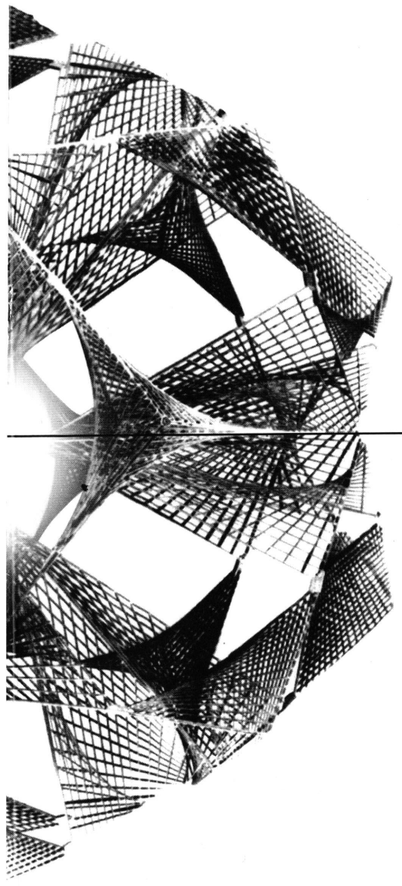

THE STUDENT PUBLICATION OF THE COLLEGE OF DESIGN

VOLUME 30 CONTINUUM

NC STATE UNIVERSITY

+++ THE STUDENT PUBLICATION +++

VOLUME 30 CONTINUUM


CAROLINA DWELLING
one
DESIGNING
THE METHOD
Student
Publication
Bonty Gardens
master builder

THE STUDENT PUBLICATION

VOLUME 30 CONTINUUM

SELECTED WORKS FROM VOLUMES 1–29

The Student Publication of the College of Design
North Carolina State University
Marvin J. Malecha, Dean

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The cover image was taken from a photograph of a sculpture by Roy Gussow,
professor of design from 1952 to 1961.
It was originally published in volume 7, no. 3.

This volume of The Student Publication *is dedicated with respect and appreciation to:*

Henry L. Kamphoefner, the founding dean of the School of Design,
for whom *The Student Publication* became both a consuming passion and a critical
instrument in establishing the visibility and prominence of the new school. Behind the scenes,
he resolved that the publication would not fail: when, at crucial moments,
special resources were needed, he secured them; when editors grew weary or irresolute,
he found ways of restoring their commitment; and when the publication achieved
critical recognition, he deflected attention from himself and directed it toward the
student editors and their contributors.

Marvin J. Malecha, current dean of the College of Design, whose determination to
re-initiate *The Student Publication* after an 18-year lapse demanded an uncommon
personal commitment of time and energy. His efforts have led to the creation of a major
endowment that assures the continuing financial health of the publication, and his constant
encouragement has been critical in the realization of this first new volume.

The students of the School/College of Design who, for more than half a century, have
invested their creativity, intellect, and idealism in the difficult but rewarding task
of shaping a more harmonious and humane world through design.

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Introduction

Robert P. Burns

Robert Burns has been an architecture faculty member in the School/College of Design since 1965. He is a 1957 graduate of the School and was a co-editor of The Student Publication *in 1956-57. He has served as chair of the Editorial Committee for this issue.*

The book that you are holding offers a glimpse into the distinctive themes and features presented in the 29 volume series titled *The Student Publication of the School of Design* published from 1951 until 1985. It is a highly selective gathering of material and, as such, represents only a small fraction of the remarkable work that filled its thousands of pages. Published work was diverse in content and appearance, reflecting not only the changing preoccupations of society and the design communities, but, more particularly, the issues felt most urgently by student editors and their faculty advisors. From the beginning, one objective—to publish only material that had "permanent worth," the words of the first editor, rather than merely chronicling current activities and projects of ephemeral interest—served as a critical guide throughout its publishing history. Attendance to that purpose enabled this modest but ambitious publishing venture to transcend the limits of traditional student magazines and journals common in schools of architecture and design and to attract international attention while advancing the reputation of the new school of design it represented.

With the publication of *Volume 30: Continuum, The Student Publication of the College of Design** reclaims its position at the center of design creativity and intellectual discovery. This issue provides a retrospective to acquaint the new reader with some of the series' earlier achievements; future issues, to be published on an annual basis, will present only original material (a preview of Volume 31 can be seen at the end of this volume). The editorial policy of the new series will remain consistent with our heritage—to publish only work of lasting value that has the potential to contribute to the betterment of society.

James Brandt, editor of Volume 1, recently described the publication's origins in a brief memo. He described how, in the winter of 1950 just a year and a half after the founding of the School of Design at NC State, several architecture students explored the idea of a student magazine with the encouragement of the noted Dutch architect and publisher H. Th.Wijdeveld, a visiting professor at the school at that time. Intoxicated by the idealistic, innovative stance of the new school's program, they set out to create a publication to match its lofty perspective. In the first issue, the editor stated:

The School of Design is dedicated to producing not just architects but well-rounded citizens. It seems to us that the magazine of its students should lead in that direction—in the direction of unlimited scope, in the direction of a well-rounded content. We have a place for short

stories as well as articles on modern art; sonnets as well as elevations; for musical as well as architectural criticism.

While some of the early issues did embrace this free-style attitude toward content, incorporating highly diverse material in a slim, square format, the publication eventually evolved into a series of single-theme documents, occasionally produced in album form. Indeed, the first issue of Volume 1 was quickly transformed into a tribute to Matthew Nowicki, the celebrated Polish-born architect and revered first head of the Architecture Department, when he died in a tragic airplane crash in the desert of Egypt. He was only 40 years old but his relatively brief professional life had been filled with creative accomplishment and personal heroism. Excerpts from that initial publication are incorporated in this volume, including Lewis Mumford's vivid appraisal of Nowicki's potential:

Those who know Matthew Nowicki's work intimately…have no doubt that he, more surely than any of his contemporaries, bore within him the seed of a new age.

The resulting memorial issue was hugely popular, quickly became a collector's item, and brought the nascent student publication instant credibility. This landmark issue, over half a century old, has never been republished until now.

In selecting material to reproduce from the entire 29 volume series, which includes 55 individual issues (early volumes typically consisted of three issues, later volumes one or two issues), the editorial committee faced a daunting challenge. Many notable articles and creative works had to be excluded, and most works chosen have had to be severely abridged. At the same time, some pieces that would have been robbed of meaning or impact by abbreviating have been reproduced in their entirety. In a few cases, photographs of less than ideal quality have been used because they were critical complements to the text. Some important contributors—distinguished visitors and faculty whose efforts were critically important to the success and vitality of the publication—are regrettably absent from this volume. For example, several early articles by Buckminster Fuller, a frequent and highly influential visitor to the School, did not find a place in this volume. Ultimately, we set three principles to guide the selection process: each piece should possess integrity and high quality; each should focus on pedagogical and theoretical concerns that reflected a significant aspect or a turning point in the School's academic priorities of the time; and the content, taken as a whole, should be appropriately balanced across the entire period of publication—roughly three decades.

It is rewarding to examine the amazingly rich variety of thematic issues contained in this compilation. Although the School of Design quickly acquired a reputation for technological innovation and structural invention as a result of its association with the sensational and daring State Fair Arena, its academic orientation was in fact broader than most older peer institutions. The editor of Volume 2, Bruno Leon, later to become a storied dean at the University of Detroit, observed: "To place into perspective my period as editor of *The Student Publication*, one must be aware of the atmosphere of the School of Design at that time. It was an exciting, pioneering place filled with a ferment of ideas that seemingly were being generated daily. Although unquestionably a school that espoused a contemporary philosophy of architecture, it did not fall into the intellectual trap of focusing on one approach. I saw my role as editor to foster and reflect that idea. Therefore, I insisted upon a diversity of ideas from a number of different fields that

would rightly bear upon a meaningful architecture devoid of mere fashion." This rhetoric was matched by the content of his three issues which comprised a critique of building industrialization, discussions of educational theory, and a portfolio of student visual creative work, as well as a remarkable interview by six students of Mies van der Rohe, an early visitor to the new school. That interview is reprinted in this volume.

Unanticipated in the academic and professional debates of the 1950s, the brilliant album *Building Footprints,* excerpted herein as *1959: Plans*, offered profound insights into the reading of architectural floor plans, their expression of purpose and technology, comparisons of the antique to the "modern," and, because they were all drawn to the same scale, a new awareness of size and scale relationships of buildings from many different eras. Indeed this publication, long out of print, suggested a valuable new method of interpreting architectural history though its lessons are yet to be adopted by the academy.

The section titled *Structures* brings together some of the most notable pieces published in the entire series. From its inception, the School of Design had possessed a faculty cadre committed to counterbalancing the formalist preoccupations of the Modern Movement with a more penetrating analysis of architectural production. For much of the school's early development, structural discovery, constructional logic, and the integration of space, form, and structure were rigorously advanced in studios, research projects, and in the choice of visiting lecturers. We have selected a sampling of articles and studies by four of the school's most important faculty and visitors, severely and regrettably abridged, that are intended to indicate the nature and depth of this commitment. Of the four, Pier Luigi Nervi and Felix Candela were internationally known designers and builders whose influence on the school was pervasive. Even more significantly, faculty members Eduardo Catalano and Horacio Caminos provided creative leadership to the architecture program from 1951 to 1962 through their teaching, research and built works. The exhilarating Catalano House, built in Raleigh in 1955 and first published in *The Student Publication*, was hailed as the "House of the Decade" by *House and Home* magazine.

In the mid-1960s, the publication's editors applied the comparative analytic method pioneered in *Building Footprints* to create two memorable, highly acclaimed volumes, *The City: Form and Intent* and *Forty Gardens.* Both reflected a then-growing pedagogical concern for the role of design in the larger environmental context. Like their predecessor, they were immediately snapped up by collectors and have been unavailable until their reprinting in this volume.

At about the same time, the ambitious five-issue Volume 14, here titled *1964: Concepts*, explored the design concepts and processes in then-current projects by Le Corbusier, Alvar Aalto, Louis I. Kahn, and Paolo Soleri. The sketches, model studies, and candid writings by these modern masters reveals not only the creative process at work but also the remarkable interaction of student editors with their world-famous contributors. A fifth issue, devoted to the essays and early designs of Harwell Hamilton Harris, who joined the school's faculty in 1961, is also incorporated.

This retrospective would be incomplete without at least one of the numerous contributions of the faculty member sometimes described as "the heart and soul of the School of Design," Duncan Stuart, who happened to be a multi-faceted genius. One of the original faculty members brought from the University of Oklahoma in 1948 by founding Dean Henry Kamphoefner, Stuart was a brilliant geometrician, delineator, and painter whose involvement with the publication began with Volume 1 and extended periodically for two decades. *The Mass Production of Unique Items Revisited,* co-authored with Fred Eichenberger and re-published here as *1970: Mosaics*, hints at Stuart's unique intelligence.

Beginning in 1969, with society at large and design pedagogy deeply divided, a number of new themes arose to shape the publication. Volume 18 Co-editor Kenneth Moffett recalls that it "was a turbulent period, embroiled in Vietnam, civil unrest and an unfettered youth subculture. I believe that these factors had an indirect but significant effect on the approach taken with our issue…and some others that followed during that period. One dominant perspective of the times cast design as an intuitive pursuit somewhat into disrepute as a model for the design student and professional. The

individual design ego was de-emphasized in preference to collaborative projects and investigations employing quasi-scientific methods. Volume 18 was devoted to articles by social scientists and design professionals with research interests in environmental psychology and analysis, and appears in hindsight to have been a rather arid if well-meaning essay into attempts to better quantify environmental design." Moffett adds "that such systematic analysis remains a niche involvement centered in the academy" and that achieving "a better understanding of how built form affects our lives seems to remain a rather fragmented and largely unrealized goal." To represent the several volumes addressing this concern, we have chosen Editor David Tester's introduction to Volume 23 included as *1974: Methodology*.

The last three sections are devoted to the three of the most influential and accomplished books published in the later period of the first series.

1978: Vernacular is drawn from the wildly successful *Carolina Dwelling* which reflected another shift in values that took place in the turbulent 1970s. *Dwelling's* editor, Doug Swaim, remembered that "boomer America was turning towards localism, ecology and New Age spiritualism. Modernism and technology were out—symbolism and cultural pluralism were in." In such a context it is remarkable that the resulting publication turned out so sensible, revelatory, and downright inspiring. With its emphasis on two scales—the nature of settlements in the vernacular landscape and the values and origins of indigenous structures it found an enthusiastic audience, and, unlike earlier volumes, has been reprinted frequently.

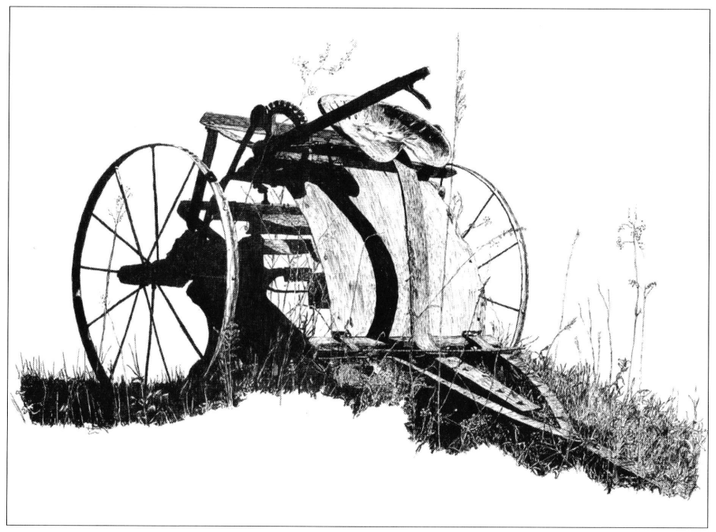
1978: Models is derived from *Volume 27: Great Models,* insofar as we know the only book published that consists entirely of illustrated essays by numerous prominent architects who describe how they employ architectural models in their design process. Among the illustrious contributors were Richard Meier, Michael Graves, Luis Barragan, and Reyner Banham. Uniquely conceived and beautifully produced, *Great Models* featured an elegant introduction by Suzanne Buttolph which is reproduced herein.

1979: Precedents represents selected material from the groundbreaking publication *Volume 28: Analysis of Precedents* by Roger H. Clark and Michael Pause, then and now faculty members in the College of Design. In examples of architecture from many eras, *Precedents* revealed the often unrecognized power of the *parti*; in so doing, the authors suggested a useful and resilient method for generating design concepts.

This book and its successor, *Precedents in Architecture* published by Van Nostrand Reinhold, have achieved international stature, and the Reinhold edition has gone through several editions and has been published in four languages. If you have not encountered this important work previously, the selection presented in this volume is certain to whet your appetite for more.

This, then, is *Continuum,* the revival of a series with a brilliant and innovative publishing record. Except for introductory notes, credits and the like, all textual and visual material has been drawn from previously published volumes of *The Student Publication of the School of Design*, though new typographic and page compositions have as their purpose a coherent and visually appealing product. The editorial team for the present volume, consisting of faculty and students from all of the College's departments, has sought to look forward while looking backward, to suggest the originality and creative impulses of past volumes re-imagined in fresh and vivid terms. Thus, a bridge between past and future has been created and the legacy of excellence, guided by the purpose to publish only work of "permanent worth," is passed on to those who, it is hoped, will conceive future volumes with similar passion and insight.

** The publication's name has been revised to reflect the change of the school to "College of Design" in 2001. Also, the first few volumes of the publication were titled* The Student Publications of the School of Design. *The plural form was dropped early in its history, and the singular form has been continued in the new series.*



1951: Seeker

A TRIBUTE TO MATTHEW NOWICKI

Lewis Mumford

One of the twentieth century's most respected critics and historians of American culture, Lewis Mumford was a visiting professor at the School of Design in its early years. This memorial tribute to his fallen younger friend and colleague was amplified in a comprehensive four-part appraisal and critique of Nowicki's career published in Architectural Record *in 1954.*

His architecture recognized no provinciality of time or place of method: it took the measure of man and sought to bring together the regional and the universal, the mechanical and the personal. Beyond the United Nations, which he served, he saw a united man and prepared a home for his use and delight. Nowicki graduated from the Polytechnic in Warsaw and in the brief year before the Nazi invasion, he had risen to the top of his profession. Following Plato, he held that architecture was essentially a pedagogical art: the architect was a teacher, a "promoter of new ideas beneficial to the life of man." He himself taught by the best of methods: his loving and lovable example. Though Nowicki was too deeply committed to freedom and democracy to accept the repressive forms of totalitarian communism, he nevertheless became the inevitable choice of Poland for service with the United Nations. No member of the distinguished Board of Consultants was better prepared than Nowicki as both architect and designer of cities; few architects anywhere could match him in his adventurousness and gaiety, his open-eyed daring, his fertility of invention, his unflagging discipline, his deep sense of duty, above all, in the humility that is given only to great genius.

Those who know Matthew Nowicki's work intimately, who can estimate his potentialities as well as his performances, have no doubt that he, more surely than any of his contemporaries, bore within him the seed of a new age. In his designs, spontaneity and discipline, power and love, form and function, mechanical structure and symbol were united. That which he left undone through his death must now call forth the creative efforts of a whole generation.

On Exactitude and Flexibility

Matthew Nowicki

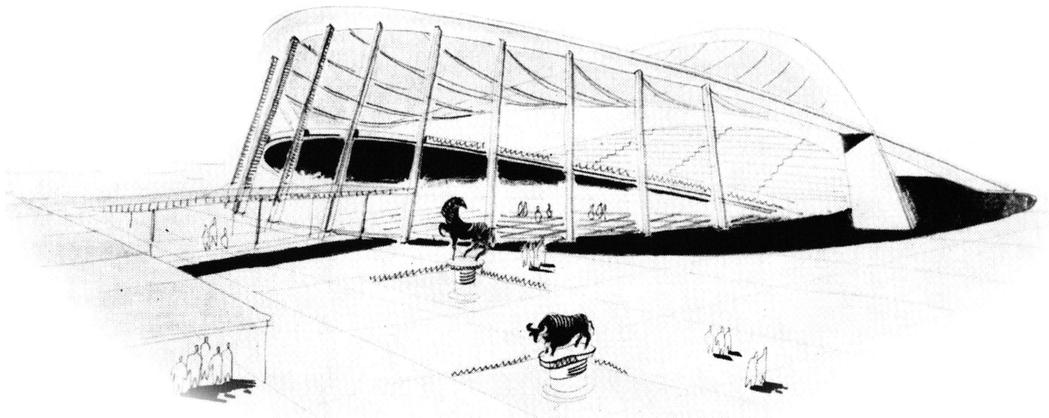
The first issue of The Student Publication *was dedicated to the memory of Matthew Nowicki, the revered first head of the Architecture Department, who had just been killed in a plane crash. The essay reproduced here offers insight into Nowicki's broad humanistic view of architecture as a cultural enterprise. From the portfolio of Nowicki's sketches included in the original publication, we have reproduced one of his many early studies for the State Fair (Dorton) Arena and two unexecuted designs for buildings in Chandigarh on which he was working just before his death.*

Sometime ago our design became a style. No matter how ingeniously we dodge the unpleasant issue, it comes at us with full force in thousands of creations of the contemporary designer. Our design is a style, with all the restrictions, disciplines, limitations and blessings that we usually associate with the term. A style in the similarities between designs differing basically in the purpose of their use and destination, subordinating to its demands a refrigerator or a motor car, a factory or a museum. A style which perhaps follows sales, quoting Edgar Kaufman, just as form followed function in the words of Greenough and Renaissance architecture in the work of Palladio followed its antique models. A style as pronounced, as defined, more limited perhaps, and as legitimate for our times as the style of Renaissance has been in its days.

In the growing maturity and self-consciousness of our century, we cannot avoid the recognition of this fact, and we have to realize what it stands for. We can no longer avoid this term "style" simply because it brings to our minds unpleasant memories. We cannot keep on pretending that we solve our problems without a precedent in form. We have to realize that, in the overwhelming majority of modern design, form follows form and not function. And even when a form results from a functional analysis, this analysis follows a pattern that leads to a discovery of the same function, whether in a factory or a museum. Approached in a certain way, an answer to every architectural problem is a flexible space, with no reason why one flexible space should be different from another, and many practical reasons why they should be alike.

In saying all this, I am not an advocate of a diversity in design for its own sake. Such a diversity is just confirming the rule of regimentation that always is the result of a style. The more one attempts to escape one's period, the more a part of it one becomes. The constructive diversity that provides strength to an expanding and virile civilization comes through a creative sensitivity to the eternally changing circumstance where "every opportunity stands alone."

This sensitivity is the main source of something for which I have no better word than freshness. Freshness is a physical part of youth, and youth disappears with time. This is the law of life true equally in the case of an individual or a civilization. Freshness can be preserved if the source of it depends not on the physical state of being young, but on the consciousness of its origin. Some individuals preserve this creative freshness in their maturity.



Those are the great artists. Some civilizations preserve this freshness for ages and then become great cultures. For although maturity aims at perfection and the stride for perfection must end with an unchanging standard of classical excellence, the consciousness of the source of freshness can provide a magnified scope to this stride. The magnitude of this scope is the measure of ambitions and strength of a civilization, and the prophecy of its future achievements.

Thinking in terms of the contemporary, or should I say modern, period of design, we realize by now that it has passed its earthly youth. The experiments with form, and the new space concept, the playfulness with "the machine to live in," the machine to look at, or the machine to touch, in architecture, painting and sculpture are more remote from us than the time alone would indicate. There was a freshness in those youthful days of the aesthetic revolution, a physical freshness of a beginning. There was a diversity in those days of forms that grew without a direct precedent in form.

I speak of architecture because it incorporates the full field of design. In its changes we can discover those that affected the interior design, the industrial design, problems of organized landscape and others, with or without a separate name. And it is these changes of the architectural concept that I propose to analyze with the aim of establishing our present position in their chain. From the analysis of these changes I will not develop any law of analogy, nor will I make predictions on what will be the coming change. I propose to define our present position because this is our strategic point of departure for the investigation of the full field of opportunity that lies within our period.

To define our present stage, I shall try to trace it to its origins. It seems to me that the beginning of modern architecture has its roots in the domestic structure of the late Renaissance. It was then that the problem of human comfort was rediscovered. Functionalism in terms of the importance of good living was introduced, along with a number of technical gadgets of which the stove in Fontainbleu was probably a vanguard. Architecture descended from its pedestal of heroism and rapidly started to grow human and even bourgeois. In France after the death of Louis XIV, the despotic "Roi soleil," the private residence "building boom" produced a plan in which areas of different use were defined and located with regard to one another. The plan of this new type differed from its predecessor, where a sequence of rectangular, round, oval and otherwise shaped interiors had a changing use, and one ate, slept, or entertained in any of them, according to a passing or a more permanent fancy. This change was not the beginning of functionalism, as architecture always had to satisfy a function, but the beginning of its modern interpretation. Resigning from heroism, architecture diminished its scale, becoming cut to size of an ordinary man. A good illustration of this change is the comparison between the Palace of Versailles and the Petit Trianon.

In the change of the predominant scale and the introduction of the problems of comfort, we can find the beginning of our architecture. These changes, essential as they were, could not alone produce the new form. Other factors were to complete the picture of the final change. One of them was expressed in 1825 by the German architect, Schinkel, after his visit to the industrialized Manchester in his famous question, "Why not a new style?" The eternal desire of change was responsible for violent shifts of attitude to form through the nineteenth century. To illustrate this violence and its extremes, I would like to quote two striking and not very well known examples. In the early years of the century, a French archeologist proposed a system of destroying the Gothic cathedrals, considered in the days of the Empire as edifices of barbarism. Cutting a groove at the base of the limestone columns, then surrounding them with piles of wood and setting fire to them was suggested. The archaeologist was convinced that under this treatment the unsavory structure would crumble "in less than ten minutes" relieving civilization of its shameful presence.

A few decades later Ruskin, paving the way for the Pre-Raphaelite movement, wrote in his *Modern Painters* that no public funds should be spent to purchase paintings later than Raphael, as the spirit of art was confined to the medieval period and replaced later by the superficial technology of a craft.

Out of these shifts of sympathies came the consciousness that some basic change in the eclectic sequence is indispensable. This was the psychological background to what we call the "modern" form. And although we shudder at the word style, Schinkel's search for its new expression contributed to the birth of modern architecture perhaps as much as any other factor.

No new form of architecture could have been created with a new structure, and the psychological receptiveness had to wait for its fulfillment until the structural possibilities ripened.

The middle of the last century with Paxton's Crystal Palace—its modular re-erection on a new site, its space concept of openness—created a new era. The following use of cast iron, then ferroconcrete and steel, created the spine of the new frame structure from those days on dominant in modern building.

Independence of the partitioning wall from the frame created the free plan and,

thus, all elements of the new architecture were present at the beginning of the century.

What would have been the characteristics of modern architecture had it followed the direction of those early days? Its form, influenced strongly by the expression of the structure, would have been intricate and detailed. The logical development of the skeleton would have accentuated the delicate ribs, dividing areas of the building into supporting and supported members. The resulting form would perhaps have acquired the lightness and openness of lacework filled with translucent or opaque screen. In its final stage the screen probably would have been replaced with a secondary skeleton filling the lacework with more lacework.

This is the way the gothic skeleton developed with its stained glass window and this was the road explored by Paxton, Labrouste, Eiffel and their contemporaries. Modern architecture instead chose a road different in every respect from these expectations. To understand this change of destiny we have to make a digression. Architecture with its social, economic and technical complexities never was in the lead of aesthetic changes. As a rule it followed other media of art. The changes of taste in the nineteenth century, mentioned before, affected architecture very profoundly, but they resulted from factors remote to the problems of building or design.

The great change introduced by the Renaissance can be quoted here as a striking example of the same problem. At the rebirth of the classical idiom, the medieval gothic structure reached the climax of its growth. The further life and growth of this structure was interrupted by an aesthetic wave unrelated to the technics of architecture. No structural competition to the gothic building was offered by the new style. The building methods of the Renaissance were crude when compared to the advanced standard of the medieval mason. The change in architecture followed the changing aesthetic of the period and the responsibility and credit for this change should rest with its men of letters. In this way Petrarch and Dante fathered the architecture of the Renaissance.

