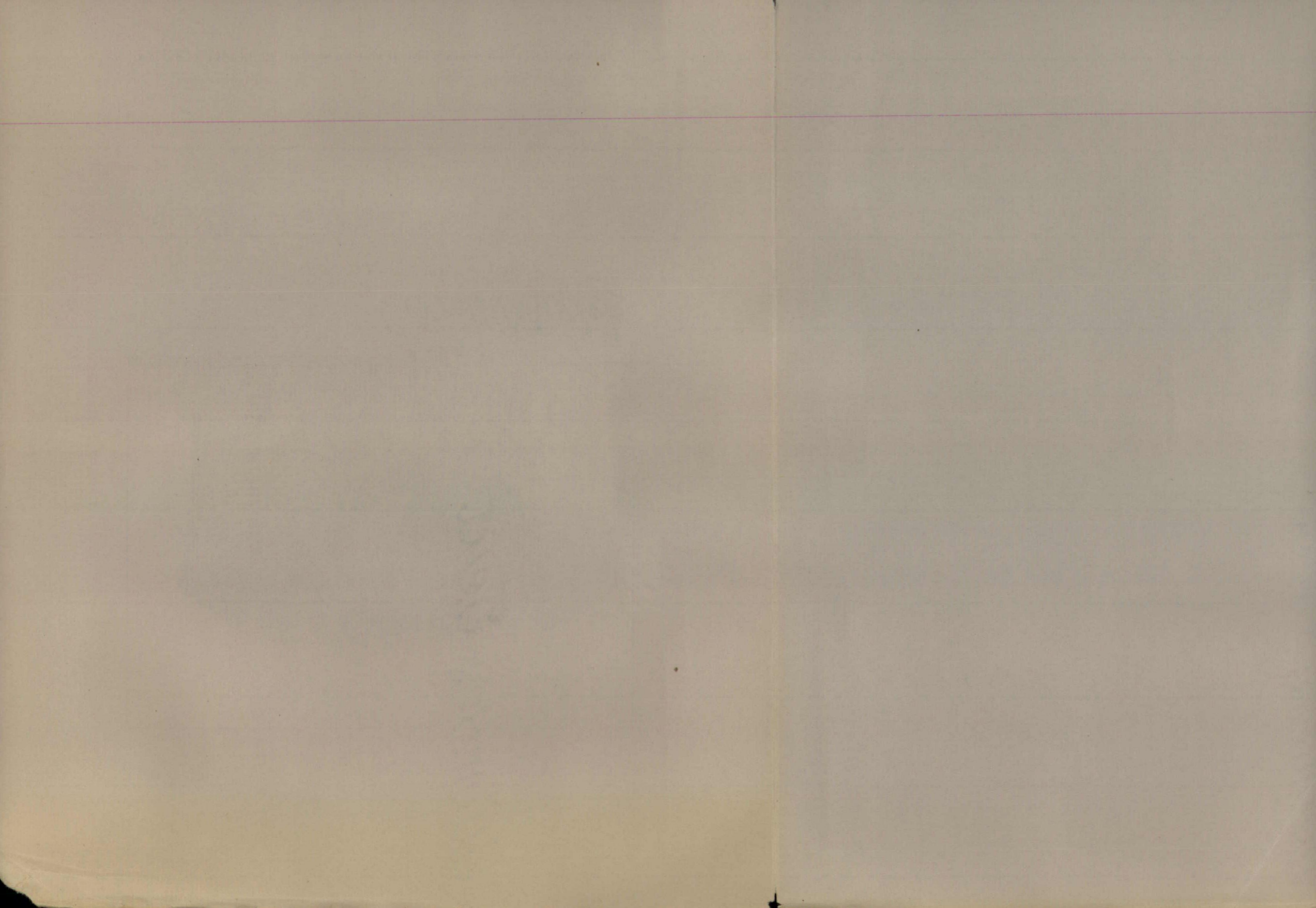


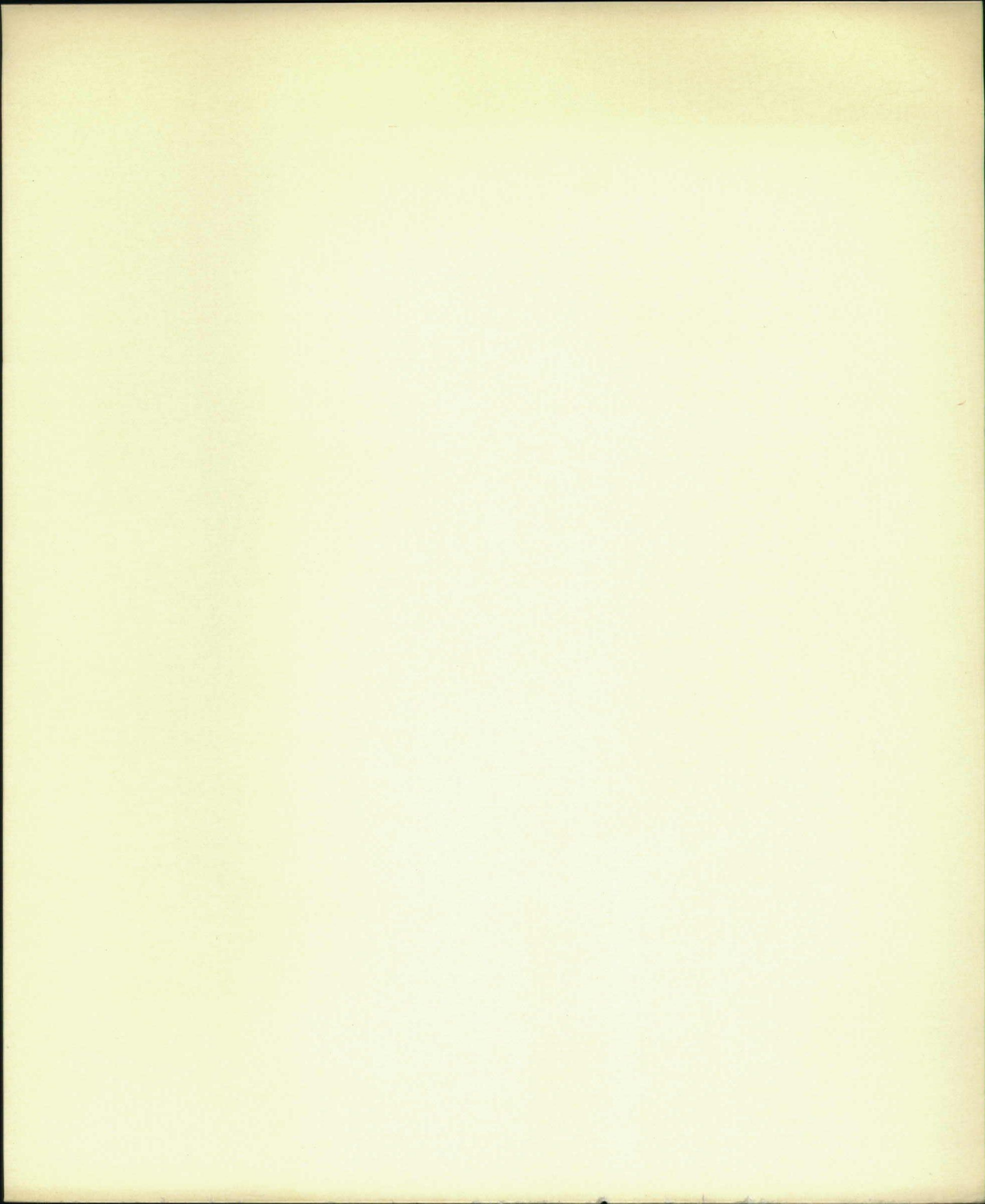
Great Models

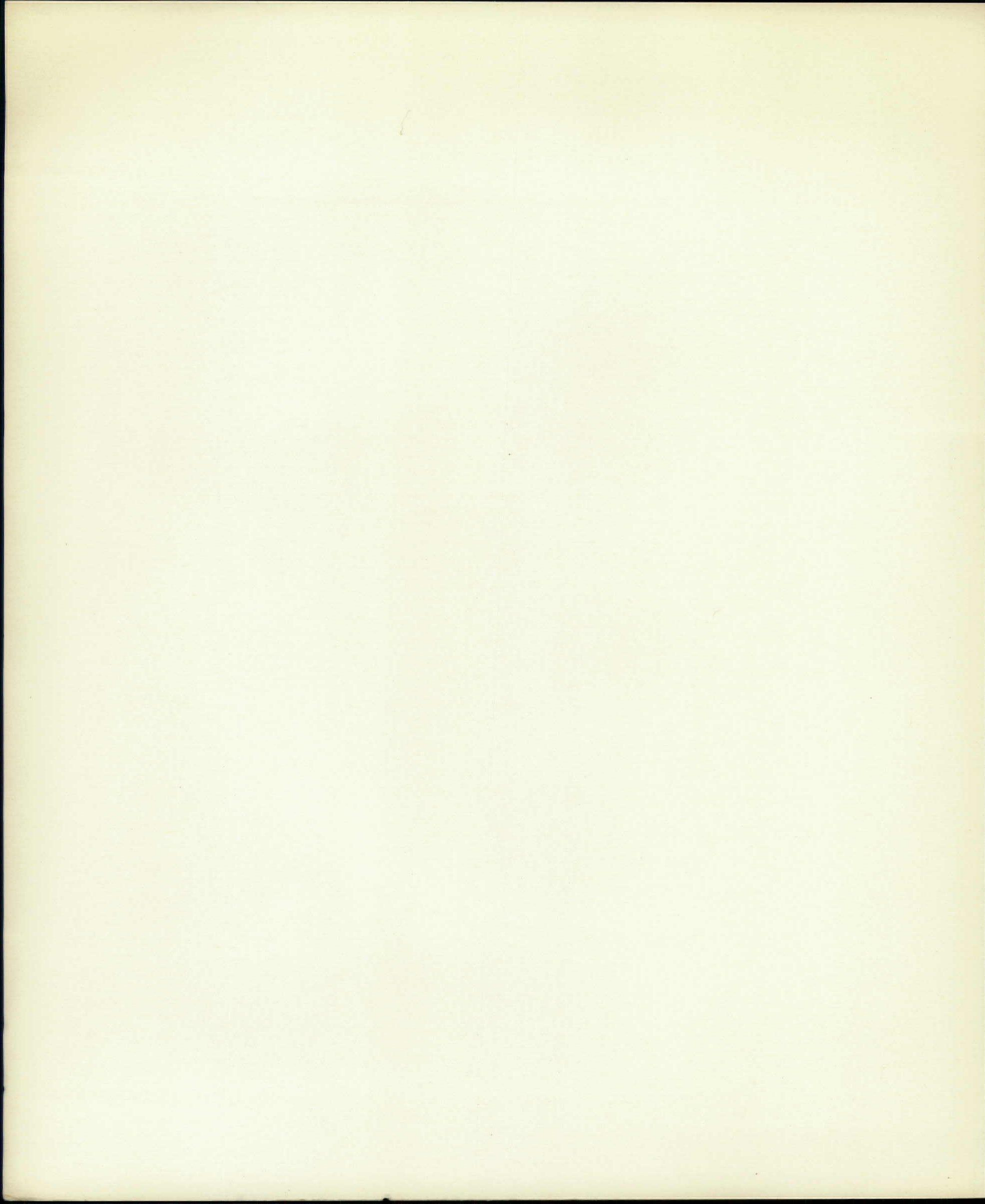
The Student Publication of the School of Design is available for sale by individual issue or by standing order from the school publication office or through Wittenborn Art Books, Inc.

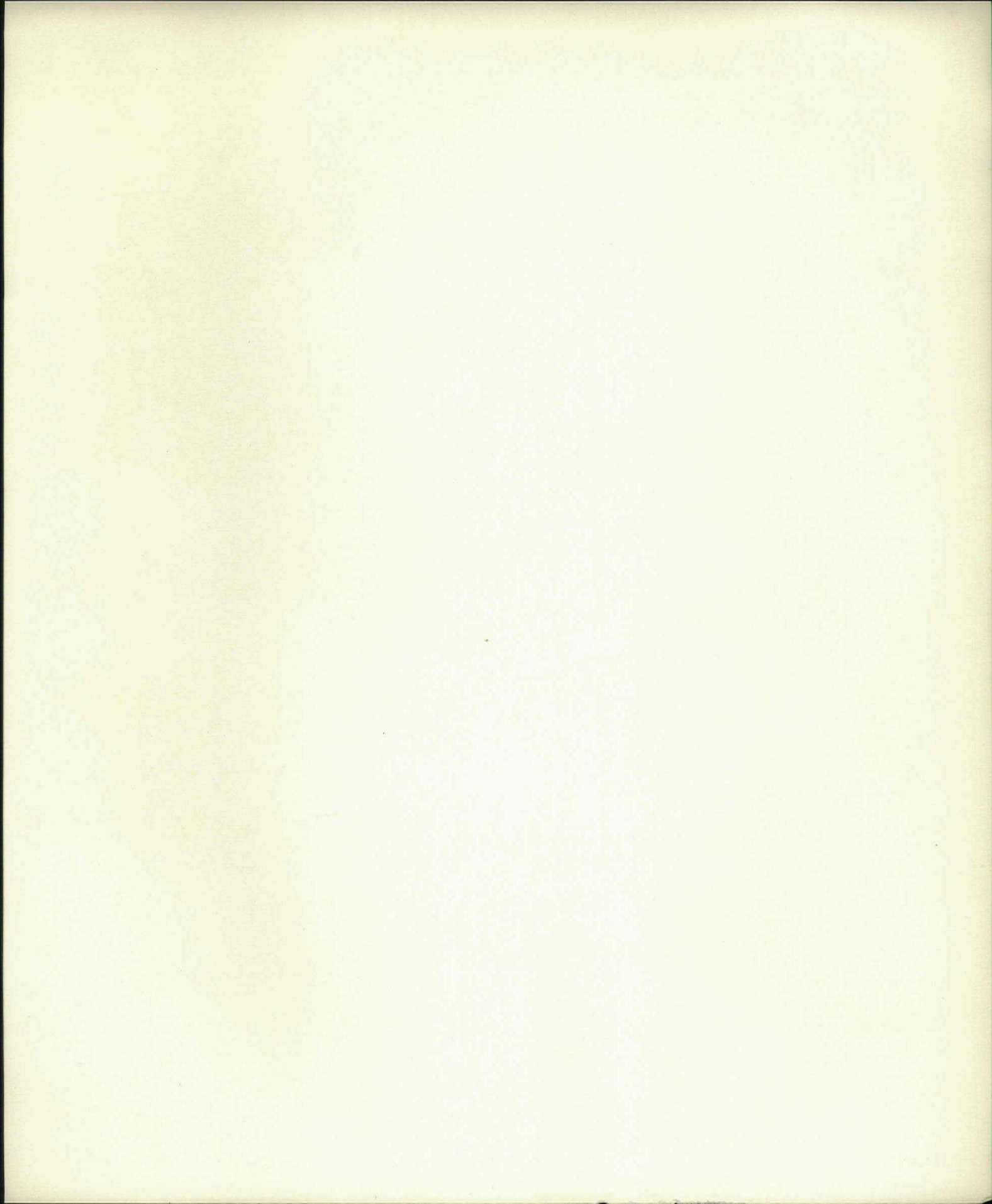
1018 Madison Ave.
New York, NY 10021

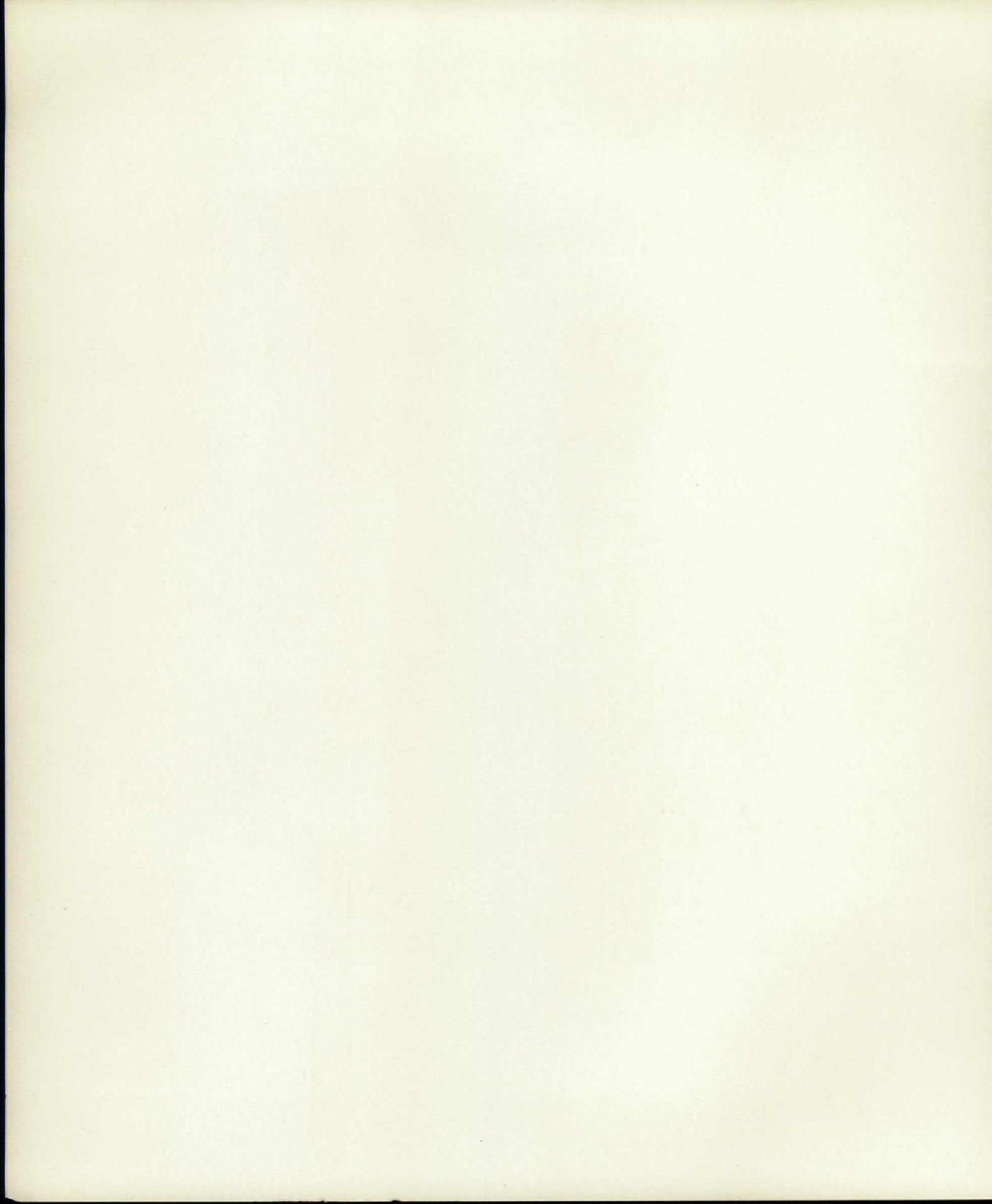
A list of back issues is available on request from *The Student Publication of the School of Design* School of Design
North Carolina State University
Raleigh, NC 27650



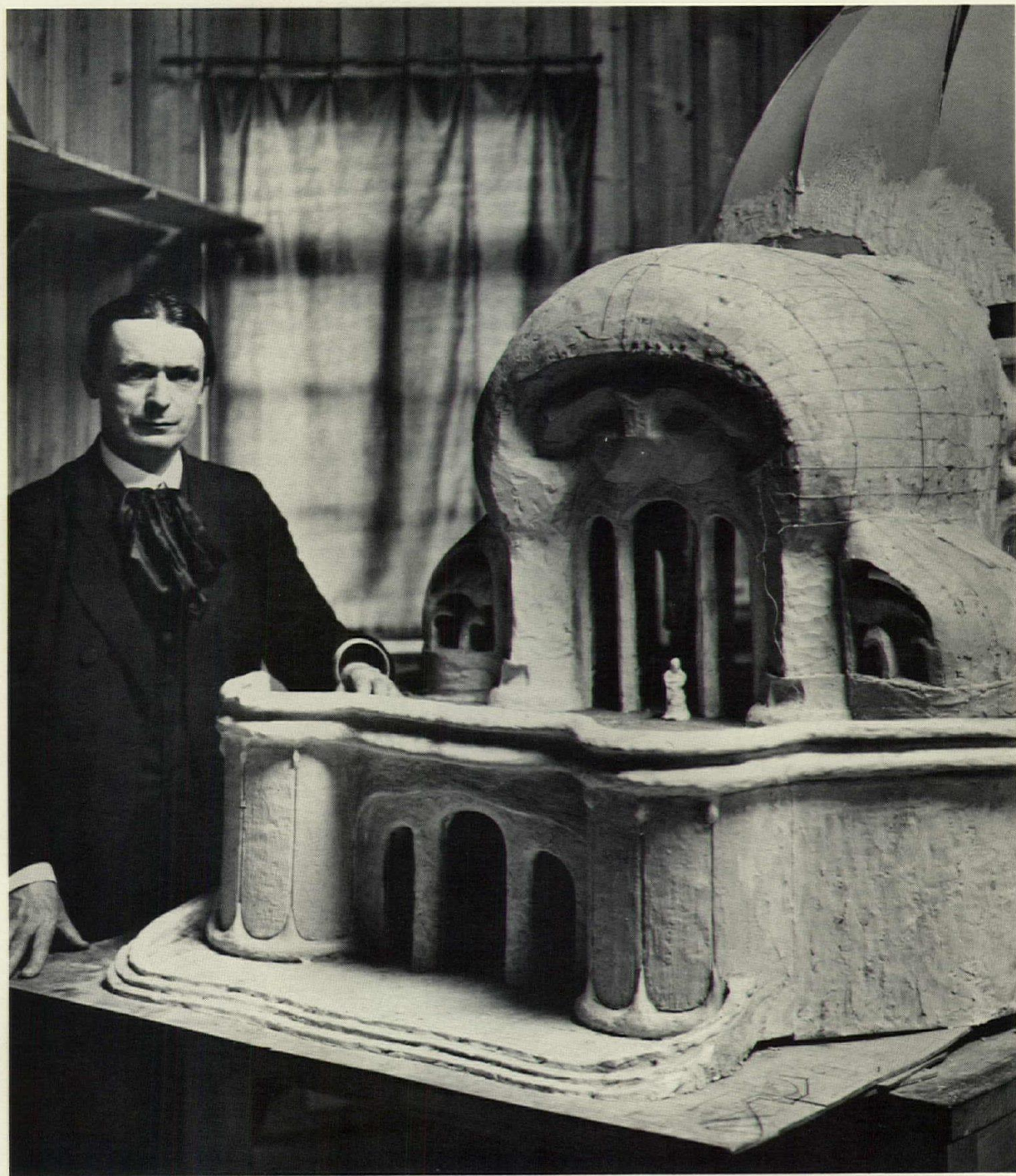


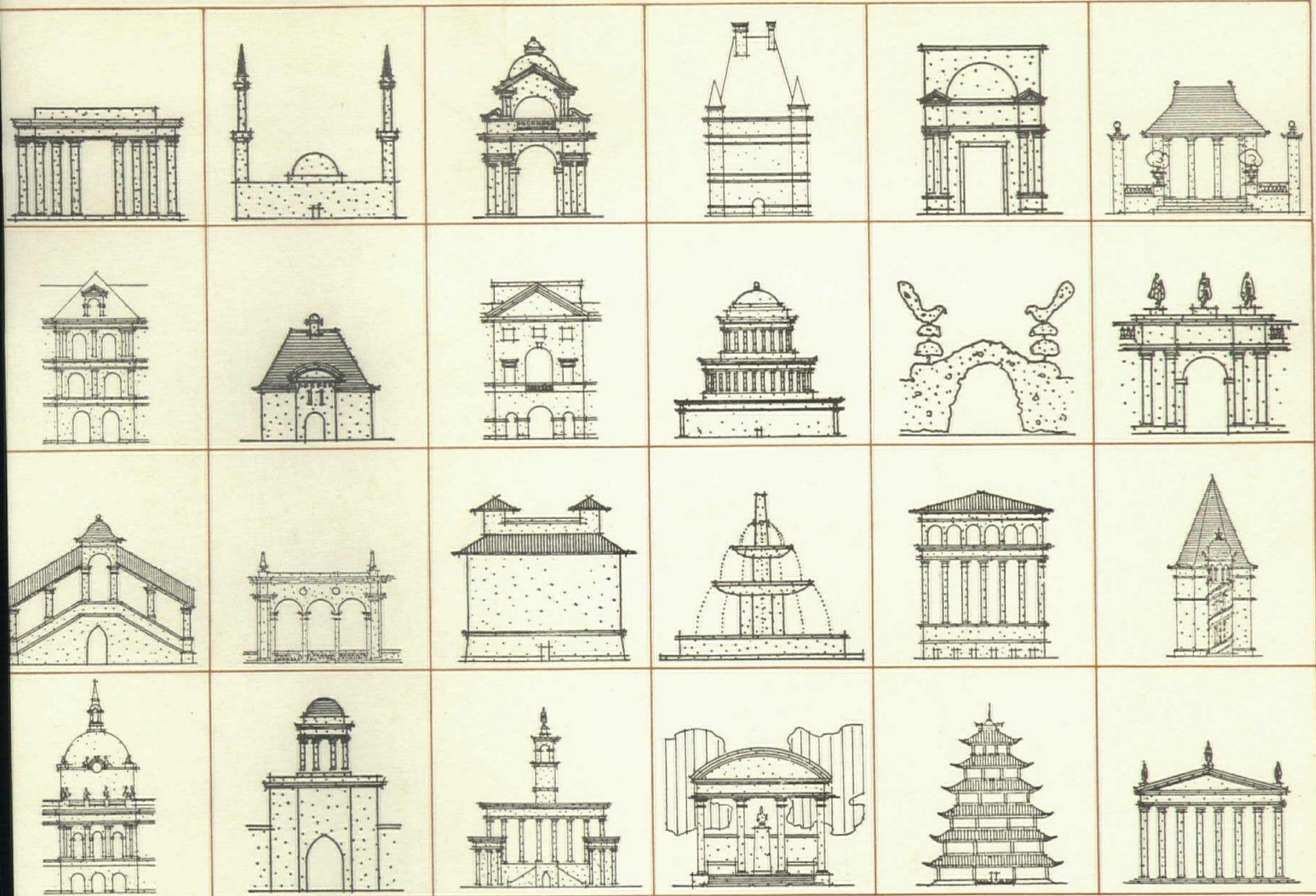




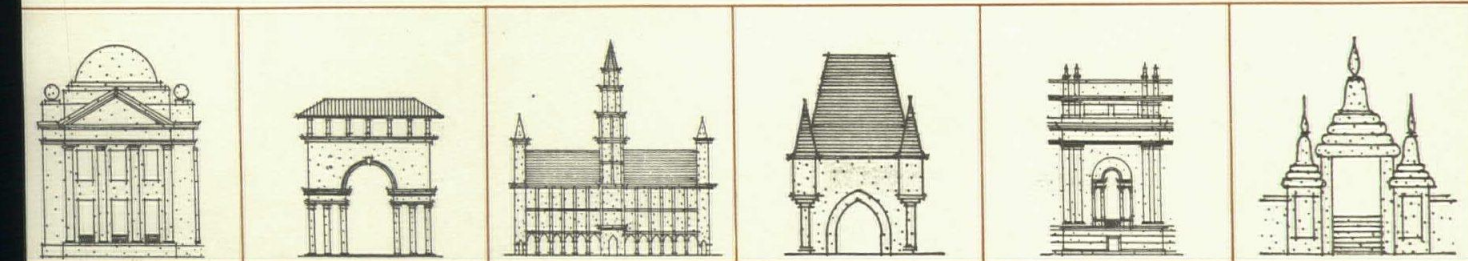


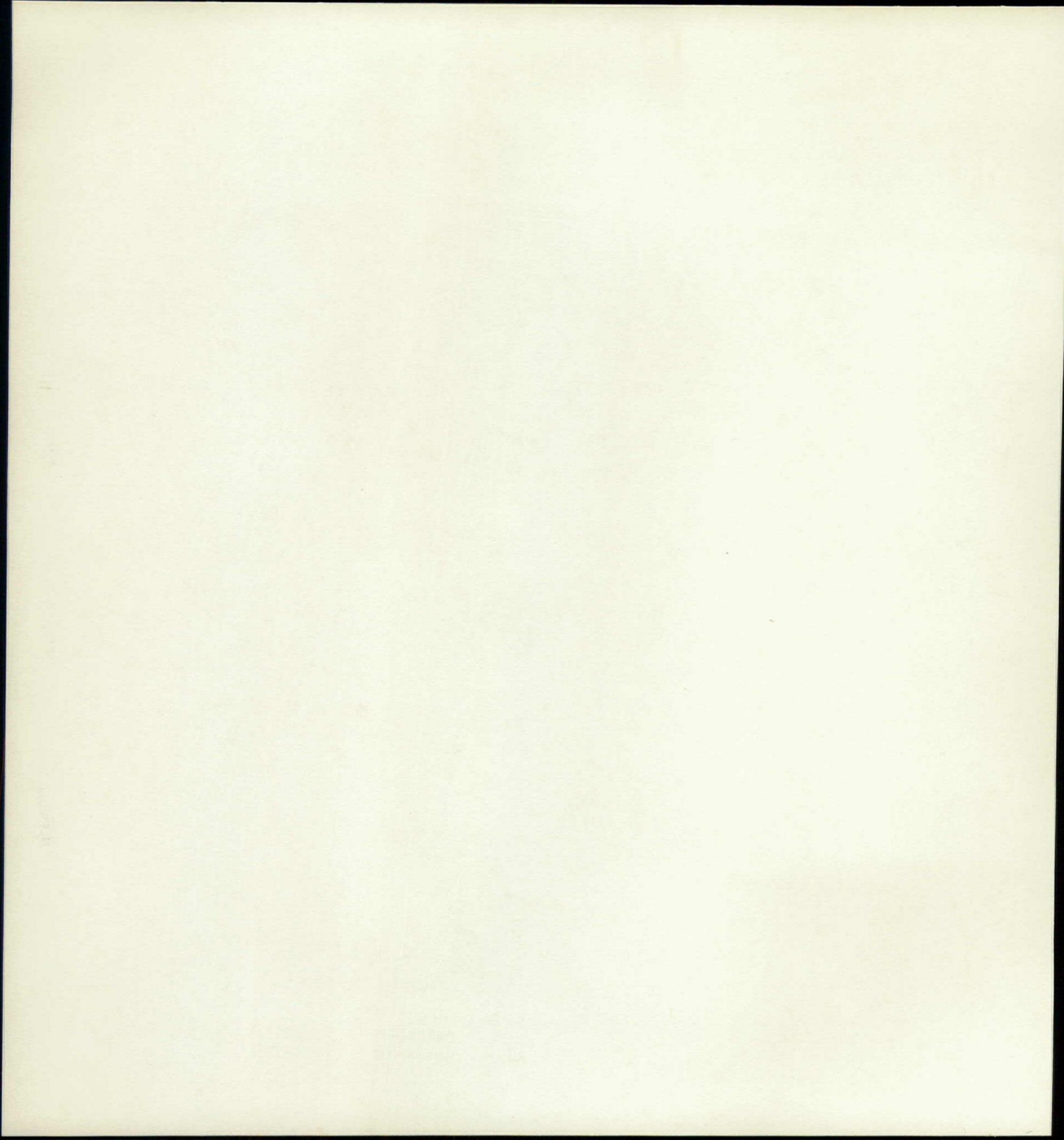
Great Models

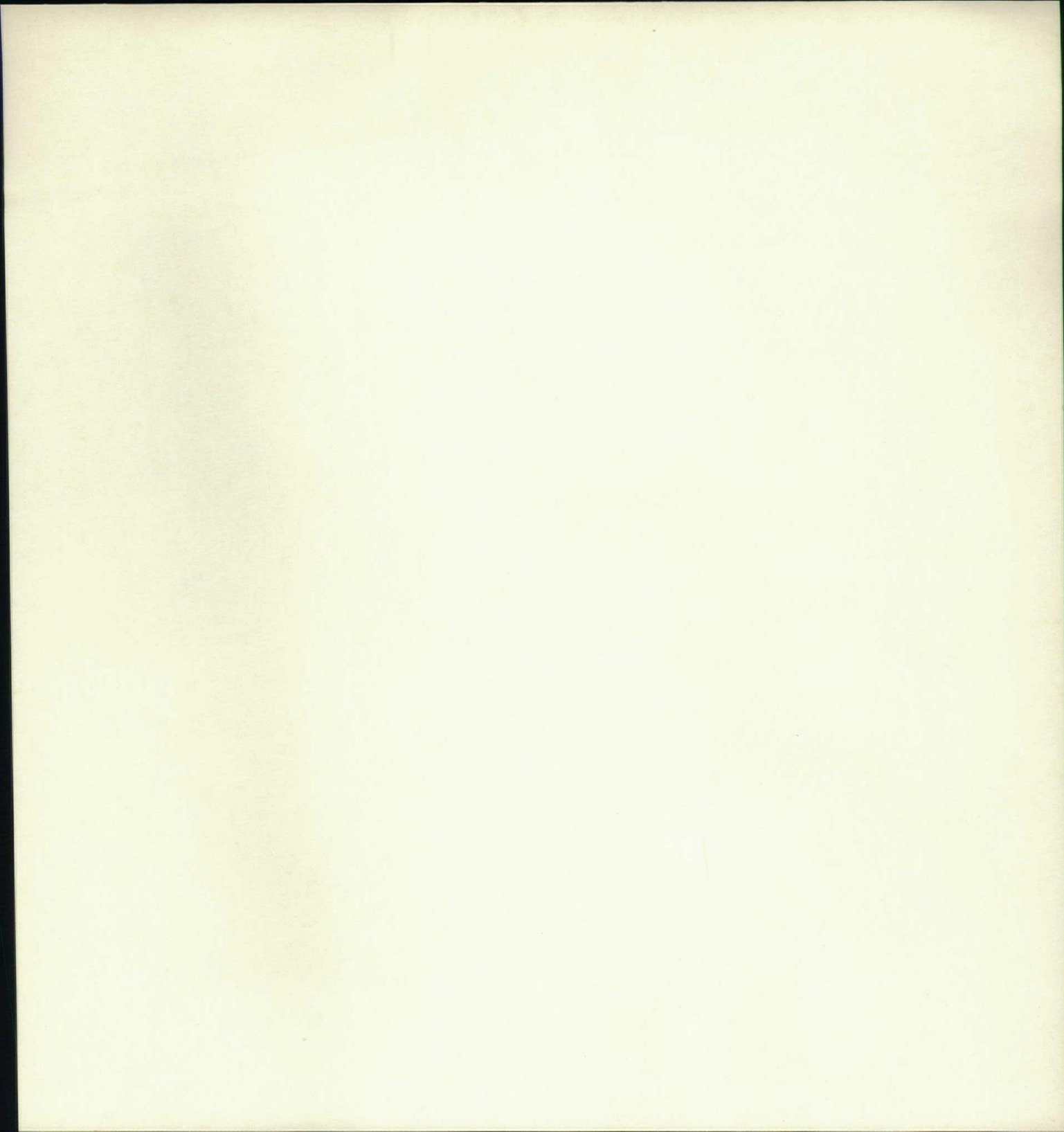


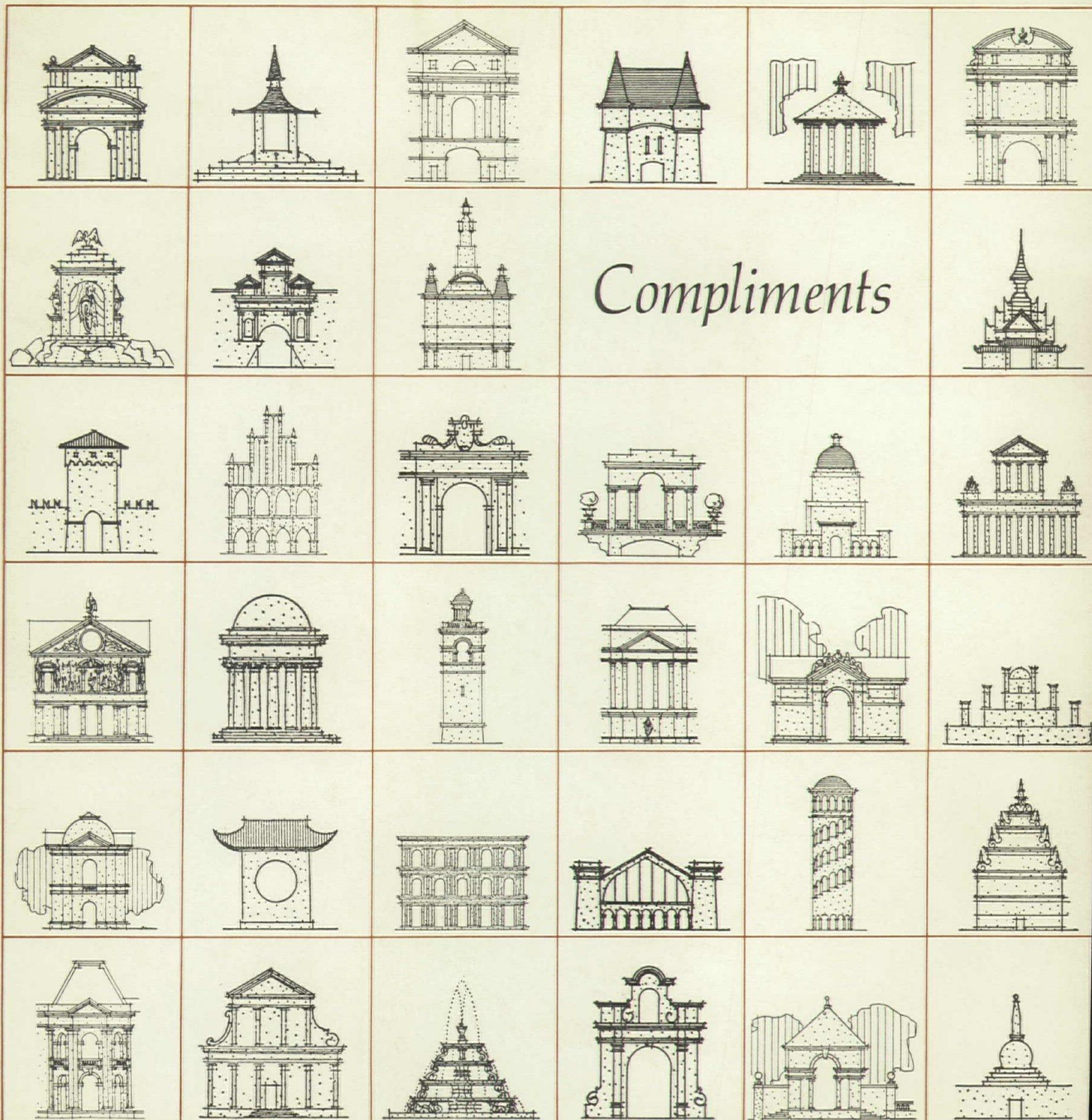


THE STUDENT PUBLICATION OF THE SCHOOL OF DESIGN
 NORTH CAROLINA STATE UNIVERSITY









Compliments

Great Models

DIGRESSIONS ON THE ARCHITECTURAL MODEL

Representation becomes nothing but a body of expressions with which to communicate our own images to others. In line with a philosophy that accepts the imagination as a basic faculty, one could say, in the manner of Schopenhauer: "The world is my imagination." The cleverer I am at miniaturizing the world, the better I possess it. But in doing this, it must be understood that values become condensed and enriched in miniature. Platonic dialectics of large and small do not suffice for us to become cognizant of the dynamic virtues of miniature thinking. One must go beyond logic in order to experience what is large in what is small...Large issues from small, not through the logical law of a dialectics of contraries, but thanks to liberation from all obligations of dimensions, a liberation that is a special characteristic of the activity of the imagination.