A somewhat similar thing happened to modern architecture. This time the change of taste was inspired by the painters and not by the men of letters. The broad and open mamiere of Cezanne, the architectonic painting of synthetic Cubism introduced a new taste for the purity and simplicity of form. The development of the structural skeleton mentioned before could not be molded into the new aesthetic. The problems of structure and materials became secondary in a period preoccupied with the aesthetics of form. One has the impression that for an architect of the early twenties construction was the necessary evil. Architecture became "idealized" and "dematerialized." Colorful planes meeting at the corners of the cube emphasized the lack of material thickness. Structural detail was eliminated to conform to the demands of purity with the result that the idealized structure reacted badly to time and weather. A column in this architecture became simply a cylinder surrounded by planes, a vertical among horizontals. The contrast of this juxtaposition had to be achieved to the satisfaction of the intellect so that no shape was created without a function which it should express and serve. But to create the shape a function was created or conveniently over-emphasized. Here my thoughts wander to those two massive cylinders dividing the steps of Le Corbusier's Salvation Army Paris building. Although emphasized more than any other structural element of the building, they function only as ventilation shafts and now, if technically obsolete, they may have lost their functional meaning, preserving their compositional importance. This architecture of the "international style," romantically disposed to over-impressed technology, developed a notion which I shall call the functional exactitude. The truth of architecture was considered to be the exact expression of every function. When building became technically obsolete and therefore no longer ideally serving those changing functions, it was to be removed and replaced by a more efficient one.

The concept of functional exactitude found a source of decorative qualities in the inventive interpretation of human life and movement. One might say that this architecture became the decoration of function. The period of functional exactitude looked for its inspiration towards the physical function. The psychological one was not considered in its philosophy. The concept of controlled environment resulted and the main purpose of architecture was to control physical environment to the physical satisfaction of the user. The recent changes in modern architecture are perhaps as basic as those separating the nineteen twenties from their predecessors. True, we share our vocabulary with this period of yesterday but the same words have for us a different and often a basically opposite meaning. We both speak of functionalism but then it meant the exactitude and now it means the flexibility. Those are two opposite concepts. In our thoughts priority often is given to the psychological and not the physical human function. The concept of a short-lived structure removed with the rapid change of technology is replaced by a notion of architecture that will be our contribution to the life of future generations. Le Corbusier introduces a measure on which this contribution can be composed—the "modulor," with its mystery

of the golden section. This measure of good proportion is most significant for the change of values. No longer the measure of functional space, no longer the measure of time, but a measure of beauty. Whatever the validity of such a measure may be, it is interesting to notice that in the sequence of "time, space, and architecture," the emphasis is shifting towards the last word in terms of the mystery of its art. The free plan is replaced by the modular plan. Again, these are two opposite notions. A module is the most rigid discipline to which a plan can be subjected. A modular plan in reality is the opposite of a free plan. We are no longer preoccupied with the proximities of related functions but with the nature of space that leads from one function to another. It is no longer "how quickly to get there" but "how to get there," that matters most in our plans. It seems that from a quantitative period we have jumped into a qualitative one.

These changes are neither as conscious nor as pronounced to the degree pointed out in my remarks. It is an irresistible temptation to express those changes in the most striking manner. But, in order to be objective one has to realize that a dividing line between periods can never be geometrically defined. This division can better be compared to a wide ribbon which separates and joins at the same time like a gray belt between fields of black and white.

With respect to the main channels of human creation, namely the invention and the discovery, one might say that our present period is also different from the yesterday. The discovery of the formal symbol of the unchanging laws of the universe seems to replace the invention of the form without a precedent. The eternal story of gravitation is again consciously contemplated. We are aware that the form of the discovery has to change but the object of it remains the same; over and over discovered in many ways. Along with these elements of philosophy we also react in a different way to the techniques of our craft. Architecture discovered its own medium of creation and the difference between this medium and the others.

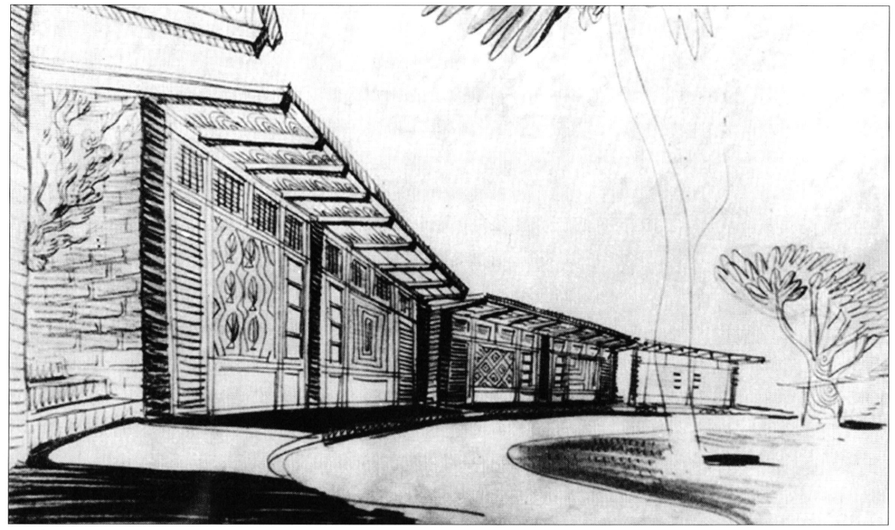
Picasso writing recently about his "blue period" of 1912 and several years later said that he discovered late the difference between sculpture and painting. Maturity brings a "sense of medium" and mature architecture in the same way discovered the difference between painting and the art of organizing accessible space. As a result, we rely in our expression on the potentialities of materials and structure almost picking up the trend of the nineteenth century. This interest in structure and material may disclose within the building medium decorative qualities of ornament much too involved for the purist of yesterday. The symbolic meaning of a support became rediscovered and a steel column is used frankly as a symbol of structure even when it is not part of the structure itself.

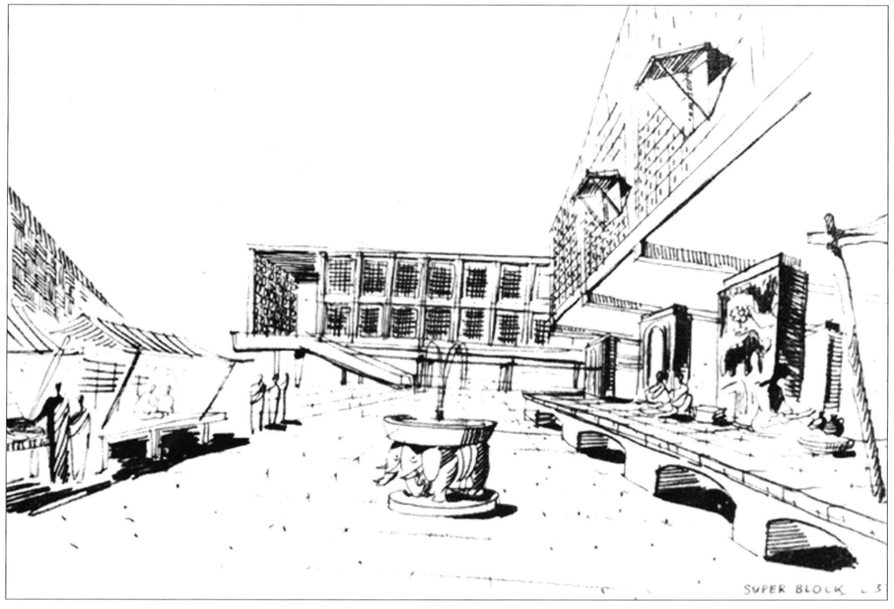
The period of functional exactitude expressed its mysterious longings for ornament in the decoration of function.This period of functional flexibility expresses them in the decoration of structure. Art tends not only to discover the truth but to exaggerate and finally to distort it. And maybe in this distortion lies the essence of art.

I have described our stage of the modern design as a style. Will this style repeat the sad story of other styles becoming an addition to the repertoire of a future eclecticism? The life and the decline of cultures follows an organic pattern which seems to be inevitable. But the span of life of a culture and its rebirth into another rests in the hands of the people responsible for its creation. Where is the future of modern design?

It seems to me that it depends on the constant effort of approaching every problem with the consciousness that there is no single way of solving it. "Art una-species mille." This battle cry of the Renaissance should be repeated again and again. Art may be one but there are a thousand species. We must face the dangers of the crystallizing style not negating its existence but trying to enrich its scope by opening new roads for investigation and future refinements.

"Form follows function" no longer satisfies ambitions aroused when form becomes judged for its universal values, but sensitivity to the minute exigencies of life remains the source of creative invention leading through the elimination of "exactitudes" to the more important and more general truth which equals beauty.

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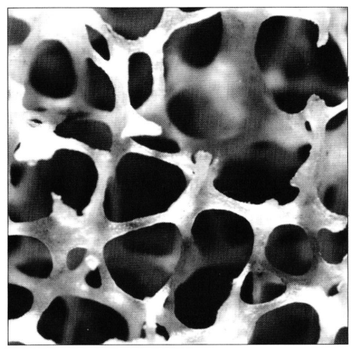


1952: Interview

INTERVIEW WITH LUDWIG MIES VAN DER ROHE

Students Talk with Mies
February 13, 1952

The following article was the result of an interview between Ludwig Mies van der Rohe and six students of the School of Design in February 1952. Mies van der Rohe was then director of the Department of Architecture at the Illinois Institute of Technology. The interview was tape recorded and transcribed into the following text.

Q: In what way, specifically, do you train your young architects to understand technology? Do you encourage them going out into industry?

MIES: We try to train and educate them at the same time. To train them to do something and to educate them to understand what they are doing and what they should do.

Q: Do you think you can take students in a college and they can be trained to become architects or is it a process that is peculiar to each individual?

MIES: They can be trained to a certain degree. I think everybody can be trained to a certain degree, but he has to grow at the same time.

Q: In other words, the training part consists of the use of his tools but beyond that he must train himself and grow?

MIES: Certainly.

Q: I know that some students feel that architectural schools in general are really teaching a craft rather than a profession. They are not teaching architecture any longer in the sense of the Master Builders of the past. I think we both agree that this is very important.

MIES: Certainly. You know, it is very difficult to train and educate somebody for a master builder. I think that in the Medieval times they had to start as an apprentice and then they learned something and then they worked more and more and became a master and so on; there was a great tradition. The trouble nowadays is that there is no tradition whatsoever.

Q: We haven't accepted a tradition but actually this is our heritage. Don't you feel we should continue from that basis rather than cast it aside and start a new one? I don't believe we can start a new one.

MIES: No, certainly not. But to understand it is another thing. Some people, when they see a cathedral, think it is a grand idea. A caprice, but that is not so. It is the logical consequence of what the Romanesque master builder formed when he tried to build a solid roof on the cathedrals. That is what I tried to show when I showed the diagram by Viollet le Duc and when I talked about Berlage.

Q: Do you feel the single greatest characteristic of our society is our technology?

MIES: Yes. Some people think our problem is the human situation today, but that is a general problem. That is not an architectural problem. That is a sociological problem.

Q: In what way specifically, should the architect be aquainted with technology and do you feel he should be actively engaged in determining its future nature?

MIES: You know, technology is neutral. It can go for good or for evil. It can be used for good or evil and architecture should use it for the good; not let it go.

Q: Nor resort to older handicraft methods?

MIES: Yes.

Q: We are more or less aware that we are depleting our natural resources and in particular steel, lead, and copper—those resources used in the building industry. Do you feel consideration of this fact is of very pertinent importance to the architect in his conception of the building? Not only of being aware of the fact that this is true but also being actively engaged in his structural conceptions to minimize their use in such a way that he will get a much greater advantage per amount of the materials used.

MIES: Yes, but that would not be the primary consideration the architect should have. I think since technology, in my opinion, is a great historical movement, we should work in the framework of technology. It is, in fact, the essence of our time—the inner-structure of the epoch. There are other things on the side but its essence is the main field of architecture.

Q: Due to the great concentrations of power in destructive weapons which can reach any part of the globe, do you feel it is a vital necessity for architecture to concern itself with the idea of mobile houses? That is, houses which are capable of being demounted and re-erected at different geographical locations.

MIES: I feel it is avoiding the real solution.

Q: The real problem is to solve the problem of war, is that what you mean?

MIES: Certainly.

Q: Suppose you were called upon to design structures for the Army. Then, don't you feel that there is a great opportunity to bring in the technology of mobility?

MIES: Certainly. But that would not be normal and could be changed tomorrow.

Q: In other words, the idea of mobility is not entirely incongruous with the idea of design?

MIES: Certainly, it is not, but I see no reason to move houses.

Q: Third-year design students are working on housing for married students and one of the solutions proposed is a building complete with packaged utilities which could be bought at a net cost by the student upon graduation and thereby have a home to live in during the rather uncertain transition period between graduation and enterprise stability.

MIES: Should not the college provide living quarters? It seems again an avoidance of the real problem.

Q: Of course, but as students we are not always in control of such considerations.

MIES: Certainly, that is true.

Q: The college would have difficulty in providing such housing. Of course, one might suggest a subsidy. In other words, the college must accept this burden or it must come up with a building system which adapts technological techniques to such an extent that it can lower the rent to very low levels. In conventional construction solutions, of which we have had bids, it turns out that it would require $3,000–$4,000 per unit of 500 square feet and anything we can devise in multi-story units comes out much more than $7.00 per square foot.

MIES: I think that is again avoiding the real solution. In a time when you spend $85 billion a year you could build many fine things at one percent of that figure.

Q: In a sense that is a subsidy idea and an avoidance of what we are trying to do in getting a rent which would pay for this building and yet be sensible.

MIES: Yes, but in my lecture I talked about how we tried to reduce the sizes of apartments in Berlin and the bankers got twice as much, leaving it still too expensive for the people. It is an economical problem, not an architectural problem. I think we must distinguish these things clearly before we can answer questions of this sort.

Q: Do you feel, as we are often forced to feel as young architects, that architecture is part of a parasite on society, and the way bankers, financiers and real estate men move around, we are just called in as bystanders who are going to take whatever they give us and do something with it. I know you are not in that position, but you no doubt can understand how we feel.

MIES: You know, there are, in the whole structure of civilization, some facts which are given which cannot be changed. Facts which come from the past. Some have done something and it has influence. We can lead and guide these factors of reality but we cannot change them.

Q: You mean we cannot change the character of reality but we can change its direction?

MIES: Yes, but our effect is quite limited because these facts take their ultimate way.

Q: What you mean is that you may, for a time, force a deviation but eventually they will fall back into their former line of force.

MIES: Yes. That is a mistake many people make. They believe they can change reality but that is not the case.

Q: To get back to the question of technology. As an example, let us consider the Gothic period which had a very logical development and solution of a functional problem. Do you think the attempts of the Gothic architects to achieve verticality and use stone in pure compression was entirely due to the idea of solving a vaulting problem or do you feel that the religious fervor of the period was also instrumental?

MIES: It may have had an influence to find a way of doing things. All these factors of reality and ideology are interplaying but, in fact, the reality is all important. For instance, the Romanesque architects could have said that the wooden roof was good enough, but technology, for instance, in our time, depends on the masses and the masses depend on technology. We could not live otherwise. And technology is what we see. Our whole way of seeing and thinking is determined by it. For instance, we like a very simple glass. We take preference to the simple form, the technological form.

Q: Yes, but as you were talking of Saint Thomas Aquinas and logic in your seminar a thought kept running through my mind about the distinction between logic and emotion. Logic is not only an analytic state of mind.

MIES: Yes, but you can prove something logical by reason. You cannot prove feelings. Everyone has emotions and this is the hell of our time. Everyone says they have a right to their own opinion but they really only have the right to express their opinion.

Q: However, in attempting to prove something by reason don't you feel that you are guided along a certain path by intuition? Logically one might not be able to determine an ultimate result by any of its effects. However, intuitively you feel one or another direction is proper. Once you have determined your course, you may begin application of reason.

MIES: Why certainly, I often experience that my thoughts have to be controlled by the work I have done. Sometimes, out of the work I have done, I have a certain direction. I am convinced of the importance of technology but that was a long process. I could not read it in a book and it wasn't dessert served on a lunch plate. Little by little, one thought is put to another. One is doubtful of a thousand things in this process but by experience and logic you may build upon these thoughts, until you achieve a real conviction and, in the end, you have such a strong conviction that no one or anything in the world could change it. That is the way it has to be. I don't know if I told you about the time I had 3,000 books in Germany. I spent a fortune to buy these books and I spent a fortune to read them, to study them. I brought 300 books with me to America and I can now send 270 books back and I would lose nothing. But I would not have these 30 left if I would not have read the 3,000.

Q: In the real analysis those book rejections were as valuable as the ones you kept because they provided you with a very valuable negative knowledge.

MIES: Most certainly. It is exactly what research means. Research does not mean to get only positive results but rather to get at the facts. I don't know if someone told me or I heard it on the radio concerning this story of Edison. His assistant was deploring the failure of 800 experiments on filaments for electric lamps and the resulting waste of time. Edison said, "What! Waste of time? We have proved that 800 things do not work."

Q: That is saying, in essence, that any success is a compilation of failures.

MIES: Yes. That may be said.

Q: I'm glad you brought up this question of people having the right to their opinion because that is one of the misconceptions of a democracy.

MIES: Yes, but we must organize our considerations in a more concrete manner. In a democracy we have the right to express our opinion but as a human being we have the duty to formulate a clear opinion. Not just some assumption out of the clear blue sky.

Q: Yes, but the general masses conclude that since everyone has the right to his own opinion, every man's opinion is as good as the next man's.

Q: It really is an encouraging thing to find two people who have a great deal of faith in technology and in man's ability to control his thoughts, his actions, and his environment for instance, as Mr. Fuller and yourself, and arrive at completely different solutions to their problems while completely within the framework of technology.

MIES: Why certainly. The whole world is similar. There are fir trees and pine trees growing in the same environment.

Q: For example, there are millions of solutions to the same problem.

MIES: I would say there are a variety. Somewhat they are limited. Let us take the closed plan and open plan. In designing a house you could use the open plan and develop one, two, three, maybe ten solutions. You know, people think with the open plan we can do anything—but that

is not the fact. It is merely another conception of space. The problem of space will limit your solutions. Chaos is not space. Often I have observed my students who act as though you can take the free standing wall out of your pocket and throw it anywhere. That is not the solution to space. That would not be space.

Q: The problem of accuracy always presents itself when you think of Mies van der Rohe. One gets the idea that there is an exact place for each element in a building and it must be exact. However, there is a certain magnitude of accuracy. How close does it have to be? In talking to a number of your students, they have discussed how they work for days upon the preciseness of a composition. I wonder if that preoccupation with accuracy is the fundamental thing or whether it is superfluous to the real conception.

MIES: If you have the conception why should it not be executed with the greatest accuracy?

Q: I am only trying to get it straight whether you may not have the conception without extreme accuracy.

MIES: You could, but it would not be an accurate expression of your conception. Accuracy is not the conception, but you must have the clearest expression to get at the essences. Take a sentence. When I have a thought and try to express it, I work on it and I work on it and I work on it. May I repeat a few sentences from what I read at the close of my seminars? "Architecture depends upon its time. It is the crystallization of its inner structure." I worked on these sentences for weeks. It is not just saying things. It is thinking them. Let me give you another example. "Form must be the form of the mind, the manner of not saying things, but of thinking them." John Cocteau said that. I have something else. "Construction, the framework, so to speak, is the surest guarantee of the mysterious life of the works of the mind." "Everything that is beautiful and noble is the result of reason and calculation." Now tell me who said that? Baudelaire, the French poet. Even he thinks construction is important. Only the architect does not think so.

Q: Whenever one thinks of exhibition buildings one thinks of the Barcelona Pavilion. What social implications do you feel exhibitions have?

MIES: Philip Johnson's book on me contains my thoughts concerning the nature of exhibitions and I still believe in them, so if you would read his book it would answer this question. I will tell you a story of the Barcelona Pavilion, however, which might interest you. One evening as I was working late on that building I made a sketch of a free standing wall, and I got a shock. I knew that it was a new principle.

Q: I'm glad you mentioned that because I'm sure you are aware that the general conception exists that your architecture comes from the intellect and therefore is very cold and calculating. However, we are aware, and this statement is a confirmation, that the idea is incorrect.

MIES: I am not a sentimentalist. The so-called humanists say that. They should define what is human. Let me ask a question. Do they have a patent on humanity? I'm living too. I have talked to people like that and asked them why they think they are the only ones who are human. But one thing is sure. I am not a sentimentalist.

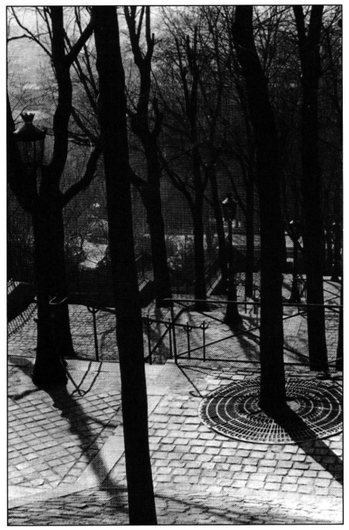
Q: When you say you got a shock it is obvious that such an experience is extremely emotional and this immediately puts the lie to these rather uninformed statements.

MIES: Certainly. The shock is emotional but the projection into reality is handled by the intellect.

Q: I was very interested in your statement that you were not doing furniture anymore because you could not find anyone to make models. Real craftsmen.

MIES: Yes. In Europe you find many small shops to do this type of work. In this country the large factories are interested in terms of 100,000 chairs. They are not interested in getting chairs, but in making them. I have used many modern chairs and I become tired after 10 or 15 minutes. When I made a chair, I sat in it for hours. I did not answer the phone or anything because I wanted to discover when I would get tired. A simple ordinary old fashioned chair such as the one you are sitting upon (high back maple chair with straw seat) are more comfortable than most of the modern chairs. You do not become tired because you can move a little. In the modern chairs you cannot move. The angle prevents movement.

Q: You must leave now, but before you go, let me express our deepest gratitude for your consent to this interview and be assured that you leave us with a great amount of respect. We sincerely hope you will return soon.



1959: Plans

VOLUME 09.1 BUILDING FOOTPRINTS

INTRODUCTION

Eduardo Sacriste, Jr.

Eduardo Sacriste, Jr., a distinguished Argentine architect-educator, provided this introduction to Building Footprints. *The forty-five building plans originally presented in that issue were drawn at the same scale by his architecture students at the University of Tucuman in Argentina. A selection of six examples is reproduced here.*

When we walk by the muddy shore of a lake and see the footprints of animals, we can say that there stood a horse, a cow, an elephant, a snake, a crab, a bird. If we do not recognize the footprint we can guess quite easily the kind of animal that has left its mark. In other words, we can classify the footprint into some group. We can guess the volume, the weight and other particulars of the animal. We can judge because we have a visual education in footprints.

With the plans of buildings the same should happen as with animals. If we have a visual education we should be able to recognize the style of a building, the period, the techniques, the materials and the social conditions that the plan expresses.

The ground floor plan of a building is like a footprint. It is the essence of the building. The technical problem of architecture has always been the roof: to span, to defeat gravity. When we put a structure into the air, a play of forces takes place. The resultant of this play of forces ends with an impact against the ground; this impact is the footprint of the building. Then those forces dissipate into the earth through the foundations. This character of the floor plan – to be the impact of the resultant of a play of forces – is what gives it its importance. It is in many ways like an X-Ray of the building. In the plan we find clearly expressed the technical system and the social conditions that made it possible, the space, the height, the rhythms and so on. "The plan has within itself the essence of the sensations." "It is a summary." "The law of the building is written on the floor."

Because of this ability to judge the building from the footprints we can find, today, many things of the past which would otherwise be lost. Tel El Amarna, Mahenho Daro and Prienne are examples. In England, in Old Sarun, we have the opportunity of seeing the footprint of a Romanesque church. How suggestive is this footprint! Looking at this plan in full size on the ground we can imagine the rhythms, the spaces, the sections of that vanished church.

The plan is not an arbitrary thing, not a pretty picture to admire for its own sake. It is the result of much experience and research. A plan is like a decantation of wine—it needs time to settle. This is the reason that the plan is so rich in expression and in intensities. There is no difference between the plan of a house and the plan of a temple within this context. Both change slowly, with time, with feeling, with the new ways of life. The history of architecture should have as one of its aims to acquaint us with the footprints of each epoch. It should teach us how to read in the plans of the past the life, the struggles and the joys of

the people who supply the imprint. A comparison of plans is illustrative. It helps us to realize the scale, techniques, spaces and social conditions of different times. Yet, what generally happens? Our books on history will show the plan of a big building like St. Peter in Rome at a small scale and the plan of a tiny cathedral as at Athens at a larger scale. We are misled.

If we compare our own plans with plans of other good buildings, we will profit by the accumulated experience that is the history of architecture. In this way, we can visualize more easily the kind of space we are creating and the scale of our own structures.

Aside from the profit, we can draw from comparing plans, the study of plans of well known buildings should be for an architect a joy and a source of pleasure. When an architect looks at the plan of a Roman, a gothic, or any other good building, he can see many things and can imagine many others. I consider that for an architect a "visual education" in plans of buildings is a necessity. That education will enrich his knowledge and experience and will help his judgment and sense of self-criticism.

But looking at this collection of plans, all at the same scale, we can see and understand many other things; for instance, in the plan of the Hypostyle Hall at Karnak we see the strong emphasis on the longitudinal axis, and we understand how right is Spengler when he says that, for the Egyptians, space existed at the moment the procession was moving along this axis. He is right also when he notes that the temple was the Egyptian model of life: a straight line that we must follow from the day we are born until the day we die, whether we like it or not.

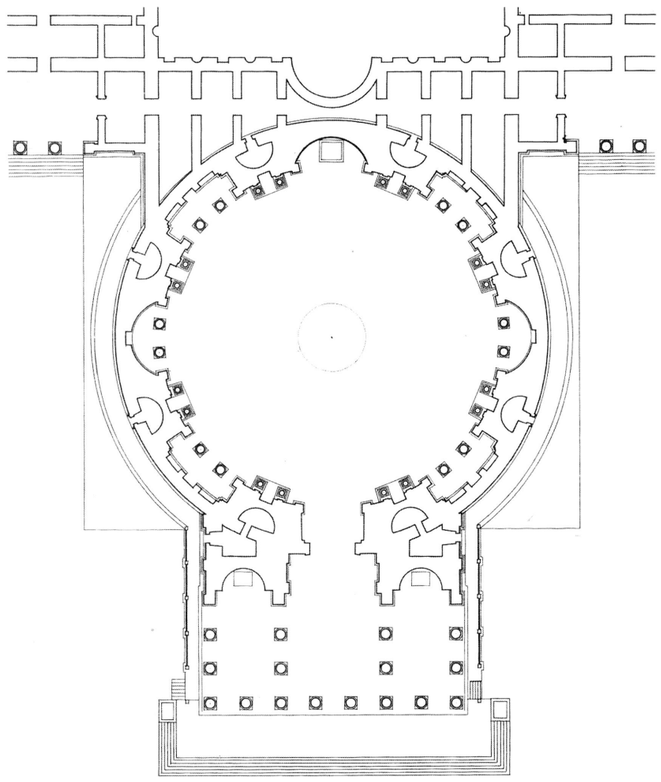
Then, if we compare this plan with the one of the Hundred Columns at Persepolis, we can see how different they are—as space—although they have a very similar appearance; there is no dominating emphasis in any direction at Persepolis. This is a room in which to move to and fro: a throne room.

If we compare then the plan of the Johnson Office of Mr. Wright, we can state without doubt that the columns in Racine are for the sake of the spatial sensations Mr. Wright wished to create, not for any technical reason.

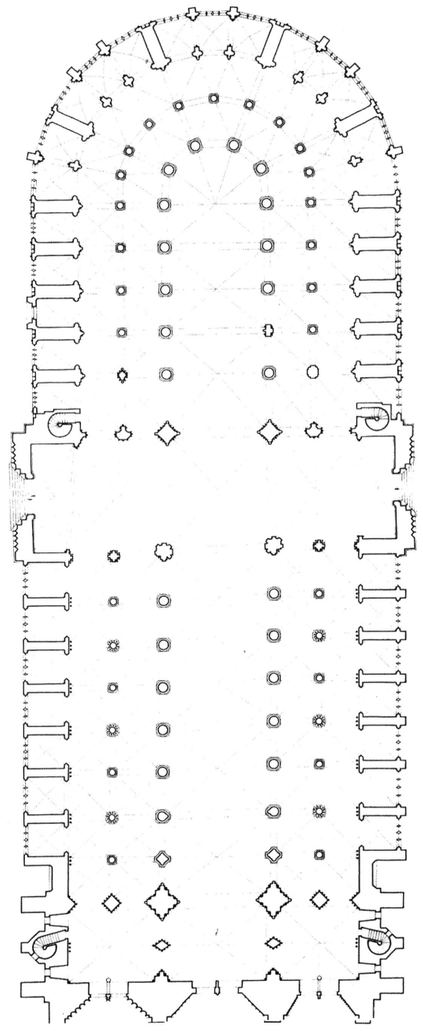
Through this comparison we can realize, possibly for the first time, the real size of St. Peter in Rome, of Ronchamp, and of the tiny Cathedral of Athens. We can understand Bramante's idea of St. Peter when he explains it saying, "I will place the Pantheon above the Basilica of Maxentius."

We can learn much when we study the plan of the small Temple of the Bull in India. We see how rich is the space and the variety of the temple despite the fact that the plan is laid out on a strict ten foot module; all the building is built using granite pillars, slabs and lintels of this dimension.

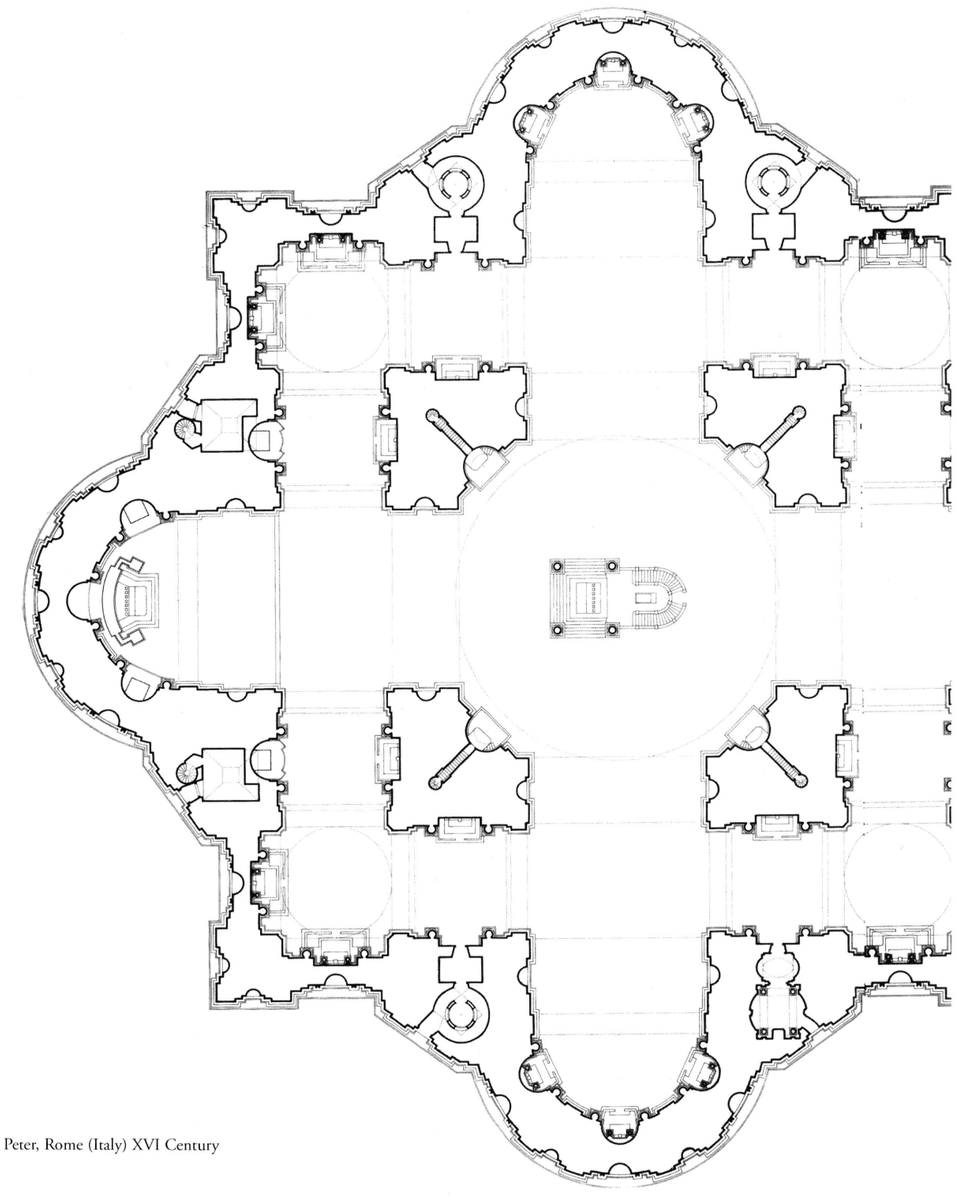
It is possible that, as a result of this review of plans, we can better understand the richness and variety that has been attained by architectural creations throughout history, despite the generally limited list of materials available—stone, brick, concrete and wood. We can see that richness and variety do not lie in the materials but in the spirit and intelligence of the people who develop the different structures (constructive ideas) in answer to their physical and spiritual needs. After the nineteenth century things began to change. Society became more complex. Population increased and new materials began to appear, such as steel and reinforced concrete. Now, today, a new scale and a new footprint are emerging. A new chapter of possibilities is open. When the great problems of our present society begin to be solved, we shall have new plans, at a new scale.



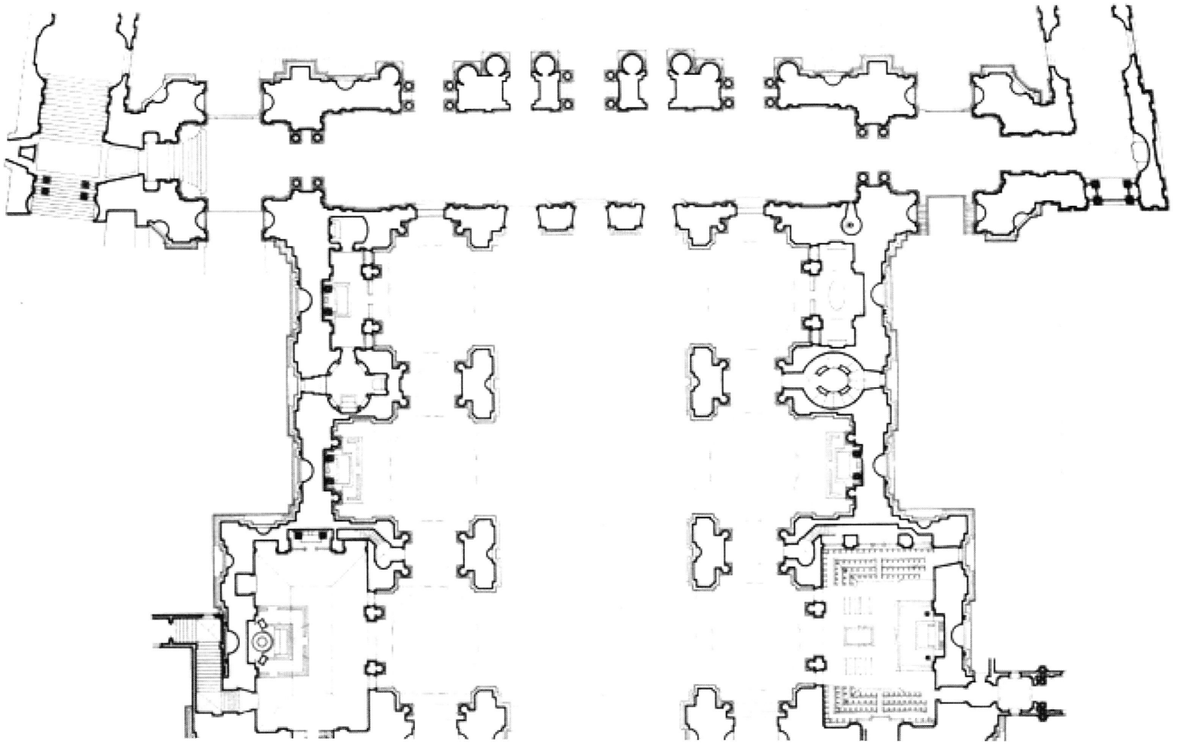
Pantheon, Rome (Italy) II Century

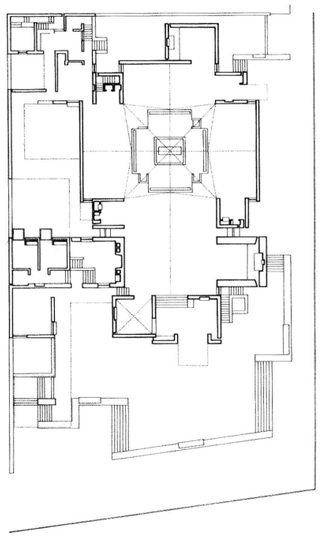


The Cathedral of Notre Dame, Paris (France) XII Century

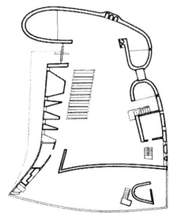


The Basilica of St. Peter, Rome (Italy) XVI Century

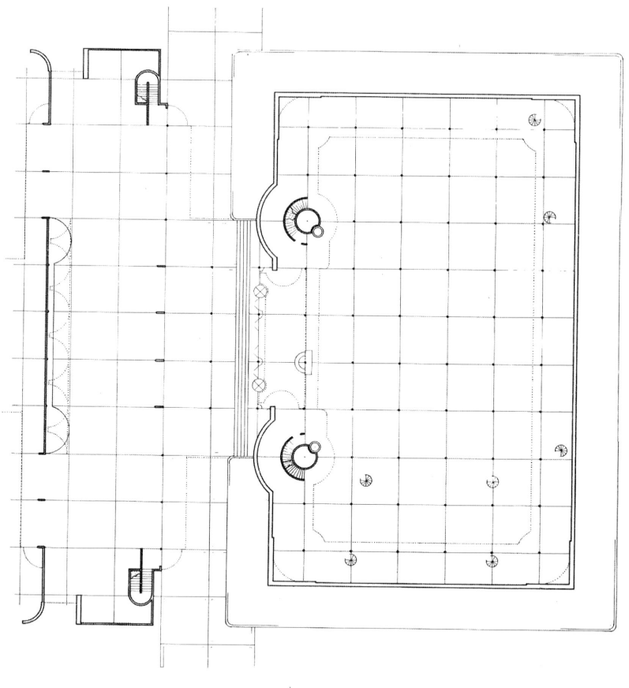




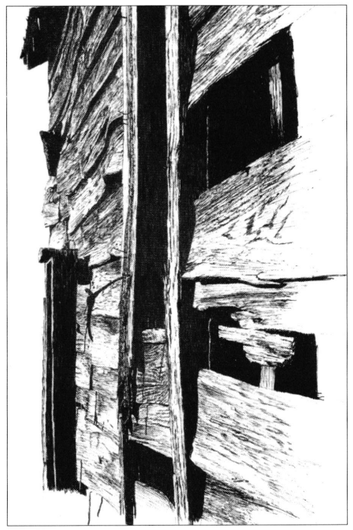
Church of Fatima, Buenos Aires (Argentina) XX Century

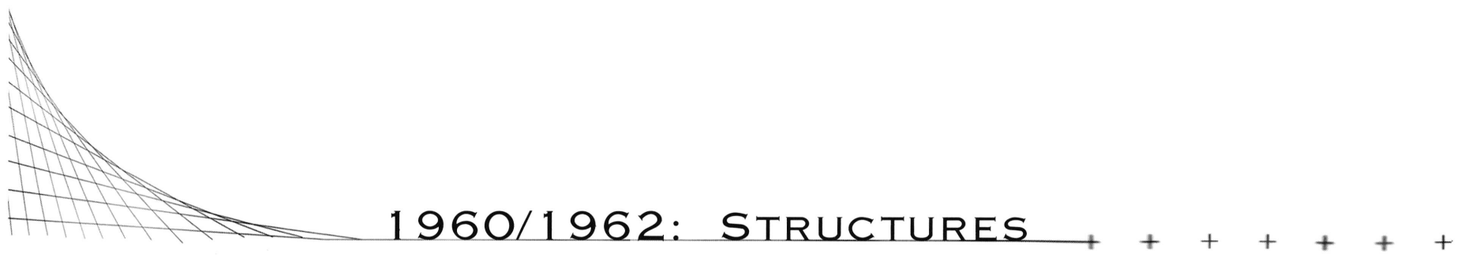


Notre Dame Du Haut, Ronchamp (France) XX Century



Johnson Building, Racine (U.S.A.) XX Century





1960/1962: Structures

VOLUME 10.1

STRUCTURES OF WARPED SURFACES

Eduardo F. Catalano

Eduardo Catalano is an internationally prominent architect, educator and author. He was head of the Architecture Department in the School of Design from 1951 to 1956 when he initiated studies of warped surfaces that led to this original publication. The designer of numerous acclaimed buildings, Catalano has just completed Floralis Generica, a towering and poetic work of public art in his native Buenos Aires.

INTRODUCTION:

The Hyperbolic Paraboloid, a double-curved surface generated by the displacement of a straight line, and commonly described as a saddle shape, has become the unit-theme of many structures built all over the world during the last decade. The first known structural development based upon such units was introduced in France by Bernard Laffaille, who in 1933, built at Dreux the two-sided cantilevered structure shown on the opposite page. As the result of such experimental work, he published two years later the "Memoirs sur L'Etude Generale des Surfaces Gauches" in the journals of the Second Congress of the International Association of Bridges and Structural Engineering.

In 1936, the French engineer F. Aimond published the most complete study ever made on the subject, in the fourth volume of the above mentioned journal, called "Treatise on the Statics of Hyperbolic Paraboloid Shells not Stiff in Bending." This study covers a structural analysis of these warped surfaces, as well as both simple and elaborate geometrical combinations of Hyperbolic Paraboloid units to enclose varied spaces. During the same year, L. Issenmann Pilarski, in his book *Calcule des Voiles Minces en Beton Arme*, published by Dunod in Paris, France, included part of the studies made by Laffaille and Aimond, thus completing the original bibliography on the subject.

Although the Hyperbolic Paraboloid had been well known as a geometric surface, it was not used until 1933 as a structure. Only Antonio Gaudi, the Spanish architect, saw the architectural and structural possibilities of such surfaces, before Laffaille and Aimond. In the basement of La Sagrada Familia, Gaudi's unfinished church in Barcelona, Spain, there are two plaster models of structures formed by three rhomboidal units of Hyperbolic Paraboloids, combined in a hexagonal plan. They are advanced for the period in which they were conceived, and constitute perhaps the best examples of Gaudi's structural ideas.

After the first structures were built by Laffaille, the Italian engineer Giorgio Baroni built several industrial roofs using units of Hyperbolic Paraboloids for the Alfa Romeo factory in Italy. The impact of these constructions was reduced, unfortunately, due to the outbreak of the Second World War, which completely paralyzed all civil construction in Europe.

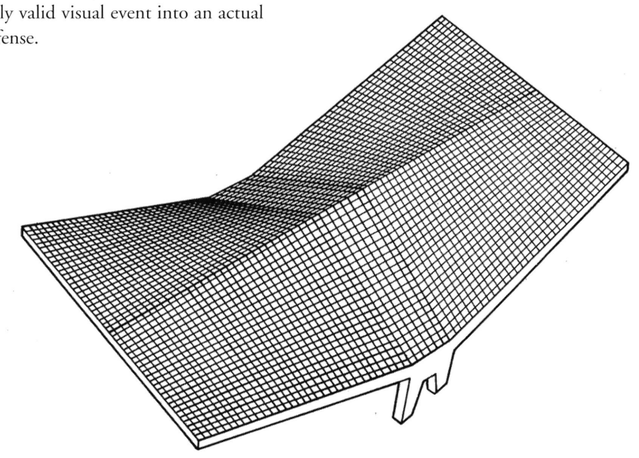
The rebirth of the Hyperbolic Paraboloid came in 1950, when it was used as a saddle-shape in the Cosmic Ray Pavilion of the University City of Mexico. This construction

constitutes the beginning of uninterrupted structural developments by the Spanish architect, Felix Candela. With the persistence present in the best builder's tradition, and with his constant exploration of the structural and visual richness of the Hyperbolic Paraboloid, he has made a lasting contribution to the art of construction.

The material published here is based upon studies made by the author since 1952 as a part of his courses in architectural design at the School of Design in Raleigh, North Carolina, and later at the School of Architecture and Planning at the Massachusetts Institute of Technology in Cambridge. Some of these studies were developed by students in their attempt to understand the geometric, structural, and architectural characteristics that result from the combination of Hyperbolic Paraboloid units, through the construction of models in varied materials, techniques and scales.

The accompanying plates attempt to convey to the reader how combinations of these nonplanar, four-sided surfaces of great structural efficiency can create almost endless architectural spatial relationships.

We hope that those who may be interested in these forms for architectural use do not blindly translate them into buildings. Here, they purposely have been reproduced solely as three dimensional organizations of the four-sided units, independent of the lengths of their sides; of the angles formed by their sides; of their curvatures; materials and surface treatment; and independent of their scale in relation to any element of reference or to any given environment. Misinterpretation of these variables undoubtedly will transform a potentially valid visual event into an actual visual offense.



UNITS OF HYPERBOLIC PARABOLOIDS—THEIR POSITION IN SPACE

The structures described in the accompanying plates are based on the combination of four-sided warped surfaces, which are portions of the boundless surface of double curvature, called the Hyperbolic Paraboloid. This surface either can be generated by the translation of a given parabola, parallel to a xz-plane, along any given parabola contained in a yz-plane, or by the displacement of a straight line called a *generatrix*. Such a generatrix is displaced parallel to a plane director, along two nonplanar straight lines, called *directrices*. Thus, the Hyperbolic Paraboloid is a ruled surface of compound curvature. This curvature usually is described as negative curvature, because the focus of each curve is placed at different sides of the double-curved surface.

The small portions of the Hyperbolic Paraboloid previously mentioned can have any position in space, depending on the position in space of the particular Hyperbolic Paraboloid to which they belong. There are three typical positions which a Hyperbolic Paraboloid may have, related to orthogonal planes of reference.

In an attempt to describe these typical positions, each of the four accompanying figures presents the vertical, horizontal, and third projections of a Hyperbolic Paraboloid containing a given unit. For clarity, in the figures the boundless surface of the Hyperbolic Paraboloid has been limited by a circular dotted line. In each figure, the vertical projection at upper left shows the front view of a Hyperbolic Paraboloid with a *unit* limited by four straight line *generatrices*. The horizontal projection, at lower left, shows only the plan of the unit with its two sets of *generatrices*. The third projection, at the right, shows the lateral view of the Hyperbolic Paraboloid containing the same unit.

FIRST POSITION: The Hyperbolic Paraboloid has its Z axis parallel to the planes xz and yz. Under this condition each set of *generatrices* is horizontally projected as *parallel lines*.

SECOND POSITION: The Hyperbolic Paraboloid has its Z axis parallel only to one plane, either xz or yz. Under this condition each set of generatrices is horizontally projected as *non-parallel lines*.

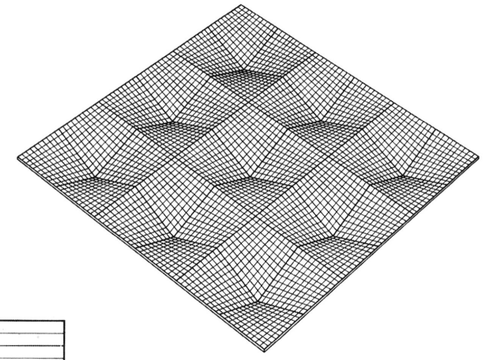
THIRD POSITION: The Hyperbolic Paraboloid has its Z axis non-parallel to either plane xz or yz. Variation A: When the Hyperbolic Paraboloid is inclined along a plane parallel to one of either set of *generatrices* (Plane Director), only such a set of generatrices is horizontally projected as parallel lines. Variation B. When the Hyperbolic Paraboloid is inclined in any position other than the examples previously described, both sets of *generatrices* are horizontally projected as *non-parallel lines*.

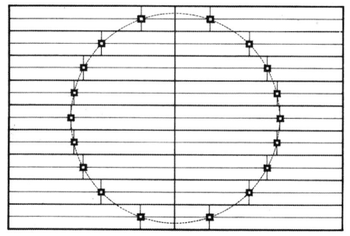
Generalizing then, it can be said that the degree of parallelism shown by the horizontal projection of the generatrices indicates the relative position in space of the mentioned *units*. The closer the parallelism among the generatrices of each set, the more vertical is the Z axis of the Hyperbolic Paraboloid that contains the axis.

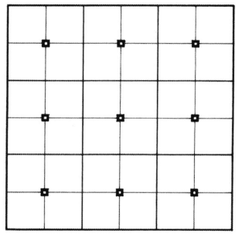
This degree of verticality of the Z axis has paramount importance in the determination of the values of the internal stresses developed within each unit. Structurally speaking, a Hyperbolic Paraboloid performs more efficiently with its Z axis parallel to the forces impinging upon it, which are fundamentally vertical ones.

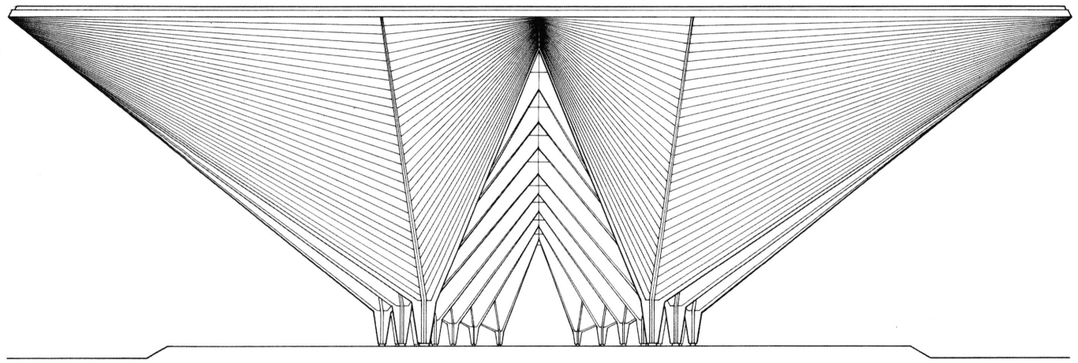
The reader, by observing most of the plans of the following plates, can easily determine, through the varied degrees of parallelism among the generatrices of each set, how inclined the Hyperbolic Paraboloid to which the unit belongs, is. Through awareness of such inclination, we can determine how close the unit is, to the ideal position in space, described in the First Position.

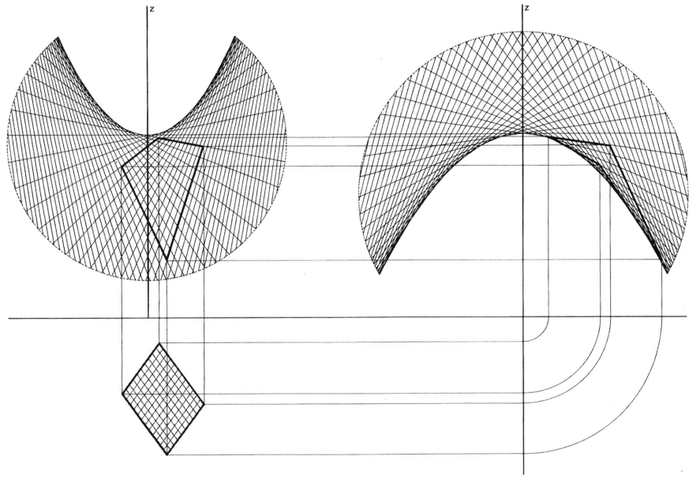
Structures designed by combining units belonging to Hyperbolic Paraboloids with Second or Third Positions in space have not been frequently used, perhaps because a more complex stress analysis than the one required for the First Position is involved; and also because Hyperbolic Paraboloids have not yet been studied long enough to discover all their structural, three-dimensional, and architectural possibilities.