Gaston Bachelard

*Suzanne Buttolph
Charles H. Boney, Jr.*

Suzanne Buttolph, Editor
Charles H. Boney, Jr., Manager

THE STUDENT PUBLICATION OF THE SCHOOL OF DESIGN: 27
NORTH CAROLINA STATE UNIVERSITY RALEIGH 1978

*Cover: Roman temple from Vulci, Italy, 100 BC.
Collection of Villa Giulia, Rome.*

*Facing title page: Rudolph Steiner with the model of
the Goethaenum in 1914, Dornach, Switzerland.*

Copyright © by *The Student Publication of the School of Design.*
Library of Congress Catalogue Number 78-61898.

Digressions on the Architectural Model

Excursus

SUZANNE BUTTOLPH	1
REYNER BANHAM	17

Discursus

RICHARD OLIVER	23
GAETANO PESCE	27
GEORGE HARTMAN	31
RODOLFO MACHADO/ JORGE SILVETTI	35
ROLAND COATE	41
MICHAEL GRAVES	43
WILLIAM TURNBULL	47
EUGENE KUPPER	51
RICHARD MEIER	55
R. M. KLIMENT/ FRANCES HALSBAND	61
JAMES WINES	63
ROMALDO GIURGOLA	67
LUIS BARRAGAN	71
ROBERT STERN	73
STANLEY TIGERMAN	77
KINSAKU NAKANE	81
HUGH HARDY/ MALCOLM HOLZMAN/ NORMAN PFEIFFER	85
WARREN SCHWARTZ/ ROBERT SILVER	89
ANNE GRISWOLD TYNG	91
The Student Publication	96
Sources of Illustrations	96

The Student Publication of the School of Design was instituted in 1951 as a memorial to Matthew Nowicki, Head of the Department of Architecture at the time of his death, and this, Volume 27, still honors that memory.

I must gratefully acknowledge the assistance and encouragement of many people: to begin, Dean Claude McKinney for his continuing support; faculty members Bob Burns and Paul Tesar for their enthusiasm (especially P.T.'s multi-lingual translations), and the ever-polemical Denis Wood for his timely editorial advice. Allen Greenberg must receive especial thanks for reading my manuscript, for his many good suggestions, and for introducing me to John Wilton-Ely, to whom appreciation is also extended. I am indebted to the numerous kind museum curators and photo archivists, such as John Summerson of Sir John Soane's Museum, John Physick of the Victoria and Albert Museum, and Judith O'Neill of the Dumbarton Oaks Center for Byzantine Studies for their special effort. And for their constant attention to the works I must thank Winifred Hodge and her assistants; our librarians Maryellen LoPresti, Gloria Close, and Lynn Crisp for unravelling the mysteries of copyright, and Bill Bayley for photographic and graphic assistance.

S.B.

to Henry Kampboefner

Constantine and Justinian present models of Hagia Sophia and the city of Constantinople to Christ and the Virgin in a mosaic in Hagia Sophia. Opposite, funerary model of house with garden from the tomb of Meket-ra, Thebes, Egypt, Metropolitan Museum of Art.



SUZANNE BUTTOLPH

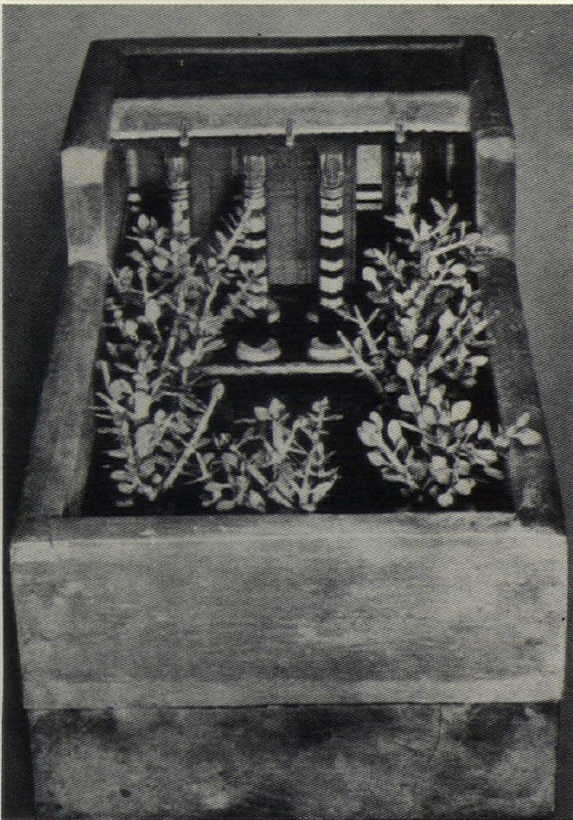
Great Models

Architectural models offer a record of architecture older than the profession itself; a record which expresses all the varying spirit and meanings which both architects and their public give to buildings. It is an enchanting journey through entombments and religious devotions, through records left in fresco and mosaic, through the hands of workmen, architects and clients, and the eyes of the perpetually fascinated public.

The earliest existing models were funerary objects placed in the tomb of the architect or donor of the edifice to surround him with the familiar, and as attributes of his work or generosity; such are the tiny Roman temple from Vulci (*cover*), and the Egyptian house replete with miniature leafy garden. Although the Romans occasionally accorded the architect such recognitions, the association of the model with the donor (the early client was frequently a wealthy patron building a church or temple, thus a "donor") rather than the architect is prevalent until the Renaissance.

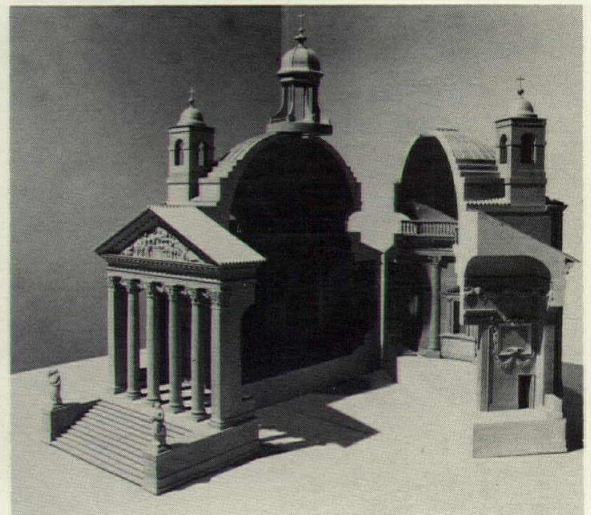
The model as a devotional image in later periods, particularly Byzantine and Medieval, shifts to the less secular "votive" model which is represented in paintings as being given to Christ as an offering of dedication or fulfillment of a vow. Here we may look to paintings to identify the model's use since—although it is supposed that models remained in use as necessary building tools—none remain, not being afforded the protection of the tombs. Moreover, the paintings are possibly even more interesting than the models themselves, for the paintings tell us how the models were used and who used them, what they symbolized and represented, and the emotion and respect they commanded. These painted favors do not necessarily represent actual designs, but promote symbolic "conversations" on the birth of a building, and provide the "image" rather than the specifics of a design, to borrow the words of Hardy Holzman Pfeiffer in describing their own models.

The early donor as seen in paintings and mosaics is usually a highly placed religious or political personage, shown presenting the model of the church to Christ or to the Virgin. In *The Nativity* by the Master of Hohenfurth, the small Jesus has only just been born



and He is already being presented the *cadeau* of a church in His honor by a reverent man wearing the robes and shield of a king. The model reflects much of the characteristic design of small churches of the time and place of the painting. We see in a magnificent lunette mosaic in the south apse of Hagia Sophia, Constantinople, head bowed to Christ's right, offering the model of Hagia Sophia, while Justinian in a similar pose presents a model representing the city of Constantinople. The models are readily identifiable representations of the actual designs, with Justinian's featuring the walls and main gate of the city of which the Virgin is guardian. An eighth-century mosaic

Left, "The Nativity" by the Master of Hobenfurth, c. 1350, panel from the Hobenfurth Altarpiece, National Gallery, Prague. Below, an eighth-century mosaic of Pope John VII with the model of his oratory, Vatican Grottoes; documentary model (1976) of Palladio's tempietto at Villa Barbaro, from the collection of Centro Internazionale di Studi di Architettura Andrea Palladio di Vicenza.



from the Vatican Grottoes depicts a poignant Pope John VII bearing an obviously symbolic model of his oratory within folded arms. Pope John's square halo tells us that as donor he was still alive when the mosaic was laid.

Were it not for the absence of the architect from these tableaux, the practice of telling the story of the participants and of the building upon the walls of the building itself—and in so ceremonial a manner—would recall the rite of laying a cornerstone inscribed with the name of the architect and correspondents in the project. One is also reminded of the carved models found on the walls of the Gothic cathedrals, left by the builders as small portrayals of the great edifice, and as testimonial to the fulfillment of their pledges to build a House of God. The skyscraper of 60 Wall Tower in New York City continues this tradition with a sculpted model at the entrance which enables one to see and comprehend the entire building since, like Gothic cathedrals, so tall a building will never be seen in entirety from the ground. Similar also to these miniature replicas are the documentary models, often very captivating, which attempt to describe the beauty of a building now lost or ruined, or perhaps merely inaccessible. Sir John Soane's vast antiquarian collection of plaster casts and wood models assumed an unintended and haunting importance as one by one many of the original buildings were themselves destroyed.

Although the Gothic builders are believed to have used models extensively, only one is still in existence, that of the late Gothic church of St. Maclou at Rouen. The Gothic reliquaries which housed the bones and sacred relics of the saints were frequently intricately detailed and expensively crafted fascimiles of the cathedrals, and most probably are further testimony to the use of models by Gothic builders. The model was thus at once a symbolic presentation of the design, an homage to God, and a working tool for the craftsmen. Matteo Di Giovanni's beautiful *Madonna and Child with Angels* pictures neither architect nor donor, but an ingenuous model of the intended building with the donor's request for funds to build the church: behind the Madonna the scroll

Model over entrance of 60 Wall Tower, New York City. Photograph by Cervin Robinson.





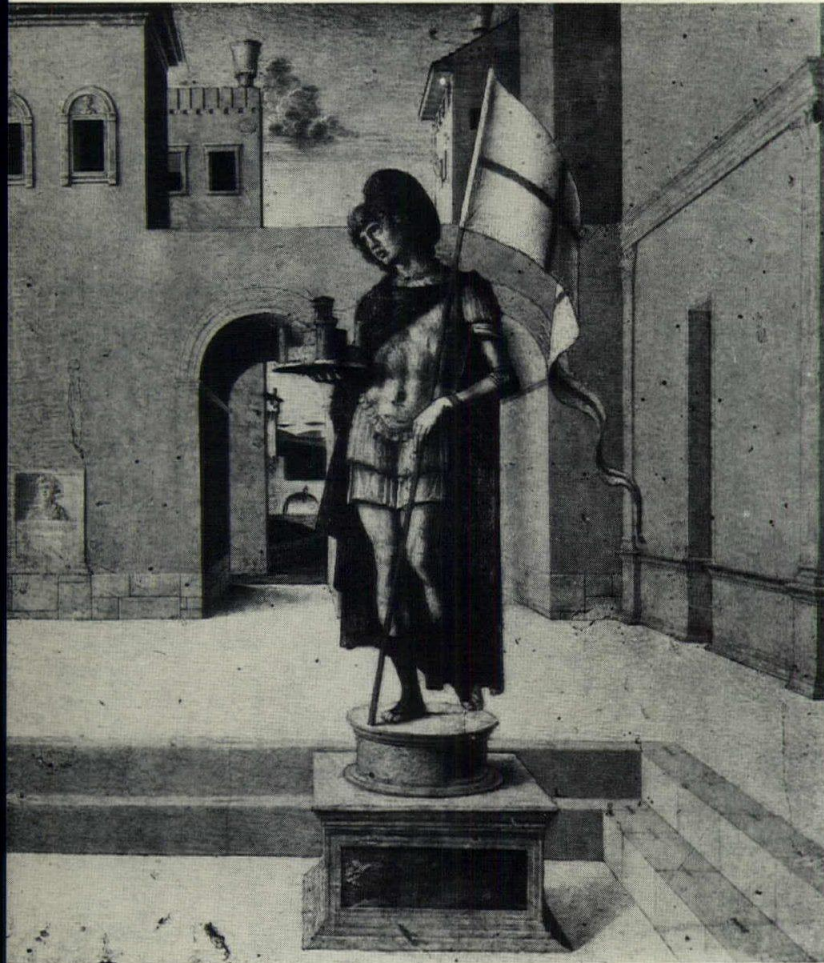
"St. Jerome" by Alvise Vivarini, c. 1490, wood panel, Samuel H. Kress Collection, Denver Museum of Art, Denver. Below, detail from the "Votive Panel of St. Lambrecht," attributed to Hans von Tübingen, 1420-1440, Landesmuseum Joanneum, Graz (Loan from Abby of St. Lambrecht). Opposite, Matteo di Giovanni, "Madonna and Child with Angels," 1485, Sterling and Francine Clark Art Institute, Williamstown, Massachusetts.

reads "Let every man help on this good work begun in honor of Mary, if you wish the blessing of the Lord,"¹ a solicitation (with that little prick of conscience) that modern model-makers sometimes imitate. It is enchanting to note the tiny figures of the masons working on the model, laying brick and carrying baskets of mortar on their heads, much like the human figures of the client contemporary architects add to give the model scale and ambiance.

This frequent depiction of religious persons with the representation of the building suggests a meaning quite beyond that of the architectural intention. The small model begins to play an almost iconic role as we can see in Alvise Vivarini's portrait of *St. Jerome* lovingly caressing a small representation of a church. Other paintings show him carrying it more in the manner of a revered book of prayer, but never do the various models appear to illustrate the same design twice. St. Dominic somewhat ruefully offers his tribute of the church he founded for the Dominican order in Lanino's *Madonna Enthroned with Saints and Donors*. In an Austrian painting of the fifteenth century, we see a nun praying before the baby Jesus, but the model is no longer in her hands, it is perched upon her sleeve as though a badge. In this manner the model becomes an attribute of the person rather than of the building, perhaps in a similar manner that







"St. Terentius" by Giovanni Bellini, c. 1474, wood predella panel from the Pesaro "Coronation," Museo Civico, Pesaro.

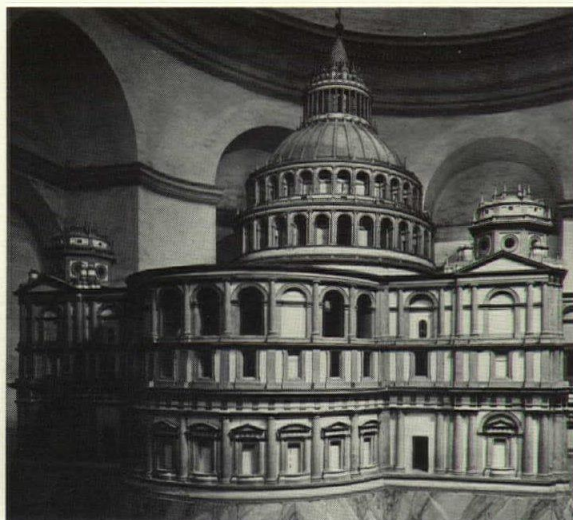
today models often reveal more about architectural ideas and personalities than about buildings.

The image of the small building answered a deep urge to symbol and allusion among Renaissance painters, reflecting the "dynamism of the miniature" of which Gaston Bachelard speaks. St. Barbara is invariably portrayed with a small tower as her attribute, which is not representative of a building she helped build but of the tower in which her father imprisoned her. The model held in the hand of the soldierly *St. Terentius* by Giovanni Bellini is that of Fortezza Costanza in Pesaro, the fortifications of which were begun in 1474, the year of the painting;² but it is also the personal symbol of a man whose legend, whose "attributes," can be symbolized not by the real building but by the *representation* of the building which, because it can be held in the hand and is without the unnecessary information reality affords, has powers and attributes the real building does not.

Such models may even be testing grounds for the architectural ideas of painters, as we may realize in looking at Pacchiarotto's elegaic *Sulpicia Upon a Pedestal*. Her inscription reads in part: "I am Sulpicia, who deserved to be chosen from the whole city to build the temple to Venus, the chaste and virtuous one."³ Only Sulpicia was pure and exemplary enough to bear the model and build the temple. Behind her to the right is the shrine of Venus Verticordia under construction, and to the left, Rome. The model she bears is strongly evocative of the architecture of Peruzzi, Pacchiarotto's student in painting, and possibly also in architecture.⁴ Not satisfied with merely rendering the designed building into the painting, it must be illumined in all the majesty of the presentation. As requiem for an unbuilt building, the model represents not an actual design which was built, but ideals about something which could be built, perhaps something which *should* be built.

The early Renaissance architect had to rely on models as communication to the craftsmen since advanced drawing techniques had not yet been developed. Enormous models of great cost with intricate detailing of interior and exterior, such as Sangallo's model (1" = 2') for St. Peter's, were frequently made

At left, "Sulpicia Upon a Pedestal" by Giacomo Pacciarotto, c. 1500, wood panel, Walters Art Gallery, Baltimore. Below, Sangallo's model for St. Peter's, 1539-46, Vatican Museums, Rome; and "Madonna Enthroned with Saints and Donors" by Bernardino Lanino, 1552, gift of Samuel H. Kress Foundation, North Carolina Museum of Art, Raleigh.



Giorgio Vasari, "Pope Paul III Directing the Rebuilding of St. Peter's," 1546, Sala di Cento Giorni, Palazzo della Cancelleria, Rome.

of both wood and clay, and many still remain. Often they required craftsmanship of the calibre required to build the building. Philibert in the sixteenth century lamented the building of "fancy models that were painted up to conceal a poor design."⁵ But Fillippo Baldinucci, in his *Vocabolario toscano dell'arte del disegno* in 1681, observed that "The model is the first and principal undertaking of the whole project, for by making good the imperfections he sees therein, the artist arrives at the most beautiful and perfect form. For architects, the model helps to establish the



dimensions of length, breadth, height, and thickness, and the number, quantity, kind, and quality of those things required to make the building perfect."

These models were for the first time representative of design ideas for which an individual designer would receive especial credit, and were executed in order to win the approval of the client or to place their makers in positions of favor in the frequent competitions for design contracts. The models were no longer mere representations, instructions for the builders, or documents of buildings already built. In their new position, they took on the presence and grandeur of the client, the pomp of the presentation, the lofty ideals and vanity of the artist. It is only now, as Rodolfo Machado notes in his article, that the paintings depict the *architect* in the role of presenting his model, and his design. Having won the approval for his plan for the fortification of San Miniato, it is now Michelangelo himself who directs the construction from a model proffered by an apprentice (*p. 97*). Competitions such as that for the facade of Santa Maria del Fiore in Florence in 1590 produced many beautiful models of wood, still existing, and established a tradition of competitive creativity and quality presentation, furthered by the Beaux-Arts and still in force today: *vide* Theo van Doesburg working on his model of the Rosenberg house for the Paris competition of 1923.

The gradual deemphasis of the model and pre-eminence of the drawing was encouraged by the rapidly growing audience for architectural treatises and pattern books, and possibly by the eventual development of the architectural office, where assistants shared the task of illustrating the master's ideas.⁶ The greater versatility of the drawing made it the better medium in which to note and develop the ideas of another. In more recent years, one is reminded perhaps of Addison Mizner of the 1920's, drawing, "modelling," ideas for villas for wealthy Palm Beach ladies in the wet sand, while his assistants rushed to take down the design on paper. The painting by Giorgio Vasari of *Pope Paul III Directing the Rebuilding of St. Peter's* illustrates the building during construction, and it is significant that no *model* is on hand but



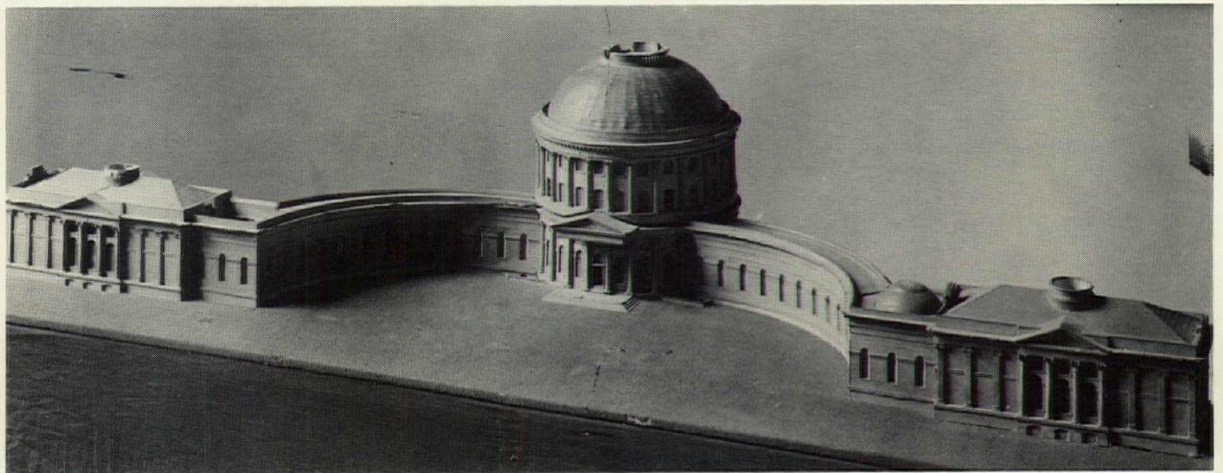
*Theo van Doesburg and Cornelius van Eesteren
working on the model for the Rosenberg House,
Paris, 1923.*



Above, model for Jefferson's Virginia State Capitol, 1786, Virginia State Capitol, Richmond. Below, model of intended design for Ickworth by Francis Sandys, 1796.

an enormous drawing which is unfurled by four sylphs as though a Commandment (note that it is the *client* who is again represented with the attribute of the building, not the architect). The study drawings by such an architect as Peruzzi make it clear that the new drawing methods extended to the realm of designing, and not merely communication between correspondents in the project. Clearly the drawing offered the new professional and scholarly architect options which the model could not, and which were more rewarding intellectually.

Certainly after the eighteenth century fewer and fewer models were found necessary to the production of a building. In directing the building of the Virginia State Capitol from Paris in 1786, Thomas Jefferson sent both detailed drawings and a model, the model made by his colleague Clerisseau. The model for Ickworth House in Suffolk by Francis Sandys in 1796, with its elaborate painted interiors represents one of the few early models of a private residence, and was made just before the demise of the model brought on in part, as John Wilton-Ely suggests, by the rise of the picturesque. Although models continued to be made in the nineteenth century—Sir John Soane produced over 100 models of his own works—architects increasingly found greater advantage in “the seductive charms of the architect’s colored impression, with its emotive devices of



romantic settings and contrived perspectives.”⁷ While failing to represent the picturesque, the model was itself so to the eye of Frank Dicksee, painter of *The House Builders* of 1884, Sir and Lady Welby-Gregory with A.W. Bloomfield’s model of Denton Manor.

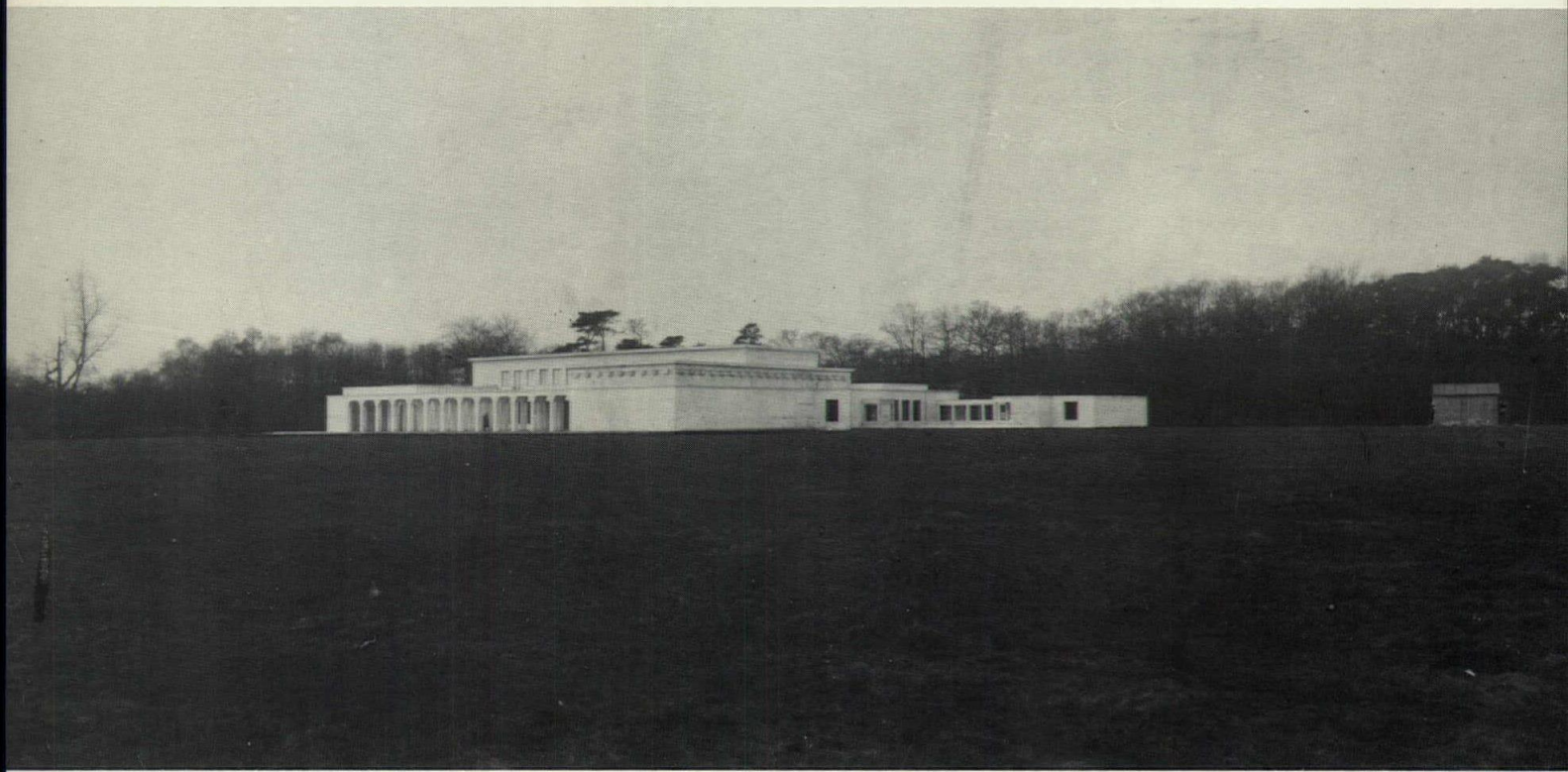
*“The House Builders” by Frank Dicksee, 1884,
Courtauld Institute of Art, London.*



Sir John Soane's prolific model-making suggests the era's last vestige of the tradition of the grand model as a requisite for presentation, and which would not be seen again until the mid-twentieth century. Made of expensive wood and careful joinery, the models had elaborately articulated interiors removable floor by floor and room by room, and with considerable attention to detail. But cost, and the decreasing perception of its value, doomed the model.

Yet, it is not a matter of the drawing *versus* the model as is popularly proclaimed. Apart from style, the drawing has a fitness and convenience for the modern world which the model can never approach. A model cannot be fed into a machine to duplicate itself, cannot be photographically enlarged or reduced at the touch of a finger. The model does not have that inherent relationship with writing and notation which the two-dimensional drawing has and which permits greater abstractions and many more

Wood and canvas model for the unbuilt Kröller House by Mies van der Rohe, The Hague, Holland, 1912.



decisions and trials in the same period of study. Problems of wear and maintenance preclude a long life.

But Robert Stern observes in his article that “architects have become accustomed to use the word *model* in a very different way from its traditional usage: once it conveyed a sense of action (to model a space); now it conveys a static noun-or-object-like quality.” In this respect it is important to note that the architecture of Rudolf Steiner (*title page*), Eric Mendelsohn, and Antonio Gaudi (as Gaetano Pesce so appropriately brings up their names) has a plastic quality—not a product of traditional architectural methods, or even necessarily of architects—which puts them out of the mainstream; yet certainly their work is architecture. For men who had already worked with their hands or who had not received a formal architectural education, the need to express ideas in an academic, abstract or conventional sense was less strong. Unlike most architects, they saw their workplaces as workshops, not offices, and even Le Corbusier was photographed turning through his paintings in a studio cluttered with plaster and cardboard. We see in a photo of Gaudi’s workshop the plaster casts of the towers of Sagrada Familia; while in another old photo of Gaudi’s bedroom, an enormous plaster model stands only inches from the venerable old man’s bed.

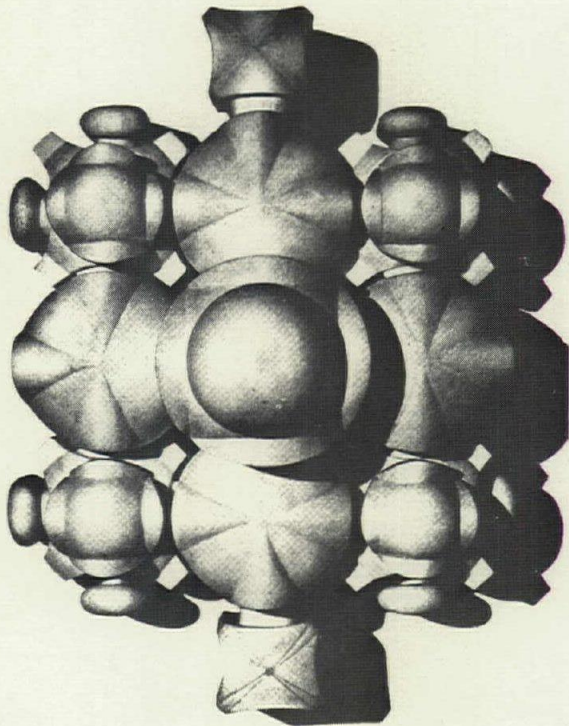
This new model for study is a relatively recent development in the model’s long history as funerary relic, votive model, building tool, religious symbol, documentary and presentational device, and the myriad shades of intention in between. It is a logical manifestation of the twentieth century’s emphasis on experimentation and method, and a result of the greater frequency of team work at the design stage. And it is probably not surprising that a procedural temper which sets goals and demands results at every stage of the general process of creation and discovery would not also render the process of architecture artifactual, and that the byproducts thereby created, drawings and models, would find their own market.

Thus we see now the new study model whose intention is a building, and the architectural study which



Antonio Gaudi's workshop in the Sagrada Familia.

Illustration from Luigi Moretti's "Structures and Sequences of Spaces": the internal spaces of Guarini's project for S. Filippo Neri.



finds little purpose in buildings but in the expression of ideas about buildings, and whose genesis is perhaps closer to the allusive model of the Renaissance painter than to its contemporary counterpart.

The speculation that architects' reliance on models for study has made buildings look more and more like models is unlikely, given the constraints of time and cost on model-building. The drawing is still the primary tool, and the truth of the matter may be that architects are *drawing* (as opposed to modelling) buildings which have the object-quality of models and hence look good as models, and look like models when built. These are models which are the logical three-dimensional extension of the drawing, not the plastic expressive models of the builder.

Different from these also are Luigi Moretti's models of *spaces*, rather than of forms or surfaces; here, for example, the internal spaces of Guarini's project for S. Filippo Neri. We recall the extraordinary full-scale model in wood and canvas for Mies'

unbuilt Kroller House, the wooden model for the altar of S. Carlo al Corso in Rome which took the place of the "real" altar for over a hundred years, and Richard Oliver's modelling at full-scale the interior for his shop in SoHo. The genus of model which Pesce suggests in invoking Picasso's thought on motion is one which allows for the experience of the space while designing, not a model which only tests or presents in three dimensions decisions arrived at in drawing.

As each model conveys all and only those evocative and mnemonic qualities which its maker or keeper attributes to it and which its audience may "wrest" from it, so the iconic objects with which Le Corbusier surrounded himself, the beef bones, conchs, skulls, pebbles, and crabshells, were for him an inventory of shapes and colors and forms which melted painting, sculpture, and architecture into one. As small objects they are models; as found-models they initiate architectural ideas which made-models can further.

For some architects, the model as a tool has an almost deific importance, much as a great carpenter cherishes and champions the instruments of his craft. But the model has rightly always been many things, not merely things intended, or needed, by architects. Says Eugene Kupper in his article, "A really beautiful model condenses the monumental instinct in architecture—the integrity of the object as icon," a penchant toward which not only architects incline.

1. Berenson, Bernard, *Homeless Paintings of the Renaissance*, Indiana University Press, 1969, p. 56.

2. Robertson, Giles, *Giovanni Bellini*, Clarendon Press, Oxford, 1968, p. 68.

3. Zeri, Federico, *Italian Paintings in the Walters Art Gallery*, Walters Art Gallery, Baltimore, 1976, Volume one, p. 136.

4. Berenson, B., p. 69.

5. Kostof, Spiro, Ed., *The Architect*, Oxford University Press, New York, p. 142.

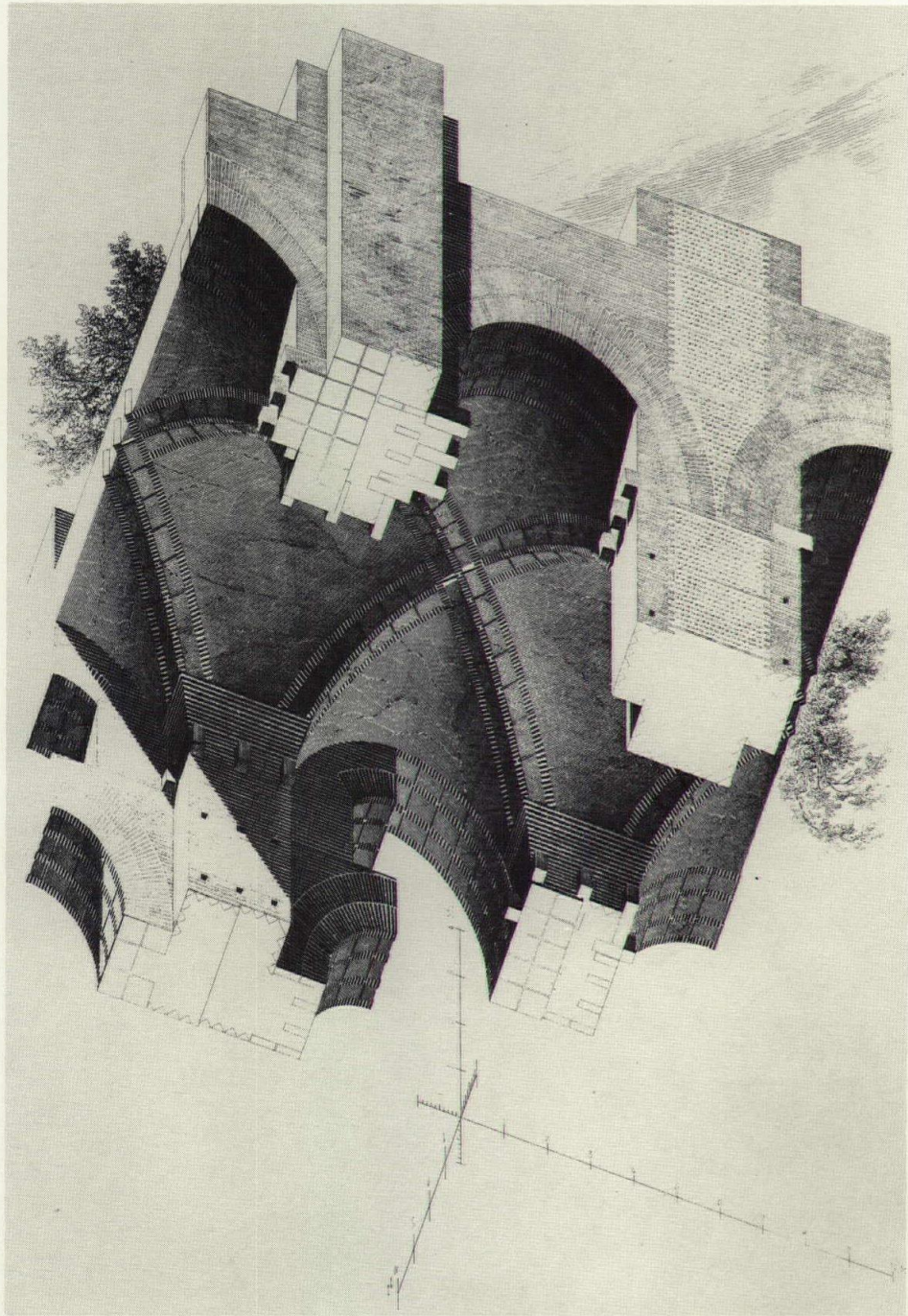
6. Kostof, S., p. 147.

7. Wilton-Ely, John, "The Architectural Model," *Architectural Review*, July, 1967, p. 32.

*Le Corbusier at home with his collection.
Boulogne, 1951. Photograph by Lucien Herve.*



Illustration from A. Choisy, "L'Art de Batir chez les Romans," the Palatine gate.



REYNER BANHAM

Iso! Axo! (All fall down?)

In November 1977, an energetic visitor to New York could have taken in no fewer than three substantial exhibitions of architectural drawings back-to-back— at Leo Castelli's gallery, the Cooper-Hewitt Museum, and the new Drawings Center down on Greene Street. Many of those who did so came away feeling disturbed rather than elevated by what they had seen, and puzzled to know why drawings by living architects, previously hard to see outside MoMA, were now so conspicuously exhibitable.

The rise of interest in architects' drawings (and, to a lesser extent, models) has not been as sudden as it looks. Short-memored New York gossip puts it down to the Beaux-Arts show at the Modern but a foray through the magazine files of any architecture library will show that it has been going on longer than that. The invention of the "Project Award" by certain magazines (*PA*, *AD*) in the Sixties as a way of jumping the gun on other (competing) magazines which had secured priority of publication of the completed buildings, put a premium on knockout presentation drawings and began to raise a new generation of designer-delineators who were often hired as such, direct from architecture school graduation exercises.

“a peculiar kind of professional
atavism”

In the same period, the emergence of world-class designers who were also draftsmen of the highest quality, notably James Stirling, was paralleled by the emergence of lesser talents whose work often looked better in drawings than it ever could in real life—one thinks, unavoidably, of the New York Five. Both these cases, however, were marked by a revival of interest in one of the more strenuous yet potentially decorative forms of architectural projection—the isometric or axonometric.

The use and performance of the axo or iso are instructively ambiguous. In spite of their all-

Reyner Banham is an architectural historian, journalist, and Professor and Chairman of Design Studies at the School of Architecture and Environmental Design, State University of New York at Buffalo, where he is currently developing an MA program in “Total Building Biographies”—conception to demolition or landmark status.

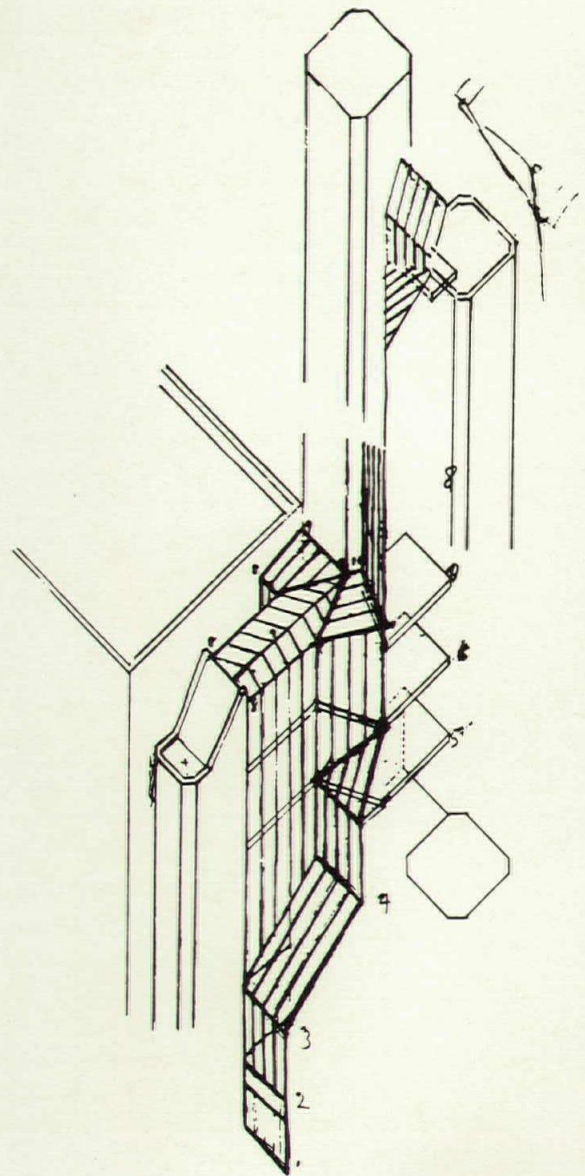
dimensions-true quality, they cannot normally be used as a means of giving instructions to the building industry. They are not a convenient convention for production drawings in spite of their ability to explain how things fit together in space—the old 3-coordinate, 3-view, orthogonal projection is still the normal language of production, supplemented by devices like the “exploded” perspective.