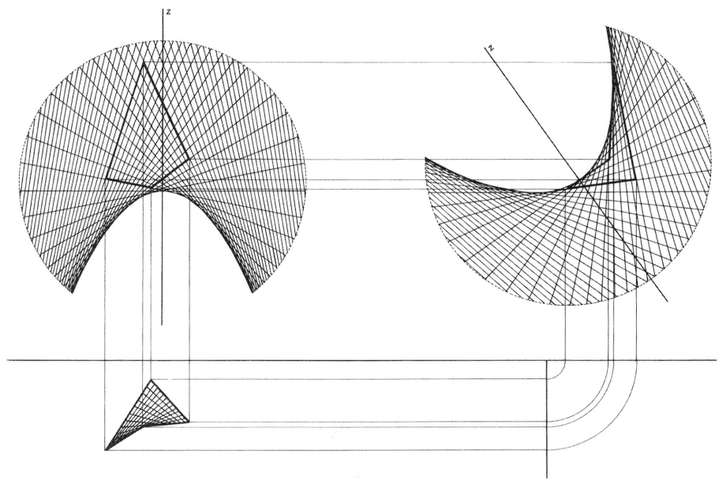




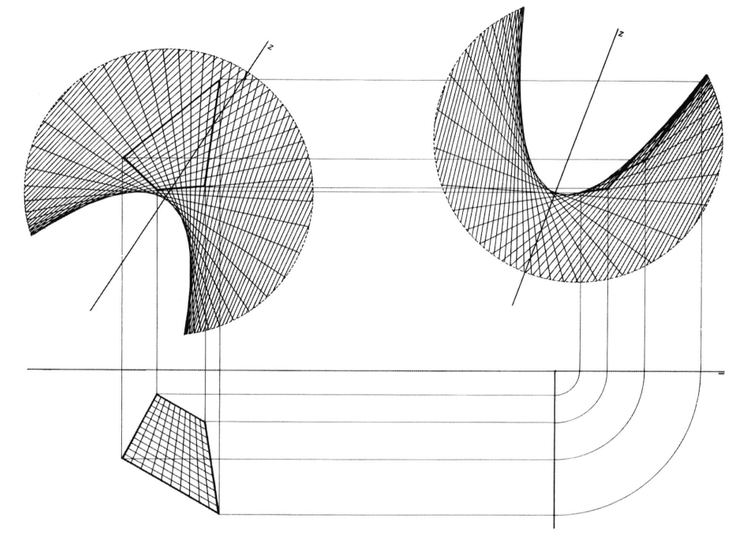




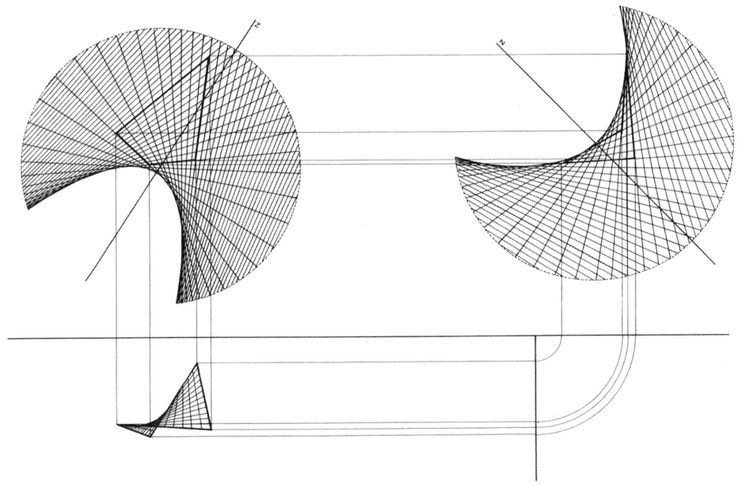
First Position



Second Position



Third Position—A



Third Position—B

REINFORCED CONCRETE SHELLS

Felix Candela

The Spanish-born architect Felix Candela, who practiced extensively in Mexico and also internationally, was a pioneer in the design of thin shell concrete structures and in methods of mathematical analysis. The text presented here is the introductory part of a much longer article; most of the remainder details his techniques of structural analysis.

The construction of curved laminar structures of reinforced concrete has experienced a notable increase in the last ten years. Judging from the considerable number of projects appearing in professional journals in which such structures are employed, the growing interest that its constructive and esthetic possibilities has awakened is clear. Nevertheless, the interest of architects and engineers in this type of construction has not been preceded, nor even accompanied, by the discovery or natural evolution of trustworthy methods for the stress analysis of such structures and even less of methods sufficiently simple so as to regulate their application so that they can be used by the non-specialist engineer. Both the design of such structures and the previous choice of their form and disposition are generally made in a somewhat arbitrary manner because of the lack of a body of doctrine available for general knowledge. This obliges those who have devoted their efforts to the investigation and construction of laminar structures to try to examine publicly the present state of the problem of their design and especially to circulate knowledge as to the reasonable possibilities of execution of the different forms known and the conditions that must be fulfilled for new forms that may be proposed.

Among the various points to which I will be referring in the course of this article, the following should be pointed out:

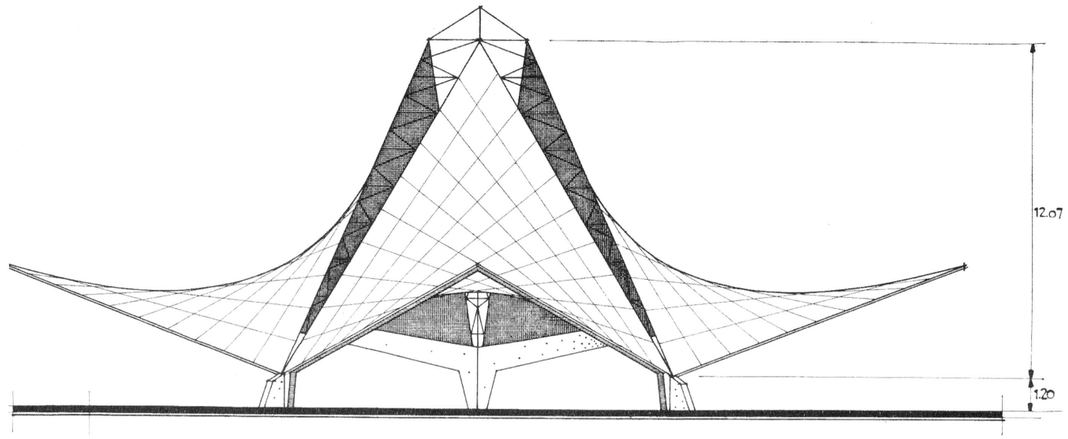
a) The problem of form in relation to structural behavior and the present possibilities of calculation.

b) Limitations imposed by the necessity of calculating the stresses previously and by the economic condition that the cost of the calculations must not exceed a small percentage of the total cost of the structure; the practical impossibility of making an exact analysis for all the possible cases of load.

c) Influence on the project of the size or scale of the structure.

d) Difficulties and inconveniences of analysis by means of tests made on reduced models.

Under the name of the "shells" are usually grouped a series of structural forms whose structural behavior differs essentially, however, from one type to another in accordance with the shape of the surface. An adequate definition of what is to be understood by a so-called "shell" would help considerably to avoid confusion and constitutes the first step in any explanation of a general nature.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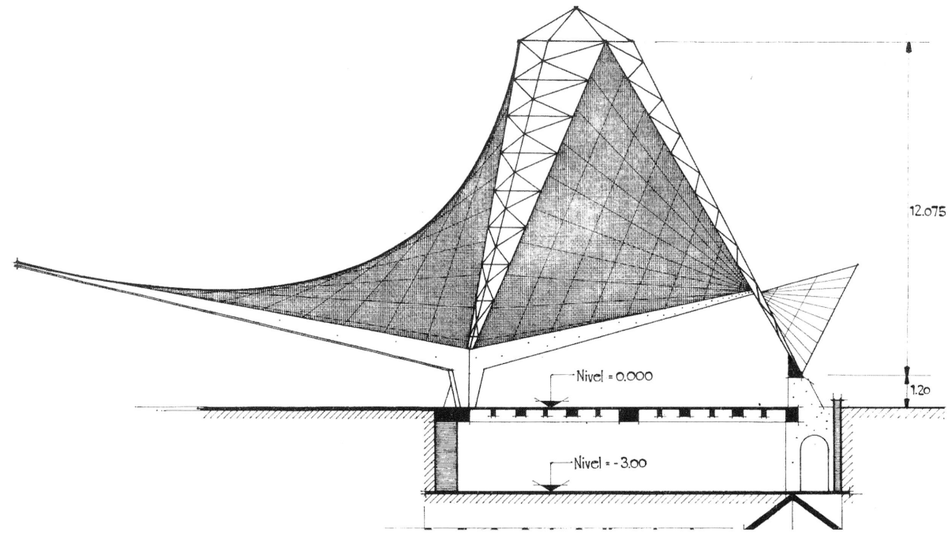
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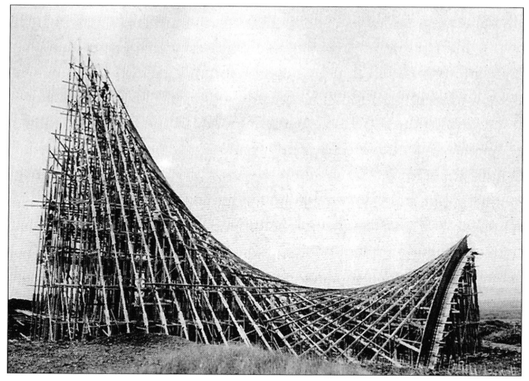
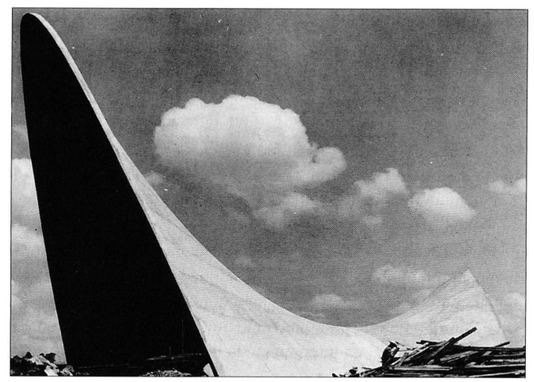
It would be clearer, in my judgment, to use the general name of "laminar structures" for all those structures in which the thickness is very slight in relation to the other two dimensions and to restrict the use of the term "shell" structures to those laminar structures which would be capable of working, under normal load conditions, with membrane stresses only; that is to say, without bending stresses. Let us call "membrane stresses" those that are uniformly distributed in the laminar thickness and act parallel to the plane tangent to it at any point.

One essential condition to prevent bending is that the surface which constitutes the shell be of a double curvature; that is to say that it has a geometrically immutable form as long a considerable lengthening or shortening is not induced. With the relatively inextensible materials that are used in construction, with reinforced concrete particularly, such longitudinal variations are possible only when the membrane stresses (of compression or tension) reach very high values which exceed the elastic limit of the material. This means that if it is possible to analyze the membrane stresses that are produced in a shell structure and if the resulting stresses do not exceed admissible values, bending that would have to be accompanied by change of form or of curvature of the surface cannot appear; and it is not necessary, therefore, to go back to the general theory of bending for the study of the structure. It is curious to observe the fact that the majority of theoretical studies do not seem to take into account the properties or characteristics of the geometric shape nor the practical impossibility that there may co-exist in the elastic range bending and membrane stresses. So that bending may occur in the elastic range the membrane stresses must have surpassed the elastic limit and be acting in the plastic range; and, therefore, the whole precious mathematical artifice of the general theory of bending falls apart.

An intuitive demonstration of the preceding can be obtained by considering a revolution dome with loads parallel to its axis and symmetrical around it. So that bending or changes of curvature in the meridians can appear, for example, it is necessary to shorten certain parallels and lengthen others. Observe also what happens upon trying to produce a dent in a sphere by applying a concentrated pressure at some point. It is necessary in this case for the surface immediately around the spot of application of the pressure to lengthen concentrically to allow a surface of greater area to pass through. This is perfectly possible in a rubber ball which is made of a very extensible material but cannot occur in one of concrete until the tensile stresses along its circumferences have exceeded the elastic limit of the material.

In summary, it can be said that a surface of double curvature, completely flexible but not extensible, has an immutable form under the action of any loads. There is no purpose, therefore, in trying to extend the funicular concept to surfaces, attempting to shape them in accordance to the distribution of permanent loads and giving rise to surfaces called "velarias" or "anti-velarias" (the shape of sails). An arch, which is a lineal structure, can only work with direct or membrane stresses, without bending, when its form coincides with the funicular of the loads, but a surface structure of double curvature develops only membrane stresses under any system of loads. This is a property that nature makes use of since all natural shells, and particularly those of stony materials like an egg or a snail, use forms of double curvature. Since it is not necessary in this case for the surface to have any resistance to bending, its thickness can be reduced to the minimum economically or practically possible, obtaining in this way the two fundamental advantages of this type of structure: reduction of its own weight and the possibility of adapting itself structurally to cases of unforeseeable loads without ceasing to behave as a membrane…Keeping in mind that such behavior is fundamentally more economical than that of bending, since stresses are shared uniformly in the section, double curvature surfaces are the most interesting from the structural point of view and the only ones that should be called shells.





A THEME CENTER FOR A WORLD'S FAIR
TWO SURFACES OF REVOLUTION

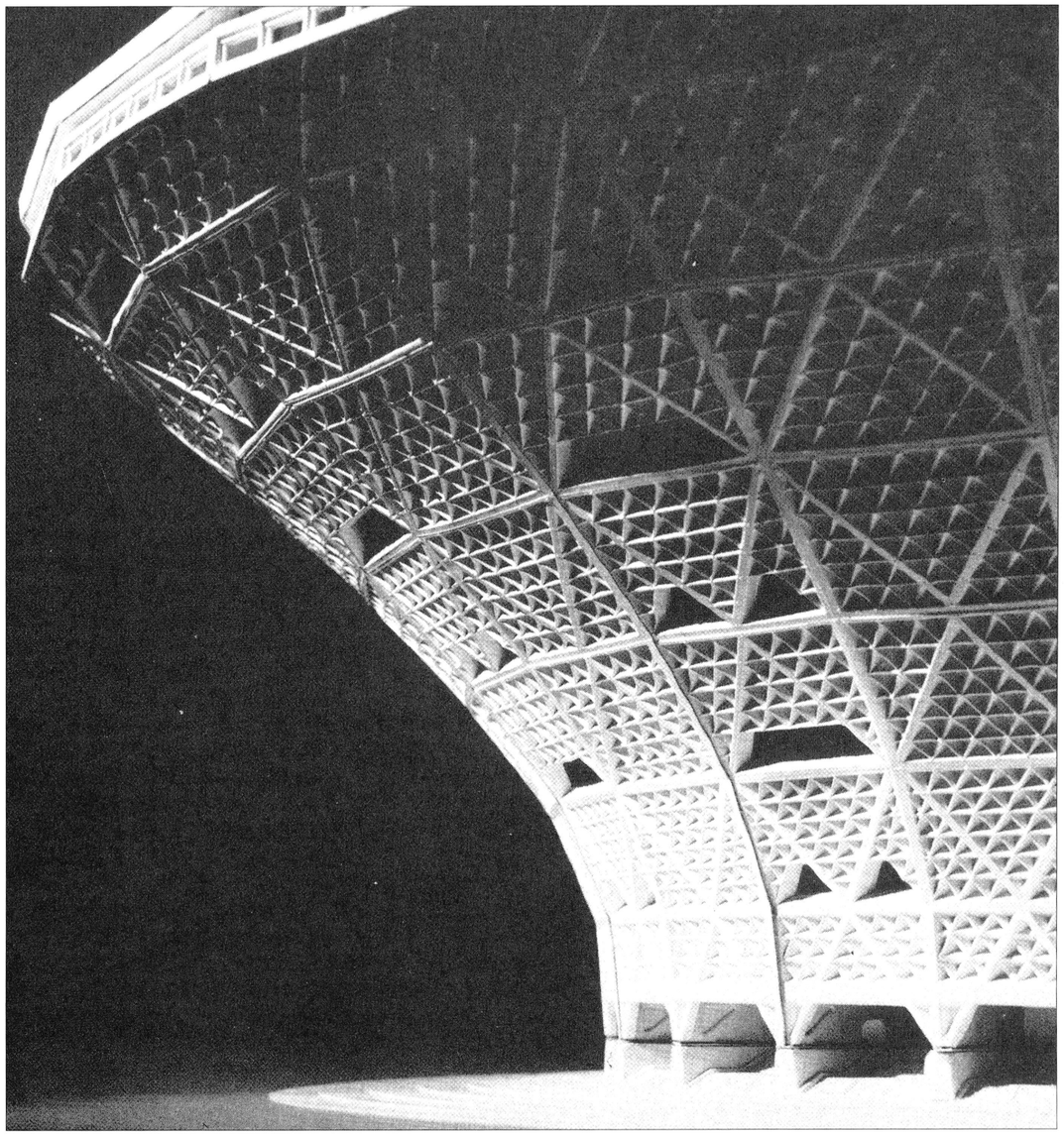
Horacio Caminos

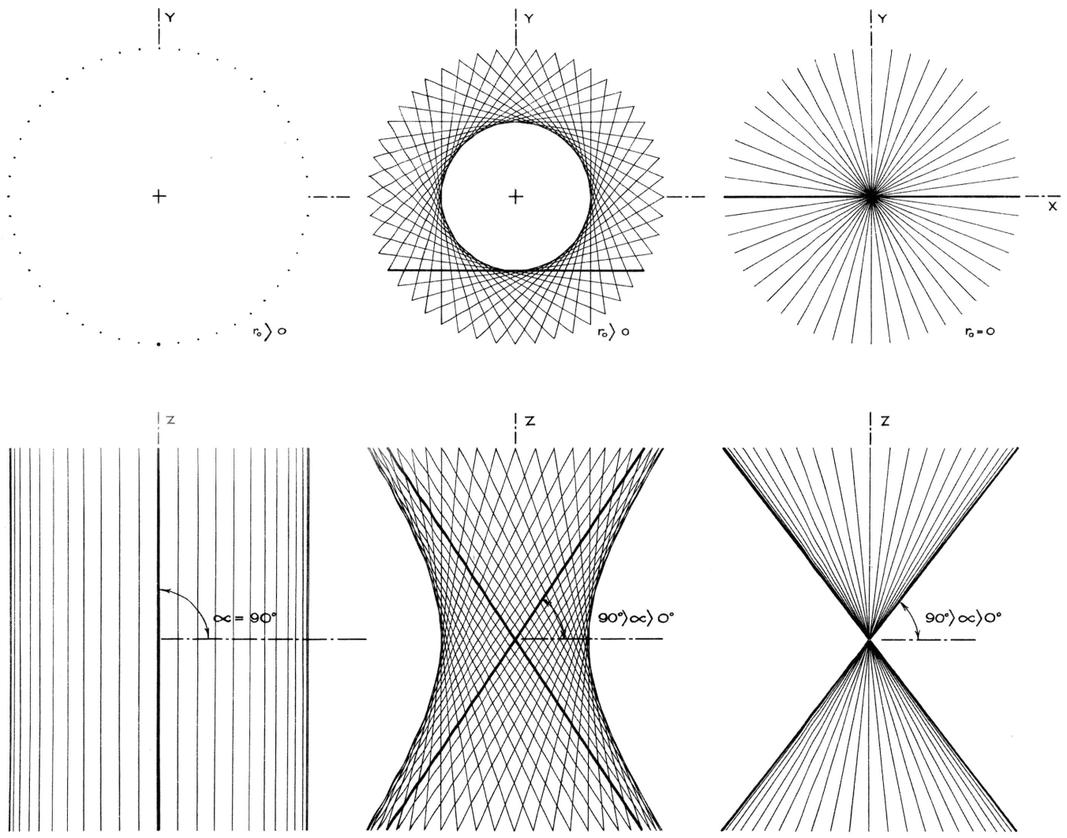
Horacio Caminos, a legendary professor of architecture at the School of Design from 1952 to 1961, initiated this remarkable study which became the vehicle for an architecture studio project in 1960-61. Caminos also had faculty positions at the University of Tucuman (Argentina), The Architectural Association (London), and The Massachusetts Institute of Technology.

Two studies of different nature are presented here. The first one is a schematic description of a building for a World's Fair which attempts to formulate a set of questions and to evolve a set of assumptions. It includes three similar projects that are variations of the same basic limitations. They are recorded in notes, drawings and models.

The second one, on the hyperboloid and torus, is an elementary compilation of geometrical information about two surfaces that may have application in the construction of buildings. It was prepared mainly with the purpose of determining different manners of dividing the surfaces and subsequently of defining them with linear straight segments. In both cases the simplest method of plane sections was used. The presentation of the two surfaces follows the same sequence: a brief description of their geometrical properties as well as some algebraic expressions; generation; plane sections; rotation and translation of these sections; division of the surfaces in triangles and/or diamonds. At the end of each set of drawings a few photographs are included showing the generation of the surfaces by rotation of lines and planes. The last technique of study and representation deserves indeed a more thorough consideration than the one given on these pages.

These studies are presented together because they were contemporarily developed as parts of one problem. They retrace a long, although sporadic, period of incubation. They were sketched at length during the spring of 1959. It was not until the fall of 1960 that they had the opportunity to be prolixly developed with the cooperation of the students of the Fifth Year Architectural Design Course. Finally, models were completed during the summer of 1961.

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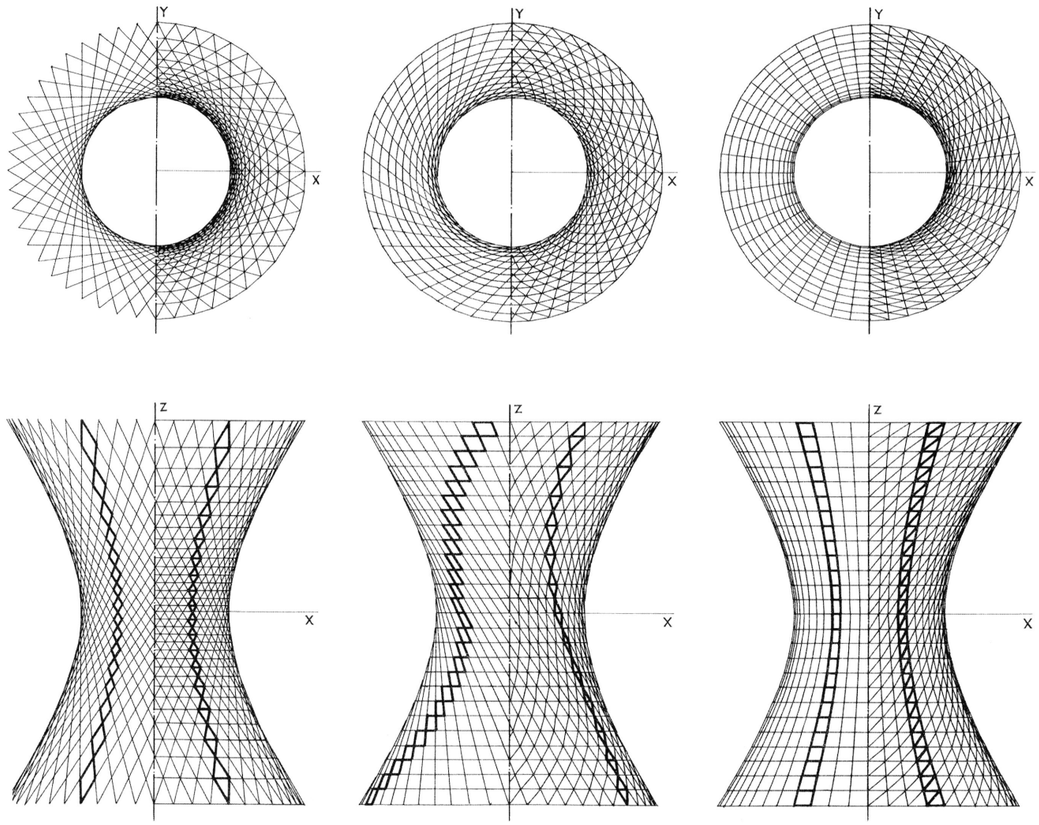
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VOLUME 11.2

SOME CONSIDERATIONS ABOUT STRUCTURAL ARCHITECTURE

Pier Luigi Nervi

Pier Luigi Nervi, a visiting lecturer at the School of Design in 1956, here explores the realm of structural architecture, which he believes is in need of a clear definition. He states that there are three essential conditions, and in expanding on these conditions he makes positive contributions toward an approach to the means, methods, and ends of architecture.

The following lecture was delivered by Mr. Nervi on April 10, 1961, at The Massachusetts Institute of Technology for its centennial celebration and was published by permission of the author.

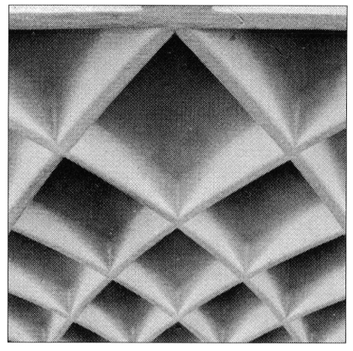
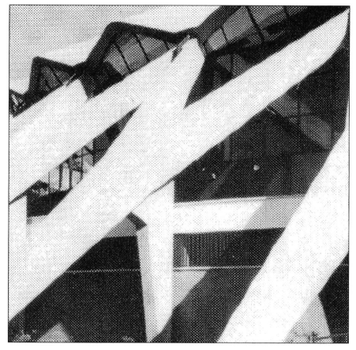
In the last few decades, the ever-increasing sizes needed for the most representative buildings of our time have brought to the forefront the problem of their structure. In many cases, structure has become a factor of such formal and dimensional importance as to become the main protagonist of its architecture. It may, therefore, be interesting to examine certain characteristics of the structural problem and try to define the basic concepts underlying true structural architecture.