What axo’s and iso’s can explain, however, is how spaces relate in space and how the structure of the building connects and separates them. As Charles Jencks observed: “This method of drawing is really a method of designing, for it allows the architect to work out the space, structure, geometry, function and detail altogether and without distortion.” And, indeed, the Stirling office used axo’s and, to a lesser extent, perspectives, to monitor their design processes, assembling detailed and localized decisions into single comprehensive presentations where their cumulative and interrelated consequences could be seen.

But these are not drawings that need ever leave the office; they concern the interior processes of design, not the exterior processes of realization in the physical world. However, they *do*, increasingly, leave the office and enter the world; and for this there is a reason and an excuse.

The *excuse* is that they illuminate the workings of the creative mind and thus ought to be seen by everybody. This is simple baloney; your average axonometric by Stirling, say, or Meier or Eisenman, illuminates nothing; it simply records a particular stage of the design process in permanent and embalmed form; is usually too prissily finished to reveal any changes or development in itself; and—in the case of Stirling—will sometimes post-date the working drawings, so that it merely immortalizes the final outcome of designing.

The *reason* why such drawings get loose from the studio and turn up in Leo Castelli’s gallery is that axo’s and iso’s make such entrancingly ambiguous patterns on the paper surface. Emphasize “paper surface”—for all that such drawings might indicate about spatial relationships with all dimensions true, they are not the vanishing-point perspectives in



James Stirling, drawing for glass “cascade” at the Leicester Engineering Laboratories.

which we have long been indoctrinated to see the third dimension of depth without conscious effort. These drawings, taking their cue from the illustrations in August Choisy's *Histoire*, begin from the depiction of a plan, or part-plan, flat on the paper surface and as if seen from above or below. Then, as in the house-interiors in Japanese prints, we proceed to draw the uprights, equally flat on the paper, but seen from the side. Information about the third dimension is something we impute to, or wrest from, these drawings by an effort which involves spatial sensibilities and rationalizing powers very different from the customs of perspective which are now as normal for our culture as the grammar of everyday speech.

This tense relationship between an almost inscrutable spatial notation and an (often deliberately) elegant two-dimensional composition can give these projections the eye-teasing charm of an "Analytical" cubist painting (and ancestrally, behind all this, lurks that late-late cubist, Le Corbusier, and the frontal axonometry of his Purist paintings). So, one way and another, the characteristic architectural drawing of the late Sixties becomes a gallery art-object in the late Seventies.

The reason why this turn of events has evoked some alarm, however, lies elsewhere. It does not take much cynicism to divine that the present interest in gallery exhibitions of architectural drawings arises from crude economic pressure: if architects at present cannot sell their services because of the building slump, they can at least sell their drawings down in SoHo. However, this is too crudely Marxist an interpretation of architectural drawings as "art-produce." The preoccupation with delineation and draftsmanship goes back before the present economic recession and applies to parts of the world where building is still brisk business.

But cultural, ethical, and intellectual threats to architecture also go back before the economic crisis. If there were any reasons to pay serious attention to Charles Jencks' mythical chronology in which "Modern Architecture died...when the infamous Pruitt Igoe scheme, or rather several of its slab blocks,

were given the final *coup-de-grace* by dynamite" it would be because the exact time of that much-celebrated demise may be relevant to the rise of the present interest in draftsmanship.

For architectural drawings are not only elegant and saleable; they are also manifestations of a skill that the profession has immemorially treasured as central and essential to its well-being; and as Mike Brill has said: "When the architectural profession feels itself threatened, it goes Hassidic and we all begin to rock and chant." The worship of drawing is a peculiar kind of professional atavism, architecture withdrawing from a hostile world to comfort itself in a security blanket that no one can take away from it. For drawing, the essential skill in earning the right to hang up your professional shingle (if what happens in architecture schools all over the world is any indicator) is something that can continue whether or not you are building anything at all. Doing drawings is a way of continuing to make like an architect without serving the architect's social function of creating buildings. Yes, if you insist, masturbation.

This is hard saying, but needs to be said. As soon as we regard drawing as an end product of design, we have architectural *interruptus*; we have the creative process cut short at the point where it could become creative in "the world beyond the drawing board." The true power of architectural draftsmanship (of all design draftsmanship, indeed) derives from its being a means, not an end. It happens that architectural draftsmanship has conventions and procedures that are historically cognate with those of graphic art and with painting; like them it is one of the nobler legacies of the High Renaissance and thus stands close to that Academic or Beaux-Arts tradition that, for better or worse, is the core of strength at the heart of western art.

It is therefore very easy for architectural drawings (unlike engineering drawings, for instance) to be mistaken for art works, or passed off as art works. But the moral splendor of architecture is that it is more than a mere art; unlike painting and sculpture which engage only the "cultural" parts of our being, truly great architecture engages the whole man, both

as designer and consumer. Sculpture and painting act upon us only through the conventions of culture, but—as anyone will know who has torn her clothes on hush-hammered detailing by Paul Rudolph—architecture affects us in direct and unavoidable physical ways. Painting and sculpture only rot the mind, but “you can kill a man with a building.”

This mortal dimension that makes architecture the noblest of all design professions—and all creative vocations—sheds nobility on architectural drawings as well, as long as they serve the noble end of causing buildings to be built. Detached from that end, they dwindle to the level of bad art, *very* bad art in most cases. Compare, for instance, any great Beaux-Arts Rome Prize *projet* with—say—Borromini’s endlessly re-jigged drawings for San Carlo alle Quattro Fontane. The Rome Prize *projet* is an elegant pattern on the paper, especially in plan; and it may offer allegories, as it were, of some “commodious” French juxtapositions of room to room (but usually doesn’t). Borromini’s drawings record the efforts of a man who can see an ellipse in his mind’s eye, trying to find a way of approximating an ellipse in real three-dimensional masonry, in the days before (only just before) the technique for drawing ellipses was discovered.

Borromini’s ellipse is, in fact, constructed of segments of circles—the drawings battle with the problem of locating the centers from which those arcs must be struck, and some of those centers are right outside the constricted site on which the tiny church had to stand. Those drawings have the life-or-death grip of reality, as does say, Stirling’s famous perspective of the glass “cascade” at the Leicester Engineering Laboratories (that drawing was the only way of explaining to the glaziers what had to be done) or Mies van der Rohe’s drawings of the under-window air-conditioner boxes at Lafayette Park.

Anybody who has used a Mies office drawing for any purpose whatsoever will know that he has held a masterpiece. His are working drawings; they give instructions on how the building is to be assembled from its component parts; they direct care to the details. They also stand at the exact point where the process of intellectual creation transforms into a

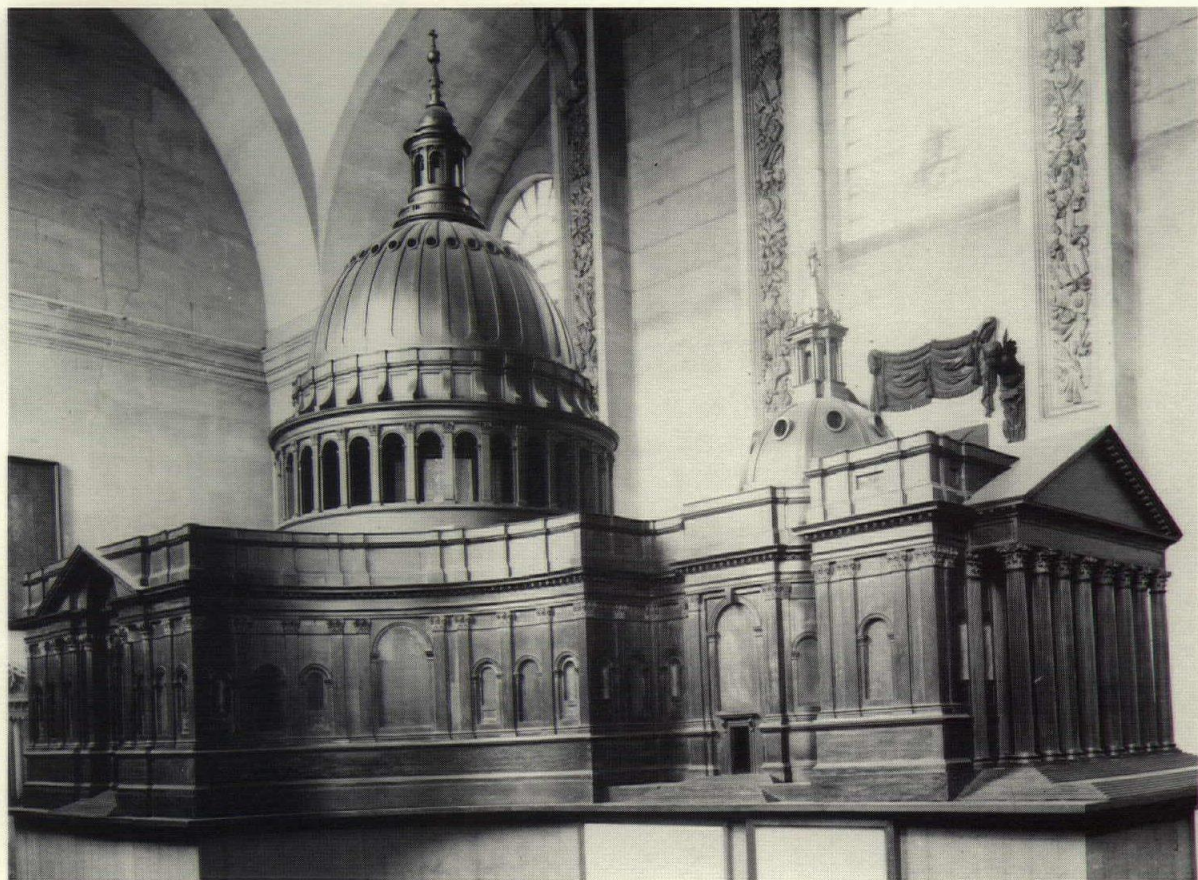
process of physical creation. Therefore, like all good working drawings, they have the kind of authority that no other kind of architectural drawing can have because they are, so to speak, the architect’s last word before the building slips out of his hands. Ingres once famously said that “drawing is the probity of art”—we can go further and say that “working drawings are the probity of architecture.”

Models, even Mies’ models, do not have that quality. Mies’ model-work serves a function more like that of Borromini’s battles with the ellipse, or Brunelleschi’s cutting tricky voussoir shapes out of lumps of rutabaga with his pocket-knife. They were ways of sorting out detail problems (sizes of external mullions, etc.) in the intermediate stages of design. In this, however, they were unusual—most models are celebratory and record the finished state of the design when there are no further decisions of interest to be made—as in the “great Model” of Christopher Wren’s preferred, but abandoned, design for St. Paul’s Cathedral.

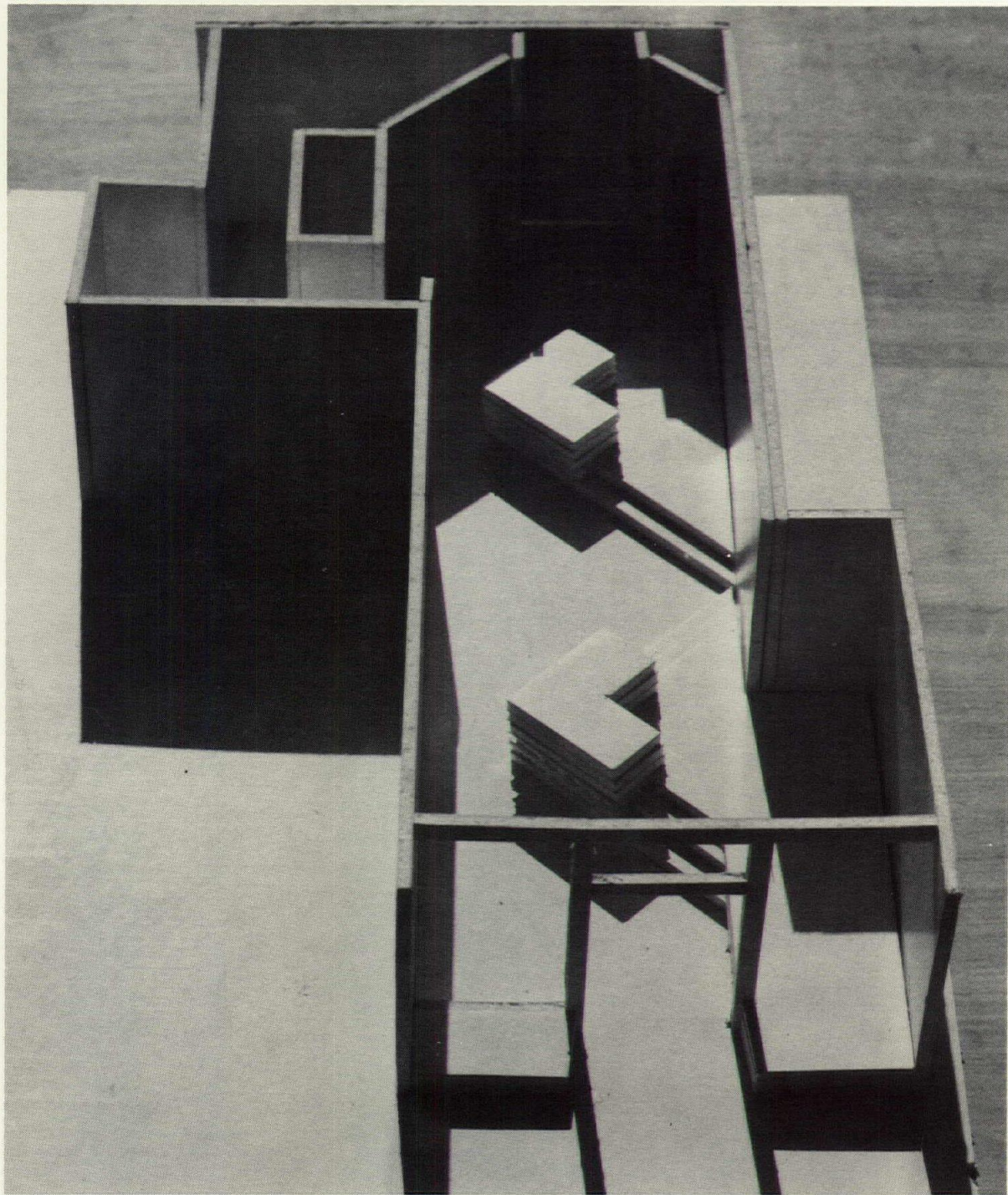
The other kind of model, made “to see what it will look like in 3-d,” is something less happy, however. It records the incapacity of a drawing-dominated professional culture, and of drawing-trained professionals, to visualize the consequences of their two-dimensional paper decisions. It warns us of the ways in which pre-occupation with drawings can insulate architects from the multi-dimensional space in which their building must ultimately be constructed. It suggests yet another reason for debilitating pre-occupation with drawings as an end in themselves—to wit, it saves us from the embarrassment of seeing how an elegant-looking drawing can still produce a real mess of a building.

For the true connection between great drawing and great building may never lie in the apparent beauty of the drawing. A great architectural drawing is great because of the architecture it seeks and intends to create; it may be neither beautiful nor elegant, though it must be transparently clear to the one man who matters in this context—the builder. All the rest of us are mere kibitzers and voyeurs; drawings made to please *us* are trivia—and we know it!

*Christopher Wren's Great Model for St. Paul's
Cathedral, London.*



*Preliminary model for STEVE, a SoHo shop at
172 Spring Street, New York City.*



RICHARD OLIVER

STEVE, a SoHo Shop

The project under discussion is a 1,000 square foot men's clothing shop designed by Henry Meltzer, Steven Solomon, and myself for an existing space in an undistinguished 19th-century building in the cast-iron district of New York City. Despite its small size, the shop illustrates the four modes of modelling indicated in figure 1. This diagram, attributable to Robert Mather (University of Texas, Austin), describes an essential feature of the design process: given a mass of information, one begins to structure it by starting in four places simultaneously, ultimately resolving all four to each other in a finished design. The diagram contradicts the notion that design is a linear process and asserts that modelling involves more than just three-dimensional cardboard constructions or even two-dimensional drawings.

The image model was a fabric of metaphors created by the client and ourselves. This model consisted of attributes which we sought to embrace in the finished shop, and those we wished to avoid. Some were expressed quite specifically as color range, light level, choice of materials, circulation, changes in floor level, and the display and storage of merchandise. Other attributes were more loosely described in

“a healthy suspicion of the
techniques by which we represent
space.”

*Richard Oliver is a principal with
Meltzer-Oliver-Solomon and Curator for Architecture
and Design at the Cooper-Hewitt Museum in
New York City.*

terms of ambiance, atmosphere, and mood. The images came from the world we each remembered—from past projects, shops we had known about and had gone to see, and even from the annals of architectural history. Importantly for us, the images were as full of humor as of seriousness; and, indeed, so was the process of constructing this ephemeral but crucial model.

The inventory model, usually a complete listing of rooms, dimensions, amounts, and equipment, was, in this case, full of blanks. The client was creating a

new kind of store, and wasn't entirely sure what items he would carry beyond a few basics. These blanks suggested a shop where certain physical features would be specific while others would best remain general, but capable of further definition later on. We chose to make the entrance very specific, so that the initial impression of the shop was fixed, and to leave the rear of the shop more general and open to rearrangement.

There were three scenarios to describe the actions of the various participants in the shop. One was to choreograph the movements of the customer so that the merchandise would be viewed as a continuously unfolding panorama. Another was to encourage friends of the shop to linger, sometimes over a cup of coffee or a glass of wine. The third dealt with security and the surveillance of dressing rooms and merchandise. These little plays—suggesting the

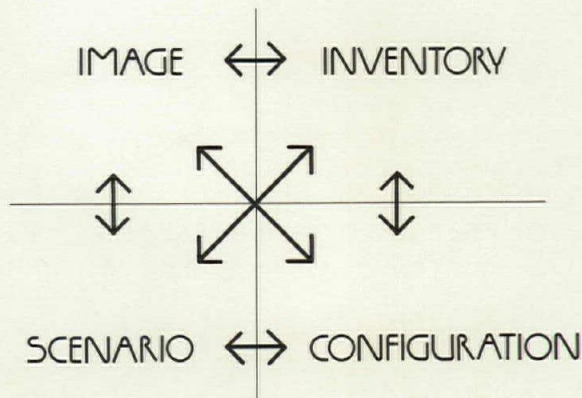
inhabitation of the space—were used to evaluate the proposed configuration, and vice versa.

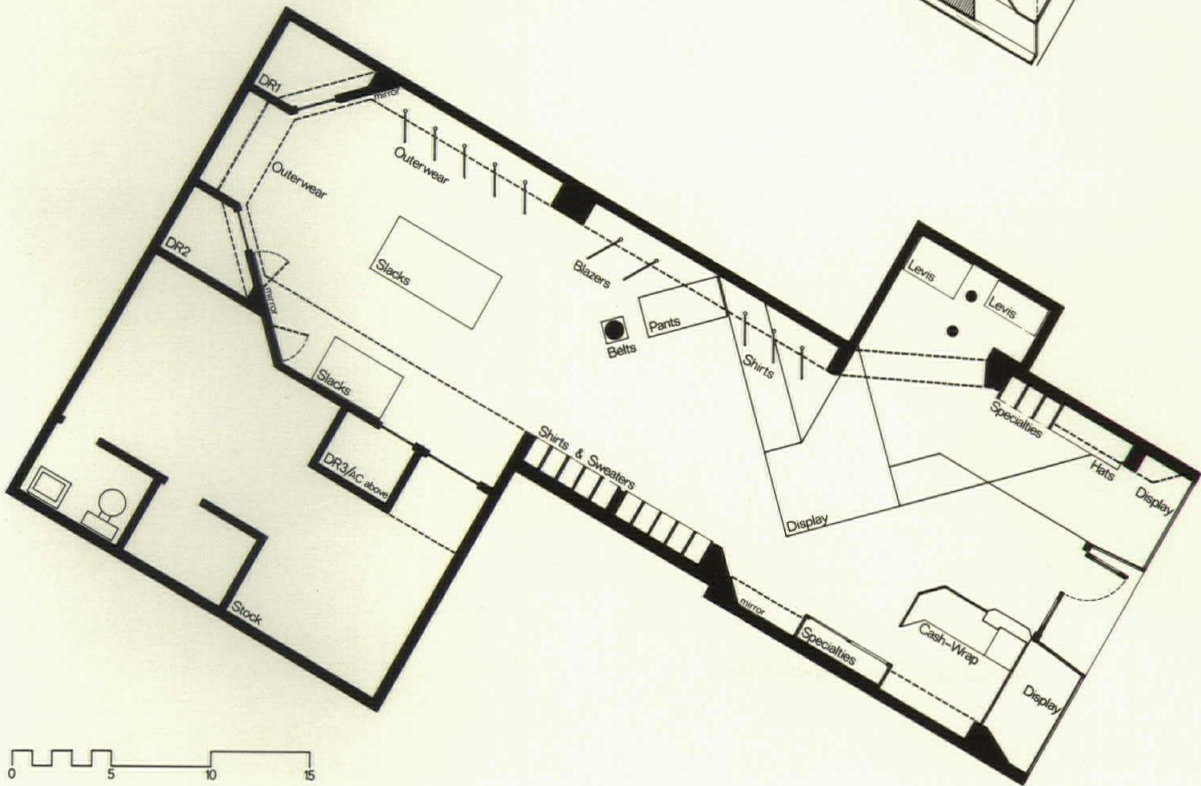
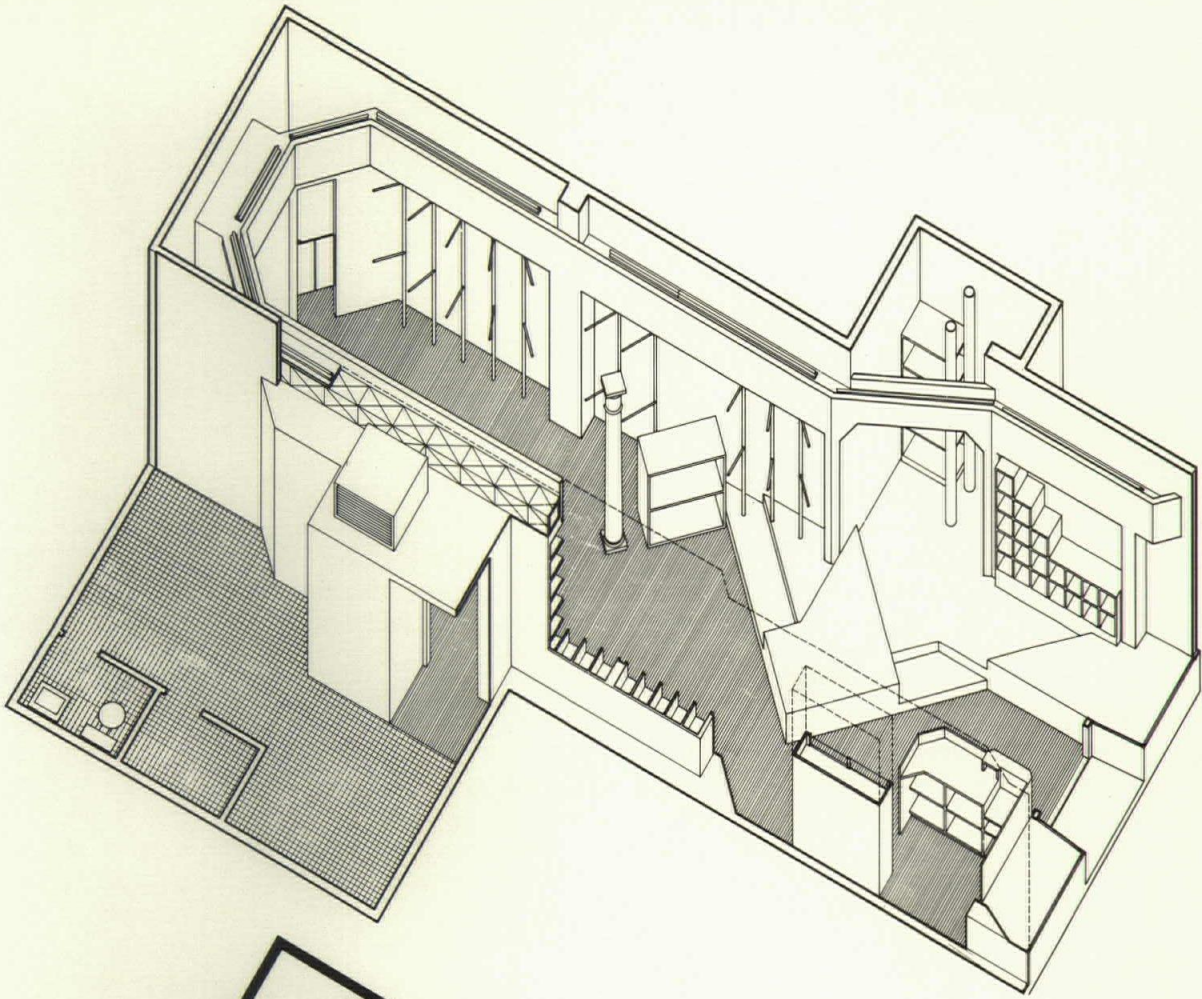
To begin the layout of the shop, we prepared a simple, even crude, three-dimensional cardboard model that showed no more than the fundamental shapes. It is worth emphasizing that this model was not realistic, and did not even begin to depict details. Instead, it proposed an idea about configuration, and ultimately that stage set idea of two triangular platforms and an encompassing interior facade was tested, modified, and made real by the influence of the other three modes. In order that various concerned participants, such as the builder and the Building Department, would also have a picture of what was to be, plans and sections (merely other forms of configuration models) were drawn.

As the space itself took shape, the modelling of platforms and fixtures was executed at full-size by using sheets of plywood on the floor to represent the various objects. The triangular platforms had been worked out on paper and in cardboard. But in the space itself, they seemed ponderous and heavy. Thus, before they were actually built, one was discreetly eliminated and the remaining one simplified. Other elements were moved to and fro, often only by inches, and mirrors were carefully located. All this was done to create the ease of movement and surprising vista that could be imagined in general, but which was best worked out in the actual space. Indeed, when we drew up the as-built presentation drawings, we were surprised to discover that spatial and formal relationships we like in the shop itself looked bland and unresolved on paper.

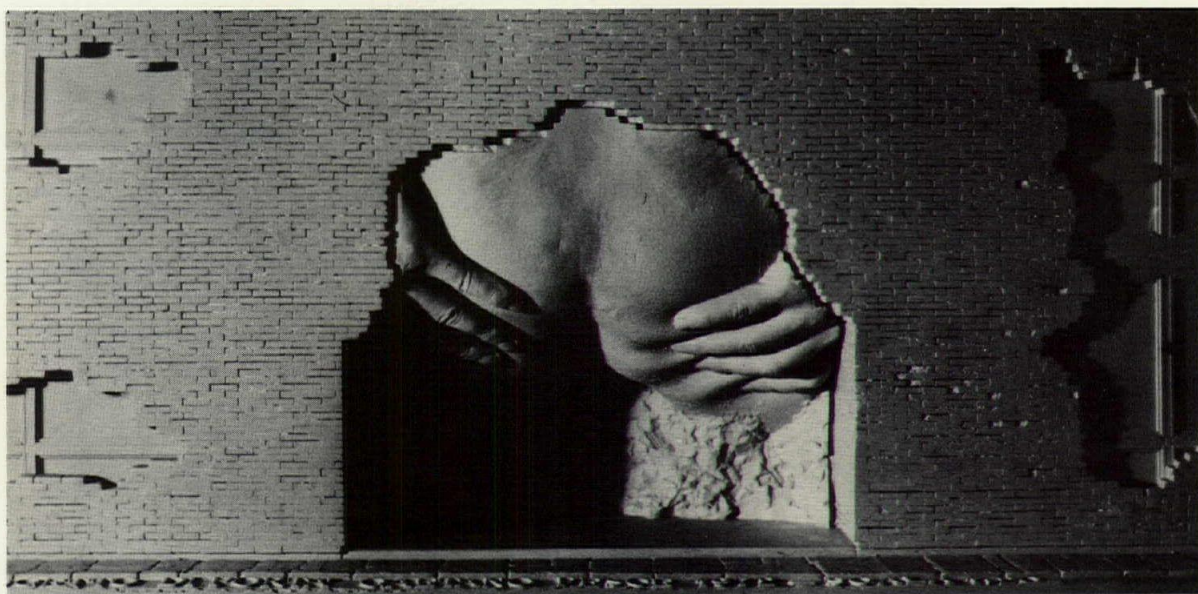
This last discovery has since caused us to acquire a healthy suspicion of the techniques by which we project space, and also to realize that modelling is a process that is useful, and indeed obligatory, at all stages and at all scales, in the making of a place. Models, after all, are really only tools and not at all the real thing. A model, whether made of words, cardboard or lines on paper, can inform the design process a great deal. But the moment a model is mistaken for the real thing is a moment of potential danger.

Figure 1





*Modello di Porta, 1972. Collaborator: Ulderico
Manani*



GAETANO PESCE

Postscriptum to "Difference Means Life"

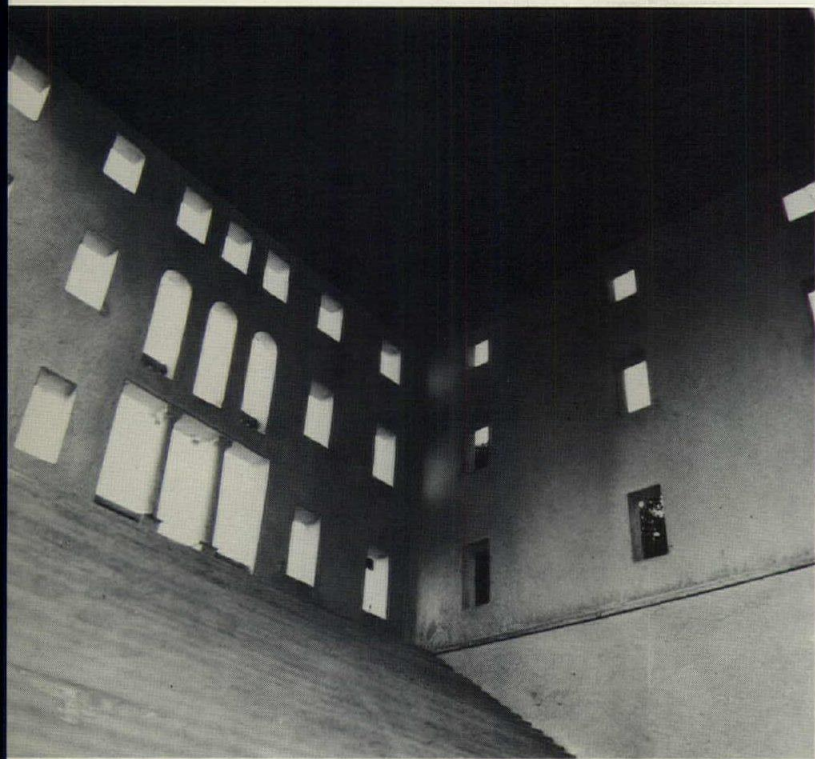
As I have said before, our age is characterized by reduction in content and method. The strict rules of economy in work and thought are designed to rationalize, to the maximum, man's every activity. The Renaissance began the process of standardizing the work of shaping architecture through drawing. The eighteenth century contributed most patently to the process. As a consequence, we find ourselves today living an architectural ideology that is the fruit of all this standardization, from the sixteenth century onwards. Worst of all, it has led to the standardizing of ideas and the formal method by which these ideas are translated into the visible. In other words, in architectural studies the protagonists are the rule and the square, two instruments that, given their limited possibilities, bind us to "impoverished" results on the expressive plane — straight, perpendicular lines leading one to another, with the occasional 45 degree angle as experimentation. In any case, the surface is of principal import in the shaping of architectural form.

The result is a classicism provoked by the repetition of the basic elements of architecture, for the simple fact is that this is easier to execute—the whole

**"our every slightest movement can
bring a new view, a new reflection, a
new critique, a new and evolving idea"**

Gaetano Pesce is an architect practicing in both Paris and Venice, and is a Professor of Architecture at the School of Architecture of Strasbourg.

being dressed with symmetrical forms, since symmetry is a good vehicle for "safety." Thus in spite of ourselves, the lessons of Gaudi, Steiner, Mendelsohn, Le Corbusier of Ronchamps, Facteur Cheval, etc., are rejected as of no account. Of no account, as I said, is the non-specific, the non-methodological nature of their work. Of no account is the idea that we might see in certain cases the model precedent to the drawing, because the space to be represented cannot by its very nature be put down on the paper



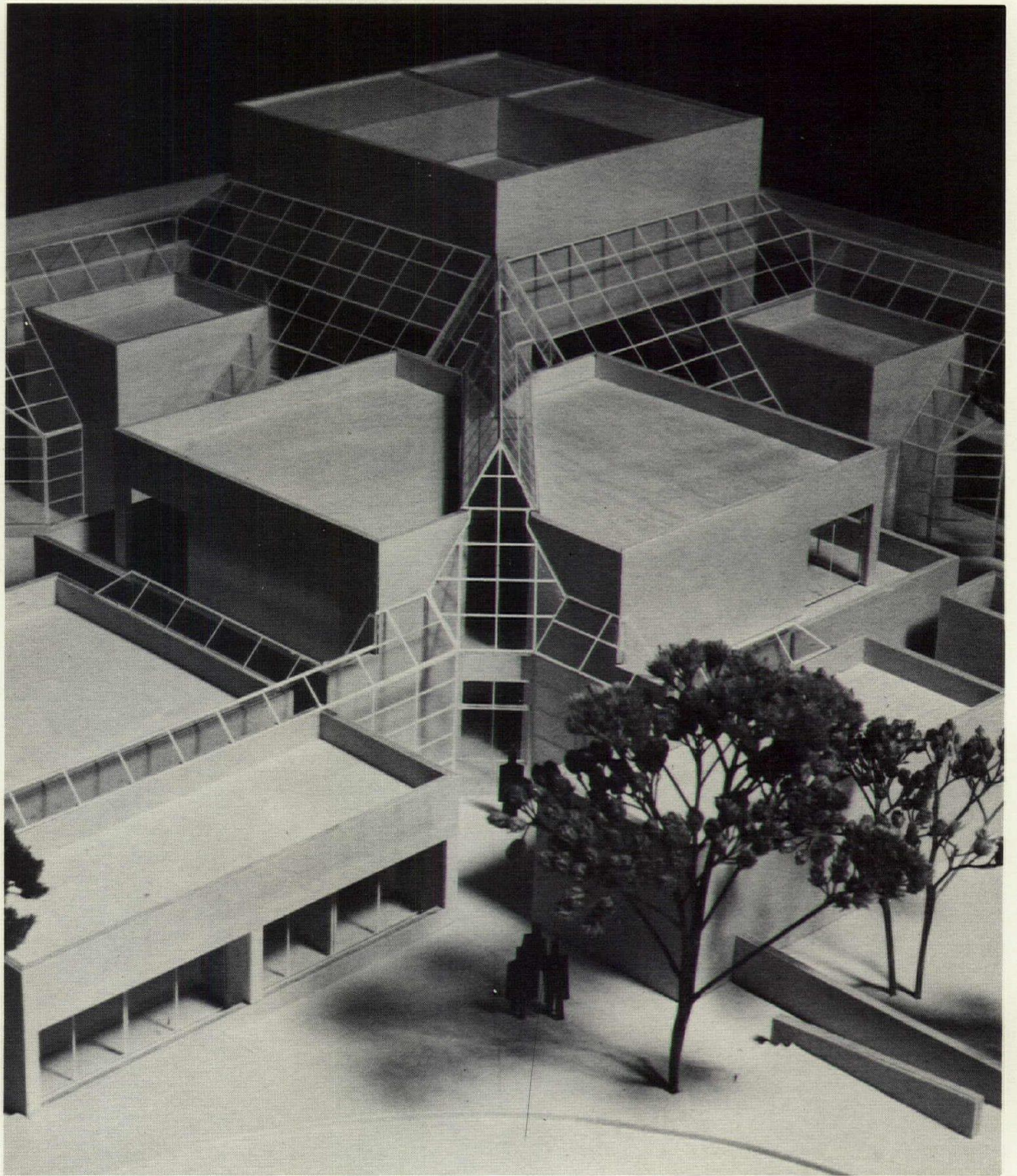
Progetto di Ristrutturazione di Villa Tardo-Romantica, 1973. Model scale 1:50. Collaborators: Michele de Lucchi, Valerio Tridenti, Pino Zennaro.

upon which the design is to be placed. Of no account is the fact that no drawings were consulted in the workshops of Gaudi and Steiner but, for the most part, scale models, the materials of which covered a vast range of types, such as wood, chalk, wax, metal. Today we should probably see in their ateliers resin, foam, rubber. And I am certain their study of models strongly contributed to stimulate the extraordinary expressive richness of their work.

It appears to me useless to recall that, after the lesson taught us by Picasso about motion, we have understood that if we move in front of a drawing that represents a space, the same physiognomy regards us, until the moment that, moving around, we realize that behind there is nothing. If we do the same before a model that reproduces a certain spatial quality, our every slightest movement can bring a new view, a new reflection, a new critique, a new and evolving idea. From the other perspective we see, in spite of ourselves, that such a consciousness is most limited; and it is tragic for architecture that a certain part of its "avant-garde" (at least that considered so by "drawing room" critics), instead of engaging itself in the search for new languages capable of moving on from the age of canned space, is engaged upon the re-discovery and repositing, as perfect necrophilisms, of languages from the recent past, that had as principal protagonists Pagano, Terragni, etc. The worse for them. In life there are those who make love and those who, in their turn, masturbate, dissipating energies in the smoke and scent of the drawing-room intellectual-conservatism, without distinction in terms of right or left. That is to say, progressives in word and reactionaries in deed. My sorrow is for the many students who, suffering the same crisis of identity the majority of us are undergoing today, are in no position to defend themselves against such fashions.

I wish you well with your work and good luck.





GEORGE HARTMAN

Some Observations on the Influences of Architectural Models

Artists have always used models to study and explain their designs. Some of these have come down to us from the past and the relationship between the study and the finished work has produced some of the most interesting volumes in the history of art. During the last twenty-five years, architects have relied so exclusively on models that it seems appropriate to comment on the effects they have had on architectural design, especially today when many buildings look increasingly like large models and the models themselves are being sold as art objects in galleries.

The natural influence of media on content is unusually strong in the case of models and is often underestimated. Models instantaneously reveal and emphasize the schematic organization of a design in a way that few buildings can be perceived. This leads to an instinctual preference for those designs which look best in model form. These include fragmented, additive schemes and those consisting of complicated intricate objects. The inherent abstraction required in the construction of a model tends to emphasize organization, volume, and surface and to deemphasize mass, texture, material, and, in many cases,

“few models...are built at even
one-fiftieth the size of the actual
building.”

interior space. Contemporary cardboard model techniques have encouraged the development of monochromatic designs with cut-out elevations. Models also tend to objectify the design and consequently to minimize contextual relationships with the surrounding environment. Few architects build the adjacent context with exactly the same technique and care that they do the project on which they are working.