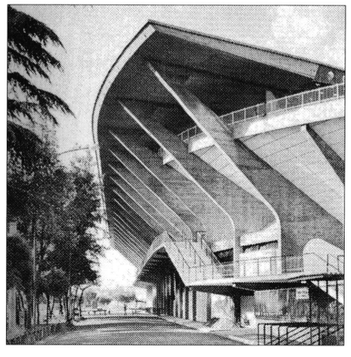
Structural architecture as we see today, or as we may expect to develop in the near future, has not many examples in history until about the middle of the Nineteenth Century. In fact, the only example of true structural architecture—that is, of structure which is visible from both outside and inside and is the determinant of architectural design—is the Goth—more precisely the great Gothic cathedrals.

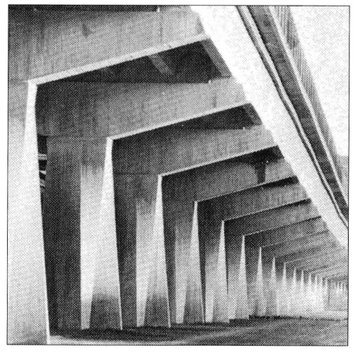
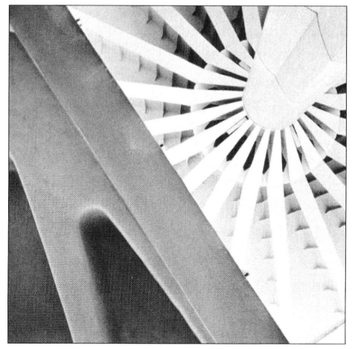
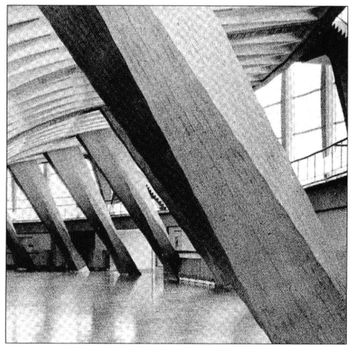
The great masonry structures of the Roman period cannot be defined as true examples of structural architecture because of the static nature of the masonry bulk and of its planimetric disposition, which prevent the structure from becoming apparent either outside or inside. In fact, if we look at that wonderful work of art which is the Pantheon in Rome, we do not find any element either internal or external which may reveal to the onlooker the method by which the balance of mass was achieved nor how thick the walls might be which gave it equilibrium.

With the advent of the Renaissance and the return of to the construction methods of Roman times, great masonry structures were erected, but none of them were in any sense real structural architecture. In fact, if we observe the interior of that extraordinary architectonic monument, which is St. Peter's in Rome, it is easy to see how the decorative elements not only are not deriving from structural reality but in many instances they display structural themes which have nothing to do with reality.

I believe, therefore, that it is desirable to give a definition of the essential characteristics of real structural-architecture. A clear definition seems, to me, very important, because in recent architectural critiques we find real confusion of terms. Structural architecture is confused with false or merely formal structural systems.




I believe the essential conditions of structural architecture to be as follows:

1. It must give a convincing answer to a real and authentic static necessity and be determined by it.
2. A static constructive scheme should become visible and comprehensible inside and outside.
3. It must express frankly the material with which the structure is executed and find in the technological characteristics of the material itself the sources and ways, as well as the details, of its architecture.

The first condition refers to the effective presence of a static problem of such nature as to demand a great resisting system and to the fact that it becomes visible and comprehensible to the person looking at it. Structural architecture needs great dimensions. This is important to remember; sometimes one sees structural solutions of very slight, static importance, such as little projections, small doors, or short spans, designed in a way which would require much greater dimensions to be right. The result is that we receive an unpleasant sensation which is similar to a caricature of something which is important and worthy of respect.

Similarly, from my point of view, we cannot define structural architecture as those works in which a formal idea is developed almost as a piece of sculpture of limited scope in itself but blown up many times in size through technical acrobatics and pretending to acquire architectonic definitions and functions.

True structural architecture is the result of a dialogue between the designer and the natural laws which regulate the equilibrium between forces acting upon a material and its capacity to resist them. The severity of this equilibrium defines the tone of the dialogue and its conclusions.

To design a structural architecture means to translate in intuitive terms or through mathematical calculations an equation posed by natural laws in such a way that the results are understood even to the layman, who more or less consciously must evaluate the essential lines and derive from them a sense of satisfaction. It is in fact true (and it is proven by the wonder intuition of all great architects and of the very good workingmen) that even the layman possesses intuitive aesthetic sense, which may be confused as to its essence but gives him nevertheless satisfaction as he contemplates a structure correctly designed.

Even more difficult, just as one tries to define beauty, is to tell on what elements the aesthetics of a structure rest: that is, when does a structure become beautiful architecture? I believe that the conditions of beauty are always found in harmony of proportions, in the loving care of details, and also in the expressiveness of the elements or forms which are derived by the correctness of the assumptions.

An eloquent example of this is given by one of the most beautiful bridges by Maillart, in which the characteristic profile of the three-hinged arch is exalted probably beyond its static necessity.

As to the third condition, that is, on the appropriate use of the material which gives static substance to the structure, it seems to me so evident as not to require any special comments. More interesting is to observe that the details which provide the aesthetic expressiveness of the structure must consciously meet the special technological characteristics of the material itself. In other words, each detail of construction must be in accord with the special quality or characteristic of the material and from this accord will result architectural effectiveness. It is enough to study the Gothic buildings to value the importance of this condition. The small details, even the decorative ones, are the result of the conditions of workability or static function of the stone itself and in such a way that it is difficult to separate in the creative act the technician from the artist.

In the last few decades, structural architecture has reached a more rapid and promising development, mostly because of better use of concrete, of new technologies in welded steel, and in the very promising aluminum alloys. There is intrinsic beauty in aluminum; it has qualities resembling those of steel, and through extrusion one can obtain shapes of very large dimensions and of any desired profile; it possesses resistance to atmospheric agents and offers a wealth of opportunities for creative structural architecture.

It is impossible for me today to examine, even briefly, all these fields of which we see every day new and ever more expressive examples. I will limit myself to some reference to concrete structures. This marvelous material, which is without precedent in the history of construction (stone made by man and capable of resisting tension), possesses the great quality of not having a specific form of its own but of being ready to assume any form one wishes to give it. As a material, it possesses all the characteristics needed to become the great protagonist of present and future structural architecture.

With concrete, the problem moves from the material itself to that of the forms which contain it. And if we are able to solve the problem relative to its execution—and we have now many means to do so—we can reach almost complete design freedom. Floor beams can assume special shapes, determined by the static demands, or they can be so disposed along curves corresponding to the preferential lines of internal stresses so as to completely fulfill all physical demands. The main structural

elements may thus lose the rigidity of wood or steel beams and assume forms which express in a disciplined way the static lines of stress.

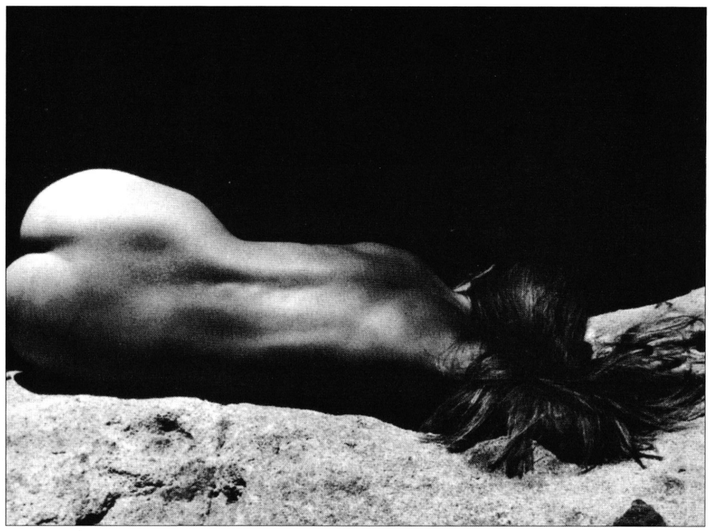
The main goals of the last few years have been to establish proper construction techniques and to perfect the details so as to obtain surfaces which are aesthetically acceptable. Now the technological potentiality of concrete is such that as a method it is ready to solve any problem of structural architecture.

If we consider the near future, it is easy to observe that because of the need for progressively greater dimensions in construction, structural architecture has a great future in important buildings. We must not, however, hide a grave danger, to which I have already alluded and which from my point of view seriously threatens structural architecture. It is the temptation of searching for arbitrary forms—for forms based on false structure, which then become untrue and merely superficial architecture.

Obviously, I don't have the time to fully enter this argument; but I beg those who are interested and are active in this wonderful field of structural architecture to consider this certainty of mine: namely, that beauty, or to be more accurate, architectural expression of a structure, cannot be achieved without a correct static solution—that is, a solution which is natural, economical, intuitively conceived, and intuitively understood. Formal acrobatics which today are made possible by technical acrobatics may give a momentary sense of awe, but never produce the serene, lasting satisfaction given by a harmonious equilibrium made comprehensible. Structural architecture must grow from the very specific necessity of the theme of the existing matter and conditions. The exterior form is the result of this joining of necessity, of meeting physical laws, of rejecting fashionable and superficial ideas. It is only by responding to physical laws that a form avoids the merely fashionable. A good structure is beyond and above the changeable trends of taste. But this is not enough. The ever-greater sizes of architectural works will demand an ever greater adherence of their structure to static laws and to the various necessities of construction in the same manner in which high speed determines the forms which have to move at such speeds.

Mankind is discovering in many ways and in many fields that new forms which are imposed by physical laws cannot be modified by whim. All this means that we are moving towards greater obedience to natural laws; the great bridges, the jet planes, and other machines which generate and use powerful dynamic forces are very eloquent examples of this truth.

If my conclusions are right, we are witnessing the birth of a style based on truth, inspired by natural forms, characterized by purity of lines, by functional clarity common to all human endeavors and which being anchored to physical laws will evermore evolve towards a more complete final truth. Isn't this a marvelous promise?



1963: CITIES

Volume 13.1,2 The City: Form and Intent

Introduction: The Enjoyment of Cities

Albert Bush-Brown

The distinguished educator, historian, and academic leader Albert Bush-Brown contributed this evocative introduction to one of The Student Publication's *most ambitious undertakings. The relief models of fifty city plans all to the same scale, four of which are reproduced here, were produced by architecture students under the direction of visiting assistant professor Richard Saul Wurman.*

A city, considered culturally, is a state of mind. It is the locus of the social posture we call urbanity, compounded of local usages in speech, dress, gesture and belief as well as universal, cultural pursuits in the arts, sciences and commerce. Urbanity has a material sustainer, the civic organism, which is the physical pattern printed by the social relationships people establish in a particular place. Some places are resilient and mark their own character, as at Assisi, Athens, Avila, Pergamum and San Gimignano. Others receive the geometry of a Timgad, Washington or Aigues Mortes without distorting it. But most cities, and all the great ones, enable nature or geometry to come and go, to dominate in some areas but not in others. Any plan that suggests a different organism is either a jungle and hayfield, not a city, or a rigid procrustean bed.

No wholly perfect city exists, and none ever existed. At various times, some cities have come close to perfection. London in the eighteenth century, when its residential squares and terraces, parks, markets, churches and clubs had not yet been obscured by urban decay, commercial gargantuism, rail and auto congestion, and the mosaic of ugly housing and factories, seems better than it is now. Cities are not static things. Before one pattern of settlement crystallizes, new constellations of space and mass emerge. The urban process of demolition, construction and changing occupancy prevents the city from being a work of art as manageable as a poem, a painting, a building or a symphony.

Still, a city regarded as physical art offers many levels of enjoyment. Intellectual satisfactions lie in knowing a city in process, sensing its tempo as it awakens in the morning, beds down at night; in knowing the complex financial exchange at New York; in following the movement of ship, train and truck in New Orleans; in studying paintings in the Prado or Rijksmuseum; in witnessing opera at La Scala; in studying at Oxford or Cambridge; in seeking fine wines and food in Paris; in following international destiny at the United Nations Headquarters.

By far the most immediate appeal of cities arrives through the senses, particularly sight. The eye records strong images: nun's hats spread like windmills before the west front of Amiens Cathedral; vegetables at Les Halles in Paris; searchlights playing above St. Paul's in wartime London; Manhattan under a full moon seen from the air over the Hudson; the streets of licensed bordellos in Antwerp; the thousand-foot drop over stone terraces from the Inca's Machu Picchu.

A sophisticated eye records such sights as parts of a greater urban vessel, the network of spaces. There are broad allees leading to distant monuments, as at Paris; there are large, enclosed plazas like the court in the Ommayad Mosque at Damascus. The pattern of space and enclosure, of restriction and invitation to movement, is the source of pleasure or displeasure we find in cities.

Special visual attention is drawn to critical points: to the gateways, such as ports, stations, tunnels, bridges, walls, interchanges—whether we emerge in the teeming subterranean market under Pennsylvania Station or vault over the Golden Gate into San Francisco. Approached from the north Philadelphia draws us over rustic drives along Wissahickon Creek and the Schuykill River to the Art Museum whence a formal boulevard with classical buildings flies like an arrow diagonally across the grid to the City Hall at the heart of the City. The skylines of cities are distinctive, and the memorable ones like New York's Battery, Florence's from the Piazzetta Michelangelo, or Istanbul's dome-crested profile, are indelible. What one sees in its spaces, gateways, skylines, groundlines and waterlines forms the theater where a city's people act out their special urbanity.

Cities also have distinctive sounds. Now, noisy motor scooters seranade Rome where Baroque fountains splash and, formerly, sacred geese honked on the Capitoline Hill. Boats complain as they ply the fog-shrouded Thames. Cities have different tongues, so we know when we reach Brooklyn, Charleston, or Quebec. We recall muezzins' echoing each other from minarets throughout Istanbul, the auctioneer's babble at Greenville, priests' chanting in Burgos Cathedral, impetuous threats of jostling rickshaw boys in Hong Kong, the primeval silence of burdened porters climbing hills in Cuzco.

Cities have distinctive smells and touches. The acrid pall that hangs over Hoboken has a trenchant power of recall, as have the odors of fish on Commonwealth Pier at Boston, or the fragrance of Viennese gardens at Schonbrunn. Touch recalls the dampness of Munich's churches, the polished toe of St. Peter's statue in the Vatican, the cobblestones of Antwerp, brick herringbone walks of Boston, worn steps at Mont St. Michele, and those memories are part of the aesthetic enjoyment of cities.

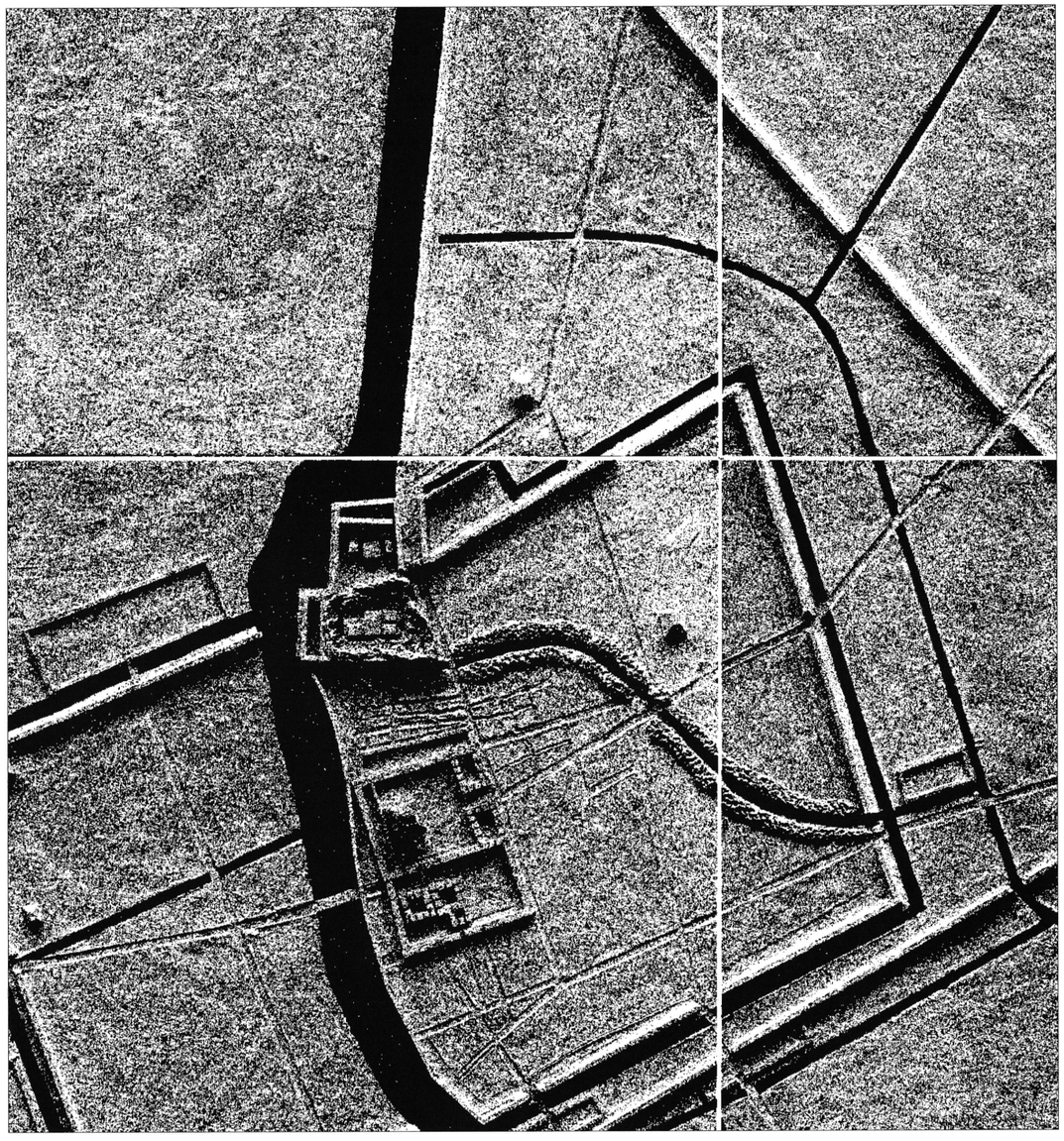
That we need a city used as a forum, each day's newspaper proves. With rare exceptions, no large city has had a reform movement to improve its total cultural and civic life in more than sixty years. The city so fortunate as to harbor a university takes no cues from the campus. Yet, the shaping of urban environment is the biggest challenge to our political and cultural future.

1. ***Babylon Ka Dinger***
(Sumerian—Gate of God) neo-Babylonian
Bab llu (Akkadian) Bab-llani situated on the Euphrates, Mesopotamia, present Iraq.
Founded ca. 3000 B.C. flourished under Hamurabi in 2100 B.C.
Rebuilt in 6th Century B.C. by Nebuchadnezzar.
Destroyed in 7th Century B.C.

2. ***Miletua Present Buyuk Menderes***
Caria Ionia
Near mouth of Maeander, present Turkey.
Founded ca. 1000 B.C.
Rectangular grid plan attributed to Hippodamus, it was ancient seaport to West Asia Minor, sacked in 494 B.C. by Persians. Remained Port until harbor silted up in early Christian era.

3. ***Amsterdam***
North Holland Prov. On the Ij at the mouth of Amstel River, Netherlands.
Founded ca. 1200 first mentioned 1275.
World Trade Center 17th Century.

4. ***Philadelphia***
Pennsylvania
Founded 1630, 1682 as a Quaker Colony by William Penn USA.
First occupied by Lenni-Lenape Indians.



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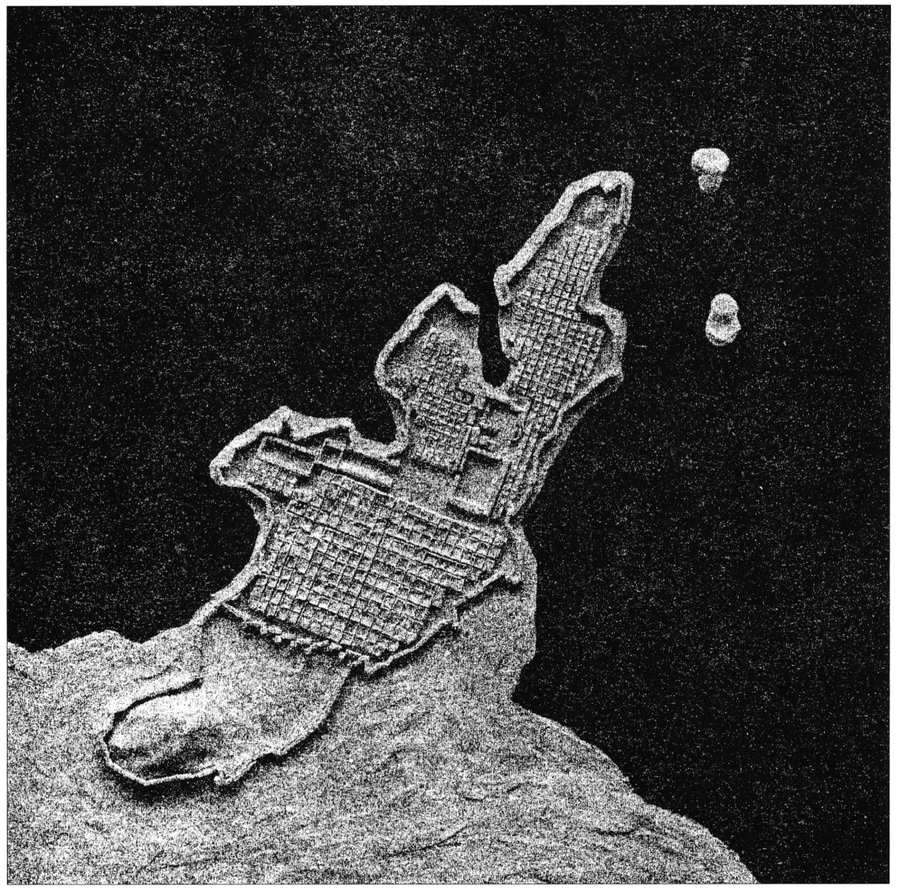

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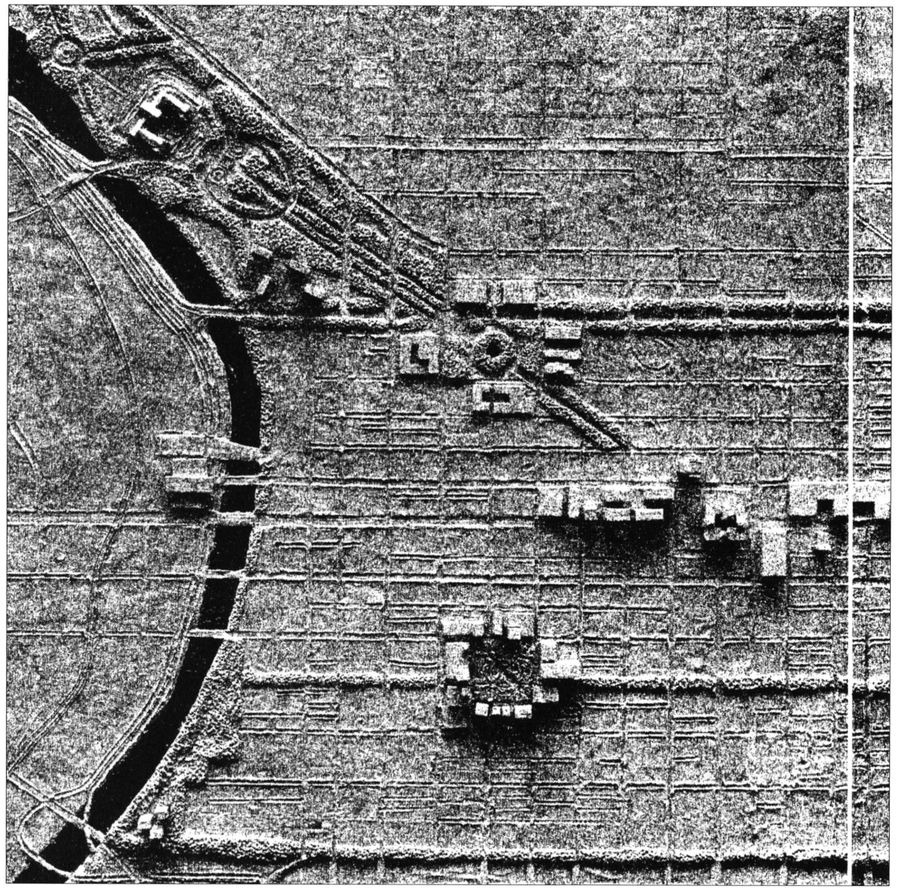

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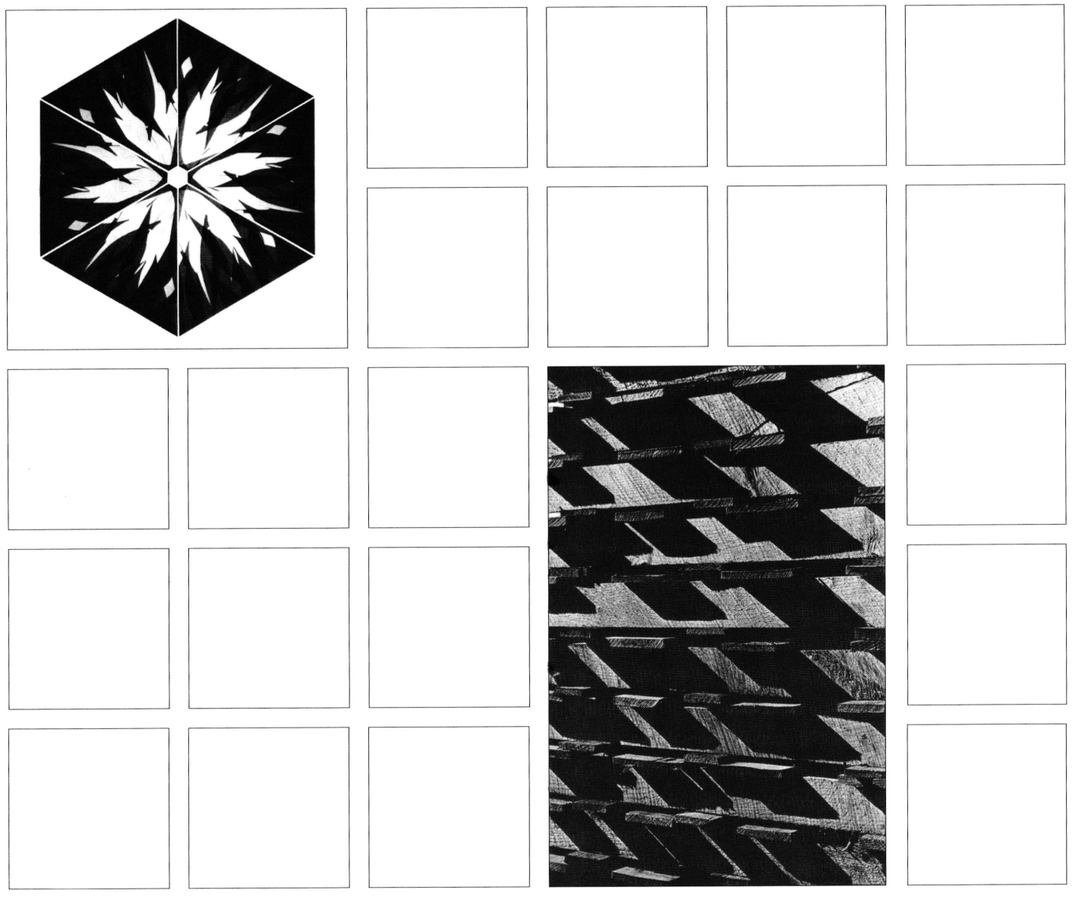
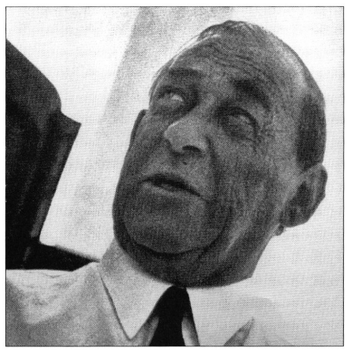


1964: Concepts

VOLUME 14.1

ALVAR AALTO



Vouksenniska Church is one of the churches in the Imatra community. Imatra is composed of several small residential and some larger industrial areas. It is a strongly industrialized area with cellulose, wood, paper and iron industries all of which are represented by the large and important firm of Enzo-Gutzeit Oy:s. This explains why they have shown a special interest in the church, even in the planning of it, because it must satisfy the special needs of an industrialized community.