Models must be constructed at an appropriate scale to emphasize those aspects they are intended

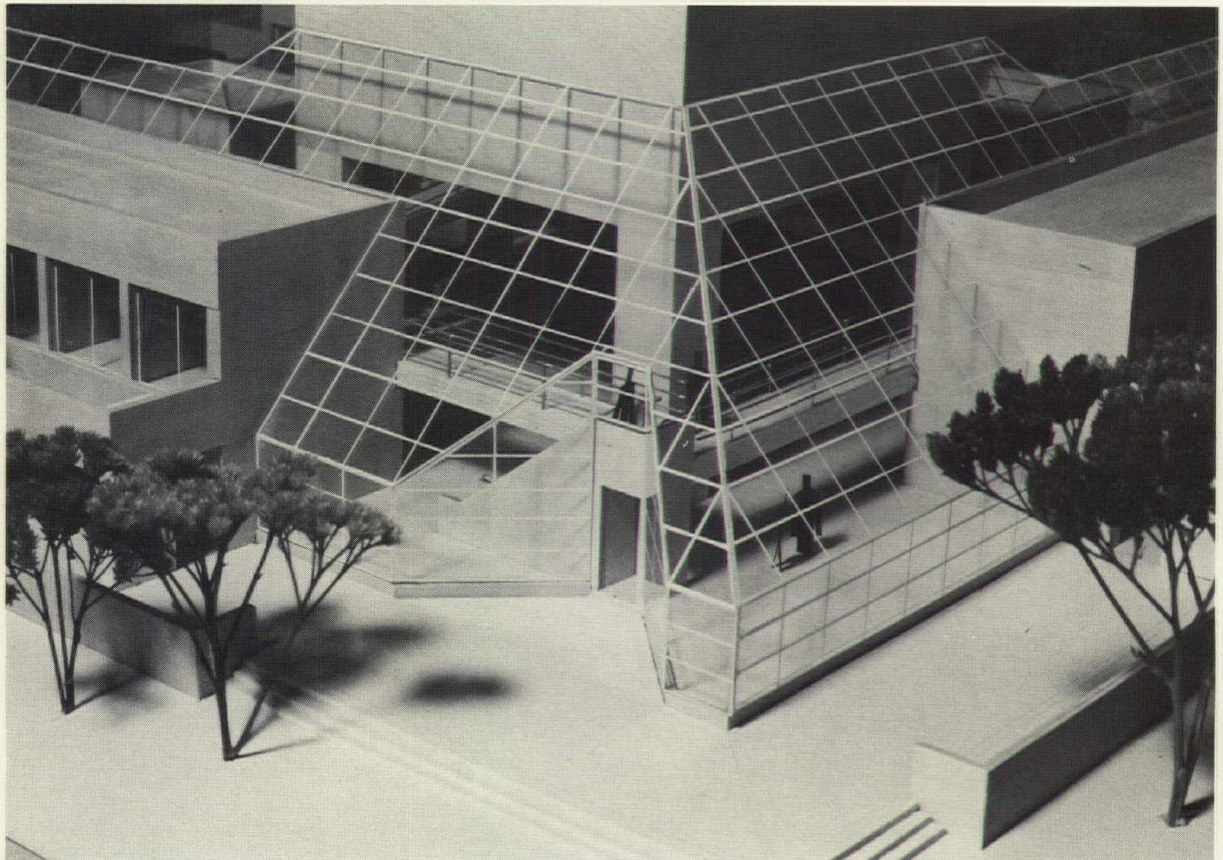
George Hartman is a partner in Hartman-Cox Architects of Washington, D.C. and was elected to Fellowship by the American Academy in Rome in 1977.

to reveal. To design a building entirely through the use of models might require as many as four or five scales and possibly more. The constraints of cost and size on the scale of models usually results in their being built at a scale which effectively precludes their being seen in the same way as the buildings they represent. This also creates problems in detail as few models other than houses are built at even one-fiftieth ($1/4" = 1'$) the size of the actual building. In fact, one-hundredth ($1/8" = 1'$) and even one two-hundredth ($1/16" = 1'$) are much more common scales.

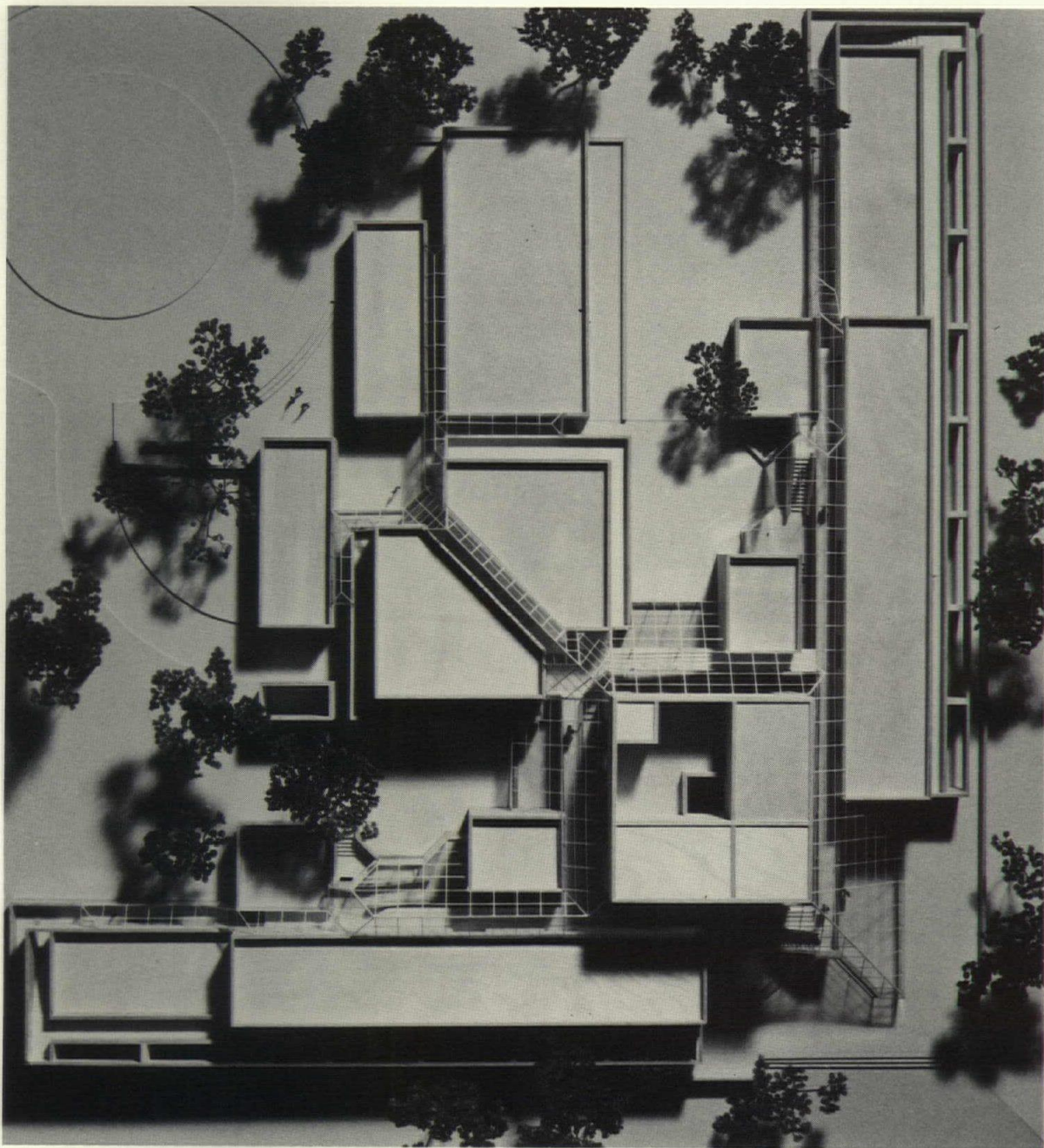
In the case of models constructed for presentation, the interest and complexity created by the building's emphasized organizational system revealed in the model is sometimes a welcome plus which can make a project look more interesting than it actually

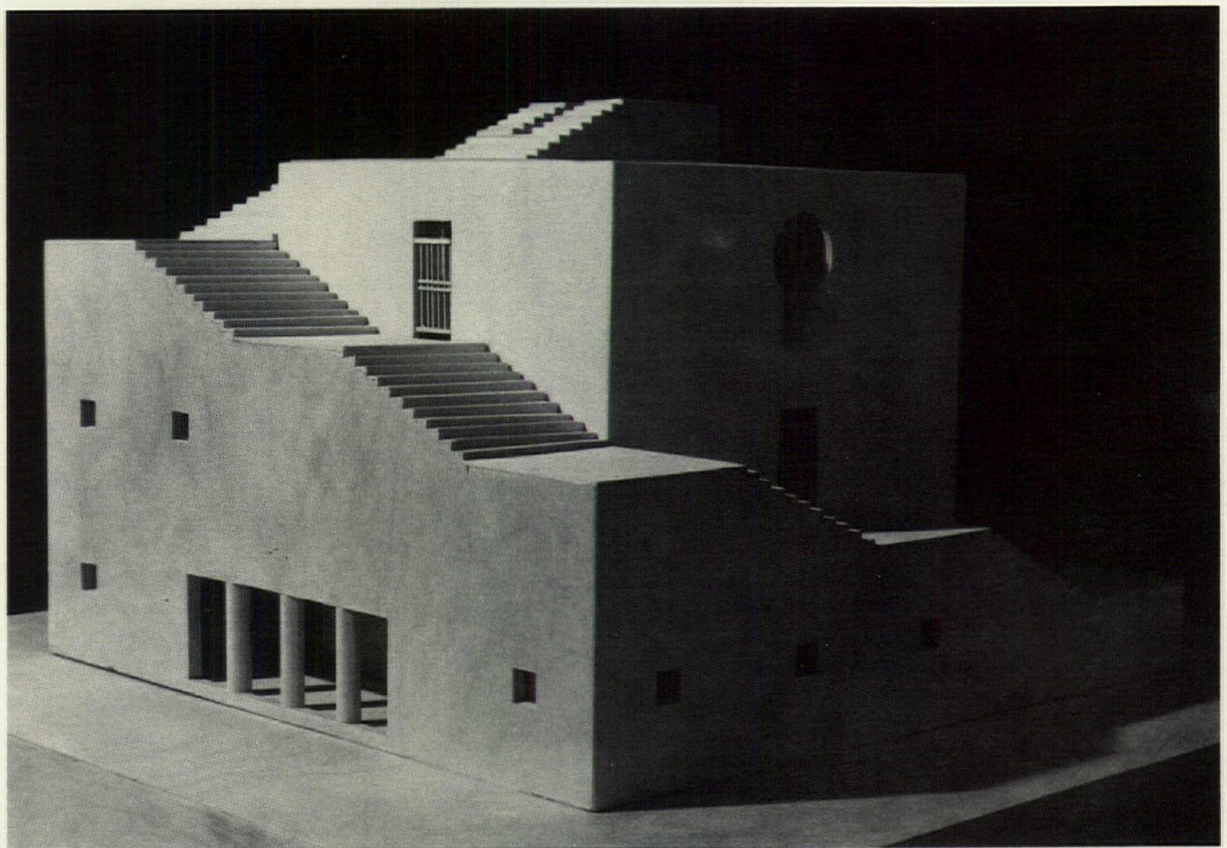
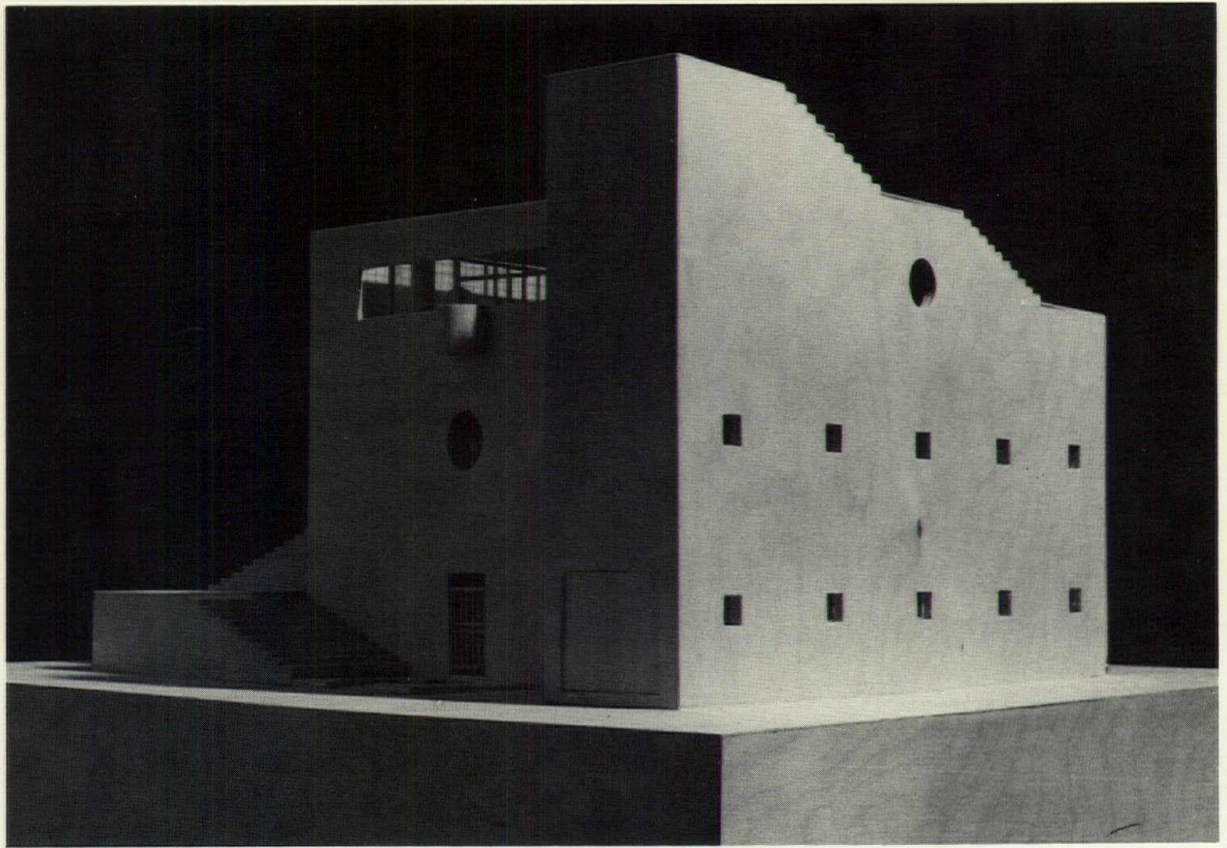
is and shift attention away from what the architect or client might otherwise perceive to be an underdeveloped or even inappropriate design. Since projects are often accepted on the basis of the model it is hardly surprising that buildings are sometimes simply enlarged models.

However, a model is not a building. The client who says that a built design looks just like the model is identifying the monumental scale characteristic of so much contemporary architecture. Whether this is due to modern materials or to contemporary aesthetics or financing, it is furthered by the profession's reliance on models which are built at a tiny fraction of the size of the ultimate building. In this sense, architectural ideas have a lot in common with living organisms in that they cannot just get bigger; they must also develop.



*The National Humanities Center on the Campus of
Triangle Universities Center for Advanced Study,
Research Triangle Park, North Carolina.
Model, 1977.*





**RODOLFO MACHADO/
JORGE SILVETTI**

Seductive Models

There are several types of models currently used in architecture—for instance: the model as a design tool (that malleable object that helps the development of the designer's interior monologue or, mostly in the past, facilitated technical communication with the workmen); the analytic-didactic model, reductive piece *par excellence*, seeking to describe a complex fact (think, for instance, of Moretti's void-solid inverted models); the "artistic" model, conceived not as a subservient representation of a building-to-be but as final product in itself and executed according to the dictates of art; the so-called conceptual model, where usually the generative architectural idea is represented, ideally naked, sometimes metaphorically, sometimes metonymically. Those types are not our major concern nowadays.

The type of model that interests us (the type to which the photographs of models of our work selected for this publication belong) should be regarded as a traditionally propagandistic one. Our models (propagandizing for architecture at large and for the possible buildings they stand for in particular) consciously function as elements of communication; as discourse elaborated by the architect and addressed to the

**"The model generates the dialogue
of the eyes, provokes the indicative
gestures of reverent hands..."**

patron, to the client or to the juror, as is the case in competitions. The models we advocate are then architectural products to be offered, or presented, to the patron in a way not all too different, conceptually, from the manner in which the Renaissance architect used to present his models (or, at least, from the manner in which he used to be portrayed presenting them).

It is indeed by analyzing the relative roles by which the culture has depicted the triad "patron-model-architect" that a symbolization of architecture

*Rodolfo Machado is an Associate Professor of
Architecture at Rhode Island School of Design,
Jorge Silveti an Assistant Professor of Architecture
at Harvard University.*

can be studied through the ages. For instance, in the Casa Buonarroti in Florence we see two exemplary paintings: in one Michelangelo is submitting the model of the Campidoglio to Pope Giulio III; in another, the model of St. Peter's dome to Paul IV. In both cases the model is the precious signifying thing that is carefully given, that is exchanged as merchandise, that circulates from hand to hand, that seems to emanate from Michelangelo's palms (or, as we can also see in an old picture of Le Corbusier holding contemplatively a maquette of Maison Curuchet, the model looks like an extension of his hands, the round columns of the house magically prolonging his fingers, "blossoming" from them). The model



generates the dialogue of the eyes, provokes the indicative gestures of reverent hands, prompts Giulio to stand up while entranced cardinals observe the scene.

It is this sort of social organization of the discipline as depicted in the iconography of those paintings that, we argue, is still not too far from us. Brunelleschi instead, kneeling in front of Cosimo de Medici (presenting the model of the church of San Lorenzo) clearly represents a transitional—if not archaic—moment in the formation of architecture, a situation with still too many gothic overtones to be taken as precedent of today's "Presentation of the Model." Since the practice was not yet quite organized in the present mode, Brunelleschi appears too close to those medieval sculptures of kneeling "architects" carrying upon their shoulders, sometimes with the help of functionaries, the excessive load of a model intended as metaphor of their responsibilities and social role.

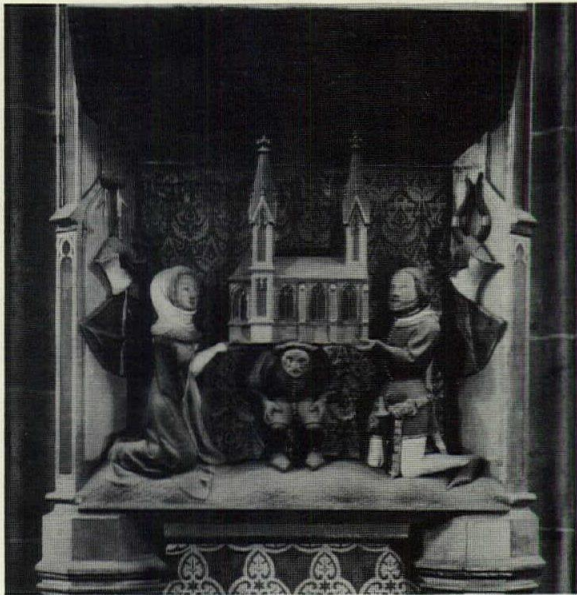
Thus architecture has maintained rather intact the Renaissance-born but somehow transformed manner of using models, which we simply use as a means of gaining access to the construction of architecture. In the process of history, previous uses of models have been dropped: the Roman conception of the model as attribute of either the architect or the patron, as funerary object to be placed in the tombs; in a similar fashion we have lost the Middle Age's traditional construction of *post-factum* models, which were made once the building was finished as memorials to its erection. (It is interesting to note that such a custom is, somehow, kept alive today by mass culture's endless reproductions of degraded models sold as souvenirs of visits to the monument.)

Models, for us, are rhetorical representations of buildings. As such, the two old and ever present functions of rhetorical discourse (to convince and to move) do apply to them. As alluring pieces, they should dazzle with the brilliance that Wren's ideal Great Model of St. Paul's Cathedral once had. They should be as fascinating as fashion models, convincingly selling the qualities of the future building. They should have the evocative power of doll houses,

Below, Michelangelo presents the model of the Campidoglio to Pope Giulio III in a painting by Turchiani. At left, Pope Paul IV receives Michelangelo's presentation of the dome of St. Peter's in a painting by Passignano. Previous page, Jorge Silveti's House at Djerba, 1977.



Top: the architect of Ulm Cathedral bears the model upon his back, assisted by the mayor and his wife. Below: Brunelleschi presents the model of San Lorenzo to Cosimo de Medici in a painting by Giorgio Vasari.



providing the necessary support for the imagination to inhabit, to grow and play with them in order to visualize life and ambiance. Therefore, the inclusive depiction of objects, furniture, human figures, natural skies and naturalistic viewpoints when photographing, and the mixture of techniques of representation (i.e. drawing what cannot be built), are legitimate devices for the production of the effect of reality.

Models should possess the illusional power Michelangelo's model for the Farnese's cornice once displayed: it was a full-scale wooden model of the fragment, set *in situ*, occupying for maximum effect at the time of its presentation the place of the real cornice; such a model shortened to extremes the conceptual distance between model and building, leaving the technique of construction (and with it, durability) as the sole variable useful for its assignation to one or another category. Sometimes the difference between models and buildings—the limits of the iconic, the limits of the built—becomes, when pushed to the edges, revealing. Think of Brunelleschi's workshop by the cathedral (or some modern structures labs) and his experimental models where *scale* and *construction technique* were those of the building and only the isolated *location* of the piece (unrelated to the already built parts, syntactically senseless) made it a model. Or think of those buildings which are turned, conceptually, into a "model" because they are built to be replicated, as examples of, as prototypes for, a series. Sometimes there are cases when buildings become like models of themselves, when their life and *use* stops: think, for instance, of a palace no longer used as such, organized as a museum—untouchable; is it not a witness of a building that was? Are not models witnesses and announcers of buildings? Are they not unusable, impoverished objects, condemned to always be "poorer" than the buildings they represent? Are they not reduced scenographies?

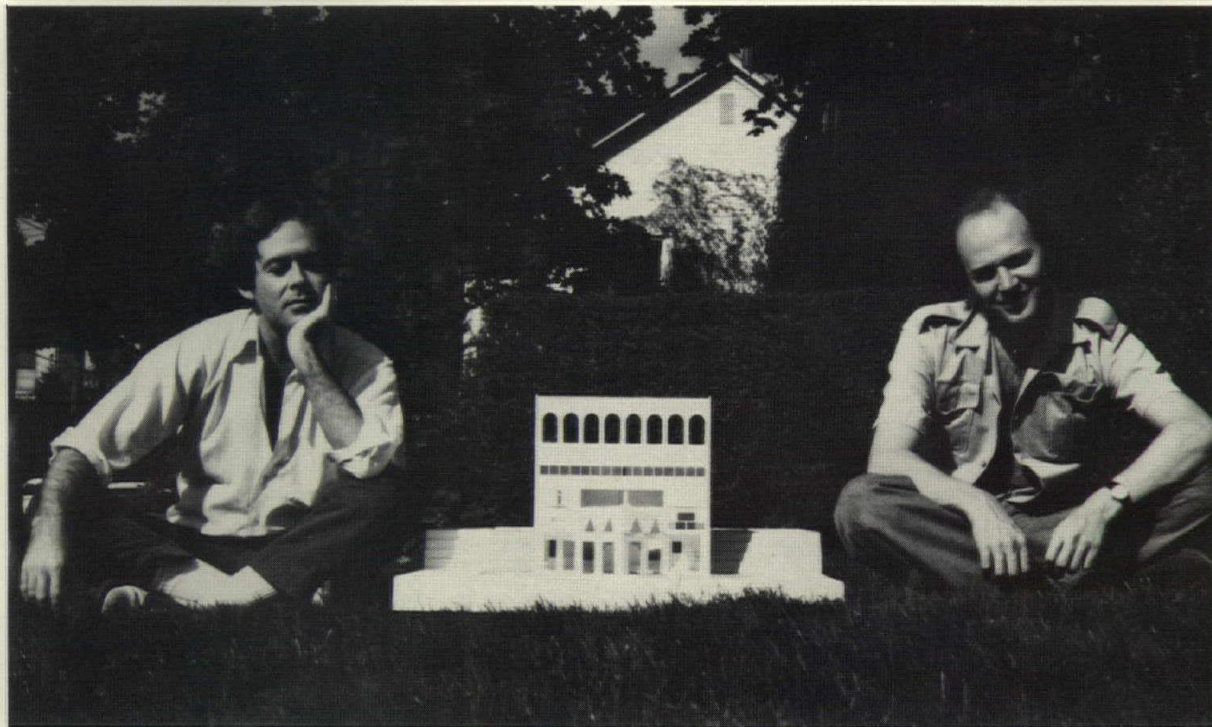
Our models are by necessity realistic, figurative pieces composed from iconic signs codified on a base of similitude, by analogy between the signifier (the form of the model) and its signified (basically, the form of the building; thus the model is a form whose

*Top: Machado and Silvetti's Walter Burley Griffin Memorial at Canberra, Australia, project, 1975.
Below: the authors with the model of their Fountain House, 1974.*

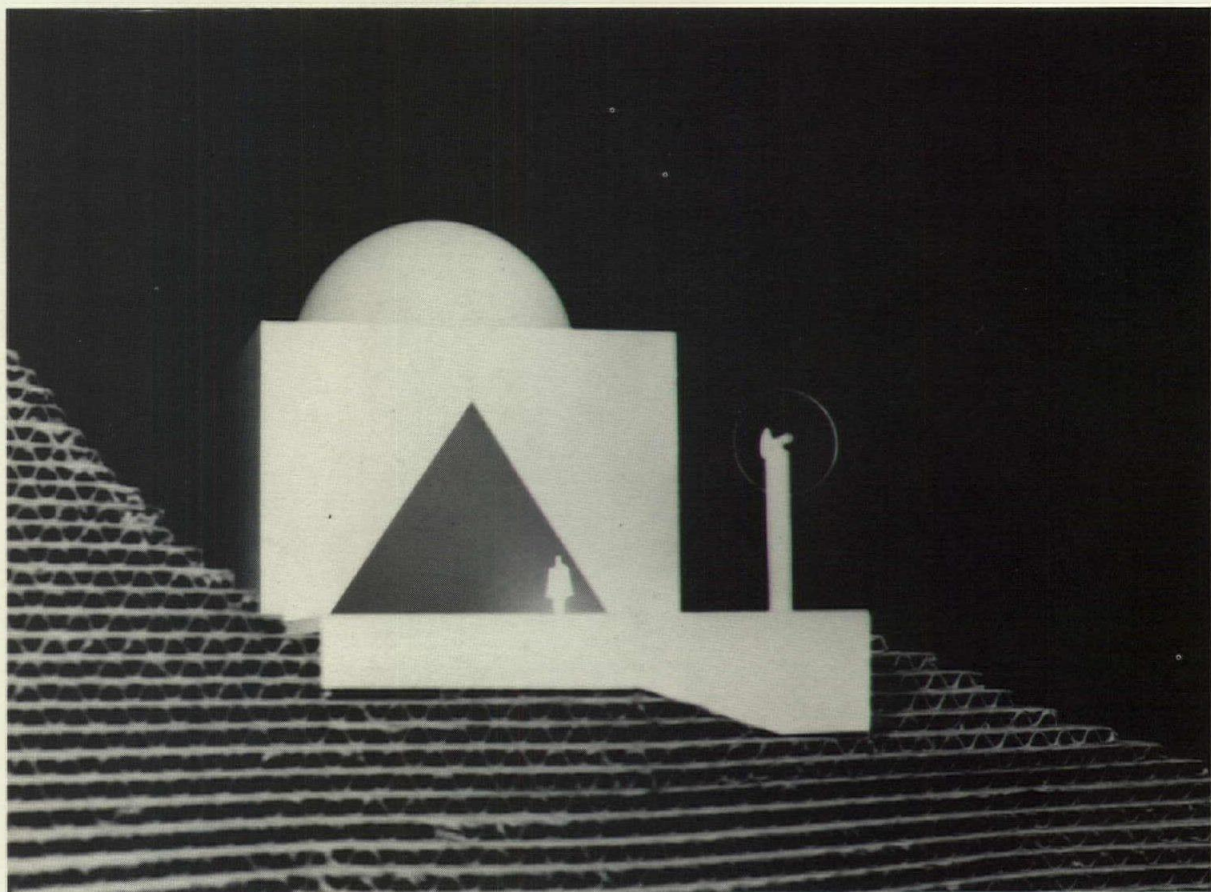
content is a form). Models and buildings share the same tridimensionality, the features of the same physiognomy. It is this one-to-one correspondence which makes them easily readable, loquacious pieces suitable for the non-trained beholder.

We should remark that today the nature of our role in society is shown—usually by the press or in television—in an apparently broken triad in which the model appears alone, sometimes the architect with the model, sometimes the developer or the corporation with the model (the anonymous mass “the people”— those substitutes for the patron—are difficult to represent). This inconclusive depiction only points to the ambiguous nature of our present relations with society, but once again reaffirms the role of the model as a seductive piece, as object that awakens the desire for the building.

Only as such do we want to use it: for us, the generation of architecture is still dependent upon the plan and the vertical plane, its tridimensionality being a product of the imagination.



Leland House, Hollywood, California



ROLAND COATE

Three-dimensional Design

I usually start the process of architectural design in my head, after talk with the client and analysis of the site. A loose concept emerges with the help of rough sketches made on any kind of paper, anywhere. I take a lot of time for this mental development, sometimes going back to look at other projects and to let all the aspects of the program be somehow linked and related to sun, view, and circulation. This mass of ideas usually boils itself down into some concept of site utilization and some kind of attitude toward the building.

At this point I make a model based upon sketches and a guess at how I might work with the contours of the site. During the process of making the model for the Alexander House, I got mad and tore out a series of level changes on the roof which, because they had added an undesired complexity to the model, never reappeared in the design. This interaction of emotional intensity because of the model building process itself is quite important.

On my last project, a home in Hollywood, I was much more concerned with making a model that was a creative part of the process, but which would also aid the client in his understanding of the project. This

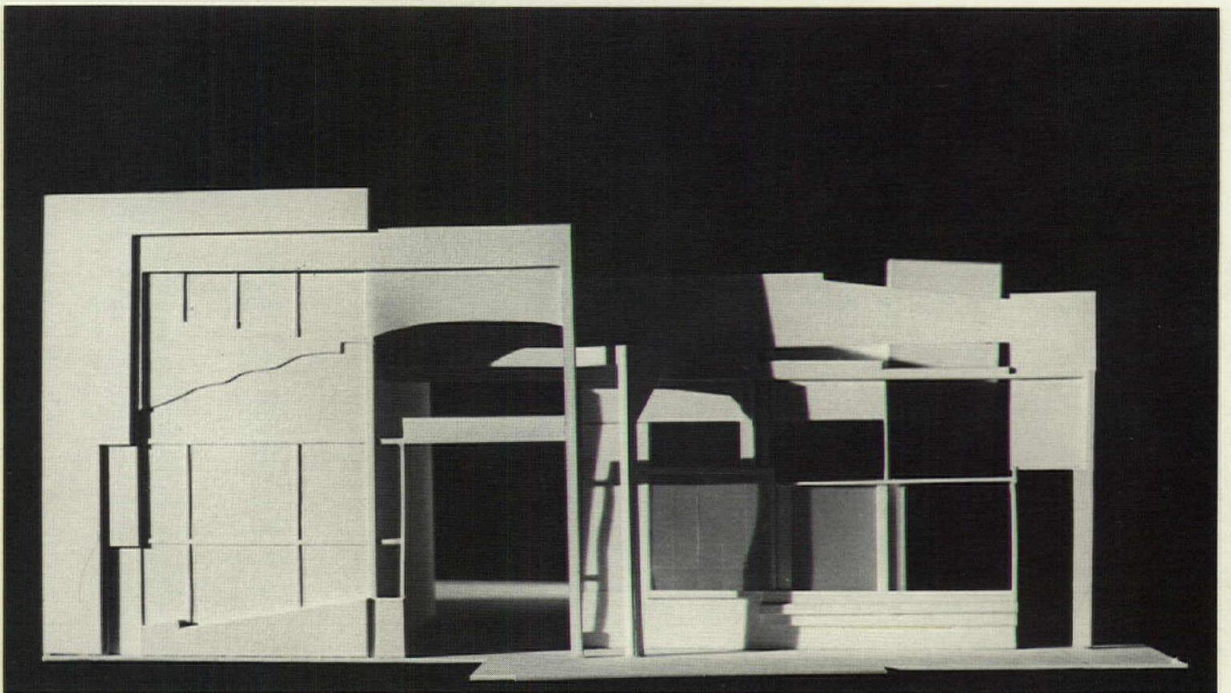
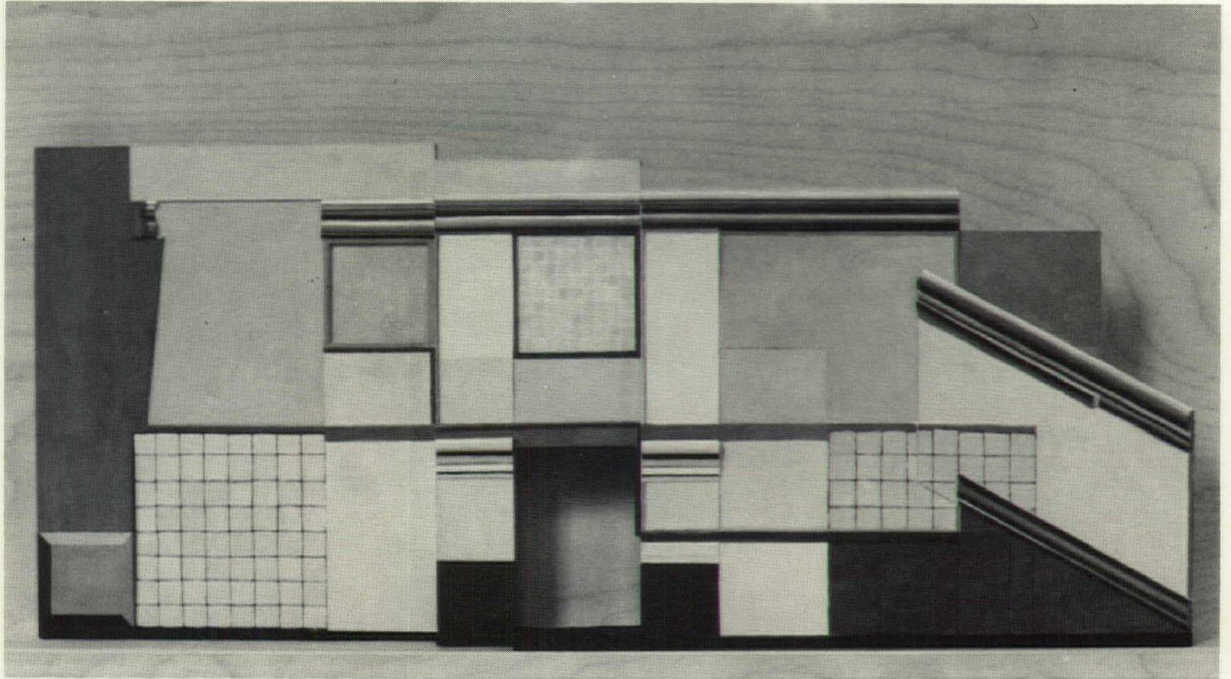
“interaction of emotional intensity”

meant a total rebuilding of the model several times.

It is important to stress that I work alone through the design phases of a project. I get some outside crits, and of course the client is always involved; but I make the drawings and the models, and later I do the photography of the model. This is part of a larger philosophy on which I operate in life, but it all goes back to the making of the model and the sketching. In my mind it is like painting. You do each step as it comes along the best you can and give yourself plenty of time. Most people try something once or twice and then give up, and their lives are changed.

Roland Coate is a Magic Realist practicing in Venice, California and a Professor of Architecture at Southern California Institute of Architecture.

Wageman House, Princeton, New Jersey. Models,
1975. Top: final scheme, bottom: preliminary
scheme.



MICHAEL GRAVES

Thought Models

Models and drawings serve me primarily as a diary or sketchbook of remembered things, such as a facade I have thought about or a painting that has particular meaning for me. The collected material objects which surround us are a part of this diary; as a kind of model, as artifacts, they have architectural significance by virtue of their thematic structure. For example, a metronome may bring to mind an obelisk or a pyramid, which in turn represents the figure in the landscape and ultimately the landscape itself. As objects, these are collected and understood, like drawings of an idea, becoming variables in an assumed landscape—a sketchbook of remembered pieces that one may assemble later.

Another type of model or drawing is the preparatory sketch. This type of drawing documents the process of inquiry, examining questions raised by a given intention in a manner which provides the basis for later, more definitive work.

In modelling, we're not making real buildings; we're making models of ideas. From the ideas that are imagined come the ideas that get down on paper or in object form, and these aren't the true ideas. There is no direct translation, no more than than I

**“a matter of continuing reciprocity
between thought and object.”**

can directly translate any given thought into any graphic description; they're different languages. The idea and the representation are similar to each other, but they are not the same thing.

Once you make a drawing or a model, it starts to have a life of its own which then conditions the thought. That's very exciting because the presence of the artifact starts to conjure up other memories and thoughts about things past. It's not a matter of translation, it's a matter of continuing reciprocity between thought and object. The tension of lines on paper or cardboard in space has an insistence of its own that

Michael Graves has an architectural practice in Princeton, New Jersey, and is a Professor of Architecture at Princeton University.

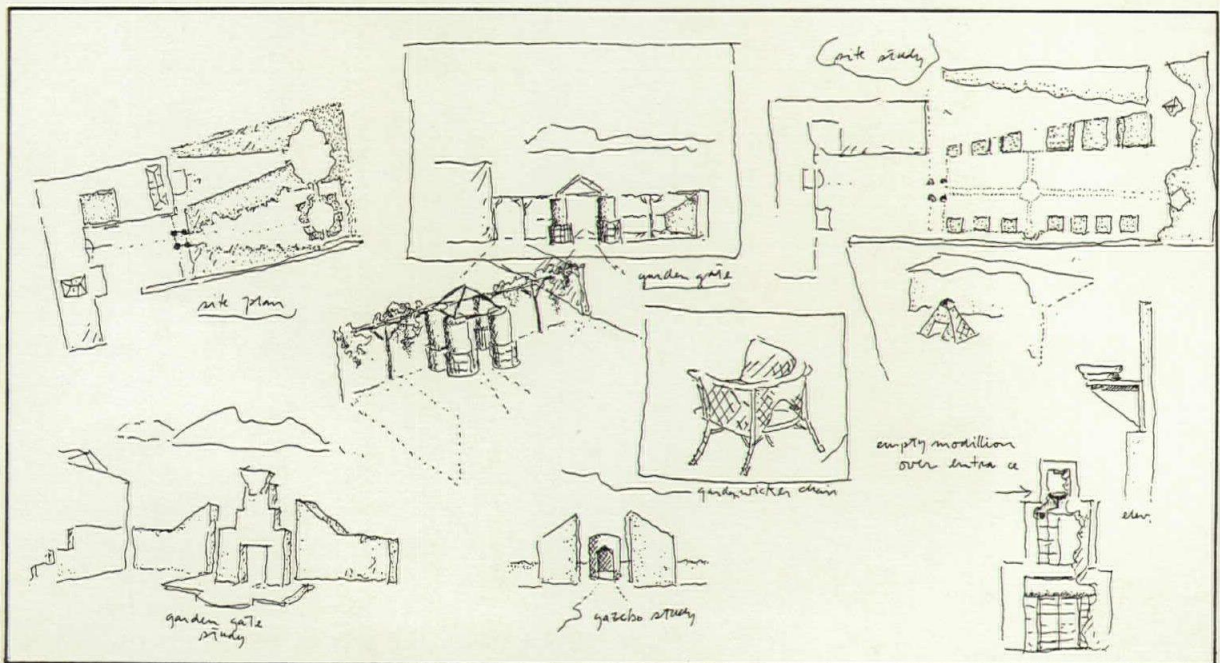
describes possibilities that perhaps weren't imagined in the verbal or initial intention.