The activity of the church in an industrial area is naturally given its form so that the main stress is laid upon the social activity of the church.

There are many different combinations of such church activity in the world—it is only a matter for regret that social demands have usually deprived church buildings of their character of public buildings. Very frequently they present the appearance of a conglomerate of settlement hotel, clubs for youth and the congregation, parish halls, and, connected with these, there are premises for a modest amount of real church activity.

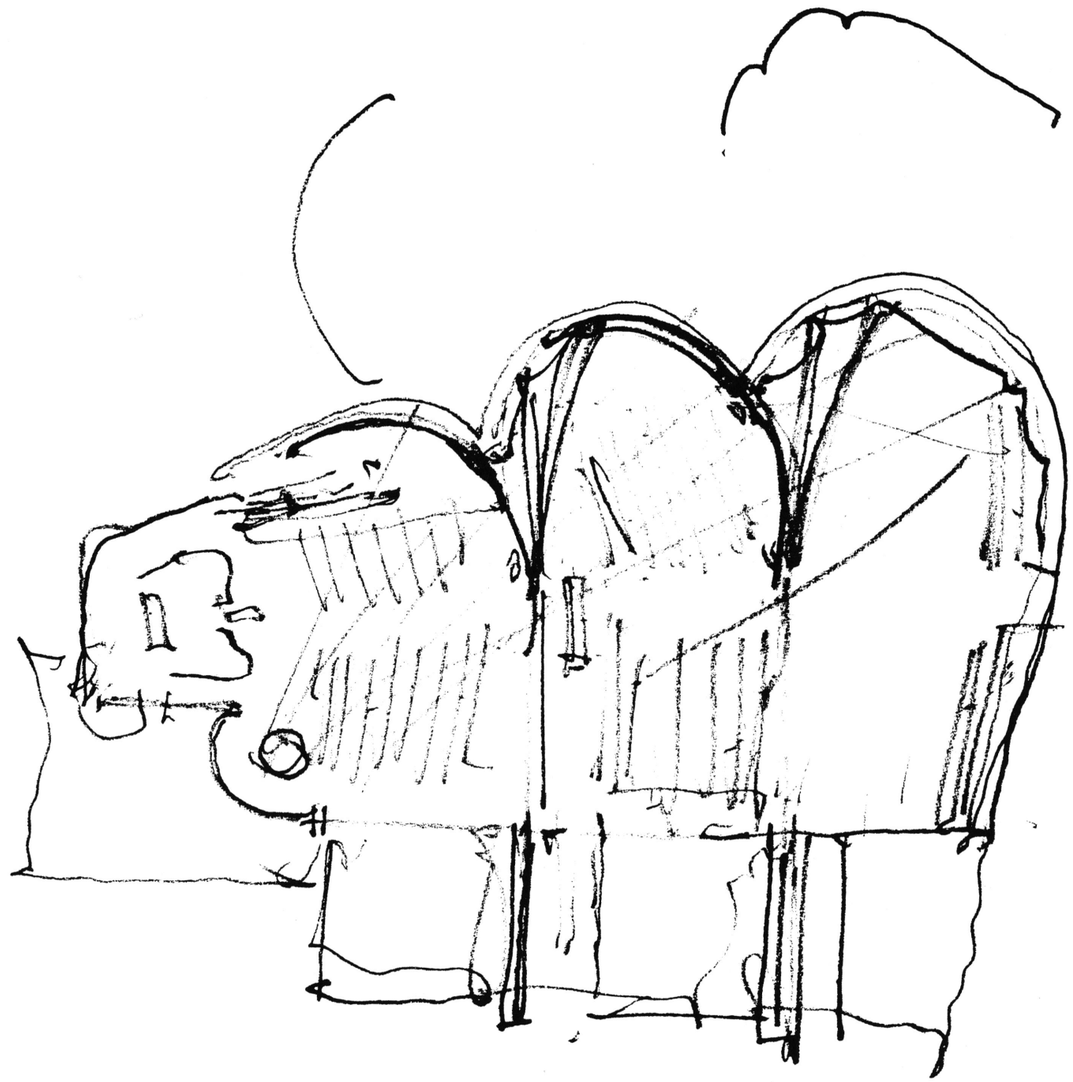
Thus, the fundamental concept of the church was that of a series of three halls following one another. These halls could be termed A, B and C: A is the actual hall of worship; the other two halls can be connected with it at need by means of movable walls. During the week, halls B and C are used for congregational purposes. Each hall accommodates barely 300 seats, A and B in conjunction 600, and if the three halls are joined together there are 800 seats.

The church halls are separated by movable partitions approximately 42 cm in thickness which slide on ball bearings in oil suspension, and according to their weight act as a complete sound insulator for the room. Some of these partitions are straight and some are curved. There are three architectonic requirements in a Lutheran church: the altar, pulpit and organ loft for the music and choir. All three are grouped in a triangular form in the main hall A. The altar being the most sacred element of the church, is placed in the center and the pulpit to one side. If we consider the sermon and its audibility as the most difficult problem from the standpoint of acoustics in a Lutheran church, this leads quite logically to an unsymmetrical disposition of the space of the church. The long wall set diagonally opposite to the pulpit has a much greater effect on the reflection of sound than the other walls. By means of correct shaping of this wall, the sound can be projected as advantageously as possible from the viewpoint of the congregation. The movable parts of the walls are connected to the bowed wall sections. Here, the architect had tried to solve two problems, of which one is more nearly of psychological character (the acoustic tone of the sermon) and the other purely technical in nature (an effective internal isolation of the church halls).

The materials used in the building are reinforced concrete, tile and copper for the roof. The tower is predominantly divided into three parts and is wider at the top than the bottom. Through this form, the architect has created an architectural image immediately identifiable among factory smoke-stacks which tend to dominate the surrounding area.

The tri-partite motif reappears in the church ceiling covering the three halls. The same motif is repeated in the altar in the form of three white crosses.

The church has five entrances altogether, one of which is isolated on the east side. This entrance serves the community gatherings and youth circles held in the church during weekdays. The architect has found it necessary to plan this entrance so that the other entrances serving the secular part of the church under no circumstances be disturbed.



VOLUME 14.2

LE CORBUSIER

Publier les croquis de naissance d'une oeuvre
Architecturale peut être intéressant
Lorsqu'une tâche m'est confiée, j'ai
pour habitude de la mettre au dedans de ma mémoire,
c'est à dire de ne me permettre aucun croquis,
pendant des mois. La tête humaine est ainsi
faite qu'elle possède une certaine indépendance : c'est
une boîte dans laquelle on peut verser en vrac les
éléments d'un problème. On laisse alors "flotter", "mijoter",
fermenter."
Puis un jour, une une initiative spontanée de
l'être intérieur, le déclic se produit : on prend un
crayon, un fusain, des crayons de couleur (la couleur est
la clef de la démarche) et on accouche
sur le papier : L'idée sort, - l'enfant sort, il
est venu au monde, il est né.

Jose Oubrerie a dessiné les plans. Paris 21 mai 64 L-C

TRANSLATION:

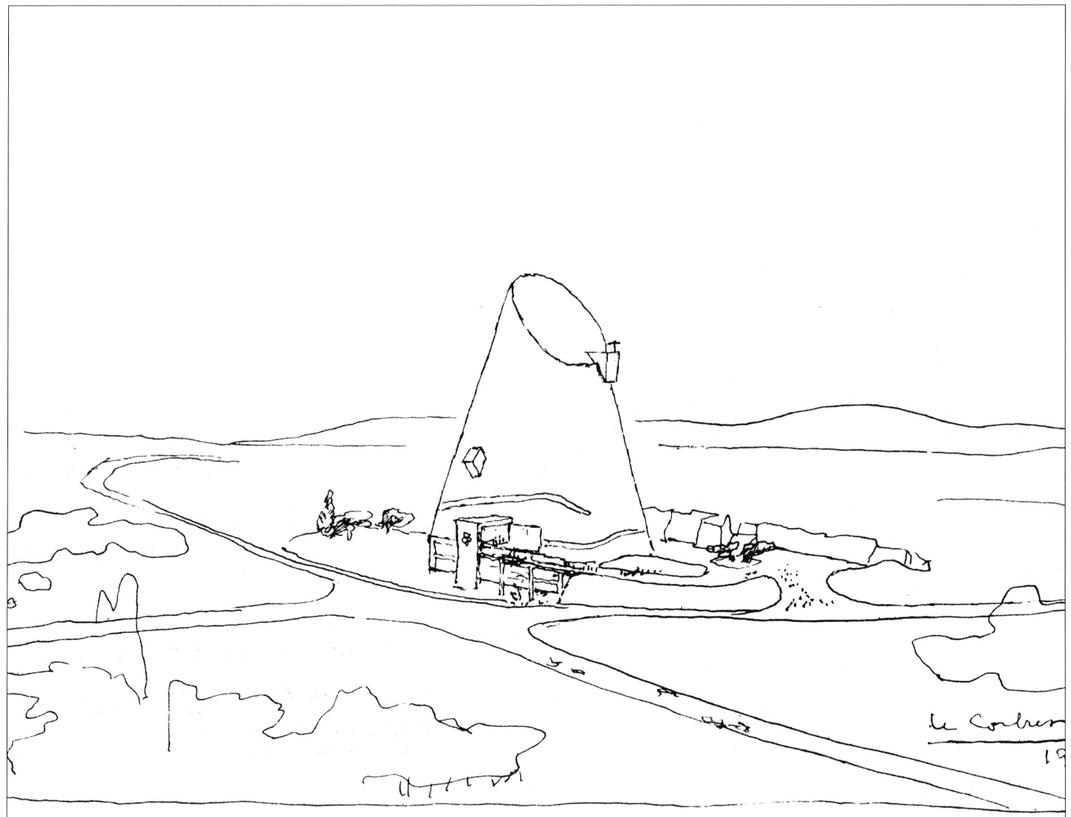
Publishing the sketches of the birth of an architectural idea can be interesting.

When a task is entrusted to me, I am accustomed *to place it inside my memory*, that is, to allow myself to make no sketch for several months. The human head is so made that it possesses a certain independence. It is a box into which one can pour pell-mell the bits of a problem. Let it "float," "marinate," "ferment."

Then one day, out of a spontaneous burst of the inner being the click is produced. One takes up a pencil, a piece of charcoal, a colored crayon (the color is the key to the course) and one gives birth on the paper: the idea comes forth—the child is born, come into the world. *It is born*.

Jose Oubrerie drafted the plans. Paris May 21, 1964

L-C



dans ce grand paysage naturel
en ~~este~~ ce lieu de croisée des routes

In this great natural landscape—on this site of crossed roads

VOLUME 14.3

LOUIS I. KAHN

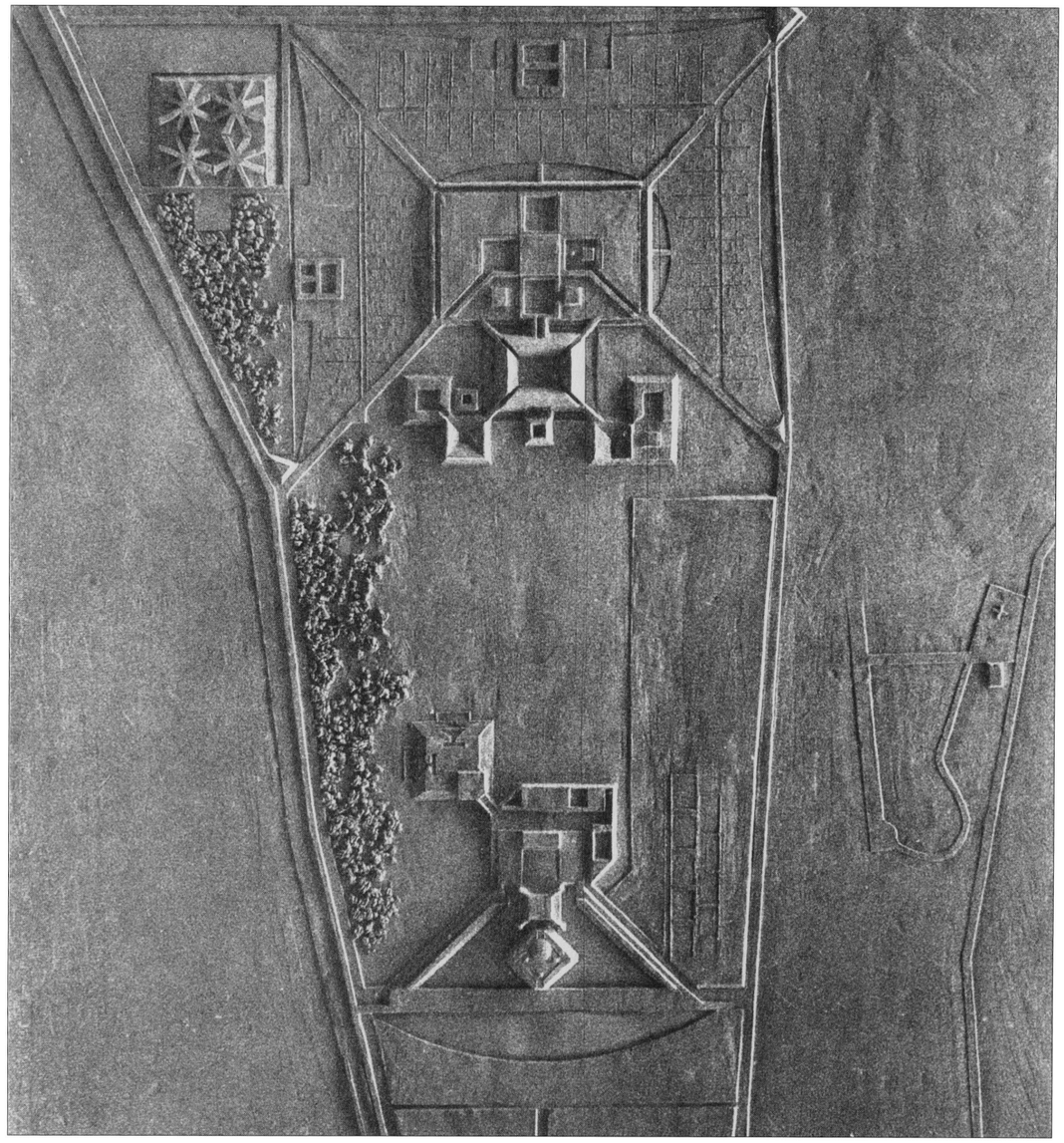
When I was asked to design the Second Capital, legislative, of Pakistan in Dacca (the First Capital is in Islamabad and is the executive capital), I was given an extensive program of buildings, the assembly, the supreme court, hostels, schools, a stadium, the diplomatic enclave, the living sector, market, all to be placed on a thousand acres of flat land subject to flood. I kept thinking of how these buildings may be grouped and what would cause them to take their place on the land. On the night of the third day, I fell out of bed with the idea which is still the prevailing idea of the plan. This came simply from the realization that assembly is of a transcendent nature. Men came to assemble to touch the spirit of commonness, and I thought that this must be expressible. Observing the way of religion in the living of the Pakistani, I thought that a mosque woven into the space fabric of the assembly would have such effect. I feared the presumption to assume this right, that is to know it to fit symbolically their way of life. But this assumption took possession as an anchor. Also, the program required the design of a hotel for ministers, their secretaries, and the members of the assembly. But this requirement became in my mind a corollary to the assembly and I thought immediately that they should be transformed from a hotel to studies in their garden in a lake. The supreme court in my mind was the test of the acts of legislation against the philosophic nature of man. The three became inseparable in the thinking of the transcendent nature of assembly.

I couldn't wait until morning in my anxiety to relate these thoughts to Kafiluddin Ahmad in charge of this project. In the morning I was there at 9 o'clock sharp and told him about the symbolic importance of the mosque; I got no immediate response, no reaction. But he got on the phone and talked to several ministers. After he had spoken for some while, he turned to me and said "Professor Kahn, I think you have something there." I felt enormous confidence that the plan could have form. "But," he said, "you will have a problem with the Chief Justice of the Supreme Court because he doesn't want the court next to the assembly."

We saw the Chief Justice the next day, and we were greeted with the usual tea and biscuits. He said: "I know why you're here—the grapevine is very well developed in Pakistan. You're barking up the wrong tree, because I will not be a part of this assembly group. I will go to the provincial capital site near the provincial high court where the lawyers are, and I think I will feel much more at home there." I turned to him and said, "Mr. Chief Justice, is this your decision alone or is it also the decision of the judges who will follow you? Let me explain to you what I intend to compose." And I made my first sketch on paper of the assembly with the mosque on the lake. I added the hostels framing this lake. I told him how I felt about the transcendent meaning of assembly. After a moment's thought he took the pencil out of my hand and placed a mark representing the supreme court in a position where I would have placed it myself, on the other side of the mosque, and he said: "The mosque is sufficient insulation from the men of the assembly."

I was very happy that the motivations of religious thought were communicable. It was not belief, not pattern, but the essence from which an institution could emerge, which changed his mind.

The relationship of the assembly, mosque, court and hostels in their interplay psychologically is what expresses a nature. The Institution of Assembly could lose its strength if the sympathetic parts were dispersed. The inspirations of each would be left incompletely expressed.



VOLUME 14.4

PAOLO SOLERI

11T

SIC & DANCE
ANNA & OPERA
VIE & BIOGRAPHY
IE ARTS & CRAFTS
SIGN - INDUSTRY

← ⊕ IN SUCH CONTEXT MAN'S DEFIANCE OF STATISTICAL TRUTH, IS MAN QUEST FOR ITS ODUM. ORIGINAL & SIGNIFICANT DIVINITY

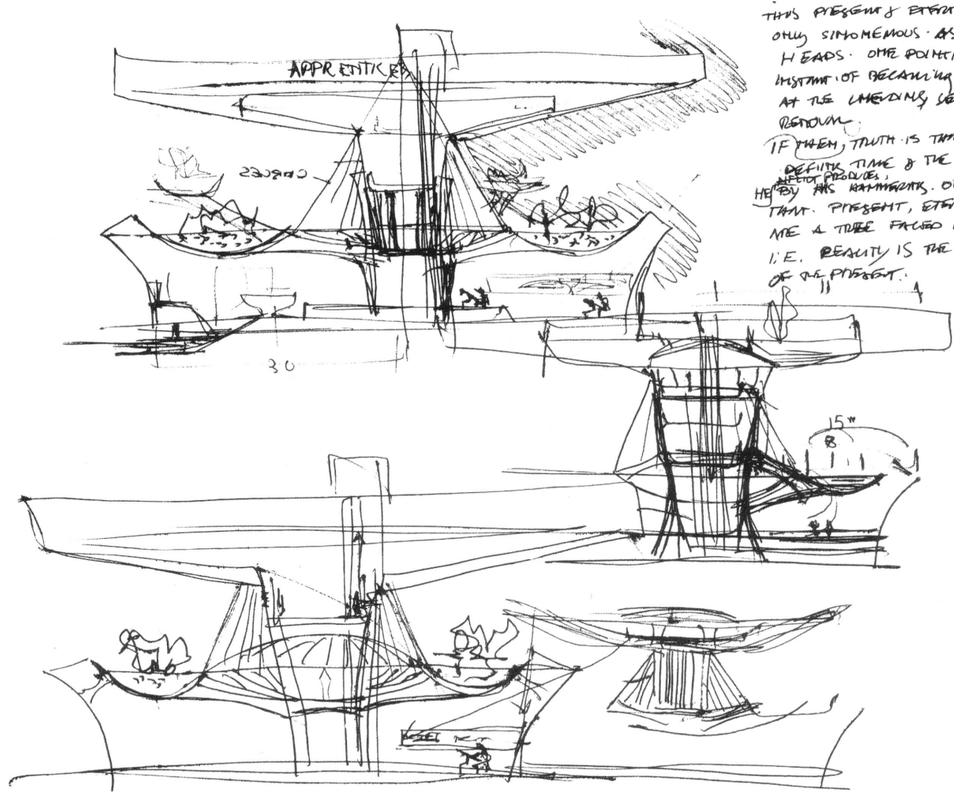
HOW MUCH UNDOING OF THAT WHICH IT IS WASTING THE DOING. TO PRODUCE THAT WHICH IS NOT IS POSSIBLY A PIVOTAL PROBLEM ". IS ACCEPTANCE OF THE "REAL", THE BEST POSSIBILITIES FOR THE CONSTRUCTION OF THE "DESIRE"? OR IS A CRITICAL DISCRIMINATION OF THE REAL. THE NEEDED STARTING POINT? OR IS THE TOTAL REJECTION OF THE "REAL", SUCH PERHAPS?

SCIENTIFIC REALITY IS A VERY FOREIGN WORLD TO MAN. NONE OF THE RELIGIOUS MINDS OF THE PAST SO MUCH WOULD HAVE FORESEEN, THUS THEIR OCCASIONAL, OR NOT SO, REJECTION OF THE MATERIAL WORLD CAN NOW BE CONSIDERED LITTERALLY

REALITY IS NOT THE WORLD OUR SENSES OFFER TO US. YET UP TO YESTERDAY THOSE SENSES WERE OUR "CONNECTIONS", WHAT THE SUBSTANCE OF WHAT THEY SENSED.

NOW SCEPTICISM ABOUT MANS PERCEPTIONS IS JOINED BY MISTRUST OF THE TRUTHFULNESS OUR SENSES ARE EMBODIED WITH.

"THE ETERNAL TRUTH OF THE PRESENT,,
THERE WILL ALWAYS BE A PRESENT.
THIS PRESENT & ETERNITY ~~WILL~~ BE THE
ONLY SYNCHRONOUS. AS TWO FACES/
HEADS. ONE POINTING. AT THE
INSTANT OF BECOMING. & ETERNITY
AT THE UNENDING SEQUENCE OF HIS
RETURN.
IF THEN, TRUTH IS THAT WHICH IS
BEFORE TIME & THE CONSUMPTION.
HEREBY ~~AFTER~~ PRECEDES;
THAT. PRESENT, ETERNITY & TRUTH
ARE A TRUE FACED REALITY-
I.E. REALITY IS THE ETERNAL TRUTH
OF THE PRESENT.



VOLUME 14.5

HARWELL H. HARRIS

My Introduction to Architecture

A youth trudged slowly up a winding road. The road encircled a low hill. The hilltop was covered with groves of tall pines and eucalyptus, the slopes with gray green olives. Below the hill, on three sides, were busy thoroughfares and beyond these stretched the city.

The youth paused often and looked above him. He had been told that hidden among the trees on the top of the hill was a building that would interest him as a sculptor. He doubted it. What had he ever found to interest him in a building? Is architecture an art? It possesses the same elements of three dimensional form as sculpture—theoretically the same means of abstract statement. Why then are there no examples of architecture as art? Architecture, he decided, is, for practical reasons, too impure to be an art. Arguing to himself, he reached the top of the hill.

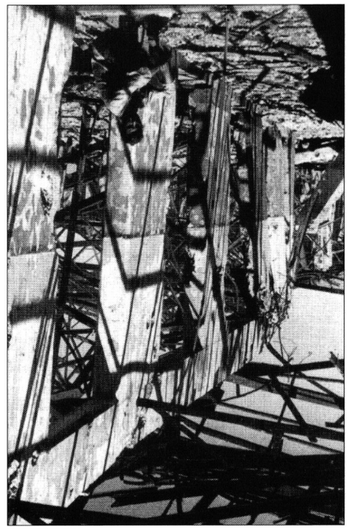
Through a screen of tall trees he glimpsed fragments of a low building with sharp outlines. He came at last to a break in the planting and stepped through. Within an open grassy space, strongly silhouetted against the circle of dark trees, lay a long building, its creamy walls golden in the afternoon sunlight. Its low wings were extended and paralleled by high garden walls. In the foreground was a pool, as sharply rectilinear as the building. Joining the building to the pool was a large plant-box. Building, pool and plant-box were one material. Above the plant-box was a broad opening. Within the opening was a pair of square vertical mullions covered with intricate square ornament in low relief. Above the line of the opening the walls broke back, and, on the ledge thus created, the square sharp ornament appeared again, this time in bigger scale and in high relief. Like a wreath, the ornament moved lightly across the broad brow of the building, continuing in quiet unbroken rhythm from one wall to the next and from one wing to the next. The ornament, which he had followed through its development in relief, now burst into full round—not singly, but in pairs—high up in the interior of the building. He no sooner discovered it once than he discovered it again—always in pairs, always silhouetted against a background of trees or of sky. Stunned, he watched climax follow climax.

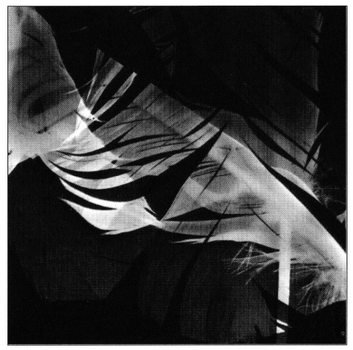
As in the life of the youthful sculptor, so in the lives of countless others, the work of Frank Lloyd Wright has been the revelation of architecture as art. Not the art of books or of classrooms, but the art that proceeds from the very fiber of things. An art from within; filling the imagination with a swirling stream of living images; arousing an intense desire to body them forth in living buildings; energizing their possessor with a feeling of the reality of the self; making him part of the living stream; sensitive to the aliveness of all things; feeling the oneness and continuity of all things; delighting in the rediscovery of his own self in these expressions; delighting in the richness and multiplicity of being of which he finds himself capable.

In Wright, the architect becomes the free spirit, the creator, the uniter of living impulses, evoking a new sense of mystery from the familiar—his building, like all living things, born rather than contrived.

Stretched at their ease upon the ground, seemingly absorbing energy from the contact of the broad surfaces with the earth and the air, these buildings express in their naturalness, casualness, amplitude and democratic acceptance of sun, wind, rain, and vegetation, a quality singularly American. There is in them a Whitman's "contempt for statutes and ceremonies," a "beauty of independence, departure, actions that rely on themselves." Their pattern is the pattern of a free man, striding abroad in the open. Their spread is the spread of creation.

To the youth in architecture these buildings are evidence of the existence of the art of architecture and of the nature of creation.

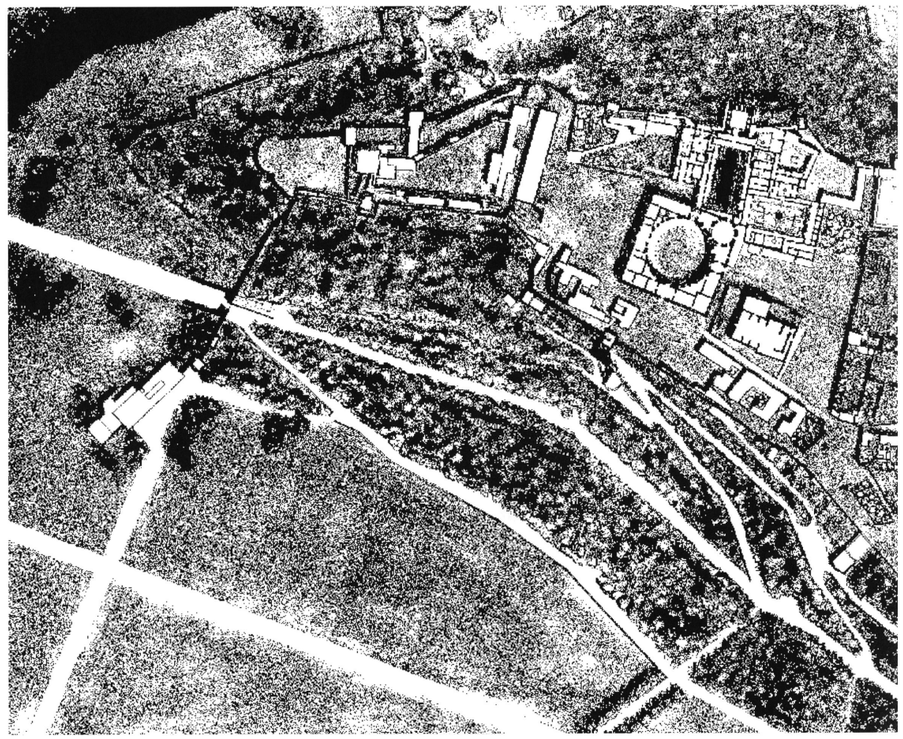


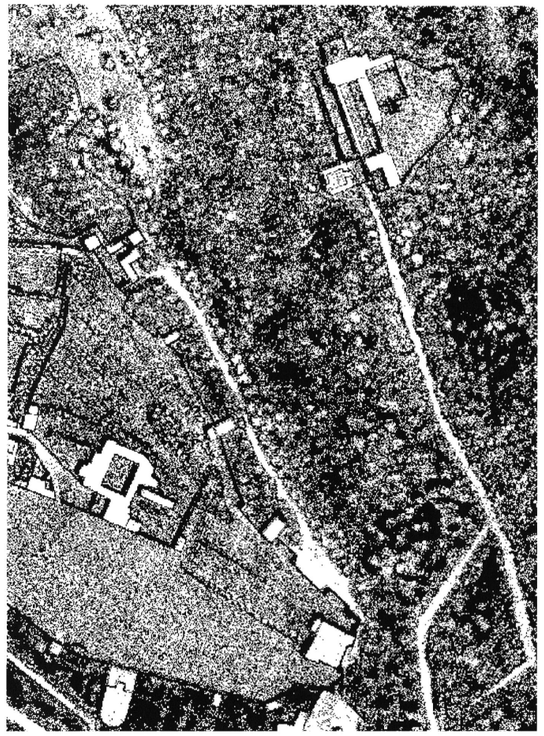


1967: Gardens

Volume 16.1,2 Forty Gardens

The relief plans of Forty Gardens, *all drawn to the same scale, were produced by landscape architecture students under the direction of professor Lewis Clarke. Clarke, a respected teacher and former head of the landscape architecture department, is recognized as a leader in the design of public landscapes.*





La Alhambra and Generalife

La Alhambra covers about 35 acres on the side of El Cerro del Sol in the foothills of the Sierra Nevadas in Spain. The palace is situated on a plateau that commands a view of Granada on the southwest. Generalife, the Garden of the Architect, is situated high on the slope of El Cerro de Sol above the Alhambra. The name Alhambra, which is Arabic for "the red," is thought to be derived from the color of the sun-dried bricks that form the outer wall.

The general pattern of La Alhambra is a series of flat gardens and rectangular courts, both open and covered. The perimeter is defined by a fortifying wall and 13 towers. The Patio de los Arrayanes (Court of Myrtles) was built during the reign of Yusuf I (d. 1354) and is one of the most beautiful and few remaining courts at La Alhambra. A rectangular pond in marble pavement lined with myrtle hedges extends down the center. A subtle golden hue, suggested by the goldfish in the pond and the orange trees, pervades the court. At the north and south ends are galleries supported by graceful colonnades and several alcoves intend for quite pastimes. An easy flow between indoor and outdoor space, serenity, and seclusion are all achieved in this fine Moorish court.

At the Patio de los Leones (Court of the Lions), built by Mohammed V (1334–1391) the court is dominated by an elaborately decorated fountain with 12 marble lions. Color abounds in the stuccowork, especially blues, reds and yellows.

The Generalife was built as a summer retreat for the Granada Kings and their harems. The grounds are a fine example of a Moorish hillside garden consisting of open terraces and sequestered courts. The villa proper, called the Place of Recreations, and its enclosed court are attributed to the Moor, Oman, in the late 13th century.

Katsura

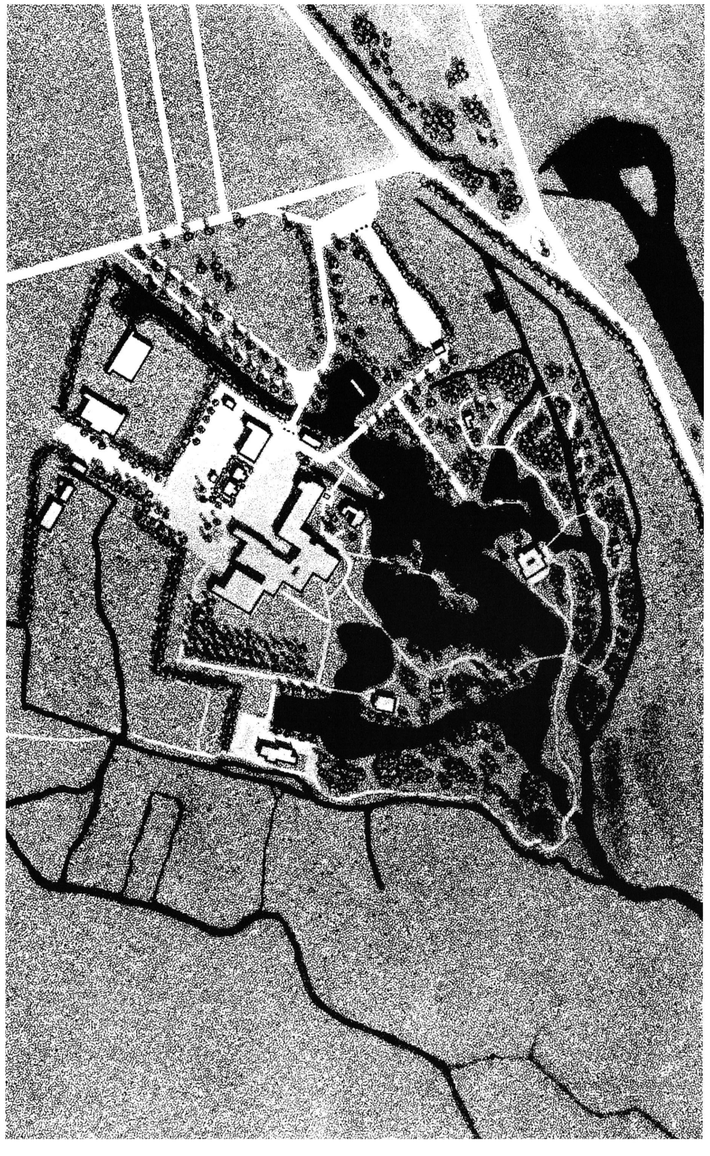
Kyoto, Japan 1615–1658
Clients: Prince Tomohito, Prince Tomotada
Advisors: Kobori Enshu, Hosokawa Yasai, Nakanuma Sakyo, Ogawa Bojo Sunsho
Site: Katsura River Valley on a flat site rimmed with hills.

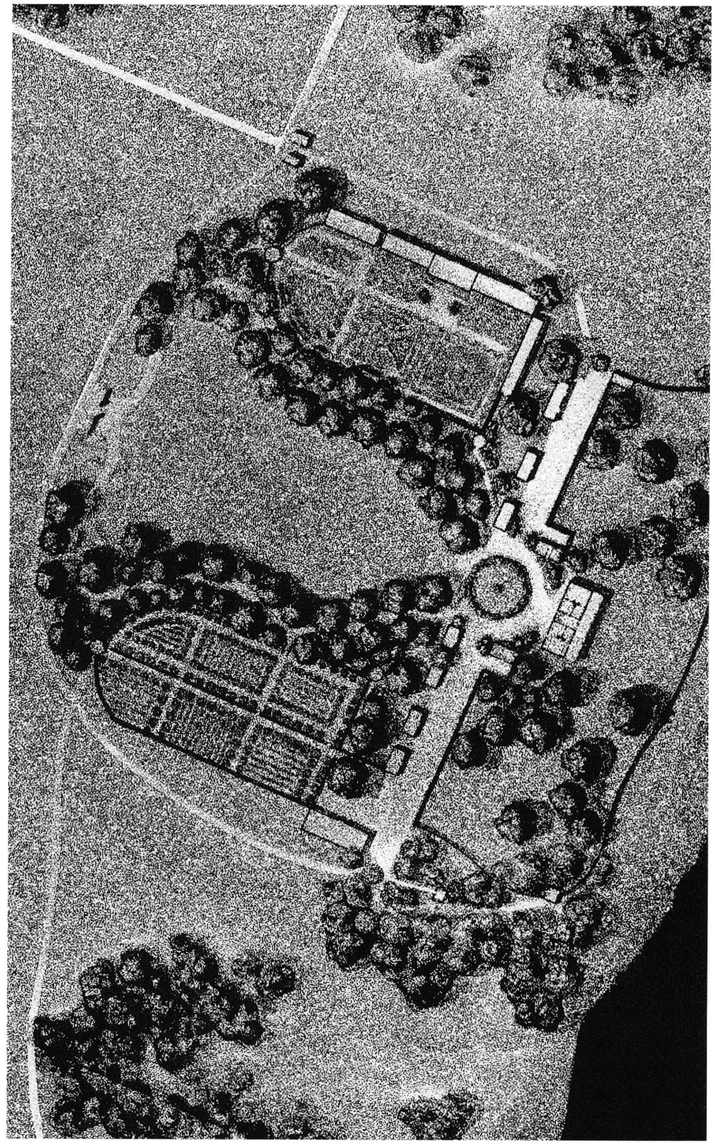
The name Katsura was derived from the name of a tree, which, as legend has it, grows in the light of the moon. Work on the garden began about 1615. Using priest Ogawa Bojo Shunsho as advisor, Prince Tomotado, Tomohito's son, completed the garden in 1658 adding the tearooms, stonework, and lanterns.

The garden site is encircled by dense groves of bamboo, which elimate distant views and direct attention into the garden itself. Water from the Katsura River was introduced into the garden by digging a lake bed about six feet below ground level and then piling the soil to form small islands and miniature mountains 30 feet high. The form of the lake, with its many tributaries and arms, was carefully designed for variety and contrast, leaving only small portions of the two acres of water open to view from any one vantage point. Further enriching the water and earth formations are the many stone patterns and the plantings, which include mosses, grasses, maples, cherry trees and various pine trees.

Situated at intervals throughout the garden are various small cottages or teahouses, which served as retreats for the Prince and his guests.

When, almost 80 years ago, the last of the line of Katsura princes died, the garden became an imperial estate. It is maintained as such today, having been changed very little since the time of Prince Tomohito and his son.





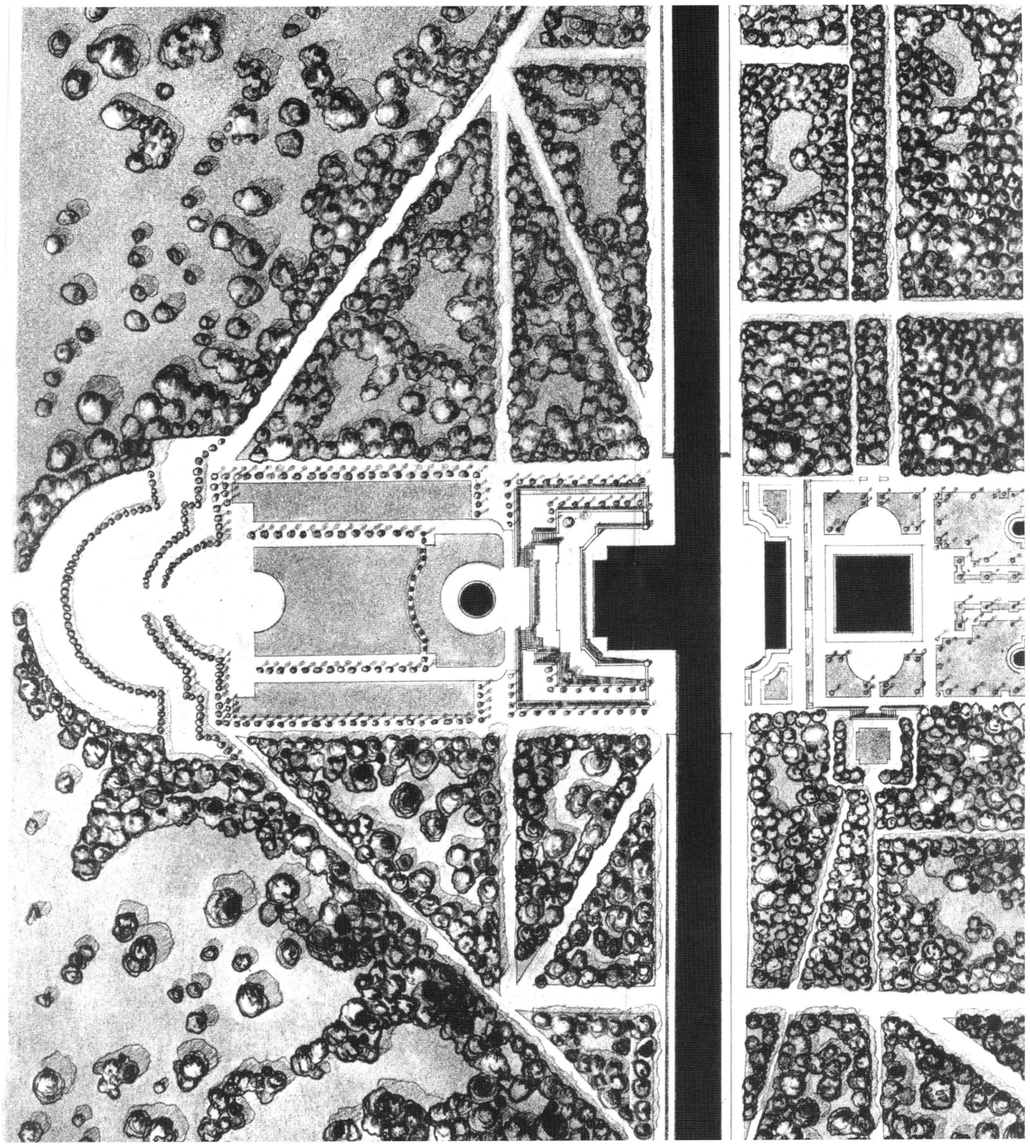
Mount Vernon

Virginia 1750–1799
Client: George Washington
Site: On a gentle slope overlooking
the Potomac River.

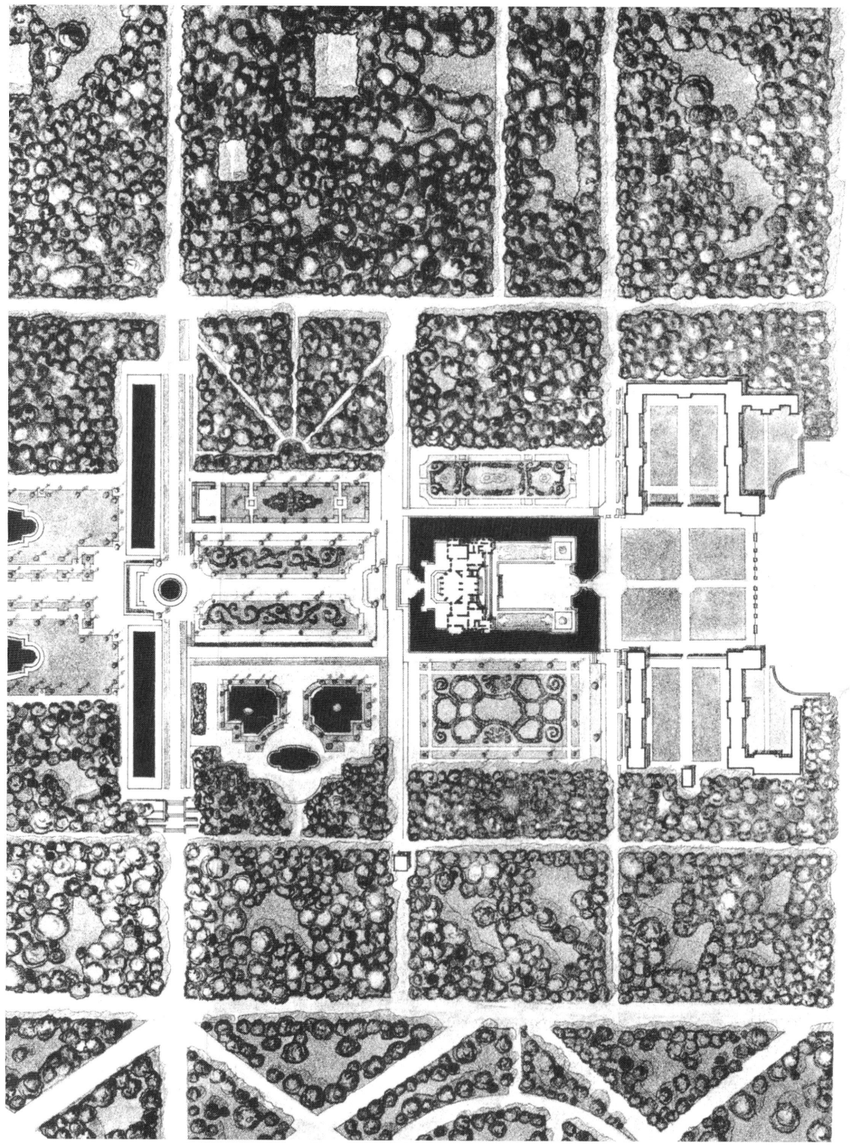
George Washington was the chief planner of his home and gardens.

The west front of the mansion faces a circular courtyard that is partially enclosed by outhouses and covered walkways planted with honeysuckle. The courtyard opens onto an expansive stretch of lawn, the bowling green, that is bordered on each side by a serpentine drive planted with ash, tulip poplar, hemlock, holly, buckeye, boxwood and Kentucky coffee-bean trees.

The kitchen garden on the south was laid out about 1760 with vegetable beds planted in geometric patterns edged by herbs, with brick and turf paths between.



Note: Image scaled 40% of original size in relation to other *Gardens* images



VAUX-LE-VICOMTE

Melum, France 1650–1661
Landscape Architect: Andre LaNotre
Architect: Louis Le Vau
Client: Nicolas Fouquet
Site: 33 miles south southeast of Paris
on a wooded, gently sloping site.

Vaux-le-Vicomte is a refined achievement of 17th century French garden design, conceived and spurred to completion by Louis XIV's Superintendent of Finances, Fouquet.

The view, from a vantage point on an elevated terrace to the north of the chateau, was halted on both sides by dense foilage and directed down a long vista where it was again terminated by a natural hill and more foliage. This central axis, emphasized by a broad promenade between a chain of parterres, was firmly stopped by a wide, impassable canal, a grotto with a Hercules statue and a falling column of water on the hill.

Pazzi Chapel

1970: Mosaics

VOLUME 19.1

MASS PRODUCTION OF UNIQUE OBJECTS

Duncan Stuart & Fred Eichenberger

Duncan Stuart was one of the School's original faculty members and one of its intellectual and creative leaders for nearly forty years. This report on one of his investigations is but one of several provocative studies presented in The Student Publication *during his long tenure. His collaborator in this instance, Fred Eichenberger, was an associate professor of Product Design.*

FOREWORD

The following text is, with some editing, a reprint of a research report, entitled *The Mass Production of Unique Items*, that was published in a limited edition of 100 by the Design Research Laboratory of the School of Design in September 1968. The original study produced a set of 1752 unique items by means of photographic offset-lithography. This large group of similar but not identical prints resulted from printing and overprinting 12 images and three colors within the context of certain constraints. This paper describes the system which produced that set.

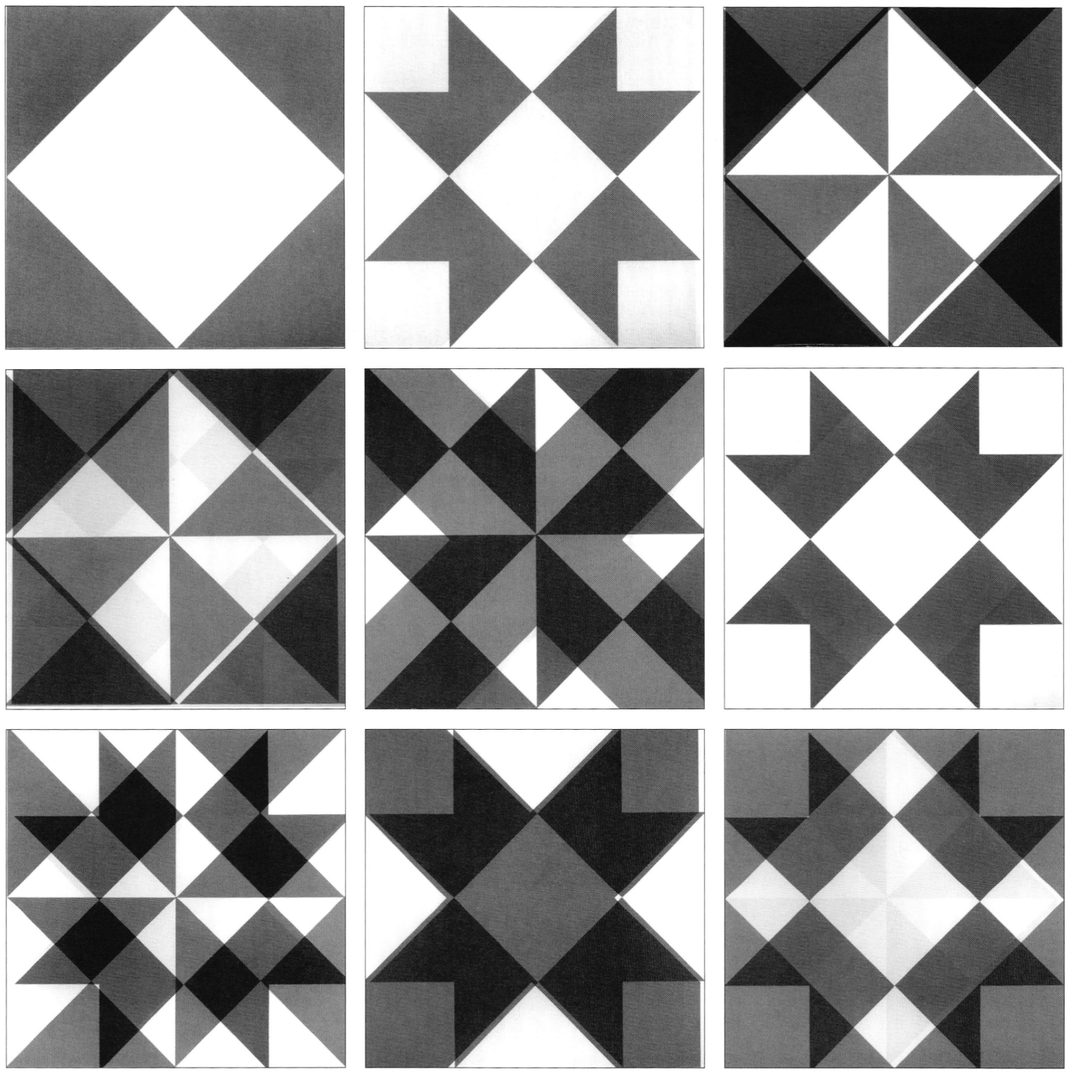
The exigencies of commercial printing, plus the vast number of one-of-a-kind items that would have been required to ensure uniqueness, made it impossible for us to duplicate the original study. In the simulation we designed for this publication, there are 72 different prints, each of which is repeated 250 times. Each copy of the magazine contains a set of prints which illustrate the process and represent a portion of that set of 72. While the items themselves are not unique (each has 249 identical brothers somewhere in the world), the sets are. No two are identical. The production history of the set of 72 is described in an afterword to this article.