Models that are in parts were generally seen in whole at some point, either in plan or parti. When one takes one aspect of the design out and models it separately, it's both a conceptual separation, a fragment in space, and also a detail which is given an importance by being seen in isolation. And by seeing it in isolation you require of yourself and the model that the other pieces of the composition will be registered in it. But I also think that pulling a piece of the building apart or taking it out of context puts a load on it, saying something about the piece in the round that it might not otherwise suggest.

In the Wageman House you don't see the object in the round. There is a primary street facade and you do not see the other sides since there are other buildings crowding the house. So the primacy of the street facade has an insistence which the other sides don't have.

The several reasons for the isolation of the front face are that I wanted to show what it was like to travel through this building, and the issues of

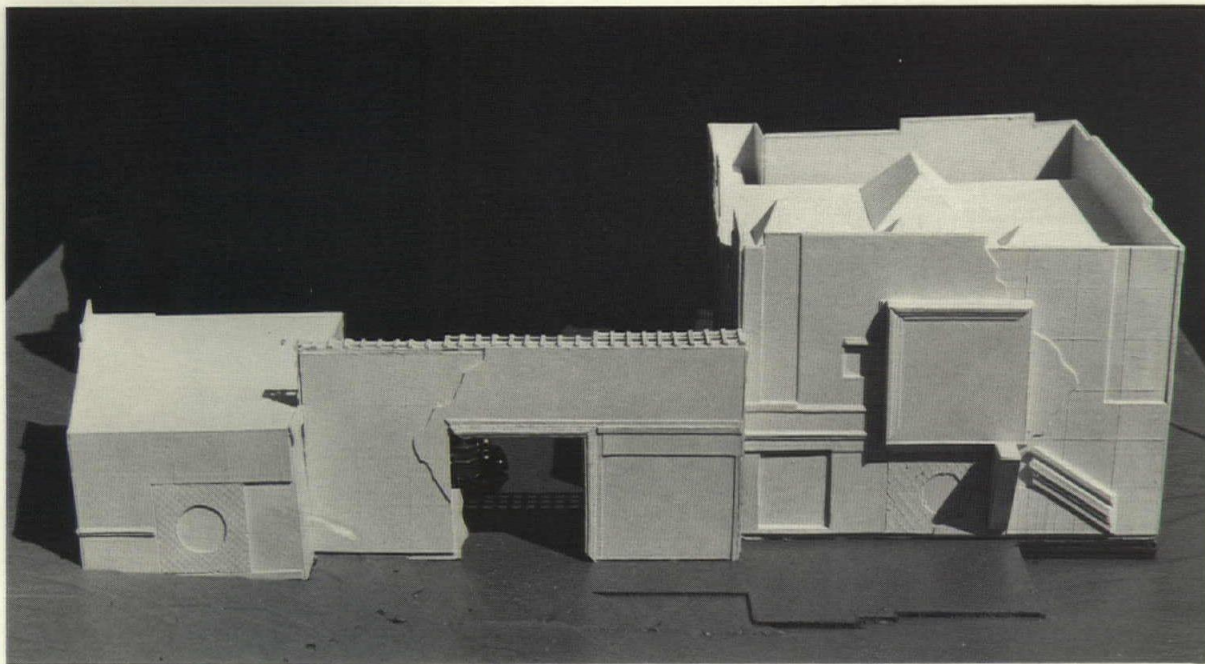
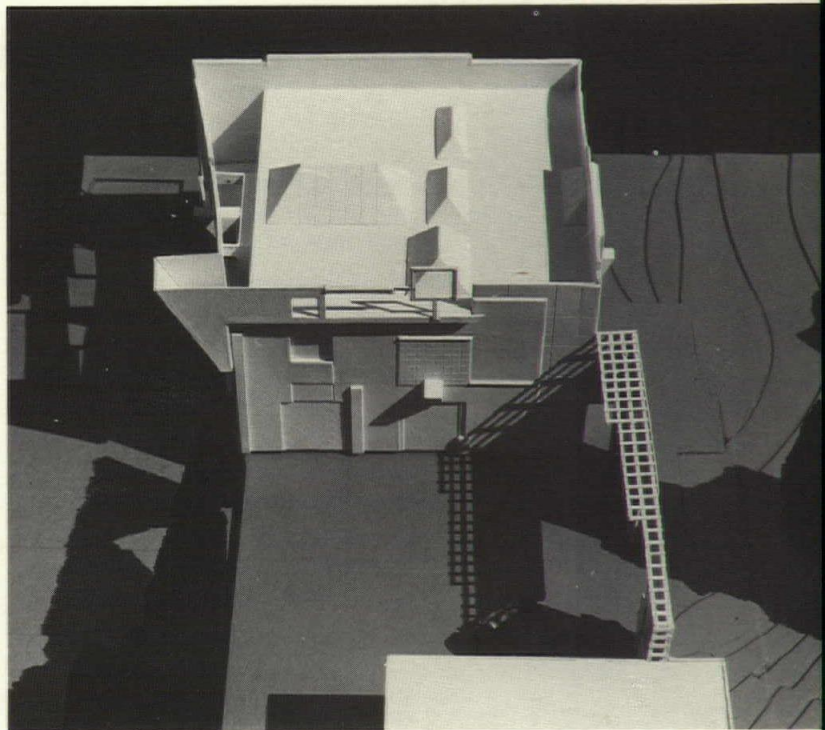
*Garden Studies for Graves Warehouse
Renovation, Princeton, New Jersey, 1977.*

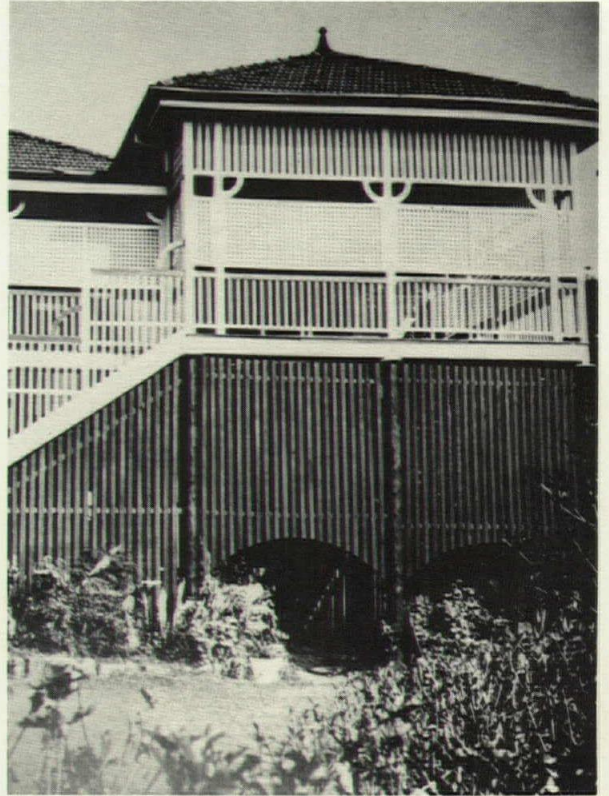


Crooks House, Fort Wayne, Indiana. Model, 1976.

movement or procession through this object were registered in part on the facade: foreground, middle-ground, background. Also, I wanted to say that there was a primacy to that particular fragment of the building that others didn't have.

I didn't model the entire building for the Wageman House, but in another case, such as the Crooks House, it would be entirely justifiable to model the whole building. Because the Wageman House was a frontalized condition, all one participated in from the street was the depth of the facade. The painting of the facade, in the tradition of Cezanne and Matisse, attempts to jump the picture plane and bring the surroundings into the painting in order to create depth. The plane of the architectural facade as painting can thus be studied three-dimensionally, since it is possible to perceive foreground and background through the datum provided by the facade itself. In study, the facade becomes a series of surfaces, creating voids which become the architectural spaces. In this way the model represents a study of facades and surface planes—the illusion of space—rather than virtual space.





*Above, house in Queensland, Australia; below,
San Gimignano, Italy.*

WILLIAM TURNBULL

Models

There are all types of models in the world surrounding us, each meaning different things to the people who refer to it. The mathematician's illusive abstract relationships are models that are light years away from the child's, or grown-up child's, scaled-down version of an object of everyday life. The architect uses this kind of toy model as an assistance in conceiving his buildings, but he uses another one with the same name that is far more important. This model is the one of image and excellence, the standard by which he measures the personal acceptability of his ideas and solutions.

Each of us as designers is to a great extent shaped by the physical world he has enjoyed: first in our houses growing up, the unconscious assimilation of architectural relationships; then in our schools; and lastly, and most consciously, in the memory of our travels to other places—be they down the road or across the continents. These experiences are coupled with conscious study; and by the time we have finished architecture school, we have an acquired formal store of models of excellence—from the Parthenon to the Salk Center—that society has recognized as being of communal value.

“an acquired formal store of models
of excellence”

William Turnbull, Jr. is a principal with MLTW, a teacher at the University of California at Berkeley and Yale University, and the author of the Sea Ranch volumes in the Global Architecture Series.

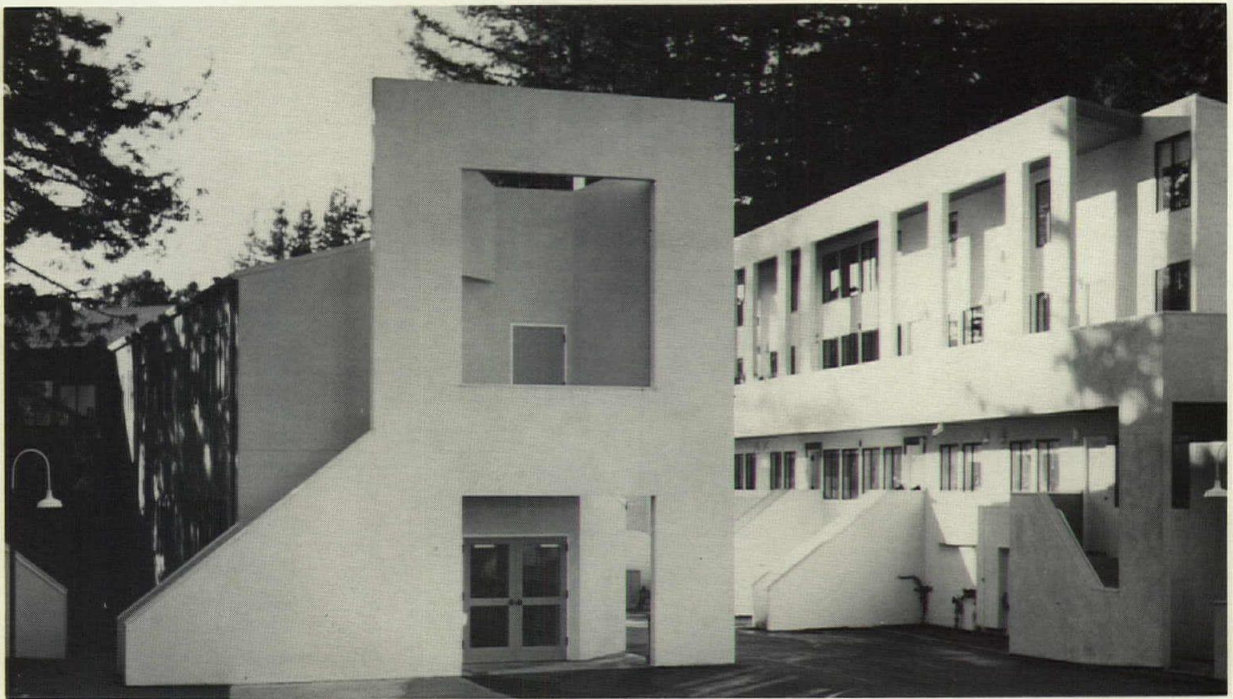
Now, if you think of your mind as being a general store with its shelves filled with architectural “models,” slightly dusty, you have a vague analogy of the way a designer lays by the treasures of his experience. Some never venture into the back room of the past and are only concerned with new shipments (from the magazines of style). It is their loss; for there is a great richness in the past, as well as in the familiar vernacular. The great architectural barns have an architectural vernacular comparable to the Gothic cathedral, the barn of the soul. Both can be models

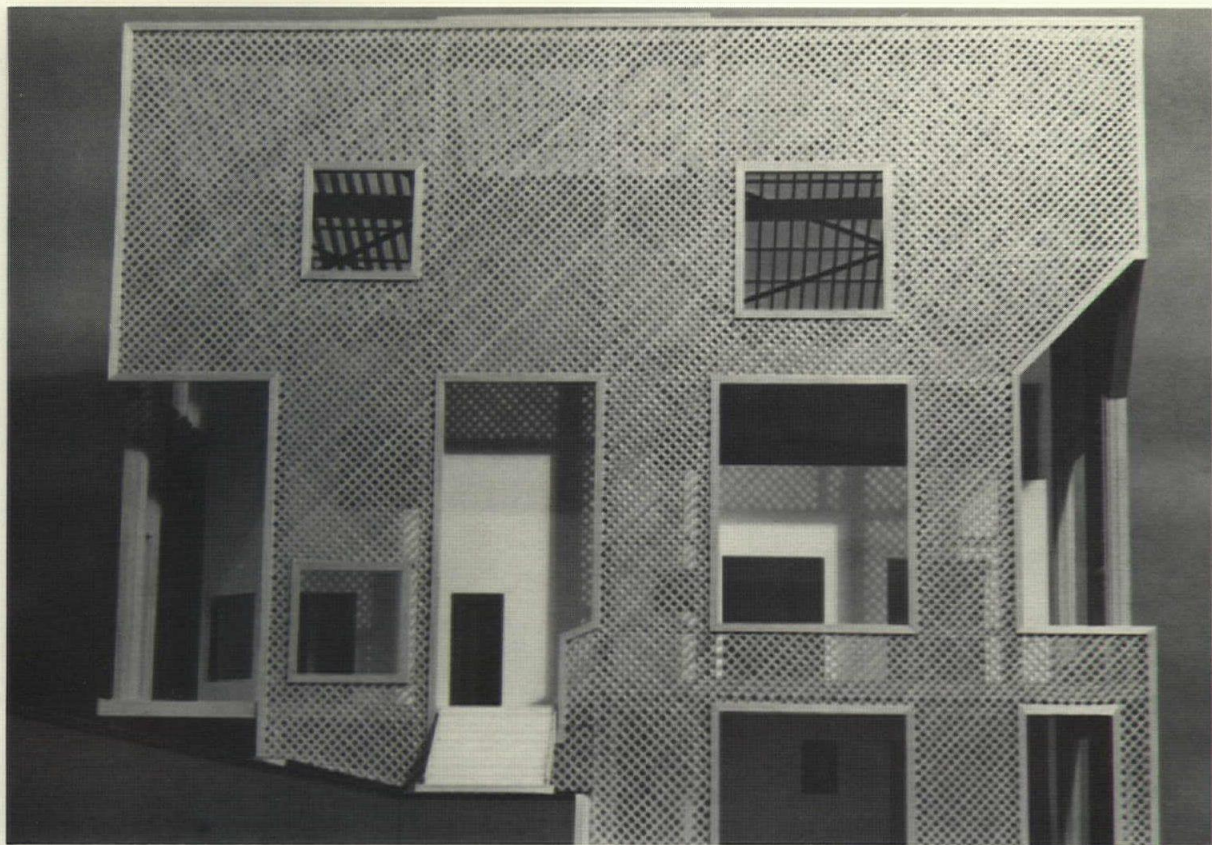
of excellence, depending on one's attitudes toward pragmatism and poetry.

The pitfall of architectural models of excellence is the one of literacy. To say that Kahn's or Mies' buildings were (and are) excellent and that all one has to do is copy them (or Corbu — as is now the style) is to produce an answer which is almost always disappointing. It is not the form, shape or size that is the model of importance, but the ideas they represent. As space, light and structure, they are symbols of the aspirations of man and his relationship to the landscape. Look for the ideas in the man-made world and disregard the styles in which they are couched.

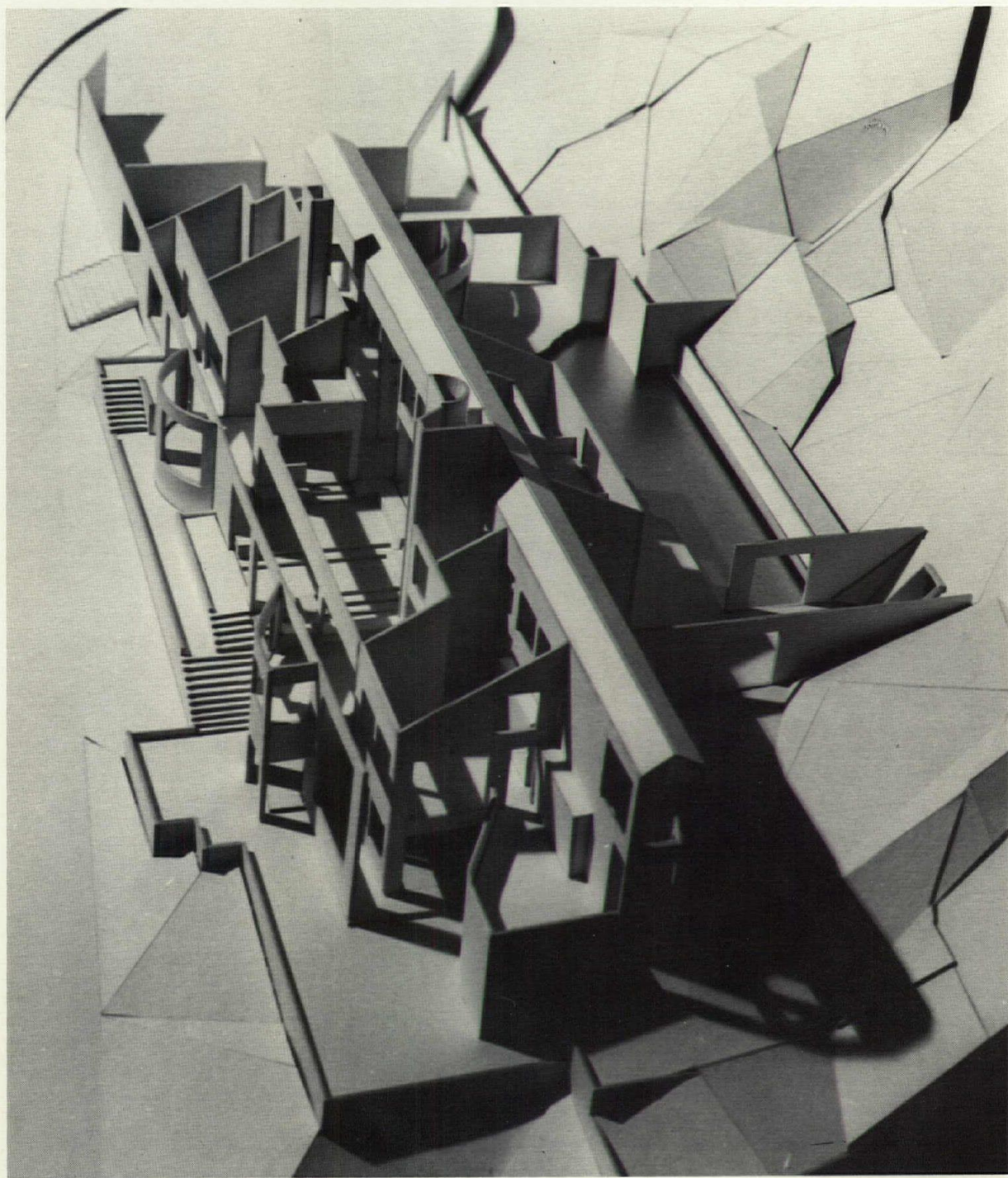
Maturity for a designer, as Jean Labatut pointed out long ago, is to recognize the value of the "model" for its intellectual insights and to creatively forget how the designer detailed the solution. Insights and ideas, like excellence, we can hold and share in common. Designs are personal, like fingerprints, and are the results of individual idiosyncracies, talent, and the number of "models" stocked in the supermarket of your mind.

Below, Kresge College model, 1970, and as built, 1973; at right, model of residence in Fairfax County, Virginia, 1973, and as built, 1974.





Nilsson House model, 1976.



EUGENE KUPPER

Nineteen Thoughts on the Model

Ask a Voodoo doctor about the efficacy of models.

A drawing is a commitment to an idea; a *model is a commitment to a thing*. (But in architecture, the idea is sometimes the thing itself and not something about the thing.)

Models are toys, not tools. Every attempt to represent a design in models, drawings, etc. is full of hope and is completed in the spirit of *empathy and playfulness*.

Models deal with problems of 3-d form and organization *but seldom 3-d space*. The model helps in differentiating the spatial components and their relationships.

A model describes parts and their relation to a whole; it has an analytical intent and effect.

The model can absorb the record of various design intentions, yet keep a whole and coherent reality together. The model catalyzes our perception of the

“the real model is a design project
at a degree of abstraction.”

design problem and leads us *from problem to project*. This is the indispensable synthesizing function.

Buildings seldom have the clarity-in-complexity that a model shows. *Models gain energy by being small*.

A really beautiful model condenses the monumental instinct in architecture—the integrity of the object as icon.

Eugene Kupper is an architect and an Associate Professor at the University of California at Los Angeles.

Imagine a world of full-size models. Now that's architecture! Or...is it?

Models are memoranda — concise and clarifying — but the world is ambiguous and sloppy. The model's message is deceptive.

A photograph of a model can create a more convincing illusion than the model itself — *the model exists as a separate world.*

Where is our knowledge of the rest of the world when we make a part of it into a model?

I cannot build a model that can represent my knowledge of and experience in a building — but I can build a building that can represent my knowledge and experience of a model.

We supply missing detail and sensations by *imaginative displacement* into the world of the model.

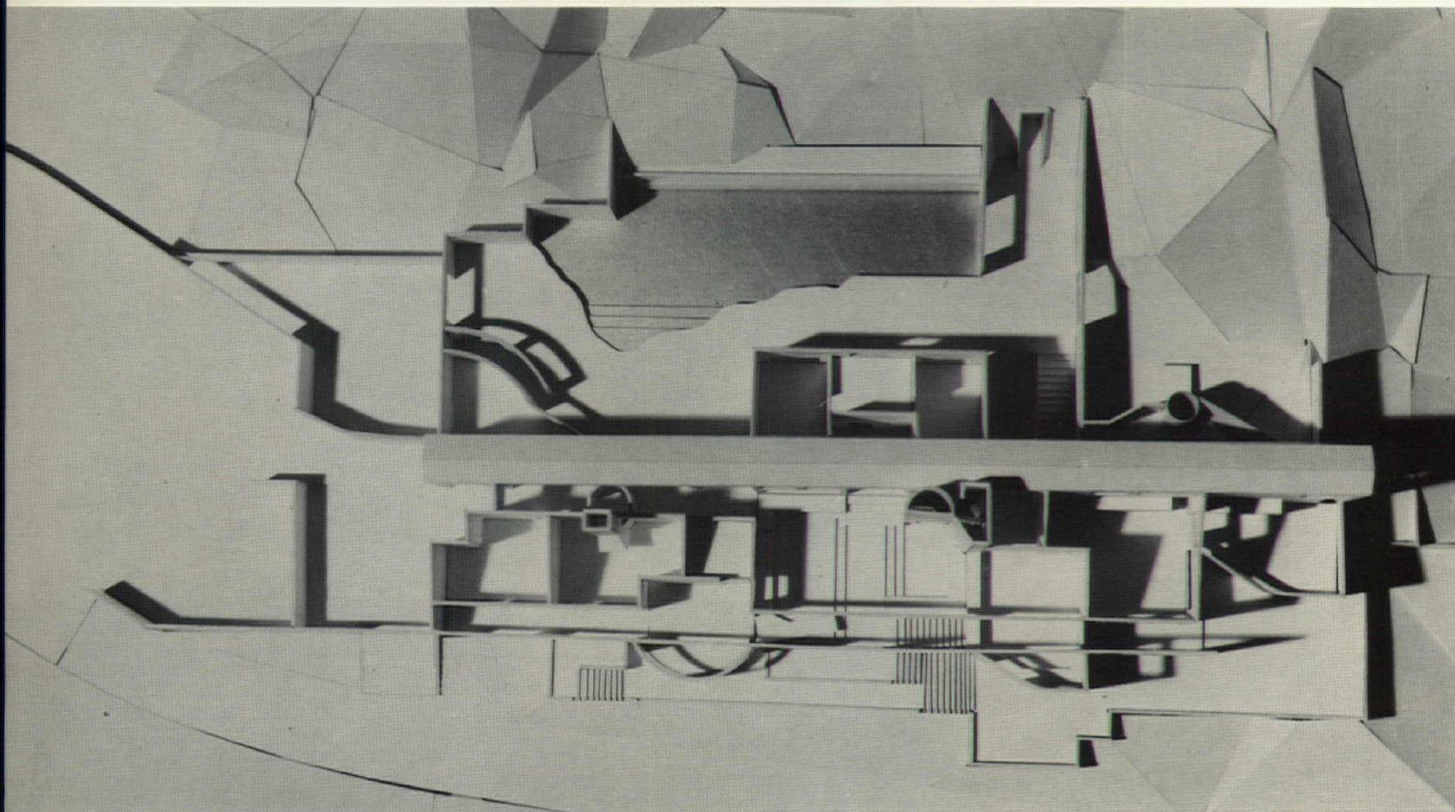
We regain a lost innocence by making models.

Design works in the abstract, and the real model is a design project *at a degree of abstraction.*

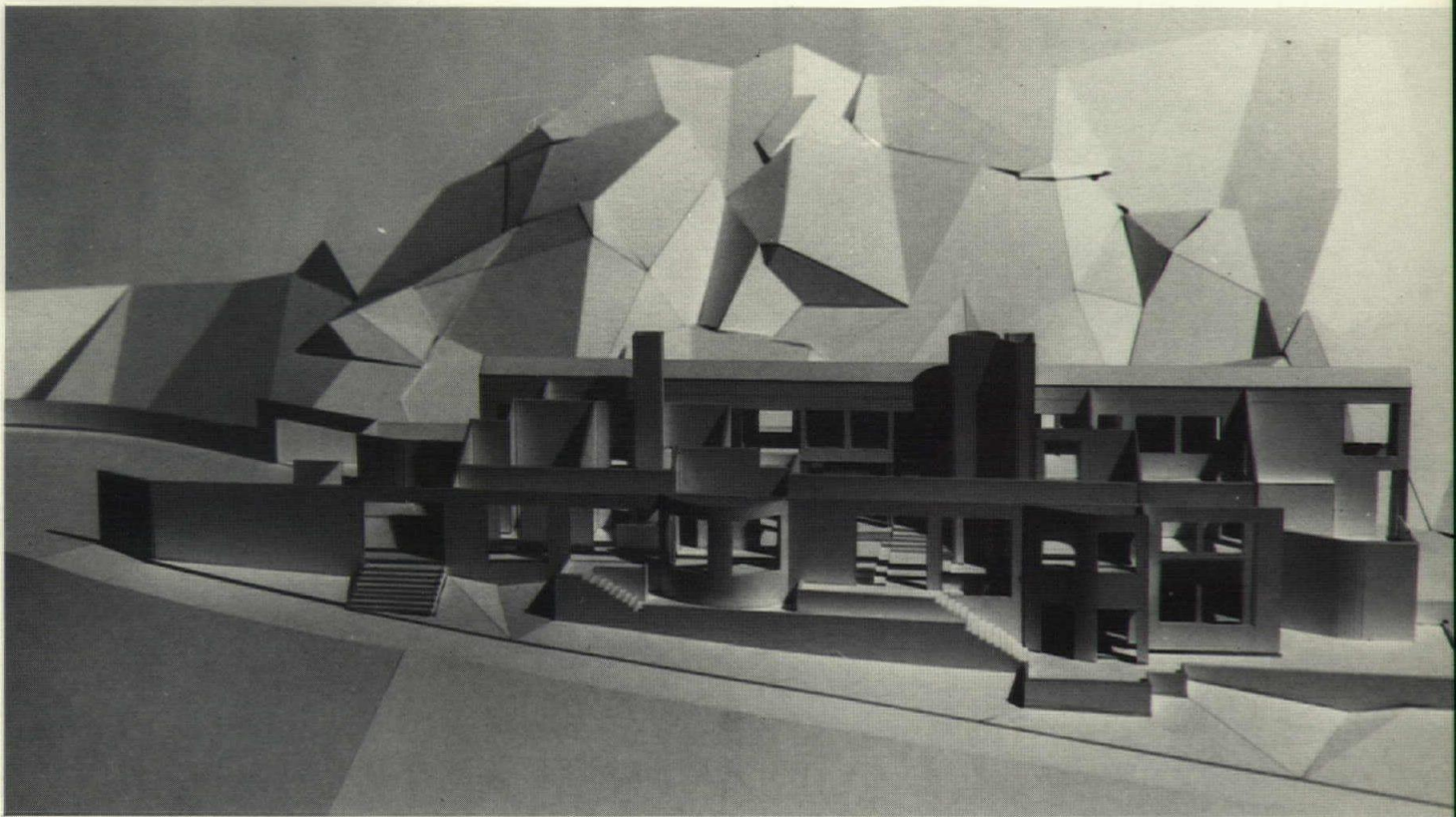
A cardboard model is a little cardboard building.

Looking for new pieces for a model, *new ways to make the illusion appear*, can restore the spirit of invention.

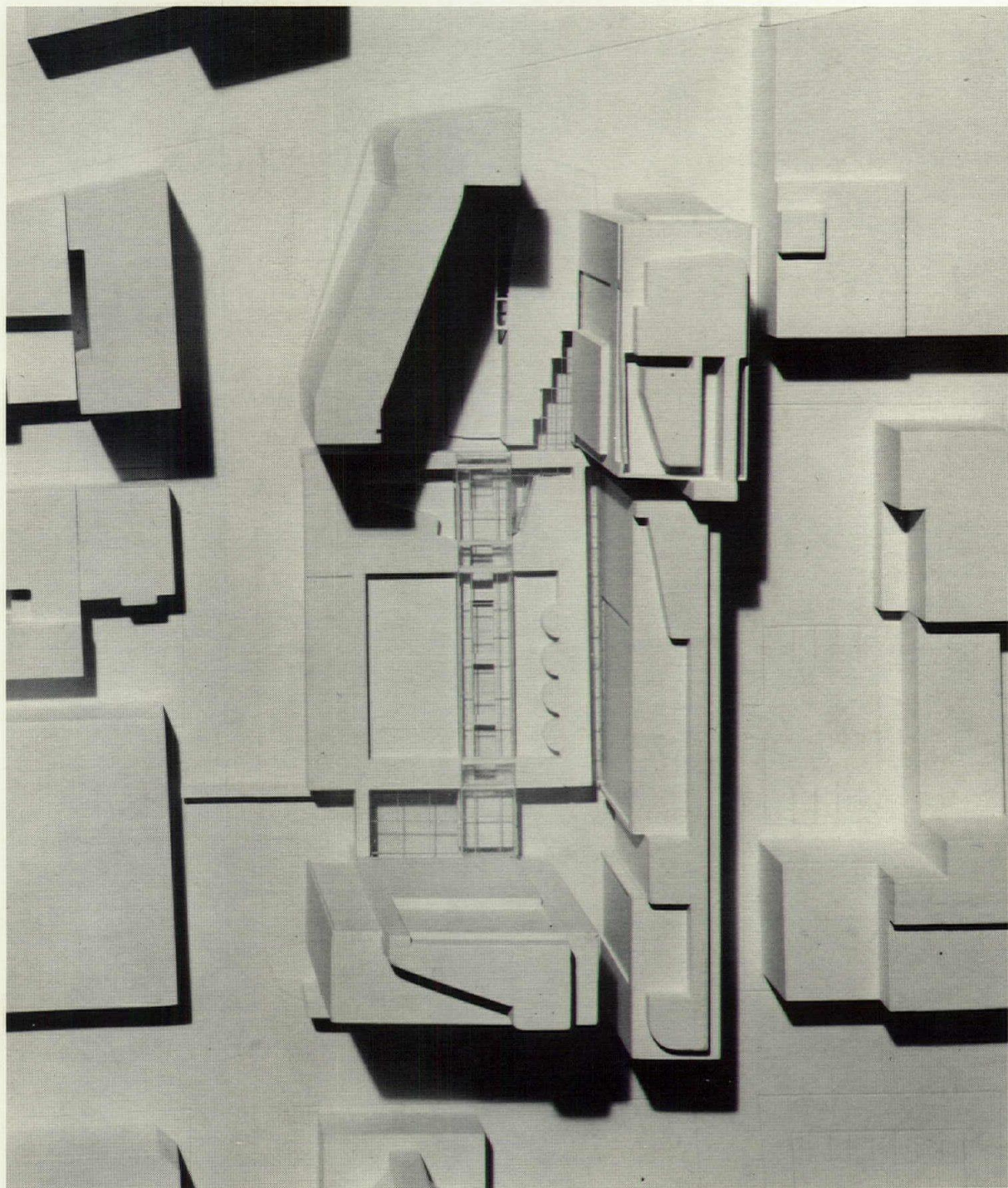
Sometimes we can find a way to make more interesting buildings simply because we had to solve the related problems of making a model.



Below, Nilsson House model: elevation/section view; at left, plan view.



1 Overview of Springfield Center, Springfield,
Massachusetts.



RICHARD MEIER

Artists and Models

Every element in architecture, whether large or small, has a relationship with its neighbors and to its context. The most important thing in the creation of a building is relating the various elements to one another in such a way that they serve to reinforce design intentions. My search has been for concepts which embody man's fabricated material environment and enable architecture to communicate and endure as a true expression of its own time. Such concepts are the real measure of architecture's cultural value.

As the architect progresses from the formless to the formed, he reaches for the highest level of consciousness. It is his recognition of the elements of architectonic expression that communicates the nature of architecture.

From the master builders of Classical Greece to the German High Baroque architects, history has taught us that buildings possessing artistic perfection can result from an attempt to disguise and even to deny the nature of building materials and construction. The architectonic goal was to obliterate all trace of material limitations and structural restrictions by gradual improvement in the appearance of the architect's work.

**“Often models may be clearer in
their ability to express the
intentions than some of the actual
built works.”**

Richard Meier, of Richard Meier and Associates Architects in New York City, was Visiting Professor in Architecture at Harvard University and Bishop Professor in Architecture at Yale University in 1977.

I believe that the world must be represented to the senses in a coherent and logical way. Unity, the relationship among the parts, and clarity or radiance of the form are necessary to achieve an ordered architectonic expression. Alberti said that beauty consists of integrating the proportion of all parts of a building in so rational a way that every part has its absolutely fixed size and shape and nothing can be added or taken away without destroying the harmony of the whole.

My concern in architecture reflects my desire to represent an aesthetic organization of the environment, investing each design with a coherent system of mutually dependent values. The basics of all architectonic activity—floors, walls, columns, doors, windows, stairs—owe their material existence primarily to some practical requirement. Yet, the fulfillment of such a requirement is not always an act of architectonic thought. Arnheim, in *Art and Visual Perception*, says “At no time could a work of art (architecture) be understood by a mind unable to conceive the integrated structure of reality,” and this orderly conception of reality is related to all aspects and components of architecture.

Architectural consciousness as applied to the details of a building is not the invention or the combination of new materials. Nor is it technical dexterity in manipulating the elements of construction as if they had an independent or even adversary nature. It is a process by which the nature of materials used and the method of construction express the form of architectural intention.

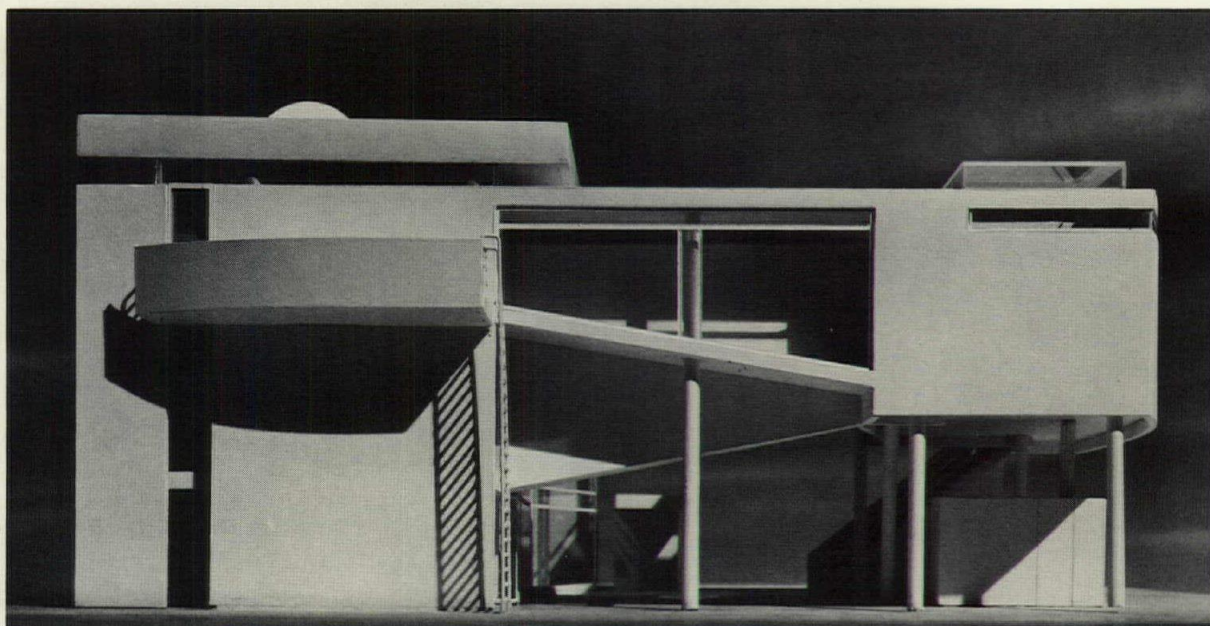
Keeping these thoughts in mind, I wish to explore a recent cultural phenomenon. In the past few

months, there have been a considerable number of architectural exhibitions in New York City. Some displayed architectural models. Some have consisted of architectural drawings. A few of them have devoted exhibition space to both models and drawings. All these shows have captivated art lovers and have uncovered a surprisingly untapped resource—a public eager for exhibitions about architecture.

The public’s perceptions of architecture exhibited in this way are not new. They are simply ones which have been ignored for too long. The idea of architecture as an art has generally been overshadowed by pragmatic concerns of politics, economics, and structural concepts—the so-called real concerns of real buildings.

Both architects and the public are elated by the current attitude which they see expressed in models and drawings. These elements are a part of the conceptual process and extend beyond the generally accepted notion of what constitutes an architectural model. This new expansion allows for different types of architectural models, which can each play a different role in the making of a building.

There are several different kinds of architectural



models at the various phases of a project. I define them as follows:

1. The contextual model
2. The sketch model
3. The facsimile.

This classification system is flexible according to the nature and the purpose of the project which it represents.

The contextual model is a type which may be thought of as small in scale and concerned with basic intentions in relationship to the physical context. It is the first three-dimensional conceptualization and from it later design stages are created. The contextual model has a dual nature. In terms of design it is the most abstract. Yet it remains very concrete in terms of the physical setting and relationship to the landscape. Here the building is seen as though *in situ* for the first time. The contextual model has a quality of anticipation which is vital to the architectural concept. The surfaces in the conceptual model at this early stage of creation have little or no articulation (Fig. 1).

The sketch model is the working tool of ideas which have developed after the contextual interpretation. It examines in three-dimensional construction the intentions which now have been raised beyond theory and have become real.

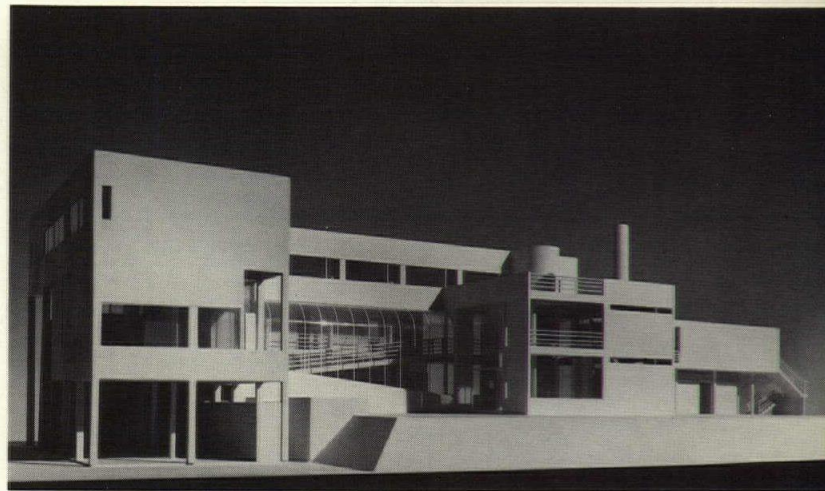
The sketch model is a learning device that instructs as it develops. Its protean nature results in a series of fragments—partial models which never are completed. The pieces contribute to the organizational dialogue between that which is drawn and that which is worked out in the three-dimensional construct. This type of model provides invaluable insights into the development of the conceptualization of the building. It provides stability for the successive modifications of original ideas (Fig. 2).

The facsimile model is the final piece. Usually this model is not reworked after it is built. It becomes the reference point which supplies proportion, detail, and dimension for the final stage of development in the working drawings. All changes from this point will occur in the construction documents and ultimately in the building itself.

The facsimile model also serves as a reminder to

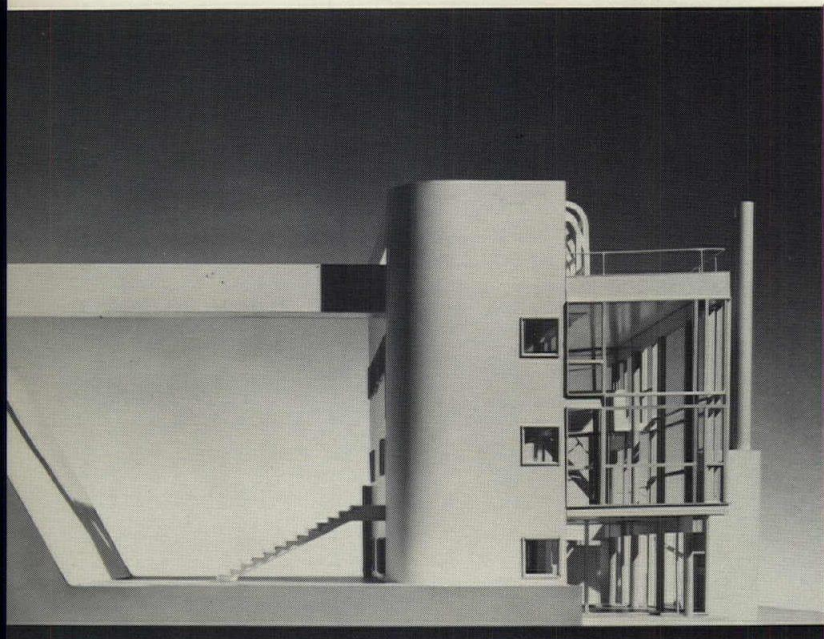
the architect of the final theoretical concept. It records the pedigree and it is the forefather of the real building. The facsimile model states the original conviction of the architect and provides a check point upon which to evaluate his future attitudes and influences as stated in the actual building (Fig. 3).

For me, the model is an abstraction of the building; the model does not try to look like a finished



2 At left, Villa Strozzi "Museum of Modern Art" facade, Florence, Italy; 3 at right, House in Old Westbury, Long Island, New York.

4 Douglas House side facade, Harbor Springs, Michigan.



building. The models help to identify those aspects of the building for which we would want to maintain an abstract quality, or those aspects which will be handled one way in modelling but another way in construction. In the Douglas House model (Fig. 4), the slope of the site is made as a diagonal plane in relation to the orthogonal organization of the building. It is made of white cardboard, and is abstract in that there is no indication of texture, color or landscape detail. What is seen in reality is not perceived in the model.

Concurrently with the development of the Olivetti Prototype I designed a Dormitory facility to stand adjacent to the existing Olivetti Training Center in Tarrytown, New York (Fig. 5). One of the two Olivetti buildings designed for a specific site, this project evolved in my traditional manner. Because all the Olivetti projects were pursued simultaneously, a great deal of cross-influence is evident. The prototype both benefitted and suffered from the absence of context. The dormitory was able to capitalize on the topography, vegetation and outlook of the site, and was intended to house trainees from all over the country

who come to Tarrytown for four to six weeks.

The century-old trees that dominate the slope where the dormitory would stand are not indicated on the model photograph. Yet the location and preservation of these trees was a very important consideration in determining the form of the building. Tree stands and the contours of the one-sided slope facing the Hudson River dictated the open, curved W shape of the ground plan.

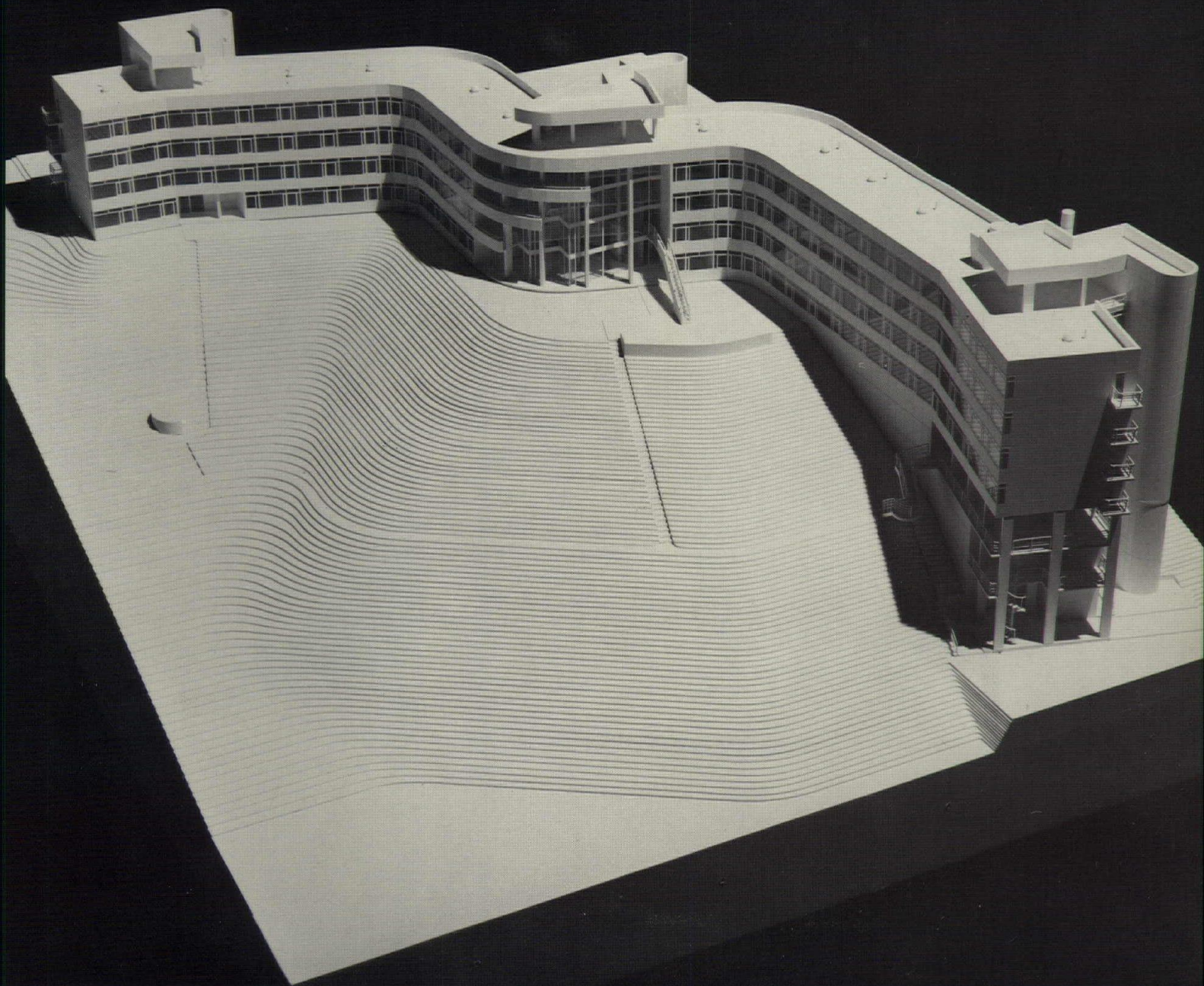
The four-story slab follows the site contours, winding its way through the trees at the top of the slope. In the Olivetti Dormitory Project, the building follows the landform, then turns and runs perpendicular to it. This intention is seen more easily in the model form. The model allows one to understand the clarity of the entire building and to sense the planar quality of the vertical surfaces.

All my work is based on formal ideas but does not rely on them solely. The models articulate at an early stage what those formal ideas are. My models are worked out very carefully and are as thoughtfully conceived as my buildings. The buildings can attain a higher level of completion because they grow out of studies in drawings and models, and are their extensions. I hope that they are not dissimilar. The models are intended to be an expression of the intentions of the building. Often models may be clearer in their ability to express the intentions than some of the actual built works.

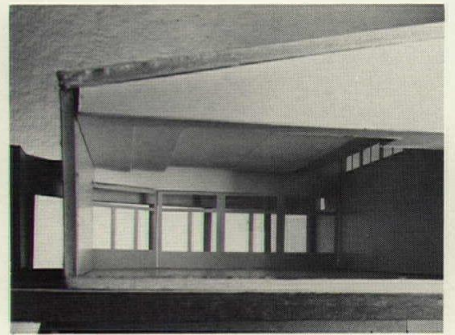
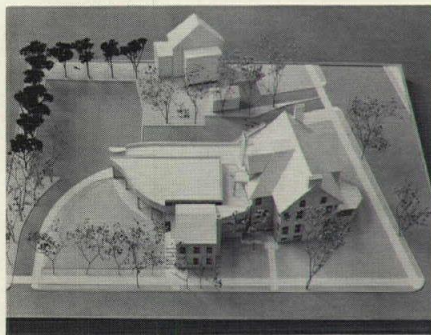
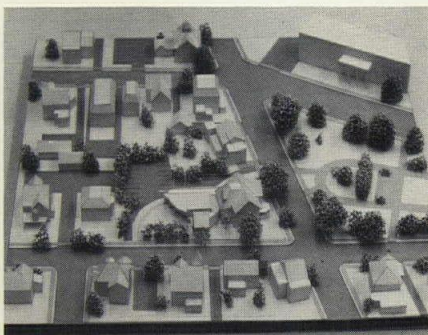
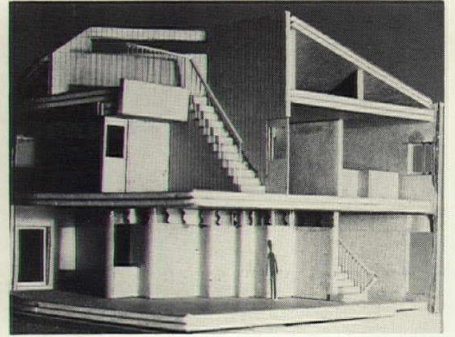
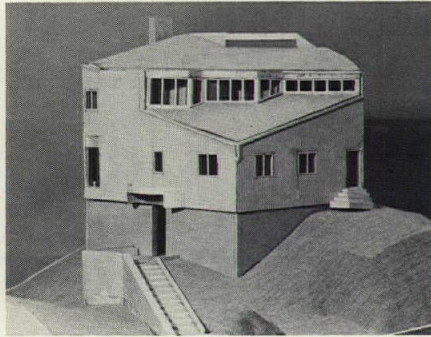
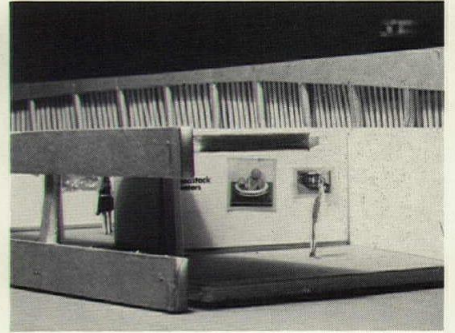
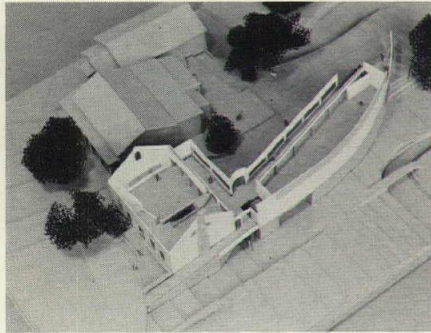
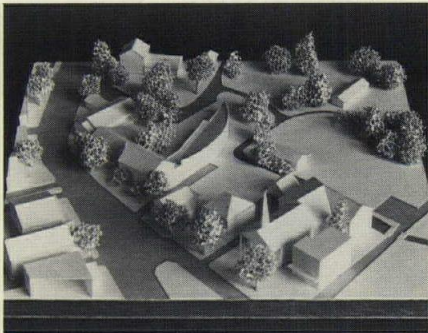
For example, the Olivetti Dormitory model doesn't try to show the trees. It shows the abstraction of the slope; but the viewer still gets a sense of context among building, slope and hill. This sense is missing in reality. The model does not attempt to express the quality of the trees against the building or the way the sun moves around the building. That is not its purpose; for in this model, I am studying the physical relationships of the sloping plane and the object and how it relates back to the diagonal plane.

The model is a provocative device. We work on the model and the drawing simultaneously. They partner each other. The model is not a thing unto itself. It is only a part of a masterplan which the architect has.

5 Olivetti Training Center Dormitory, Tarrytown,
New York, 1971.

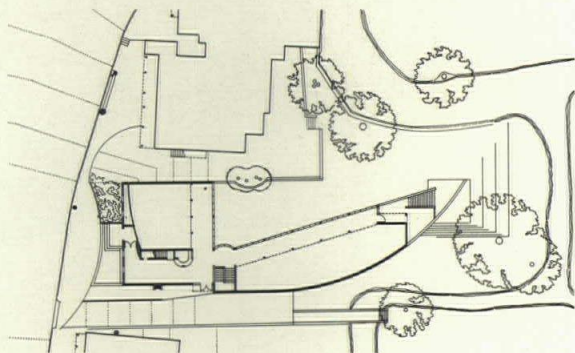


Robert Kliment and Frances Halsband are partners in R.M. Kliment & Frances Halsband Architects in New York City, and teach at Columbia University and as Visiting Critics at North Carolina State University School of Design.



**R.M. KLIMENT/
FRANCES HALSBAND**

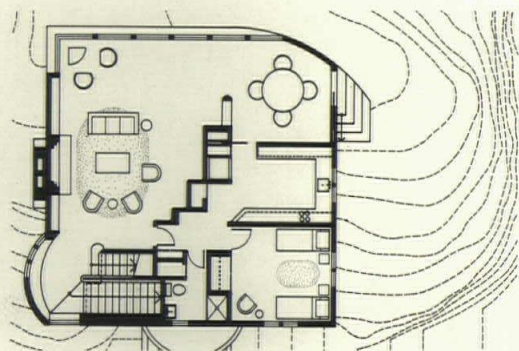
*Sequences of Study Models for Three
Small Buildings*



Gallery Extension and Renovation

*Woodstock Artists Association
Woodstock, New York*

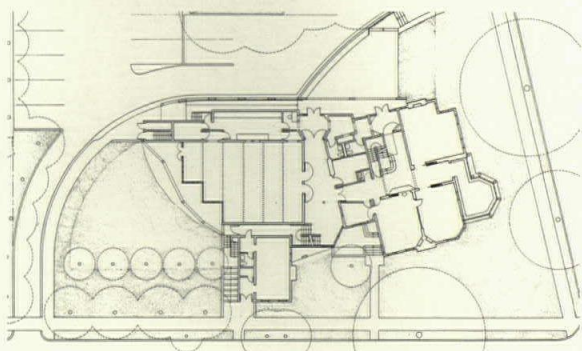
*Site location model
Site and building model
Room model
Plan at street level*



House

Hudson River, New York

*Site location model
Building model/exterior
Building model/interior and exterior
Plan at main level*

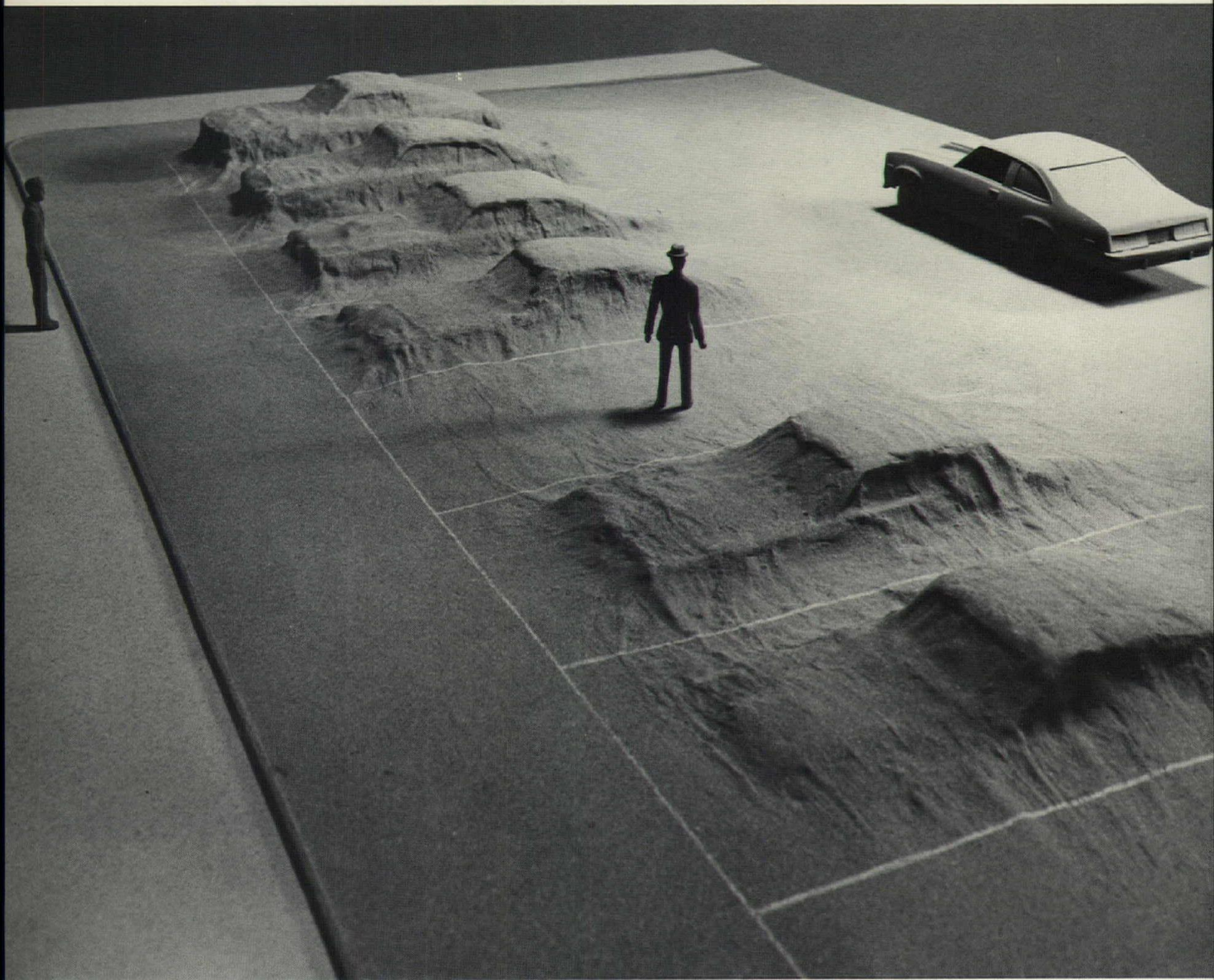


Extension and Renovation

*Young Women's Christian Association
Kingston, New York*

*Site location model
Building model
Room model
Plan at street level*

*Ghost Parking Lot, Hamden Plaza Shopping
Center, Hamden, Connecticut. Model, 1977.*



JAMES WINES

An Interview

Buttolph: Do you have a philosophy about modeling which relates particularly to your architecture?

Wines: Most architects probably use models and drawings to work out some sort of formalistic solutions, be they space, structure, volume, or some interactions of shape, color, etc. This stems from the fact that most believe architecture to be 1. problem-solving, and 2. an art based on the inter-relationship of form and space on one level or another. I believe exactly the opposite—that architecture is not the consequence of accommodation and formalism, but, rather, the result of a response to social, political, and environmental circumstances.

I would say that the models and drawings that SITE does are primarily for the benefit of the client who wants to know what the project will ultimately look like. We find the entire process rather paradoxical, because the model is simply the manifestation of an idea about something and not really a useful tool for working out problems. Apropos a recent article in the *New York Times* wherein the author didn't have a clue to what SITE's work is about, someone commented that to criticize SITE's projects in terms

“all art ultimately ends up as
product in our consumer culture,
no matter what the intent”

of form and structure (which was the case in the essay) is like faulting Duchamp's moustache on the Mona Lisa for lack of paint quality. Our group's drawings and models function as thoughts about things and not as records of formal relationships.

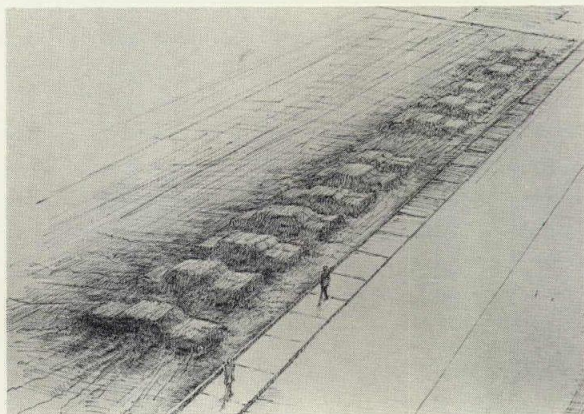
Even when a project is finished and part of the community, it is only a semaphore which triggers a thought process, a memory, a reaction. The buildings are informational—iconographic, if you will—but, the main thing is the dialogue in the mind. In

James Wines is a principal in SITE, Inc., writes and lectures extensively, and presently teaches at the New Jersey School of Architecture.

this respect, of course, SITE's work shares certain aspects in common with conceptual art.

Buttolph: If the main concern is for the idea, then you can see your buildings as life-size models of the idea.

Wines: Exactly, that is a good comment. The reality is simply a model of an idea. Unfortunately, the comparison to concept art has built-in dangers. Conceptualism backed itself into a tautology from which it couldn't effectively escape by claiming that any art manifestations having to do with the physicality of craft disqualified them from being conceptual. The latest drift of concept work into the slogans of political action only consolidates the problem because the very constituency the message is trying to reach (the



disenfranchised masses, in point) wouldn't be caught dead in an art gallery, much less reading Marxist diatribe in an esoteric format. I certainly feel sympathy for the social/political motivations of some of these artists, but I also feel that the statements must exist squarely and communicatively in the public domain. Conceptualism, like SITE's work, is a kind of "anti-art," (or what I call "de-architecture"). But, as Marcuse pointed out some years ago, "The only true role of anti-art is in the streets and marketplaces."

Buttolph: How does your drawing assist in expressing the idea?

Wines: Certainly after concept art the possibility opened up where thinking and writing became the substitute for traditional sketching. For a period of time about two years ago I must say that writing and notation became almost exclusively my way of setting forth ideas. Now, however, because of the urgent need I feel to communicate in the most ordinary public situations, I tend to do more drawing in the conventional sense. I feel the need to establish a certain physicality and I guess this way of analysis is the most appropriate.

Buttolph: So in, for example, the Tilted Wall, you are not necessarily studying it in drawing either?— You're not using drawings to study, and you're not using models to study.

Wines: No, they aren't really "studies" in that respect. The whole idea is in my head before I make any tangible evidence of it, so the model doesn't represent a process of "feeling it out" or working gradually toward some resolution. What I do often is make a series of physical indications of ideas if, for no other reason, than to sift out the weaker concepts from the good ones. What is so-called "right" for me is usually the idea that is the simplest, the one that seems iconographically justified.

Buttolph: So there's no concern over form, only for iconography. Can you elaborate, in expressing,

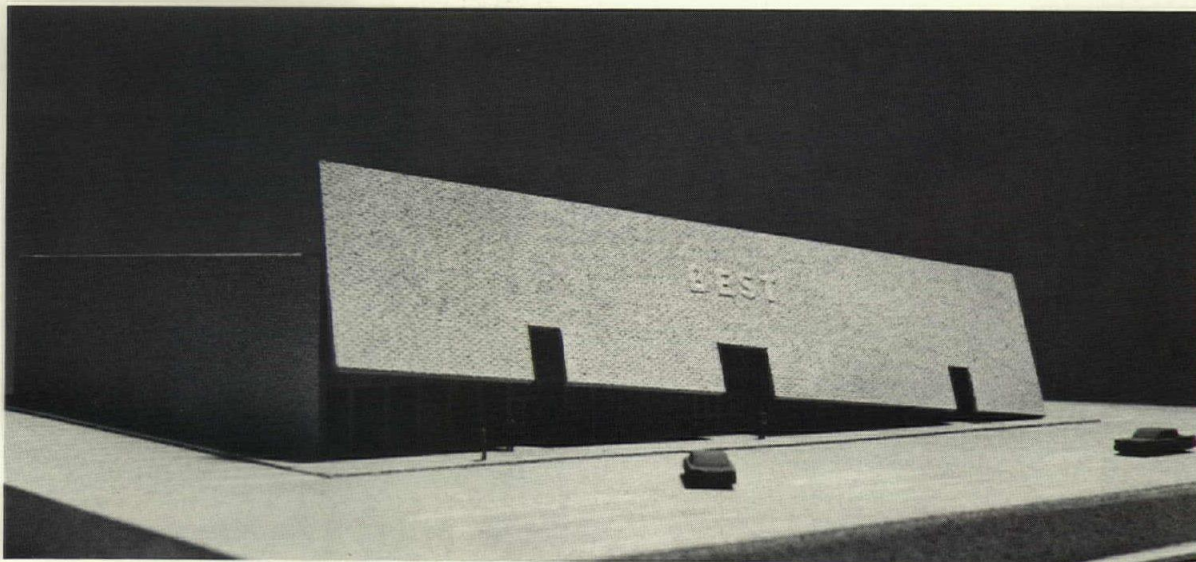
say, the Tilted Wall, on what getting the iconography right means?

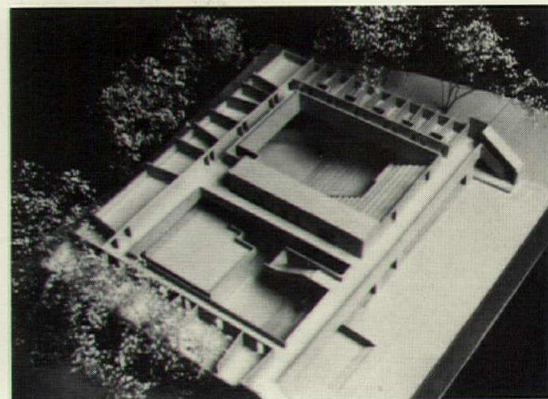
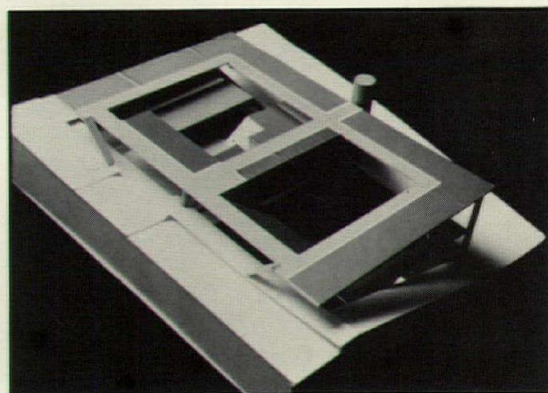
Wines: The iconography of the series of BEST buildings (and they should definitely be considered as a conceptually related series as opposed to a group of single structures) is based upon pre-dispositions toward things. In this case, the subject is equilibrium. Also the idea of developing an inversion of the commonplace; taking a circumstance completely based upon habitual use and reflex identification and then changing this reality with a single gesture. The "Tilt" Project" is about the Modernist dialogue over the exterior "expressing" the interior, as well as being a response to impulse culture. In this case the interior is not "expressed"; but simply exposed by kicking up one corner to reveal what's inside—infinately simpler as a solution and more provocative I think. So, architecturally, the idea is a humorous commentary on formalist/functionalist ideologies, I guess somewhat in the area of the moustache on the Mona Lisa. After all, the American shopping center carries with it the entire mythology of consumer culture (the personification of everything optimistic and patriotic), so it stands to reason that such inversions operate on a similar level to some of Duchamp's attacks on re-

vered institutions.

Just to sum up a few points made earlier with respect to your questions about drawings and models, I personally feel that they serve me almost exclusively for clarification of an idea to a client. Ironically now, because of the considerable publicity surrounding SITE's work, the models and drawings seem to have acquired an intrinsic value to an art market. Therefore, in spite of my protests to the contrary, all art ultimately ends up as product in our consumer culture, no matter what the intent. It always amused me that some of the most cerebral concept art ended up in a Kulicke frame on the Chase Manhattan Bank wall, as I used to be quick to puncture the myth of non-commodity proclaimed by so many of the conceptual artists. As reality creeps up now, I realize increasingly that anarchy itself has a market value in America if it can be packaged by Mobil or General Foods. The worst thing about interviews of this kind is the embarrassing confrontation with one's own words ten years from now. After all, Duchamp, Man Ray, Picasso—in fact, most of my heroes—ended their days sketching nostalgic nudes.

Model of The Tilted Wall





Music Building for Swarthmore College. Top to bottom: site model (1" = 100'), 1969; schematic model (1/16" = 1'), 1970; study model (1/8" = 1'), 1971.

ROMALDO GIURGOLA

Modelling

For each phase of the design there is a type of model which may be most suitable.

At the inception of the design it is very important to have a site model where the grades and surrounding buildings are all explained to scale, and in as large a context as possible.

The schematic model is very much a diagram of the program for, in this example, the music building of Swarthmore College. The colors refer to program elements and conceptually the building is organized with big spaces in the center which are different kinds of performing spaces, and a very large entry space. You can see this model perhaps as a 3-dimensional parti.

In this building there was a real contrast in scale, with some very big spaces which were essential to the organization of the building as a whole. The performing room in particular was a room which had to be studied in a way that required more detail, since it had many more unknowns. So to understand what that very important space in this building was like, we built something quite large in order to model it, essentially taking a piece out of the building in an attempt to really understand that piece because it

“the drawing gives a much better presentation of the idea of the space”

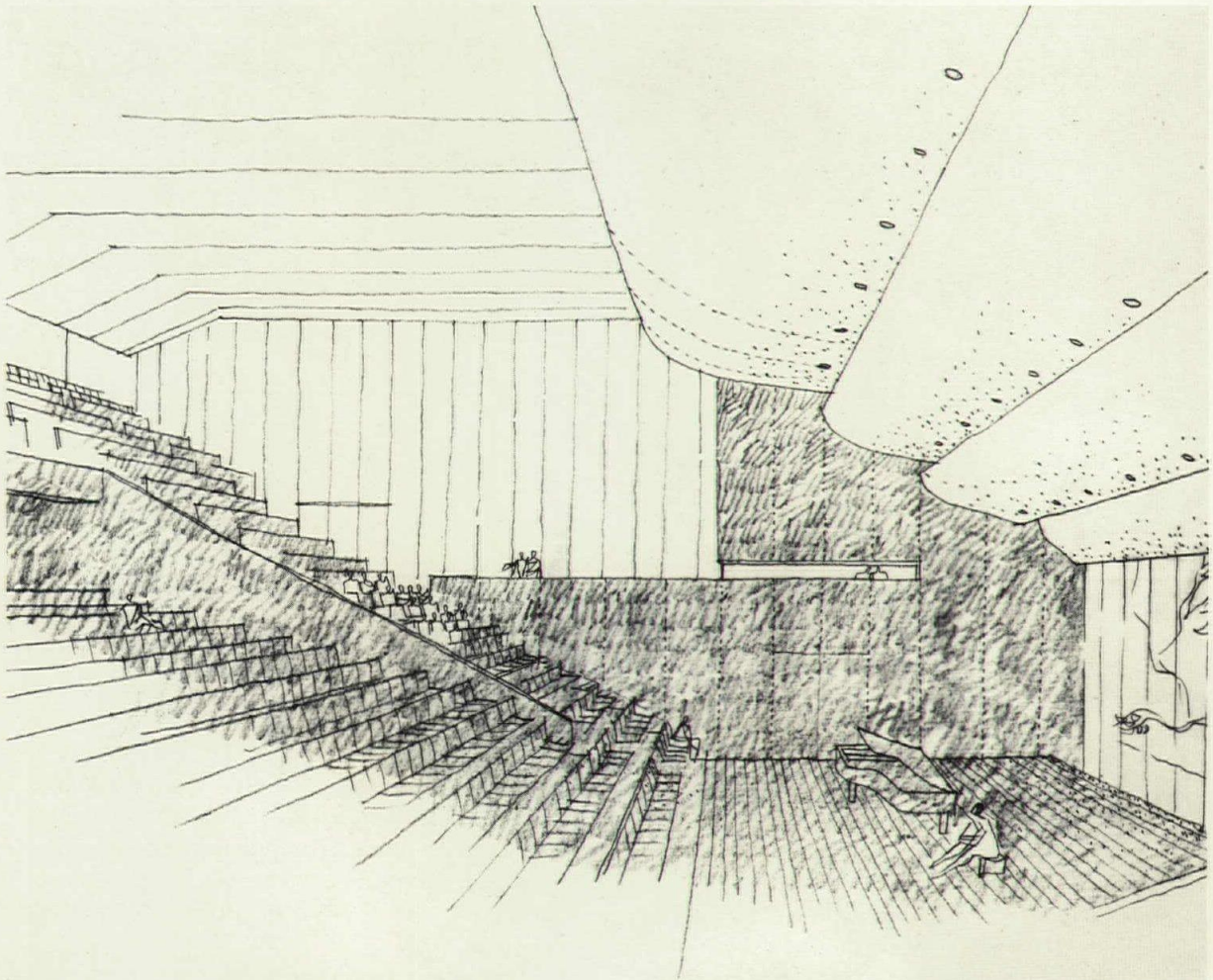
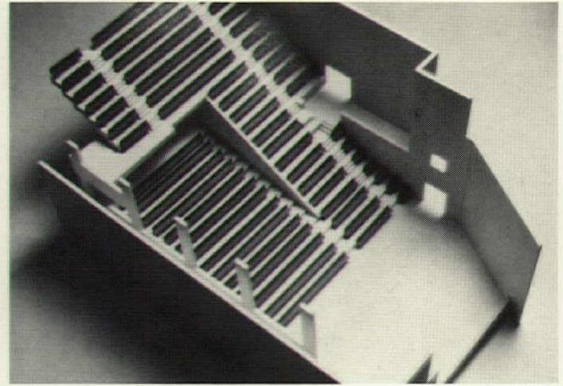
would determine so much of what goes on around it. In some cases we have even built life-size models of interior spaces.

A study model such as this can really not be built until all the parts are known. This perhaps becomes much more a tool for explanation, although certainly one will learn things from building such a model, and may change the design. But one is not in a position to make this model until one has fairly refined ideas.

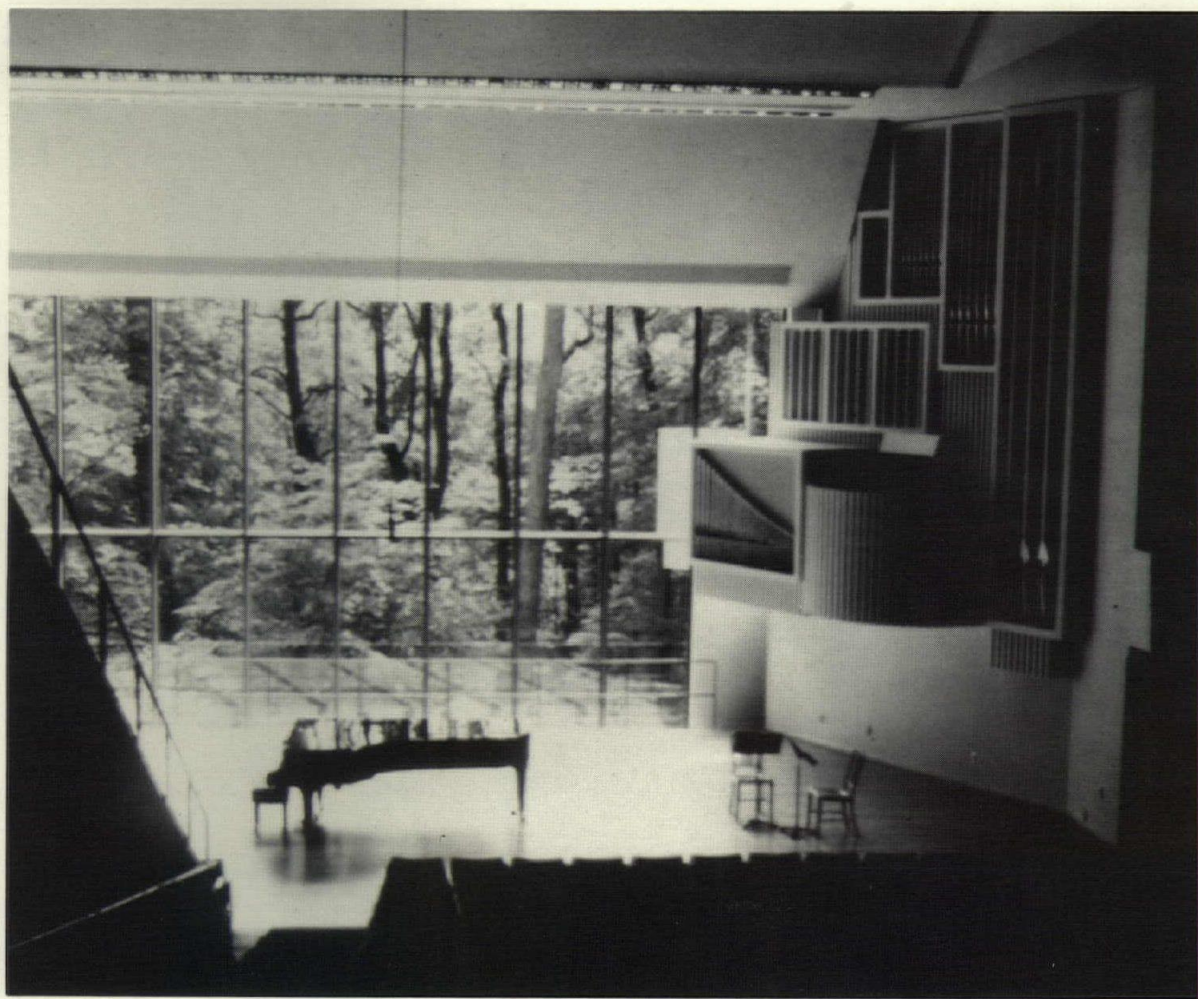
I try to avoid so-called presentation models as

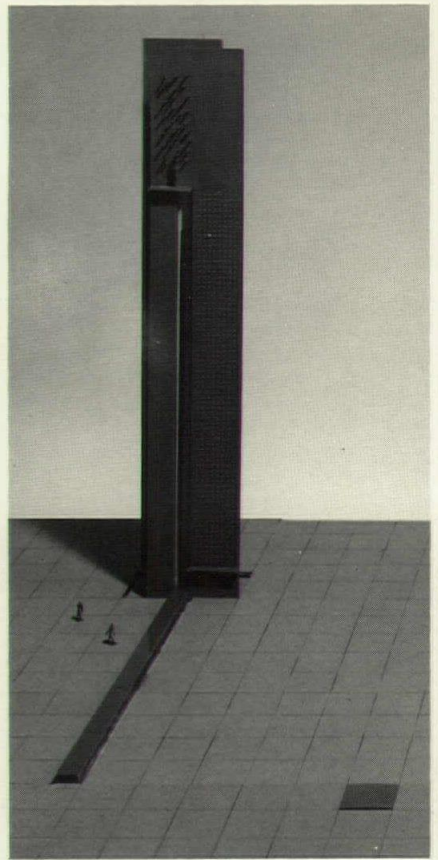
Romaldo Giurgola is a partner of Mitchell/Giurgola Architects in New York City and a Professor of Architecture at Columbia University.

much as possible because they are beyond the kind of thought I have of the building, going too far into detail to please the layman's eye, and becoming a kind of mockery of the building. For presentation, I think the drawing gives a much better presentation of the idea of the space. Surprisingly enough, often when I show clients a model, they cannot relate to the scale. One gets educated to seeing things in a certain way: a sketch has more potential for empathy. In fact, I'm always surprised, when I finish a building, how close it looks to the sketch. The sketch does not attempt to exactly reproduce the building.

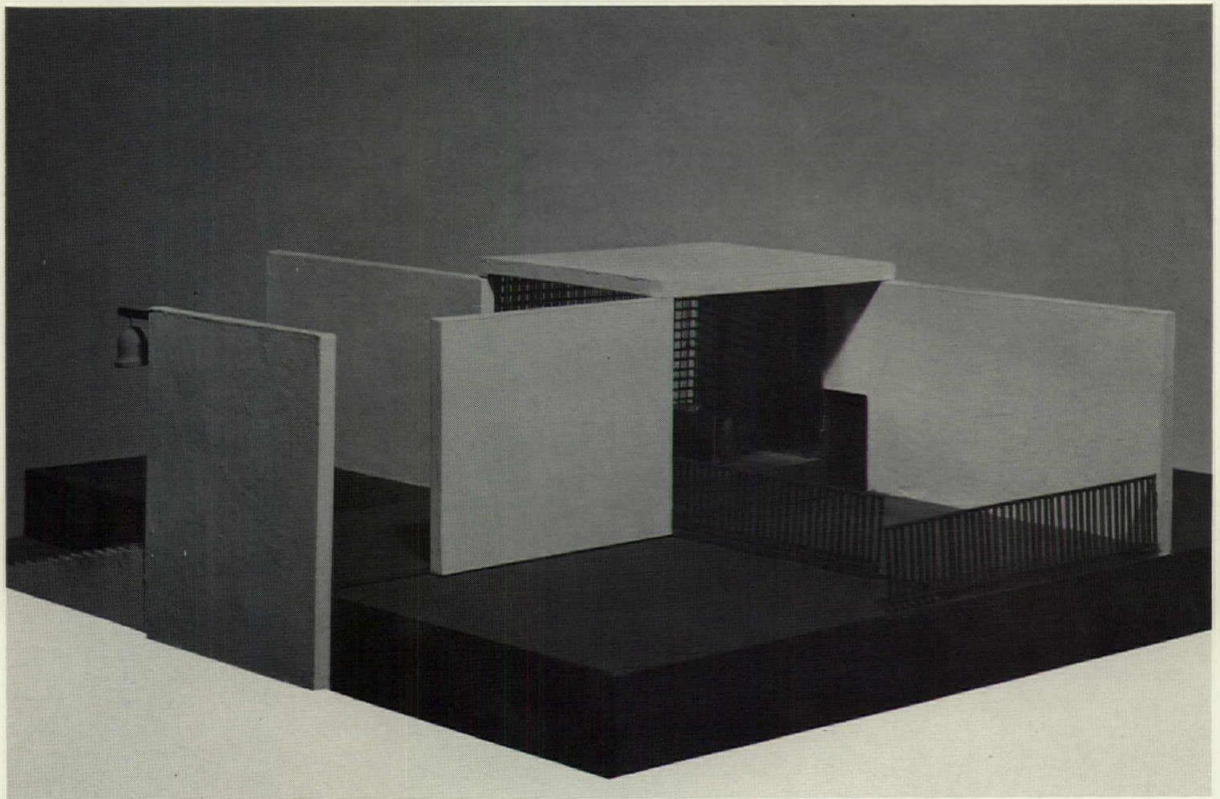


At left, sketch and detail model (1/4 = 1') of the performing room, 1972; and below, the room as built.





*At right, unbuilt design of pigeon tower for
El Palomar, 1973; below, design of open Chapel
for Lomas Verdes, 1964-67.*



LUIS BARRAGAN

Magic Spaces

I do not follow any known architectural or painting current that could be explained clearly and I do not use the same technique or discipline in each of my works. Emotion and poetry are my main inspirations.

I look for magic spaces that provoke serenity, peace and mystery; that lead to meditation as found in the environment of the popular architecture of my country, in the Mediterranean villages, as well as in the cloisters and religious architecture. Ferdinand Bac's and Rudofsky's books and the surrealist painters have been a great help to me.

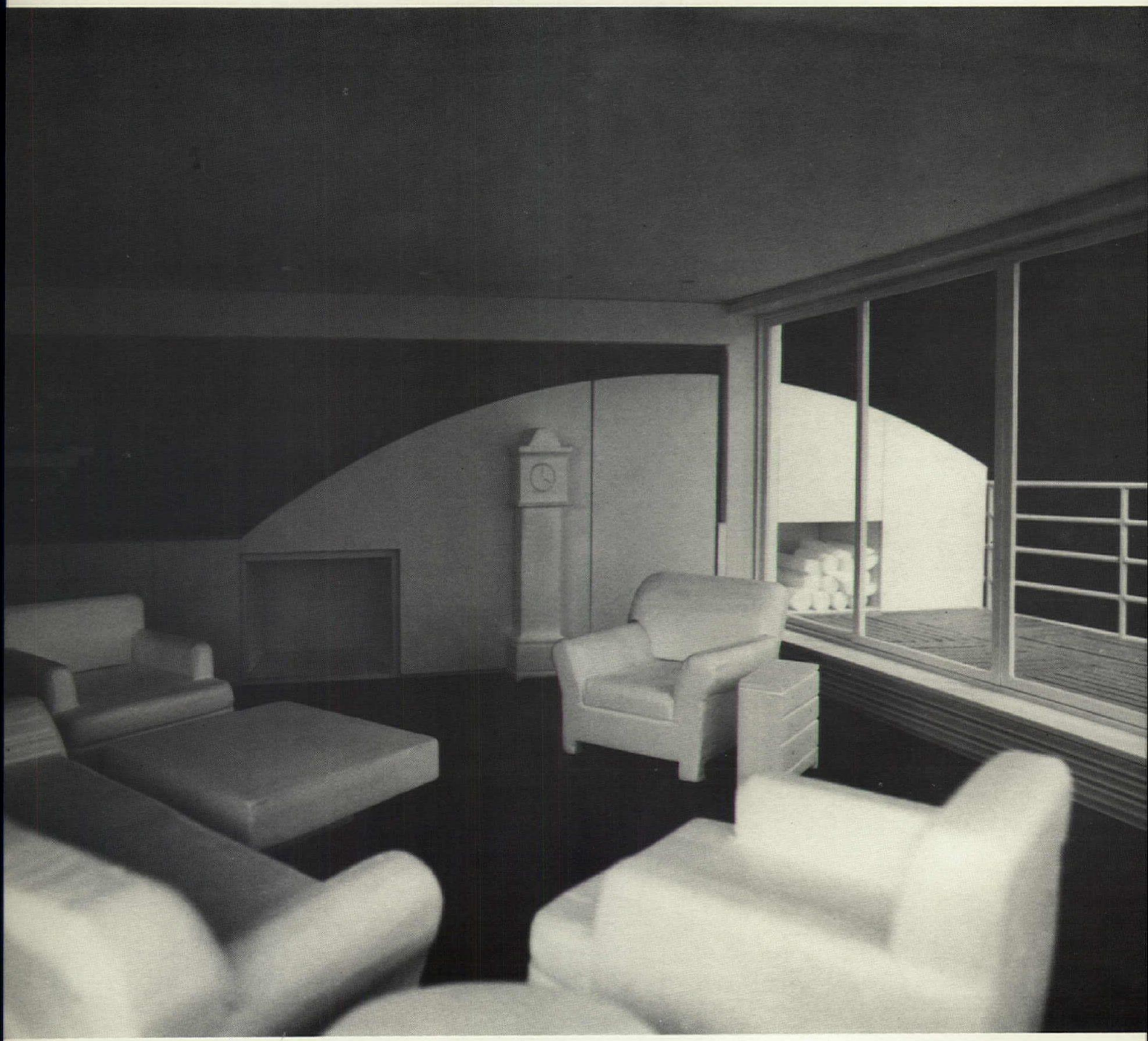
I do not use models for all my works; and as for colors, if they were decided from the beginning, usually they are changed at the last minute, when the work is almost finished.

Each one of my works in its development has a different history.

“Each one of my works in its development has a different history.”

Luis Barragan lives and practices architecture in Mexico City, and has recently had an exhibition of his work at the Museum of Modern Art.

Living Room model, Rooftop Apartment, 1972-73.



ROBERT STERN

Models for Reality: Some Observations

I do not design in model form; I draw (often—but not always—a key elevation *first* and then work on the plans and sections). My initial drawings are crude; others refine them and contribute to their meanings (for me, architecture can never be a solitary pursuit). This process of initiation and refinement continues until a set of ideas has been sufficiently crystalized so that my colleagues and I are convinced that it is time to *build* a model.

Small scale models usually come first—frequently in quick succession as massing and gross relationships of interior spaces and fenestration are explored and established. Then, at a critical time (usually after the scheme is set and has met with the client's preliminary approval) a "big" model is built, as much to include the client in the exact nature of the design as in the process of its making (both of which are usually too abstract for the non-architect to otherwise grasp at this stage) and to "double-check" what has been done to date.

The big model shows only a portion of the building: it focuses our attentions on the shapes of the interior spaces, which in our work we increasingly aim to make in such a way that they are sufficiently

**"After all, why think about
mouldings and corner beads when
straight pins and glue will do?"**

defined in three dimensions to be worthy of the name "room," even though they may be combined in unexpected and even ambiguous ways.

The big model affords an opportunity for all parties concerned to "poke around" in what is a fairly close approximation of the future building: big size helps all concerned to *see* relationships rather than to imagine them. A big model can simulate and stimulate reality to an astonishing degree, especially when combined with photography. But it is a cumbersome

Robert Stern is a principal in the firm of Robert A.M. Stern Architects, an Associate Professor of Architecture at Columbia University, and Visiting Critic in Architecture at North Carolina State University.

tool, limited in its usefulness by problems of transportation, not to mention cost.

Most of the big models that have been made in our office are scaled at 1" = 1'-0". They are built of foam core board pinned together, rather than glued, and often constructed episodically as design issues arise. The pins permit change as new thoughts occur.

Architects have become accustomed to use the word "model" in a very different way from its traditional usage: once it conveyed a sense of action (to model a space); now it conveys a static noun-or-object-like quality (a spatial model). Even though the theory of Modern Architecture is changing dramatically, so far this shift has had little effect on the day-to-day working habits of architects: the dependence on models goes hand-in-hand with the "weightless" cubism of the canonical International Style. The miniaturized object quality of models not only focused virtually all design energies on the formal problems raised by buildings-in-the-round (as opposed to buildings-as-fragments), but also diminished the potential for expression that a single wall plane, a "facade," might have in its own right. Similarly, when the traditional, expressive elaboration of detail based in part on construction was jettisoned by the form-givers of the canonical International Style, in favor of the smooth, rendered stucco surfaces, the impetus for making elaborate drawings evaporated. Only in the 1950s when Mies, and later Kahn, began to think of structure as decoration did the big-scale drawing begin to reestablish its role in the design process; but it only achieved a tentative position, supplementary to the great models of structural details which

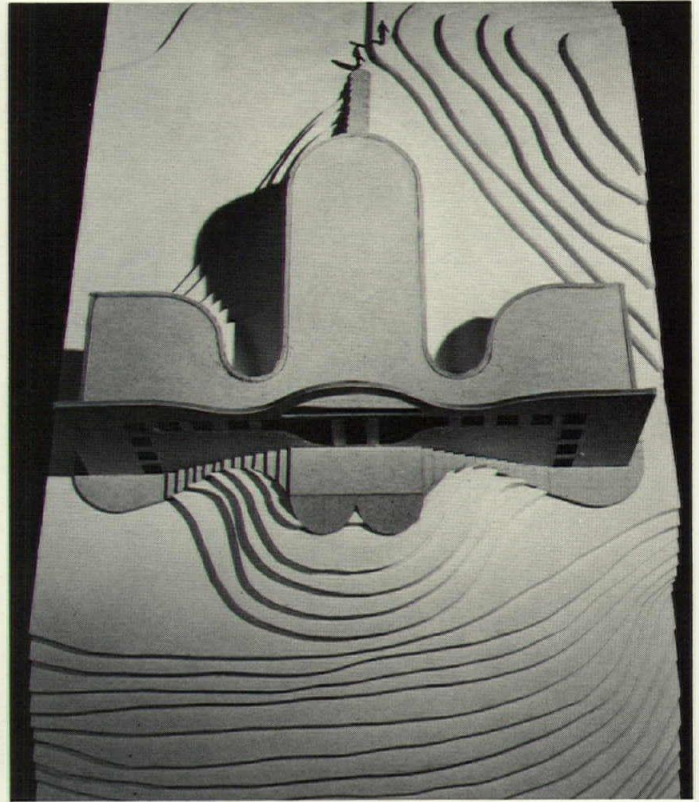
emerged from Mies', and to a lesser extent, Kahn's offices.

But it is not only the nature of one kind or size of model as opposed to another but our very dependence on the model as a design tool which needs to be examined as our architecture is redefined. The dependence on models which has characterized practice in the last thirty years is perfectly understandable given the formal premises of the International Style. Not for no reason does Reyner Banham describe Walter Gropius as the "great gray visage of the white cardboard style." Models, much more than drawings, tend to foster surface simplification; their inherent miniaturization and their limitations arising from the point of view of craft tend to lull the designer into a false security about the nature of the building fabric. After all, why think about mouldings and corner beads when straight pins and glue will do?

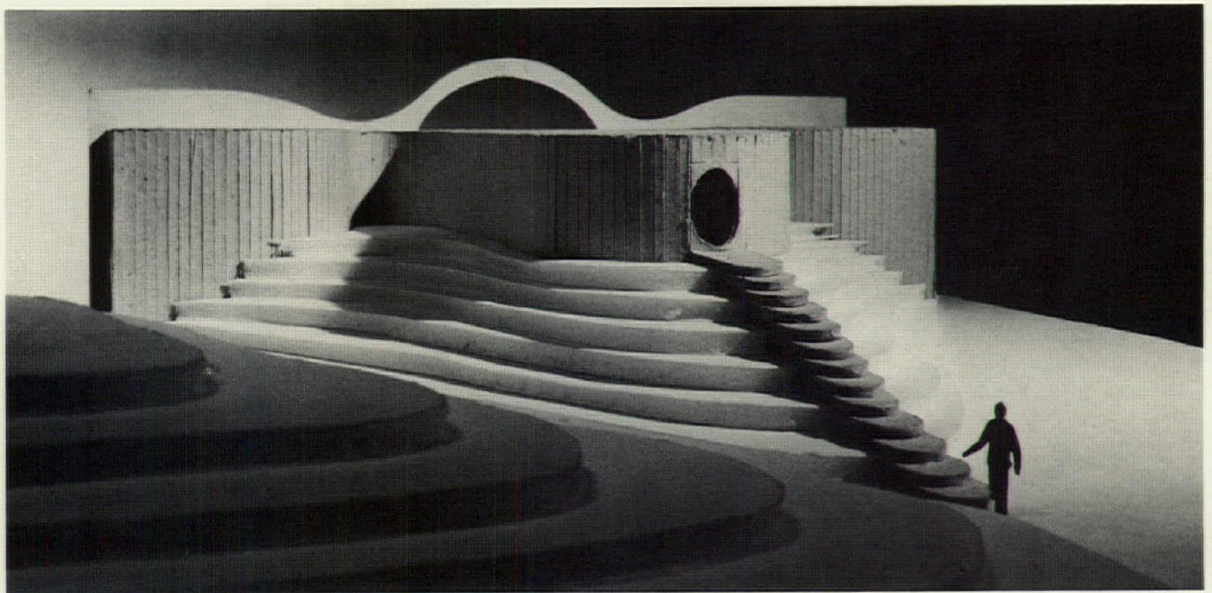
On the other hand, a large scale drawing (an elevation, or a cross-section) such as those produced as a matter of course at the Ecole des Beaux-Arts, demands that the designer think through every inch of the building's surface that is depicted: if an empty drawing is visually boring, is it not the same for the building it purports to represent? And if one *draws* a wall of brick at large scale, is not one obliged to depict each brick and the mortar joints between; while if one makes a model of the same in foam core...?

The changing definition of architecture and the changing tide of our intentions seem to call for new models in every sense of that term. As I write this, four major exhibitions stressing contemporary architectural *drawings* are being held in two important cities. I think their message is clear: Because *drawing* as such was so long a dead issue, architects seeking clear ground to say new, or at least different, things are concentrating on *drawing* their way to a more modern architecture—at least until such time as they can conceive of *modelling* it in more subtle ways and perhaps, even, getting to build their new visions whole and leave them out in the rain to take their chances, which is after all what it's really about, isn't it?





"Daisy House," 1975-77



STANLEY TIGERMAN

A Theory

There is a prevailing theory in architecture that the closer (in intention) a finished object is to its originating abstract concept, the more powerful that object will be. Now does that theory only apply to traditional ideas about Formalism/Functionalism, or can it also relate to symbolic content such as the metaphorical possibilities in theories/buildings? In all events, the underlying central intention of the theory is that *abstraction*, in-and-of-itself, is all-important.

Generally speaking, prior to the twentieth century, architecture was thought to be more or less representational. Now comes the "Modern Movement" and with it a reductivist attitude about buildings, through forces such as "constructivism" and "Synthetic Cubism." Buildings, and for that matter, all manner of process-items such as drawings and models, became progressively more abstract. Rendering in drawings and realistic, materialistic representation in models were abandoned in favor of that which came to be known (indeed eventually celebrated) as "De-materialization." That cycle now appears to be completed, only to be replaced by more complex concerns in architecture suggesting a kind

"a necessarily rich, albeit complex way of re-presenting ideas."

of "new pluralism" embracing just about everything from syntactic concerns to energy conservation, and with these "pluralist-possibilities," a necessarily rich, albeit complex way of re-presenting ideas.

Herein are three projects, asking (but not necessarily answering), the original question posed above and also suggesting the model-as-conduit as well as the concept-as-model.

The "Daisy House" (1975-77) metaphorically presumes to allude at once to a "Spanish-mission" style (The Alamo) as well as a Ledoux-like, mildly scatological commentary about American Society

Stanley Tigerman maintains his own practice in Chicago, has been published internationally, lectured extensively, and has been the recipient of numerous design awards.

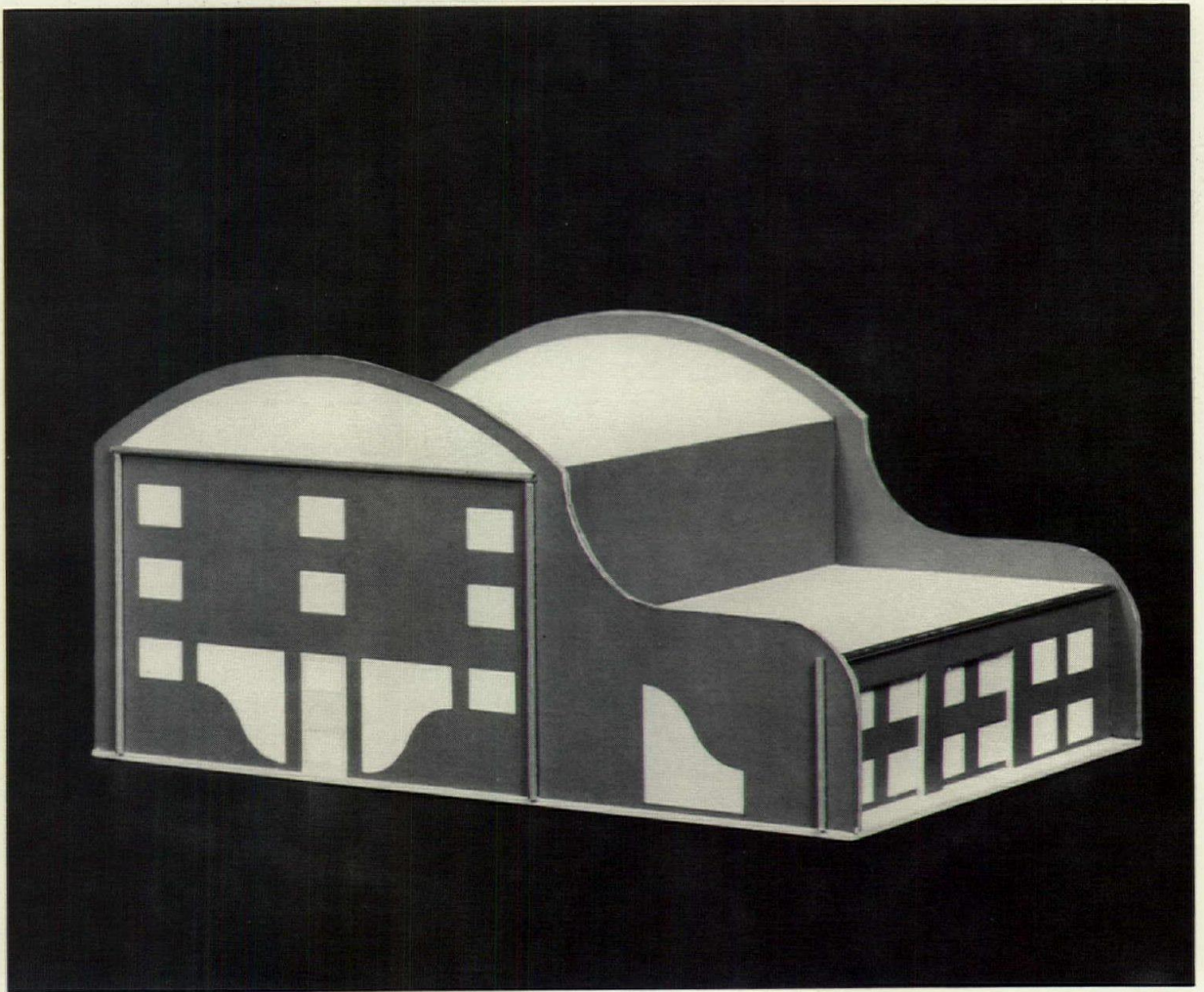
(The Maison de Plaisir).

"Animal Crackers" (1976-77), generated from the cookie box of the same name, also suggests a calliope, continuing the metaphorical concerns of the Daisy House but employing vestigial, rather than actual "cutouts."

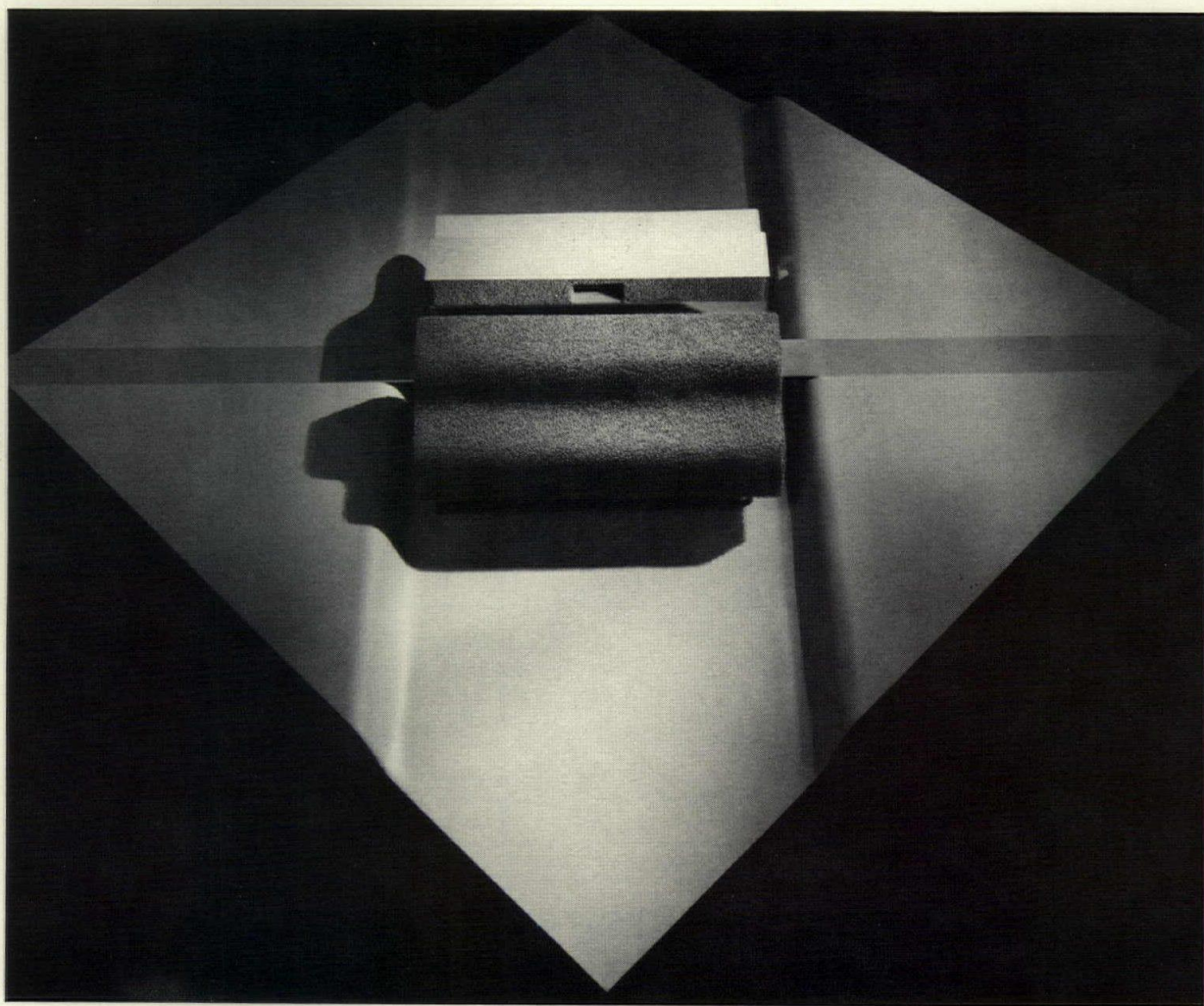
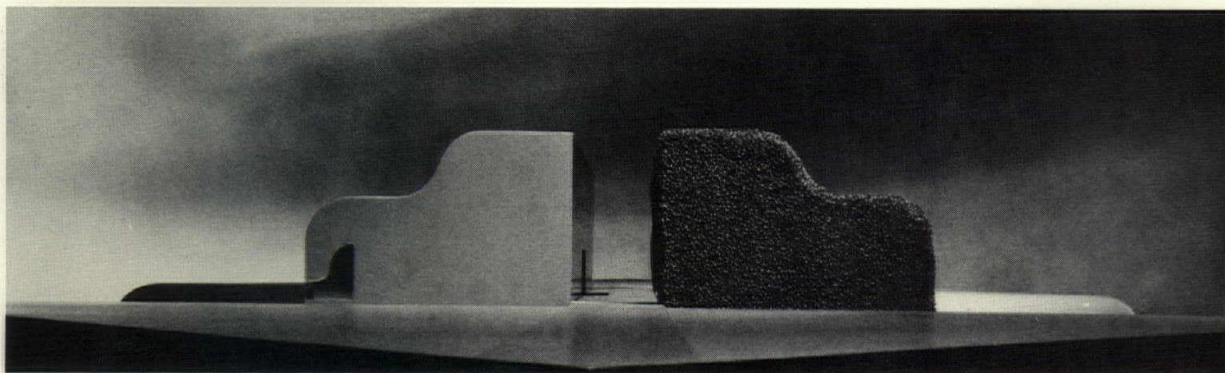
"The Little House in the Clouds" (Project, 1976), a study in timelessness and perpetuity, relates to man's home (the concretized version) opposed by his original home (its mirror image in topiary).

Now in all three cases (two nearing completion)

something is suggested other than architects talking to each other. In each case, to some degree, the success of the original concept relies upon popular, cultural symbols intended to communicate to the people of that culture in areas not normally exploited, and in all events, tangential to the traditional aspirations of man that architects normally deal with. In each case as well, the model's purpose is somewhat different from the formalist/functionalist model insofar as what is being conveyed is an idea about "ideas" rather than an idea about "Architecture."



*Below, "The Little House in the Clouds" (project),
1976; at left, "Animal Crackers," 1976-77.*



Adachi Art Museum's Garden, designed by the author in 1970.



KINSAKU NAKANE

The Thought of the Japanese Garden: Formation in Space

When the Zen sect developed in China, and the thought of the Zen sect exerted a strong influence on art and culture, various changes began to take place in the world of creative work. In pictures there was born the method of expressing the appearance of objects and nature with lines and shades of India-ink monochrome. The former method of painting faithfully and realistically with exquisite movement of a brush, became that of expressing objects by the lines and the shades of black monochrome at one stroke. It is a method which is very embodying and suggestive. In Japan, this expression is called "Yugen" (profoundness).

This change in the Oriental method of painting is something like the difference between the realists and impressionists in the West. In drawings, this method is called "Habokusansuiga" and is shown in the painting by Zenki. This thought influenced gardening, and the gardens expressed by this technique are called "Karesansui" gardens.

Here is an interesting example. The garden of Tokaian in Myoshinji Temple, Kyoto, was constructed by a Zen Buddhist priest named Toboku in 1484, and the plan at that time still remains. This drawing, as shown by the photo, is a simple drawing by lines.

"a painting painted
three-dimensionally in space"

In Japanese gardens, such an extent of simple drawing is enough, the stage of the construction at the site being the main design. Unless one stone is placed, one cannot know the size and height of the stone to be placed next. Making use of the appearance, creases, and color of each stone as it is, one finishes a formation having as a group, balance. This method is the same in technique and sense as drawing a picture on paper. Thus the designs of Japanese gardens are not made merely from the standpoint of formal drawings or models.

Kinsaku Nakane is a landscape architect in Kyoto, Japan; a teacher at the Osaka University of the Arts; and founder of Nakane Gardening Research Institute, which is reviving the vanishing art of the traditional Japanese garden.

A Japanese garden is a "painting painted three-dimensionally in space." In a small garden, Great Nature is expressed and it signifies Utopia, so one looks at it from inside a room and appreciates the suggestion and tale that the garden indicates. It is the same as the spirit of appreciating a picture. It is not like a western garden which is used for a garden party or where people sit at a table.

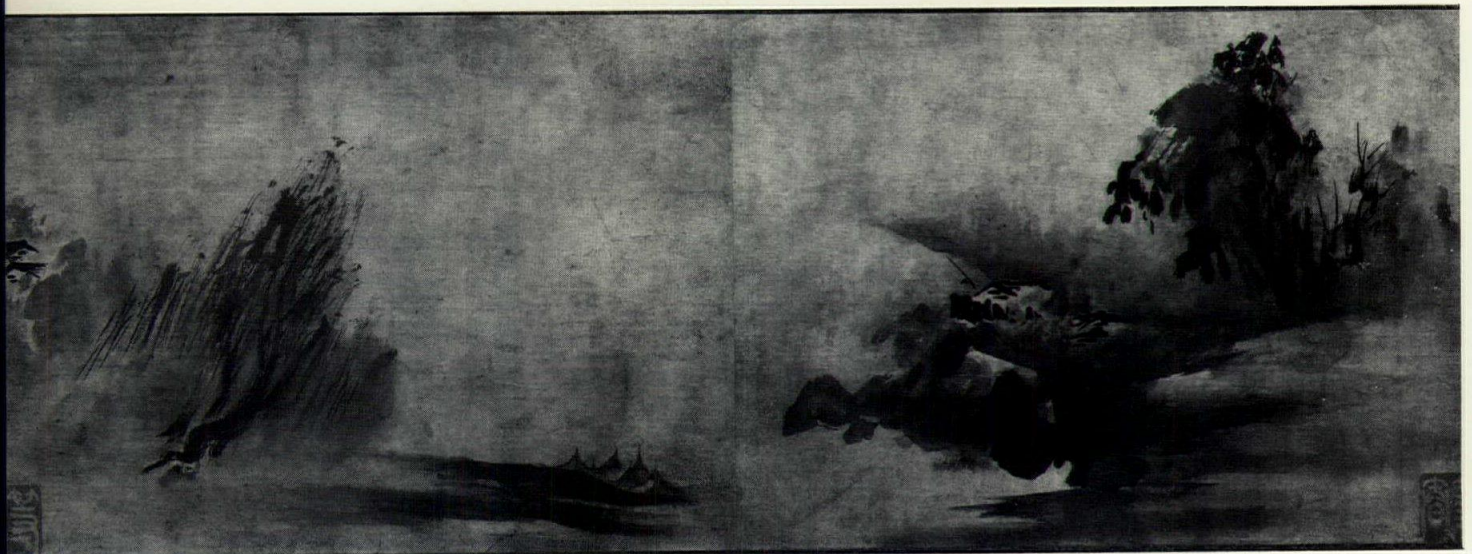
A Japanese garden is not a formation in which objects or materials which have artificially processed plane and weight are merely combined together and arranged. To say that to design a Japanese garden is to paint a picture three-dimensionally in space is to

say that the technique of constructing a Japanese garden needs the sense of a Japanese painting. In order to construct a Japanese garden, it is always necessary to know the technique of painting the traditional Japanese pictures and the thought from which the tradition arises, including not only Zen but also Buddhism, "Shinsen" theory, and others.

As for the stone arrangement in which natural stones are combined together and the planting in which natural trees are used, the constructor at the site, by formative sense and a sense of beauty which springs up momentarily, constructs a garden by combining a stone and a stone, a tree and a tree, one



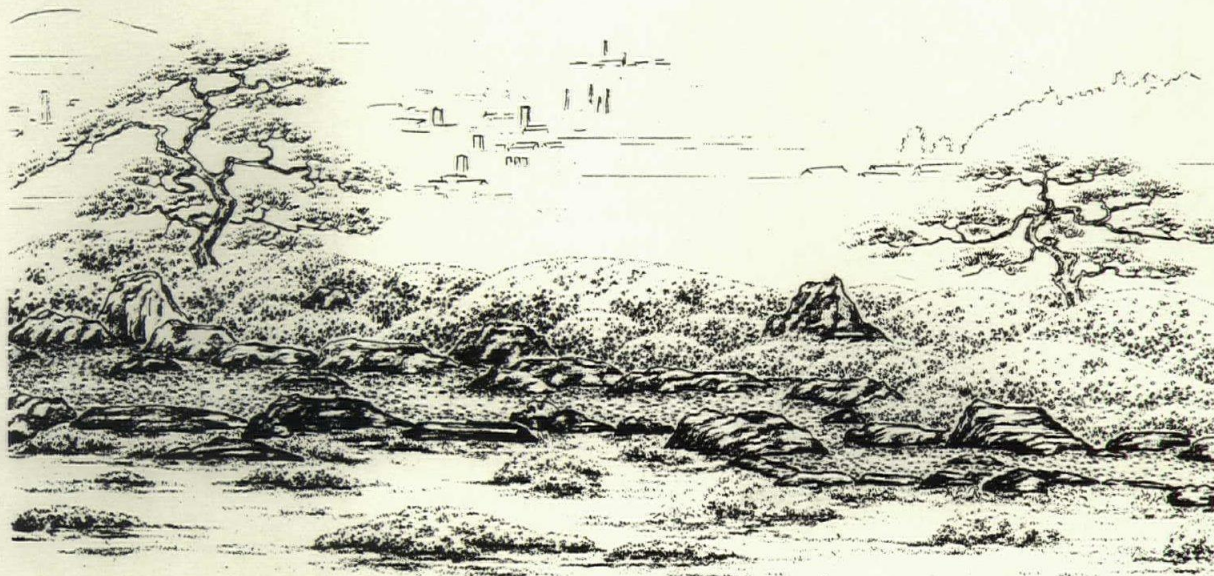
Above, design for the Garden of Tokaian in Myoshinji Temple, Kyoto, constructed in 1484 by a Zen Buddhist priest named Toboku. Below, an "Habokusansuiga" painting by Zenki, from which the "Karesansui" garden developed.



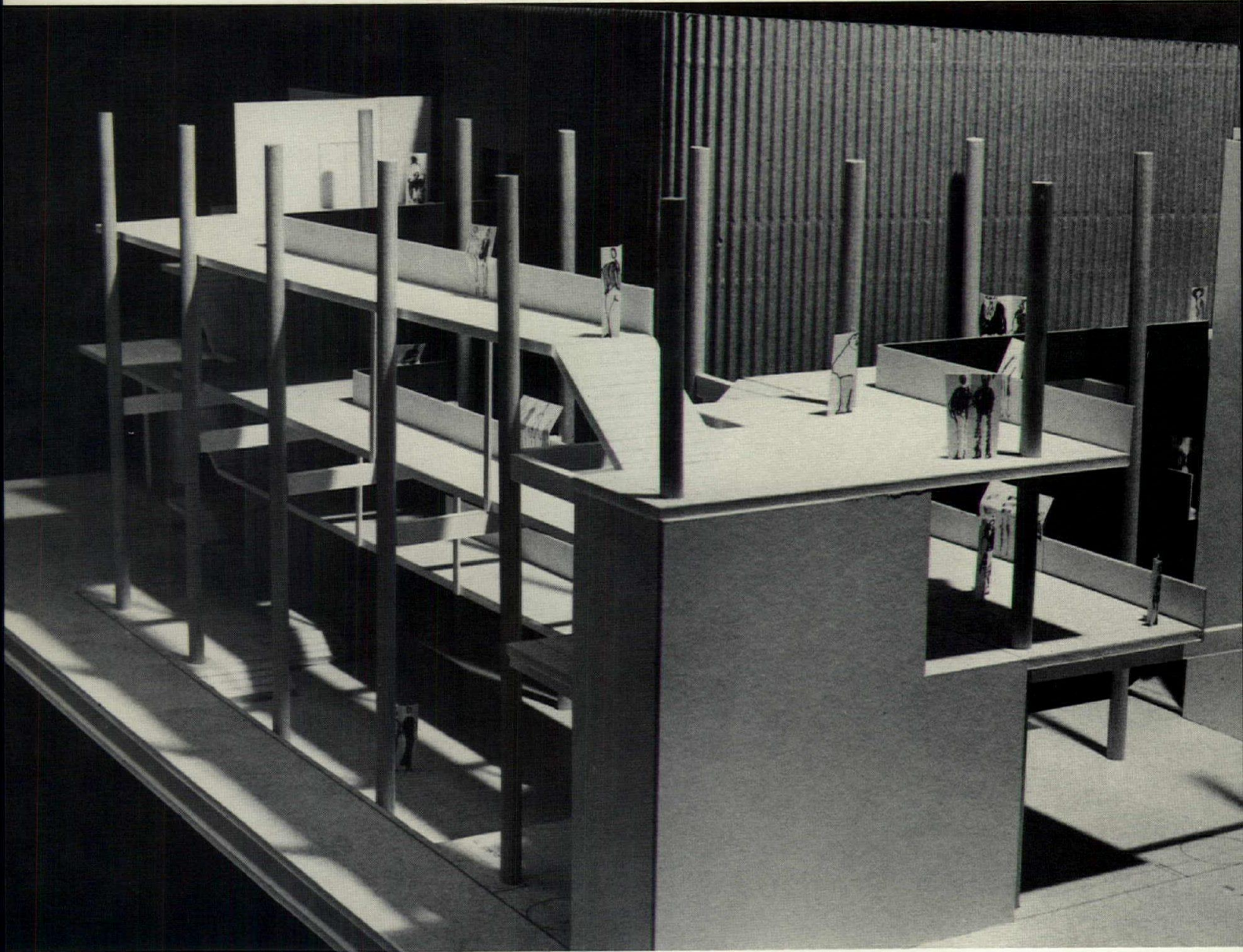
after another. Thus the design and the study are the same and are fully three-dimensional at life scale, rarely represented abstractly.

In designing a garden where hundreds or thousands of stones and trees are used, as in the Adachi Garden, it is next to impossible to select each stone and tree and express the composition in a drawing, much less in a model. I do not make a plan or a model in the case of a Japanese garden unless it is requested by my client to do so. Drawing a plan can be considered as indicating the policy of "I will construct a garden of such a general pattern" and getting his approval. Even if I draw a more detailed plan, it will prove to be of no use at the site. If a model is made, the extent of it will be land allotment of the whole area, expressing the relations between buildings and the garden and the division of the whole garden.

The drawing of the design of my garden is one of a residence expected to be constructed this autumn. The style of the garden is the "Karesansui" style, borrowing the surrounding scenery with the intention of expressing a scenery of Great Nature with stone arrangement and plants.



Orchestra Hall Lobby model



HUGH HARDY/
MALCOLM HOLZMAN/
NORMAN PFEIFFER

Model as Tool

In addition to being many other things, architecture is a language. Architectural designs in their formative stages have traditionally been presented in drawings and words, but during the last 30 years models have become a major part of the language of architecture.

HHPA uses models in two distinct ways: First, as an office device to promote conversations about architecture, and secondly to convey ideas to clients. Many times models are constructed prior to "making a design"; they define what a given project or area of a project should be about. These models provide an "image."

The Lobby model of Orchestra Hall in Minneapolis is an example of using a model to define the most general parameters for a design. A three-story rambling staircase with extended platforms linking the half-levels of the auditorium to the public space defined the three-dimensional objectives for a design. The model was not a "complete design," it was not "buildable," it was not "accurate" (e.g., regarding dimensions for risers and treads). The model was used merely to present a design direction.

Frequently models are made to develop detail

"It is no greater leap of the imagination to expect people to see cardboard as brick than broccoli as tree."

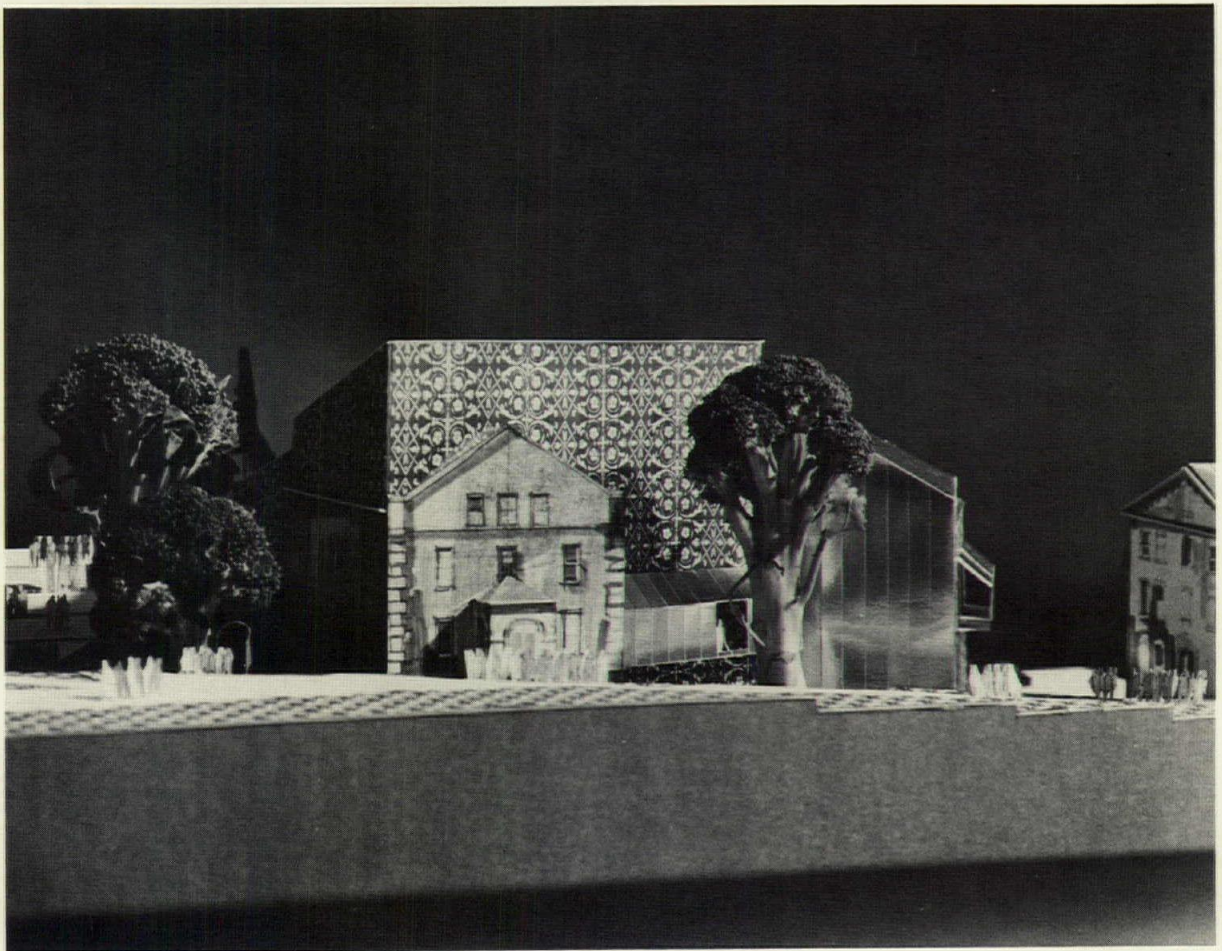
considerations. Bits and pieces of buildings are enlarged in model form to discuss painting, structure, finish materials, etc.

The models employed in our office are work tools. Since most are made of paper, glue and five-and-ten-cent store objects, their life expectancy is short. They are not for exhibit or fund-raising, nor are they intended to go into plastic boxes.

The authors form the architectural firm of Hardy Holzman Pfeiffer Associates, of New York City.

On occasion they are made for client meetings. Client models usually convey only one idea, define one situation, or one environmental quality. These models are never literal buildings. They are not miniaturizations of real objects not yet built. Because they are not exact translations, we employ any materials available to convey our intentions. In the past we have used dime store objects, hardware and bakery items. These have not been used for shock value but to convey variety of materials, quality of environment and image. This method of construction is quick and inexpensive. It is easier to simulate an automobile at 1/20 scale than to build one, and certainly cheaper

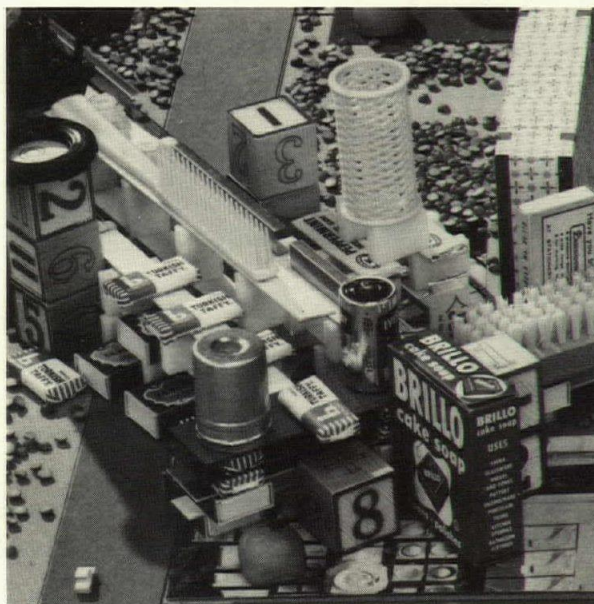
Tufts University Performing Arts Center model.



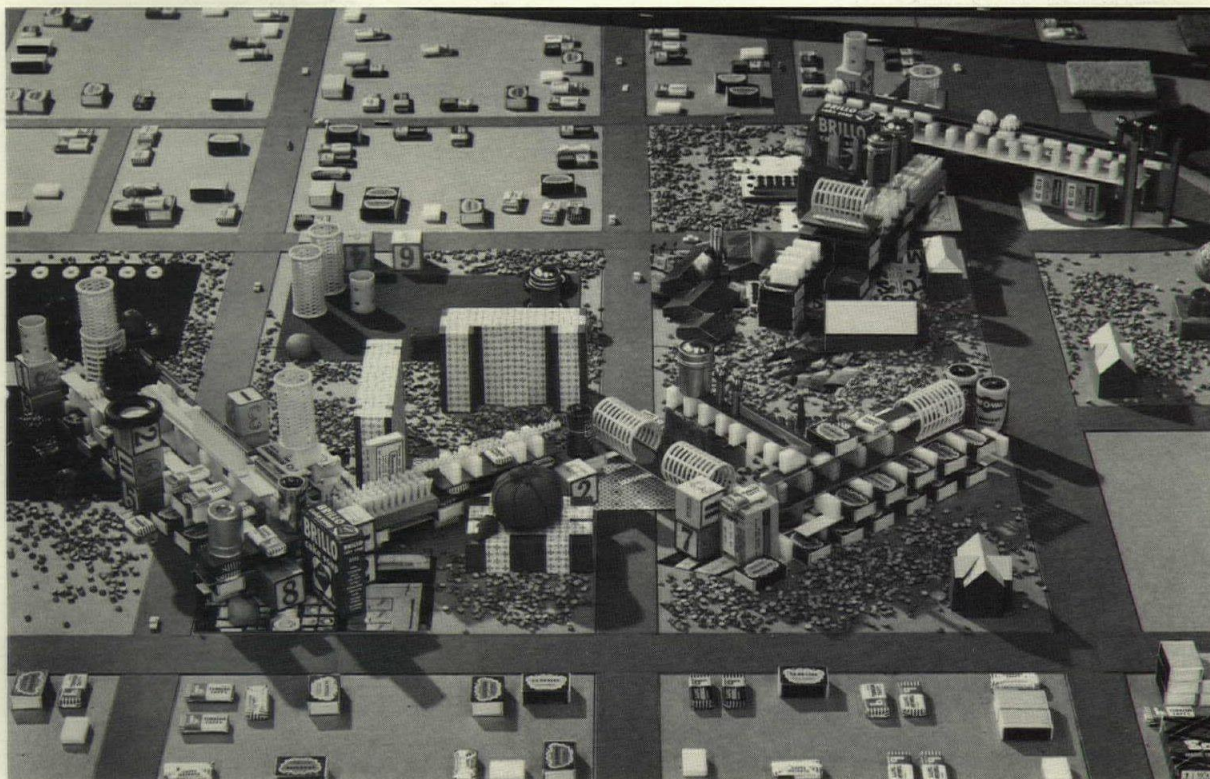
than a lead casting.

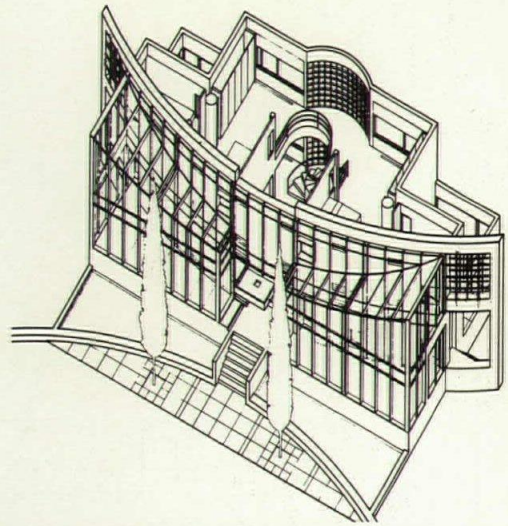
One of our most successful client models was made for the presentation of the exterior of the Tufts University Performing Arts Center. The most important site consideration was an enormous oak tree sitting at the front of the site adjacent to the quad. To simulate this tree a large, leafy piece of broccoli was employed. The client at once recognized the tree and the building orientation to the site.

If clients are capable of looking at a piece of broccoli and seeing a tree there is no reason to limit model-making to cardboard, balsa wood and baby's breath. It is no greater leap of the imagination to expect people to see cardboard as brick than broccoli as tree.

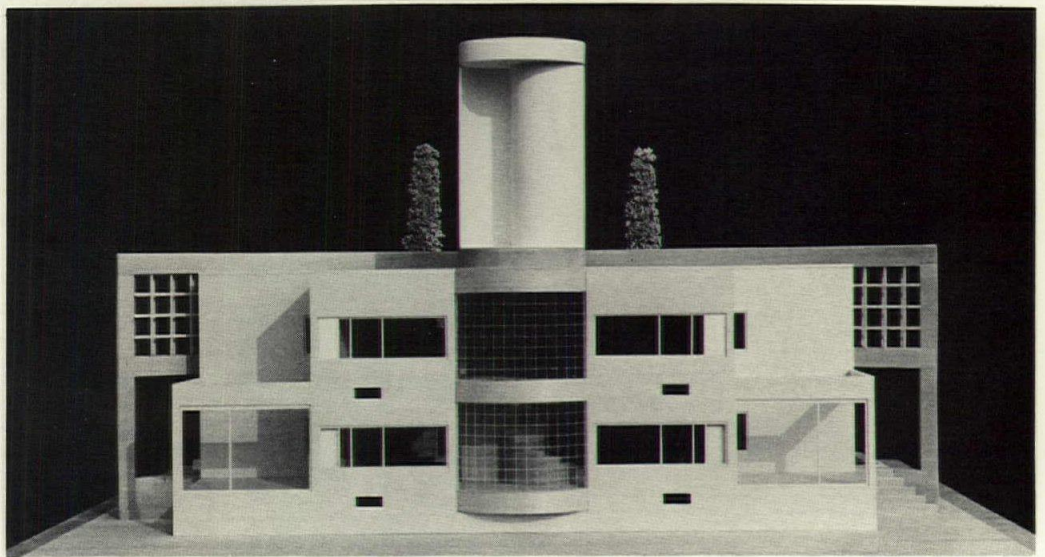
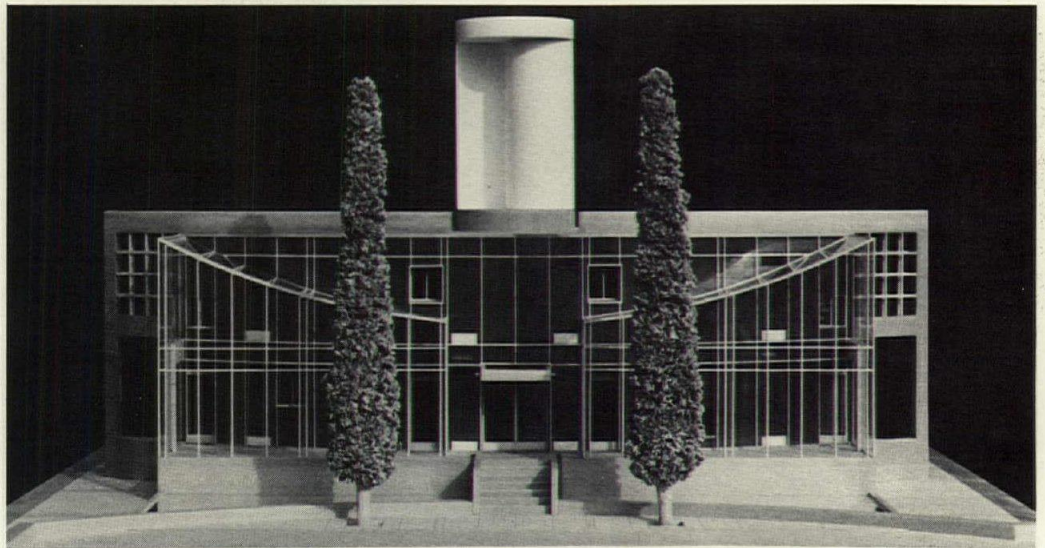


Model of Shaw University Master Plan, Raleigh, North Carolina





*Top to bottom: axonometric with roof removed,
south facade, and north facade.*



**WARREN SCHWARTZ/
ROBERT SILVER**

A Small Villa

This house, "A Small Villa," was designed for the show "Immanent Domains" held in Boston in the fall of 1977. This was an unusual project for us since all of our previous work had been designed for clients where the end product was a building. Although many models are produced by us in the design process, we do not generally view drawings or models as ends in themselves but as incomplete representations of what will follow.

This is not the case here. Without a real client or site, without a budget and without a fixed program, the model, and to a lesser extent the drawings, were to be the finished product. The model is not a simulacrum of ideas that will be better represented in a completed building, but the final realization of our architectural intent. This allowed us the freedom to experiment, both formally and technically, more than we normally would.

Our chosen site, and formal preoccupation, was Palladio's Villa Malcontenta. Our technical concerns were the environmental issues of today.

The south wall of the house is bowed to follow the path of the sun and to shelter the spaces within its concavity. It separates the house into two areas,

"the synthesis is the model"

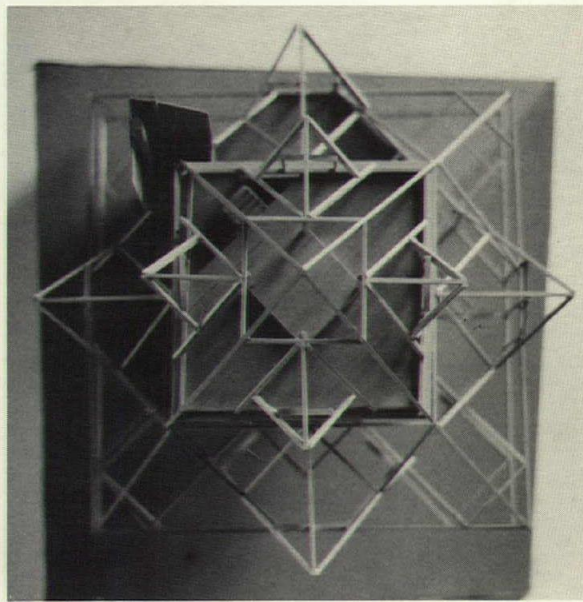
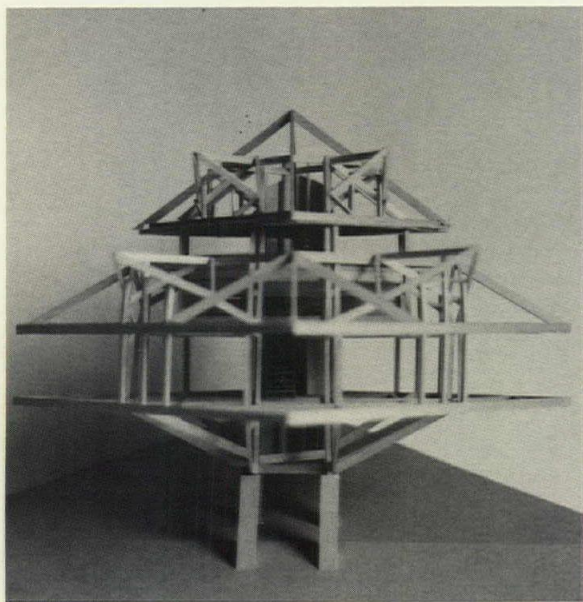
one enclosed and bounded, the other transparent and open. The wall heats in winter, and, with louvers adjusted, it creates cooling breezes in summer. When the wall's heat is not needed, the living areas of the house open outward along freestanding portions of the north facade. The wind rotor on the roof not only generates electricity but provides compressed air for small appliances.

The technical concepts expressed in the house, some state-of-the-art, some just beyond, are tuned by our formal intentions.

The synthesis is the model.

*Warren Schwartz and Robert Silver are, respectively,
Project Architect and Associate in Charge of
Architecture of Charles G. Hilgenburst & Associates
in Boston.*

"Four-Poster," Mt. Desert Island, Maine.



ANNE GRISWOLD TYNG

Crafting Space or Tossing Dice—Platonic Playthings of Baby Bacchus

craft: to make, usually by hand (and eye) with skill, artistic dexterity.”

space: a three-dimensional entity that extends without bounds in all directions and is the field of physical objects and their order and relationships.”

By *crafting space*, I mean the tangible synthesis of randomness and orders of subjective and objective, the specific making and dimensioning of solids and voids by human eye and hand which answer to abstract forming principles. To craft space is to give immediacy and tangible identity to profound universal principles of relationship, constants untouched by time or circumstance. *From universal field to precise probability mean, from ordered infinity to immediate chance, crafting space is to give meaningful coexistence to randomness and order.*

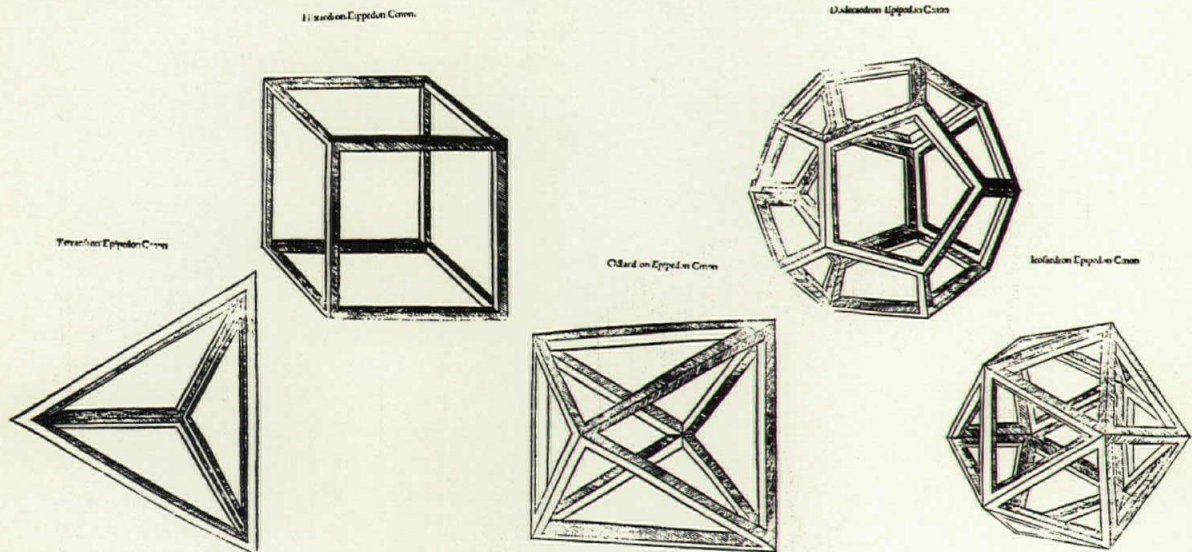
Crafting space by means of models extends the design process of two-dimensional drawings to another level of discovery of form potential. Claude Bragdon, the architect and geometrist, wrote in the 1920's, “The unique, the archetypal character of these regular polyhedrons of three-dimensional space has been recognized from the most ancient times.

“Each model of a concept...is, in a sense, only one toss of the dice.”

Among the playthings of the infant Bacchus were dice in the form of the five Platonic Solids, the implications being that upon these patterns all things in the universe are built.” Described by Plato in his *Timaeus*, these polyhedrons, the cube, tetrahedron, octahedron, dodecahedron and icosehedron, are the only five regular solids possible in three-dimensional space—a universal essence of three dimensions—and dice on Mars or the Moon would have to take these shapes. I have found that these five Platonic Solids express in their relationships a universal forming

While maintaining a small practice in Philadelphia, Anne Tyng teaches at the University of Pennsylvania and is currently researching a design methodology for “developing the human capacity to make living forms.”

The five Platonic Solids as drawn by Leonardo da Vinci from Pacioli's *De Divina Proportione*, 1509.



principle—a matrix which includes both randomness and order.¹

The realization of such a forming matrix, implications of which go far beyond the field of architecture, offers us a sense of architecture as continuous in time and space, and suggests that studying and designing by means of models can extend human creativity. Modelling reconnects mind, eye and hand. It brings us back to simple, sensual crafting of space, refreshed and reinforced with an understanding of universal forming principles derived from new discoveries in the microcosm of physics and molecular biology, from the realms of psychology and symbolism, from the macrocosm in new concepts of the structure of the universe. Understanding those universal principles of form evolution that link the close-packed geometry of “inorganic” form to the more dynamic geometry of “organic” form can give us an insight into what makes “living” form. In these same principles linking “inorganic” and “organic” form, we can perceive connective patterns between biological and psychic structure. Through the extension of these forming principles from psychic structure to human creativity, the next leap of consciousness is the use of these recurring principles to give life to the

built forms beyond human scale, to encompass *the capacity to make living form*.

Each model of a concept, although it may be built from many drawings which are studies of that concept, is, in a sense, only one toss of the “dice.” Modelling is a way of discovering a concept at another level of design, exploring a new set of variables in three dimensions which simply do not exist in two-dimensional drawings, or in the mind’s eye. These variables in three dimensions offer potentials for process, change and growth in *time*. Every cumulative toss of the “dice” of exploratory models can bring a concept closer to a meaningful synthesis of randomness and order, eliminating superficial idiosyncracies and reaching out to the universal essence, where unpredictable “bits” are synthesized or exist within a cumulative predictability. Thus the more personal expression of the architect takes on the character of a “mandala,” the more profound symbolism of the archetype with its universal empathy. A building with archetypal quality is usually the result of much struggle, discipline and restraint, as well as inspiration, to reach that simplicity which at the same time is both unique and universal.

Lutyens said that architecture should have an

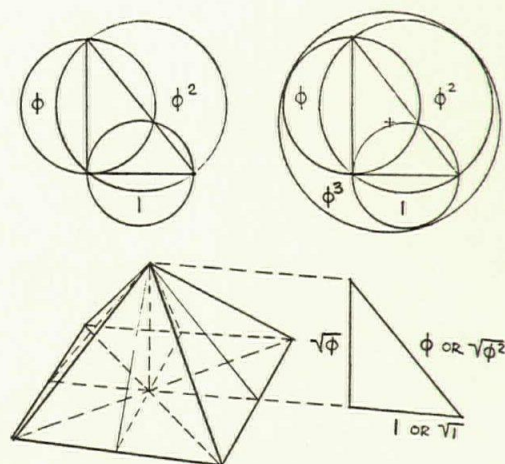
air of inevitability, and at another time said it should also have the element of surprise. Louis Kahn used the paradoxical pair of terms “singularity” and “commonality,” saying that the architect must be “singular” and at the same time in touch with “commonality” in a great work of art. The synthesis of singularity and commonality, of surprise and inevitability may, I think, be achieved by building intuitively on the tool of universal forming principles. As links between intuition and forming principles, geometry and number are steeped in symbolism, and have been used throughout the centuries as conceptual tools in the sciences, religion, in music and art. In a sense architecture is to conceive of form as number, or to transform number into form.

To the Pythagoreans the square says $1 + 1 = 2$. The Pythagorean Theorem, recognized as the greatest discovery of antiquity, states that “the square of the hypotenuse is the sum of the squares of the two sides in a right angled triangle,” or $1 + 1 = 2$. Most architects stay with $1 + 1 = 2$, the square or the 90 degree angle of rectilinear form. This orthogonal order can be dealt with in plans and elevations and does not *require* modelling explorations.

However, even the square and its diagonal offer infinite spatial complexity that can *only be understood in three dimensional modelling*. The “Four Poster” is an exposed wood frame house, conceived as a main living space topped with the four-poster bedroom, which I designed for Mt. Desert Island, Maine. It explores the spatial complexity offered by “ $1 + 1 = 2$ ” through 3-D modelling of the geometric progression of squares and their diagonals. It is supported on a central square (dimensioned by the horizontal human scale of the four-poster bed) defined by four posts, each post formed by a cluster of four posts. These posts diminish in number as the house grows from foundation to living deck to dormer bedrooms to balcony, with only one interior post in each cluster forming the corners of the four-poster bed at the top, and providing support for the ridges of its four dormer windows. In the main living space, the three “dormer” bedrooms are “crafted” out of the low-ceilinged perimeter, borrowing space for limited

strips of floor area around higher bed platforms, which are integral with the structure, forming a slightly higher ceiling area in the living space below. In these “dormer” bedrooms, headroom and light source are provided by dormers in the form of tetrahedral bay windows, whose fixed triangular sidelights join the wall planes forming the rooms. Space above the beds is again “borrowed” for the balcony floor and balcony seat levels crossing diagonally above the beds. The continuous horizontal window around the balcony brings light into the living space below. This diagonal interlocking and borrowing of spaces can only be understood fully by modelling. In fact, the spaces are actually *found* in the *process of modelling*. In exploratory drawings, I found myself superimposing several plans in a single drawing or superimposing several different sections in one drawing, in effect using a kind of hologram technique as an intermediate step between drawing and modelling. The fourfold order of this house, its diagonal “growth” and its specific expression vertically from its four-clustered post supports to its four-poster bed is for me a personal “mandala” (symbol of psychic orientation or structure, derived from the “mandala” used in meditation in eastern religions). Crafted over a period of years as an expression of a personally evolving psychic

The Divine Proportion triangle in the Great Pyramid at Gizeh.



symbol, this concept combines randomness of specific requirements with the abstract forming principles of $1 + 1 = 2$.

Deceptively simple, this $1 + 1 = 2$, but it is the beautiful tip of a fantastic iceberg, only the beginning of the *Fibonacci-Divine Proportion matrix* of randomness and order. The square cut on the diagonal produces a triangle with sides of 1, 1, and $\sqrt{2}$. If these sides are squared or "circled" (as diameters), they form relative areas of 1, 1, and 2. I have found that this 1, 1, 2 triangle is *the first Fibonacci triangle*, since the relative areas of its squared or "circled" sides are the first three numbers of the Fibonacci numerical series, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 223, ...etc. In this series, each number is the sum of the two preceding numbers, and ratios between successive numbers approach more and more closely to the ratio of the Divine Proportion or 1 to 1.61803... This numerical series was rediscovered in 1202 by Leonard of Pisa, or Filius Bonacci, nicknamed Fibonacci, who used it as the basis for his famous problem of the numbers of pairs of rabbits per month². Among examples in both made and natural forms, it has been found to exist in Pascal's Triangle of head-or-tail's probability³, in a formula for genetic drift⁴, in phyllotaxis, the laws governing the arrangement of leaves around a stem, the whorls in the florets of a sunflower, the scales of a pine cone and in the pineapple⁵, as well as in the genealogy of the male bee or drone⁶. Both research on the data accumulated through the centuries, as well as my own discoveries, provide universal examples of this apparent paradox of infinite flexibility combined with precise order which the Fibonacci-Divine Proportion matrix embodies.

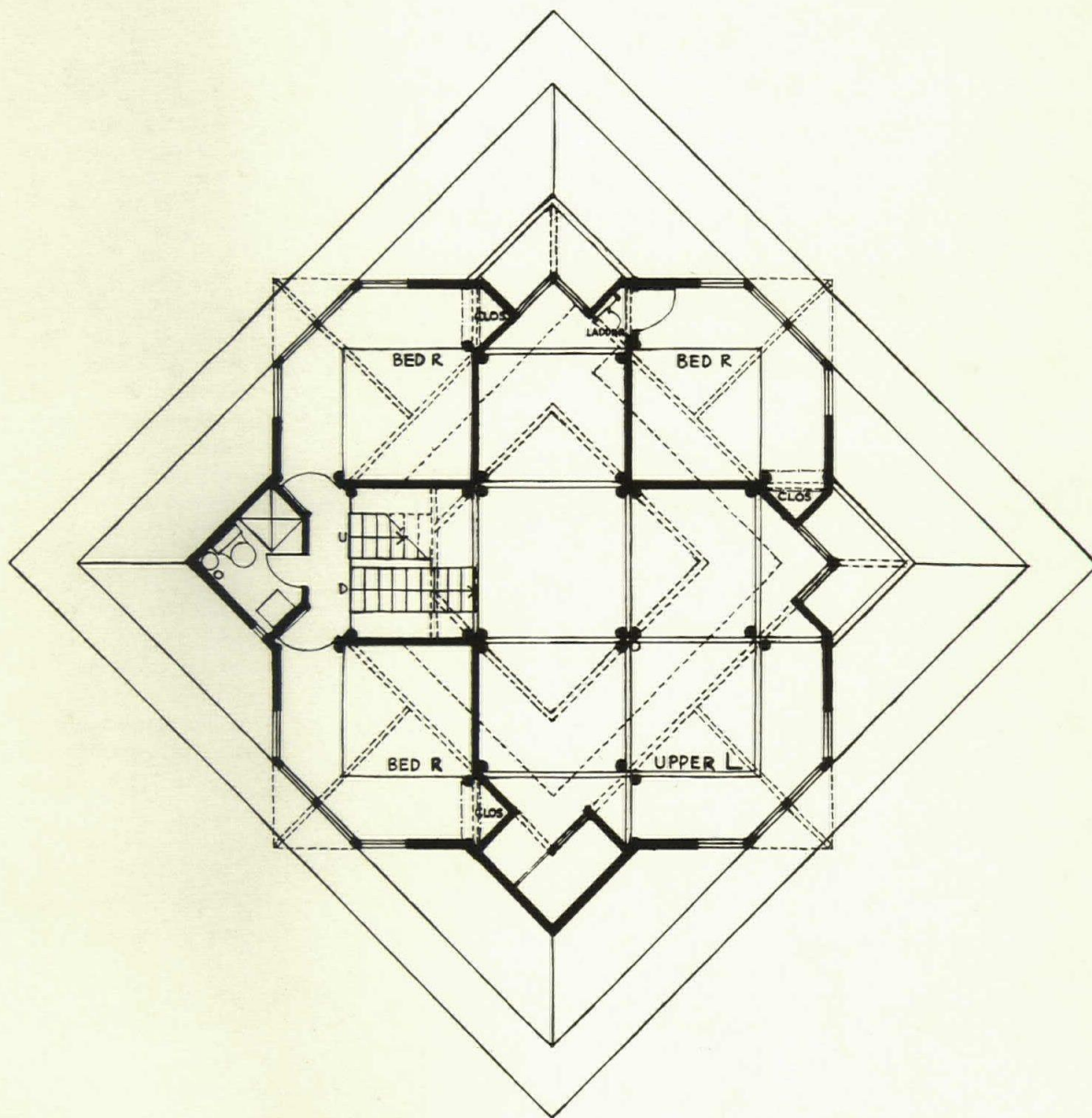
I have found that the "dice," or playthings, of the infant Bacchus, the five Platonic Solids, which express an essence of three-dimensional forming principles, embody in their relationships Laws of Probability, or the simultaneous randomness and order of the *F-DP* matrix. These include *the first Fibonacci "1, 1, 2" Triangle of the square*, and *the second Fibonacci "1, 2, 3" Triangle found in the Simpler Solids*—the cube, tetrahedron and octahe-

dron—and culminate in *the precise Divine Proportion relationships of the pentagon found in the Higher Solids*—the dodecahedron and icosahedron. Thus from number to proportion to plane to polyhedron, the *F-DP* matrix is a universal forming principle.

In evolution's random tossing of spherical dice and their close-packing, we can find the basis of the Pythagorean Theorem, or a *Super Pythagorean Theorem* which I have discovered. This extends the summation principle of squared sides to a *successive fitting of triangulated areas within triangulated areas* based on series of Fibonacci Triangles. In such a series of Fibonacci Triangles, the "circled" (rather than squared) areas of all three sides can be fitted into a larger circular area, the diameter of which is the hypotenuse of the next larger Fibonacci Triangle. These triangles approach the "perfect" Divine Proportion triangle, which appears in the Great Pyramid at Gizeh, with sides of 1, $\sqrt{\phi}$, and ϕ (1, 1.272..., and 1.618...), its sides squared or "circled" forming *relative* areas of 1, ϕ , and ϕ^2 , which all fit into a larger circle with a relative area of ϕ^3 , or a precise logarithmic, as well as summation, fitting of areas expressing synchronized "growth."

The origin of the three faces of the Five Platonic Solids in the random tossing and close-packing of spherical "dice" is another discovery I made which confirms the universality of the *F-DP* matrix. The three faces of *the square, the equilateral triangle and the pentagon* can be found in a summation series of close-packed circular areas or spheres in Fibonacci sequence, in which circular areas summing up to 3 fit into a circular "5" area, areas summing up to 5 fit into an "8" area, and areas summing up to 8 fit into a "13" area. *The 3 in 5 fit produces the equilateral triangle, the 5 in 8 fit produces the pentagon, and the 4x2 = 8 in 13 fit produces the square.*

By tossing the "dice" of universal forming principles—the Platonic playthings of Baby Bacchus—by putting our individual images in touch with archetypal order, and by modelling to explore successive fitting of forms within forms, layering of forms and hierarchies of form identity, it may be possible to craft spaces which make *living form*.

Main floor of the "Four-Poster."

1. Tyng, A.G., *Simultaneous Randomness and Order: The Fibonacci-Divine Proportion as a Universal Forming Principle*, 1975.

2. Gies, J. and F., *Leonard of Pisa and the New Mathematics of the Middle Ages*, Crowell, 1969, p. 77-84.

3. Vorob'ev, N.M., *Fibonacci Numbers*, Random, 1961, p. 13.

4. Sirks, M.J., *General Genetics*, Nyhoff, 1956, p. 473-5.

5. Coxeter, H.S.M., *Scripta Mathematica*, XIX, p. 135-9.

6. Hoggatt, V.E. Jr., "Number Theory: The Fibonacci Sequence," *Yearbook of Science and the Future*, 1977, Encyclopaedia Britannica Inc., p. 185-6.

THE STUDENT PUBLICATION OF THE
SCHOOL OF DESIGN
Volume 27

Suzanne Buttolph, Editor
Charles H. Boney, Jr., Manager
Donna Ward, Circulation
Robin Page, Design
Book design: John Kirtz
Cover design and layout: S. Buttolph
Staff assistance: Terry Barrett,
Karen Barrows, Jeff Floyd, Lee Foster-
Crowder, Robbin Gourley, Peter Hester,
Tim Hill, Steve Jenkins, John Thompson,
Rob Tullis, Kevin Utsey
Faculty Advisor, Roger Clark

Generous donations were received from the
following patrons:

T.T.Hayes, Jr.
Dellinger/Lee Associates
Mason S. Hicks
James L. Brandt
Brian Shawcroft
G. Milton Small, III
Middleton, McMillan, Architects, Inc.
Leslie N. Boney, Architect
Conrad B. Wessell, Jr.
Ballard, McKim & Sawyer, AIA, Architects
William L. Laslett
Ferebee-Walters & Associates
Wesley A. McClure
Odell Associates Inc.
George Watts Hill
Edgar Kaufman, Jr.

SOURCES OF ILLUSTRATIONS

Unless otherwise noted, all photographs are
the property of the authors. *Cover*: Museo Nazionale
di Villa Giulia, Rome. *Facing title page*: Philosophisch-
Anthroposophischer Verlag, Dornach, Switzerland.
Facing page one: Dumbarton Oaks Center for Byzantine
Studies, Washington, D.C. *Page 1*: Metropolitan
Museum of Art, New York. 2: left, National Gallery
in Prague; top, Alinari, Florence; bottom, Centro In-
ternazionale di Studi di Architettura Andrea Palladio
di Vicenza. 3: Cervin Robinson, New York. 4: left,
Denver Museum of Art; right, Editions d'Art Albert
Skira, Geneva, and Landesmuseum Joanneum, Graz.
5: Sterling and Francine Clark Art Institute, Williams-
town, Massachusetts. 6: Mario Semprucci, Pesaro.
7: left, Walters Art Gallery, Baltimore; top, Alinari-
Art Reference Bureau, Ancram, New York; bottom,
North Carolina Museum of Art. 8: Alinari-Art Ref-
erence Bureau. 9: Joost Baljeu, The Hague. 10: top,
Virginia State Library; bottom, *Country Life Maga-
zine*, London. 11: Witt Library, Courtauld Institute
of Art, London. 12: Museum of Modern Art, New
York. 13: James Johnson Sweeney. 15: Lucien Herve,
Paris. 21: Courtauld Institute of Art. 36: Alinari-Art
Reference Bureau. 37: Alinari-Art Reference Bureau.
38: top, Munster-Archiv, Ulm; bottom, Alinari-Art
Reference Bureau. 97: Alinari-Art Reference
Bureau.

Matteo Roselli, "Michelangelo Directs the Works for the Fortifications of San Miniato during the Siege of Florence," Casa Buonarroti, Florence.