INTRODUCTION

Many classes of design problems, perhaps most, may be characterized as having a multitude of equally plausible solutions. The notion of "best" solution either is not applicable, or so remote from realization as to be not worth the pursuit.

Techniques presently available, sophisticated as they may be, do not present the designer with a sensual realization of the domain available to his choice mechanism. Our reference here is to the various branches of mathematics which focus on the manipulation of multivariate factors. The output of such mathematics is highly abstract, bare-bones information transmitted in the main to the essentially rational segments of our consciousness.

Our hope is that the studies begun in the project will serve as an aid to presenting the designer with a more direct sensory grab on the domain of choices available to him. We further hope for the entrance of serendipity, perhaps supplying us with a tool honed for tasks as yet only dimly imagined. The results of our project suggest that this has been the case.

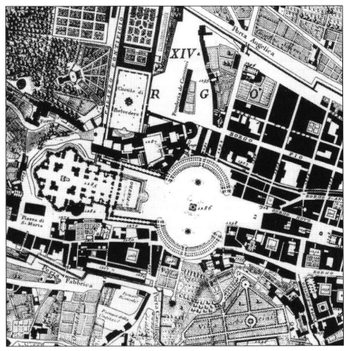


OBJECTIVES

1. We wished to exploit the fullest potential of a finite set of input elements under the controlling circumstances of self- and system-imposed limitations. We define fullest potential as the completely exhausted set of output elements available from the input elements combined under the imposed restrictions. Left to our traditional, essentially handicraft production techniques, the number of images either of us could have produced would have been limited in number and, we believe, merely extensions of already formed and partially ossified sensibilities. The replacement of handicrafts with a system and the appropriate machinery allowed us to produce an unedited, non-subjectified group which contained anything we or anyone else might have accomplished by traditional means.
2. We have developed strategies by which equipment designed primarily to produce many faithful duplicates of a prototype may be employed in the production of unique items. Our employment of offset duplicating equipment stemmed from both desire and happenstance. Such equipment is readily available, not only to us, but also most probably to other designers as well. We viewed it as a particularized example of many similar mass production systems. The methods we propose would adapt themselves to a wide variety of production situations. This latter statement is prompted by having been made aware, after completion of the set, that it had been produced with ease and simplicity. This, together with the obvious visual richness of the results, convinced us that our methods have application to many areas of design activity.
3. We further wished to consider the possibility of developing out of these efforts a method or methods by which complex design problems could be encoded and produced graphically, then studied visually for significant patterns among their possible permutations and combinations. Should this end be even partially attained, we would be able to offer a useful addition to the growing family of design methodologies.

OPERATIONS

1. INPUTS. Six images taken from a group of studies in mosaic transformation by Stuart. These six images were reproduced in positive and negative form yielding 12 images in all. Three printing inks (yellow, blue, red) were chosen to yield a relatively complete spectrum through over printing. Spectral approximation was not sought since the need to main tain true color identity against white paper would not have been possible in the case of process yellow.
2. COMBINATORIAL RULES. A. No image may appear more than once in any final print; B. No color may appear more than once in any final print; C. All combinations of 2 and 3 images and colors must be generated; D. No image may change orientation. These rules were selected, in part, arbitrarily from a larger group of possibilities. Had we chosen a different set, the character and quantity of images would have changed. For example, the introduction of asymmetric images to assume different orientations would have greatly increased the number of final images.
3. PRESSWORK. The mechanics of off-set duplicator makes plate (image) change a simple operation, while ink (color) change is considerably more difficult and time consuming. For this set, we needed to change the ink only three times and the plates only 34 times in the course of producing 1752 unique images.
4. COLLATION. The most complex and significant task in this operation is that of organizing the schedule of printing in such a way that the unique images are efficiently produced. This task is one of, first, introducing into the duplicator appropriate-sized bundles of paper, properly oriented; second, taking the papers (or other surfaces) so printed and rearranging them in a manner appropriate to the next stage of the printing operations. This operation, which we call collation, will vary with the type of printing device and the type or types of surfaces that receive the printed images.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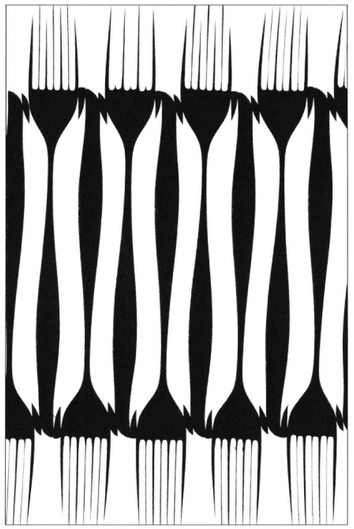


1974: Methodology

VOLUME 23.0 DESIGNING THE METHOD

EDITOR'S INTRODUCTION

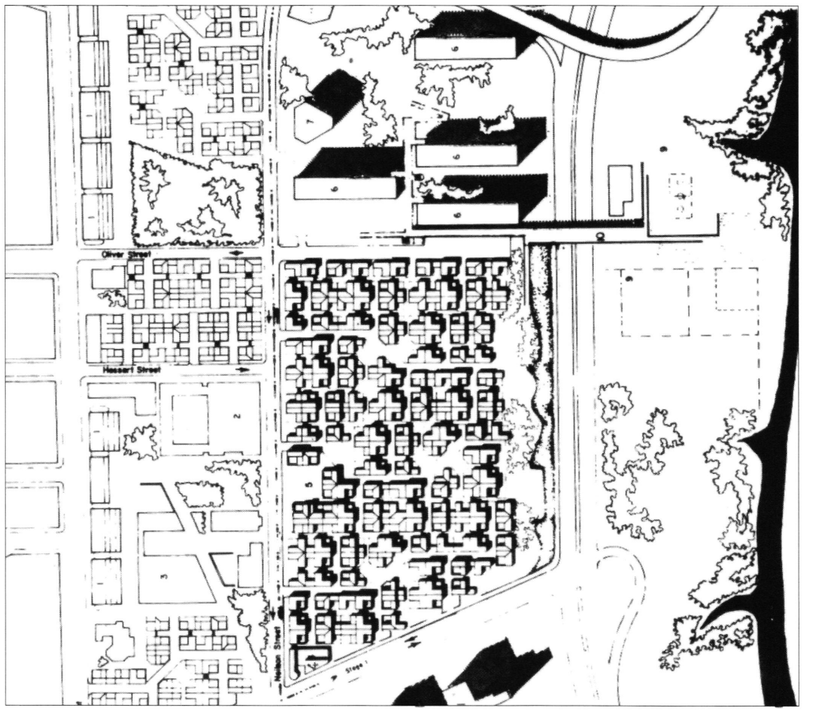
David Tester

This introduction by student editor David Tester describes the efforts of contributors, which included a number of important leaders in the design methods movement, to define and validate various approaches aimed at rationalizing the design process.

There is a growing realization of the need for new strategies to solve increasingly complex problems in the built environment. Rapid urbanization, accompanied by changes in goals, values, and technology, have resulted in changes in people's environmental needs and aspirations in such areas as education, housing, health, transportation, and recreation. In attempting to keep pace with rapid growth, it has become apparent that solutions to architectural and planning problems, whether buildings, city blocks, or communities, should not be viewed as isolated physical objects; rather, they should be perceived as integral parts of an environmental system, with economic, social, and political ramifications. Viewing the built environment as a set of interrelated systems which provide for man's needs, it is evident that a change in one subsystem might modify elements of another subsystem, with unpredictable consequences. The importance of considering this broader context is necessary when one subscribes to the view which integrates the built environment with other systems.

In the late 1950's and 1960's, efforts were made to find new methods whereby the complexity of problems in the built environment could be addressed. The greater degree of complexity was a result of looking at design problems in their larger environmental context as well as the increasing scale of institutional problems. With the realization that more rigorous methods of problem-solving were necessary, investigations were directed into operations research and management sciences for more scientific methods. Computer-aided design techniques were used to manipulate variables according to specific criteria, and computer graphics suggested optimal schematic solutions. Systems engineering techniques were used to insure internal and external compatibility of the subsystems. Statistical methods were used to identify patterns in environmental data useful in making design decisions. Mathematical models and matrices were also adapted for the identification of various components and their connecting links. Such techniques as brainstorming and synectics sessions were implemented to explore design problems and to generate new ideas. Interest in such processes resulted in the formation of the "Design Methods Newsletter," which was initiated as a forum for communications.

Simultaneously, other interests developed in the substantive aspects of the relationship of man and the physical environment. Research in the man-related sciences was redirected, with the objective of integrating findings with the human impact on the built environment.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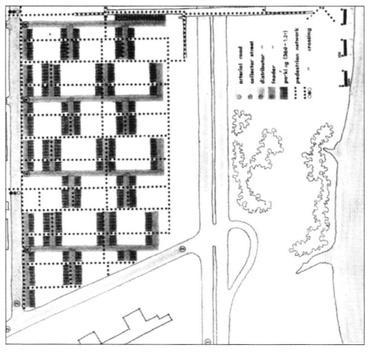
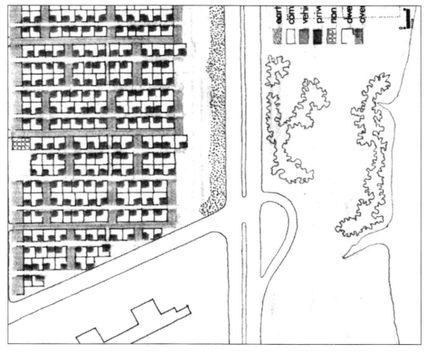




In an effort to achieve more appropriate designed environments, members of a multi-disciplinary group, known as the Environmental Design Research Association (EDRA), began to study man's behavior, the quality of the environment, and environmental attributes. With the acknowledgement of important differences in values and resulting differences in environmental preferences, studies were conducted to elicit a better understanding of attitudinal responses to the environment and of the nature of user's perceptions about environment. Attempts were made to evaluate user response to recently built environments, as a basis for prediction of human behavior in future environments. Such research techniques as interviews, questionnaires, observations, simulated environmental experiences, scaling devices, and diagrammatic sketches were used to elicit user response. New decision models and problem-solving methods were devised, tested, and evaluated. While such techniques provided and structured a great abundance of information, a major problem still existed; the resulting solutions were still the product of the designer based on his understanding of each situation. While perhaps responding to more issues related to the built environment, a new renaissance designer emerged, one who was possessed with an even greater expertise than ever before.

Recognition of the limits of previous environmental design research and similarly introspective orientation of design methodology has led to a major conceptual leap: the revision of design decision processes. This volume contains the pioneering work of innovative designers attempting to implement the conceptual leap in the role of designer as educator and facilitator. Since this new direction is largely embryonic, designers conceive the implementation of the developing approach in several different frameworks and they see it occurring on several different scales. In the first paper, Chris Jones suggests that a fundamental philosophical inadequacy of earlier methodologies is that designers have been much too concerned with buildings, and not concerned enough with providing for effective change in the quality of life of other people in the built environment. He suggests that designers relate the processes by which they have made their own lives pleasant to other people who can use these processes to improve their life patterns. In an attempt to plan and produce such change on a large scale, Edward Matchett and Anthony Blake have been testing and developing their strategy, called logosynthesis. By bringing together an interdisciplinary team, the user group, their strategy aims at developing a more powerful 'group mind,' linking together not only professional knowledge, but also such intangible areas as personal experiences, aspirations, and spiritual activities. From this group mind, they suggest, can arise innovative thought patterns, which lead to effective plans for change.

Some strategies may be designed which, while affecting the quality of life of the people, may not obviously affect the built environment. J. Wood's effort to devise objective strategies led him to apply two systematic design methods simultaneously. Used previously in the field of product design, Mr. Wood's strategy enables the cooperative development of a pension and life insurance policy plan by those members who would be responsible for its economic success, considering simultaneously the management, marketing, and client positions.

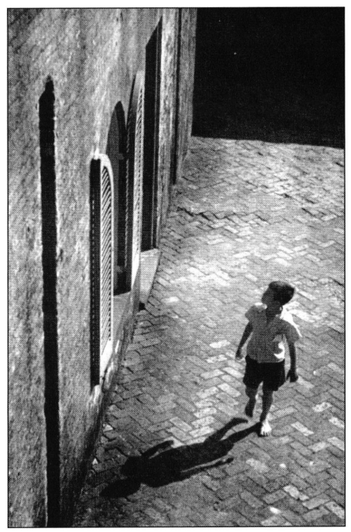
Implementing the negotiative process among user groups becomes more obviously related to the quality of the built environment in an overlay space-planning technique developed by Don Grant and Art Chapman. Resulting in a land use plan, the process, which is sequential, adaptive, and user-educating, aims at resolving conflicts of interest among clients who want land allocated for completing uses. A different aspect of planning is investigated by L.A.E. Breto-Flores. The S.A.U.C.O. game was designed to study the redevelopment process in Latin America, including an exploration and analysis of the social, economic, and political problems which arise during implementation of a redevelopment program in an urban Latin-American community. Participants of this simulation collectively design an urban renewal project for an existing community of 40,000 people. Also concerned with the residential planning aspects of the environment, Hanno Weber and a group of architectural students devised a community decision-making process. Realizing that an understanding of the residents' social structure and cultural values was essential in order to design for physical life patterns, the designers worked with a community task force to determine residents' perception of their community needs, built space, private and common open space, and vehicular areas and storage, by identifying choice options and enabling trade-offs to occur. They report the solution to be logistically unconventional.

New approaches for implementing user-oriented programming have also been developed. Michael Pyatok, assisted by architectural students, devised a two-phase gaming strategy which results in a building program after a period of negotiation and argumentation between the school board, citizens, teachers, and architects. This group, in which each person represents a specific interest group, first decides on educational objectives, then identifies major educational programs, supportive events,

and the necessary environmental characteristics. Finally, it develops a three-dimensional schematic model. Henry Sanoff and George Barbour tested a strategy using several techniques to help a multiple-user group plan the development of an alternative school. The setting for the planning strategy was a brief, intensive charrette, bringing together parents, teachers, children, board members, consultants, and designers for several days of intensive planning. Using collaborative poems, semantic rating scales, archetype drawings, and role playing, they collectively developed a list of educational objectives and chose appropriate activities and learning methods to fulfill these objectives. A user-oriented building program was the product of this charrette.

The current concern with integrating the user into the design-decision process has resulted in a new application of gaming techniques. Such gaming aids are tools which enable user groups to provide designers with specific choices concerning particular aspects of the built environment. Gaming aids may provide user groups with sets of possible objectives, activities, and environmental settings, with a set of rules which define the relationship of the different components. With such aids, a diverse user group can negotiate conflicting interests which may arise due to differences in their values and experiences. Through discussion, preferences can be stated and consensual agreements can be reached. The Community Development Group in the School of Design, North Carolina State University, has been developing and testing games for several years. Three examples are included here to demonstrate the nature of the games and possible variety of uses for specific environmental concerns. Systematic Evaluation of Architectural Requirements for Community Housing (SEARCH), is a tool for user-identification of inter- and intra-residential characteristics. By identifying the range of choices available, from interior dwelling layout to site plan, and including residential image, designers can determine user's preferences on several different scales of the environment. In a similar manner, Planning Outdoor Play (POP), enables parents, teachers, and children to make design decisions about an outdoor play area which provides for children's development, in areas other than the physical. Relating Objectives for Learning to Education (ROLE), shows the relationship between and range of choices of learning objectives, learning methods, and environmental settings.

The range of environmental issues that can be addressed in this manner goes beyond the case studies presented here, and the specific applications included do not necessarily represent the only or optimal approach to a specific design problem. It is intended that, by example, these strategies can provoke further research and application.



1976: VERNACULAR

Volume 26.0 Carolina Dwelling

Editor's Introduction

Doug Swaim

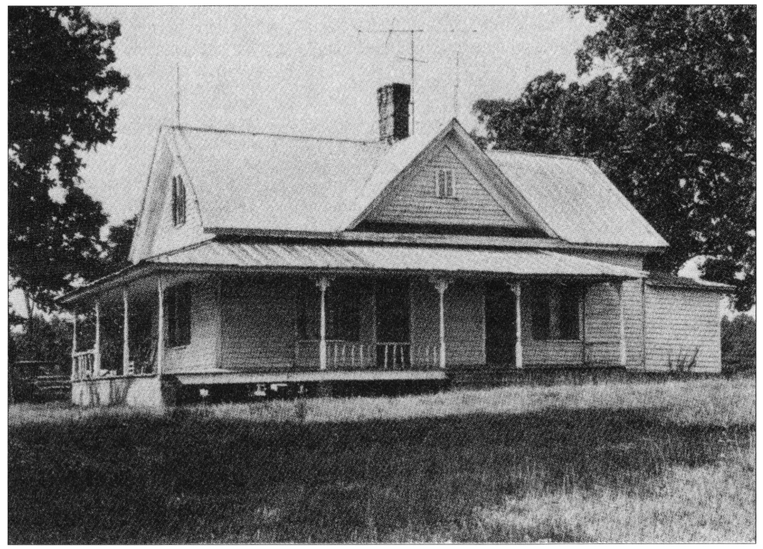
Swaim's richly personalized introduction set out the primary themes that underlie this groundbreaking volume—the nature and value of the traditional landscape, the need for its preservation in the face of destabilizing contemporary forces, and the idea, indeed the sanctity, of dwelling in the vernacular environment.

Carolina Dwelling is a collection of essays that describe, analyze, trace the history and suggest the possible meanings of various features of the North Carolina vernacular landscape. The book's purpose is to provide a basis for collective reflection upon both the particularity and the process recorded in that landscape. The book was *incited* by a felt need to tend to what is here.

All along we have said that our purpose is ultimately the *conservation* of the qualities that our environment exhibits as a special place—"special" not in the sense of exceptional or surpassing, although it is certainly that in ways both good and bad, but rather in the sense of unique. Not better—just different. As I sit down to write this introduction, though, I am struck—particularly today, October 30th—by the carry of our *natural* setting in providing that particularity. Once again the autumn color in this forested land is incredible. Sure, the oaks, those that have turned at all, are going straight to brown to remind us of a bone-dry summer, but the dogwood and red maple have been stark against the pine, and the yellow maple outside my window has passed from bright rain-slicker to a modest apricot glow. With these amazing signs to remind me how nature always turns around *this* place—and with my friends making the ritual journey to the mountains to see it full tilt reminding me of our cultural embeddedness in the natural cycle—how can I long remain upset that the peculiarity of this place is about to fade!

But then I also remember the discouragement of a flight over the Piedmont in a small plane with Project Director Shun Kanda. Looking for patterns in the spread of the small towns we chose to fly above, we were struck instead by their form*less*ness and, especially—and this is what I am reminded of now—by how few real forests actually remained below. From two thousand feet a good portion of the North Carolina Piedmont landscape appears—and I hate to say it—rather like the coat of a mangy hound. Scatterization has all but erased our woodlands. The "forests" that appear so deceptively pervasive from the ground are actually ragged strips between what is truly rampant, the small clearing. "Entropy upon the land," I remember thinking at the time.

Those who have flown to Virginia at low altitude tell me that a change in this pattern in the landscape is obvious once you cross the border. And a little research shows that in contrast to North Carolina, early Virginia had a stable government that encouraged aristocratic planters to assemble vast estates. In North Carolina, under the Lords Proprietors, not only



was the future uncertain but also early law prohibited the "taking up of tracts larger than 660 acres without special permission…" What a discouragement that law must have been to those seeking to secure aristocratic dreams upon the soil of the "new discovered Summer Country" to the south. And thus the land and its climatic delights were left largely to "the dregs and gleanings of all other English Colonies," who were quite content to become solidly middle class claiming it piece by piece.

So history is read on the land at two thousand feet and in the statistics that tell of a large rural population still. And the descendants of non-aristocrats continue to carve upon their small holdings. In fact, most of our land has been cleared, or at least "harvested," several times during the relatively brief history of settlement here. From the air, again, the vestigial geometries of property line and abandoned field show clearly in the patterning of our young woods. What's more, whereas our ancestors found mixed pine and hardwood forests predominating in the Piedmont, our continual trading of clearing and growth has allowed the faster growing pine to gain ascendency—so much so that the stability of much of our woodlands is called into question.

Every given natural region has a potential top situation where all of the plants that will grow there have grown up now and all of those that will push out something else have pushed out something else, and it reaches a point of stability. If you cut all the forests and you wait many hundreds of years, it'll come to something again…

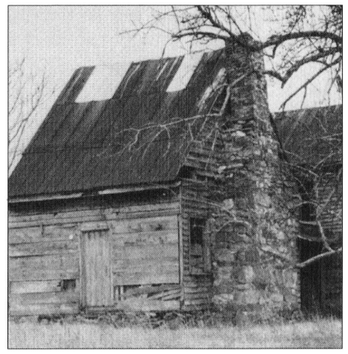
This condition, called "climax," is an optimum condition of diversity—optimum stability. When a system reaches climax, it levels out for centuries or millennia. By virtue of its diversity it has the capacity to absorb all sorts of impacts. Insects, fungi, weather conditions come and go; it's the opposite of monoculture. If you plant a forest back into all white pine, one of these days the white pine blister comes along and kills all the white pine. If you have a natural mixed forest, the white pine will be hit a little by blister rust but they won't be in a solid stand, they'll be broken up…

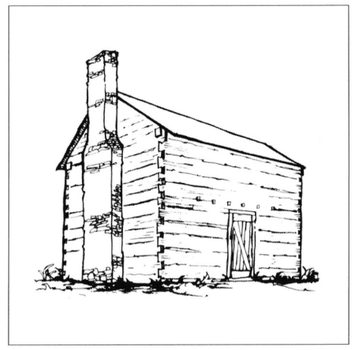
This train of thought began with my celebrating the contribution our natural setting makes towards establishing the particularity of this place. What I have arrived at is a realization that our manner of dwelling has not only significantly changed that setting—that is to be expected—but also that the alteration commonly threatens the continued existence of an important element of that setting as a sustaining and place-making ground. Let those who doubt this conclusion check today's lumber yard prices on our once common hardwoods as well as the quality of the local pine that is available, and let him visit the remote Joyce Kilmer "tree museum" for a remembrance of what time is *capable* of gathering into wood. Of course it hardly needs mentioning that this is merely one local example of the dysfunction that pervades our contemporary way of life.

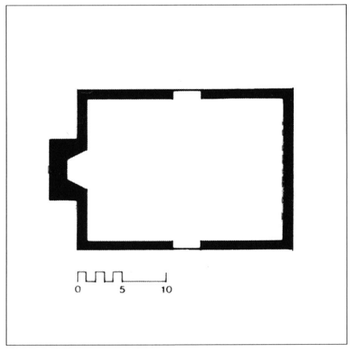
Ecology—the science of organism's relationship to environment—of necessity begins with the natural ground. In the case of man, however, if it is to consider all that significantly affects the organism's well-being, it must quickly expand to include the cultural setting. At once the human disease and glory, culture is inevitably our mediating context. Optimally our cultural extensions provide both the *why* and *how* of material progress. Through symbol systems we establish meaningful intentions; with tools we seek to execute our desires. The more tightly wound the dialectic of symbol and tool the more harmonious the dwelling that results. Furthermore, unless life is to be a careening exploration of simple material possibility—hardly dwelling—the symbol, the *why*, must always remain primary. Symbol systems provide direction and nourishment to the dwelling urge.

Of course compared to nature's massive stay, our symbolic cultural ballast is light—especially in America—and vulnerable to change. Or, put another way, our cultural topsoil is thin and vulnerable to the bulldozer's blade. Evidence suggests that human societies have the capacity to mature in much the same manner as forests—that their natural evolution flows in line with a tendency towards maximum diversity and stability. Our modern western civilization, however, is like a piece of ground that is annually scraped back so as to produce maximum *new* growth of a few species—monoculture. The energy feeding this new growth, as we are so painfully aware at present, comes not from the rich humus of recycled culture past but from the recently discovered, soon to be exhausted, purely instrumental petroleum fix. And our present vulnerability to a whole range of existential assaults results largely from monoculture's consequent lack of diversity and resilience and from its lack of symbolic depth—its lack of a *why*. The tool has taken charge and knows only how to make more of the same. Like a scrawny pine overgrowth monoculture gathers little into it that can sustain the human spirit and it is highly susceptible to a variety of plagues. Continuous rapid growth and innovation give it—in contrast to the scrawny wood—the illusion of health, but when its crude oil "stash" is depleted or cut off, withdrawal will likely be cataclysmic, the illusion banished, and a paucity of real culture left behind to support corporate America's advertised meanings.

With neurotic attachment to a pioneer mentality, we continue to drive back—"expand"—the frontier of our economy. Our civilization has substituted a dreamy



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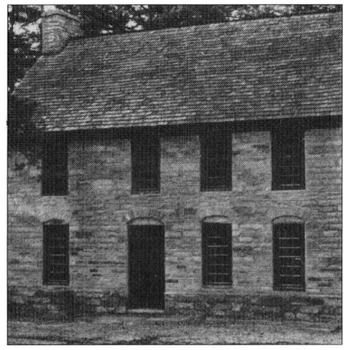

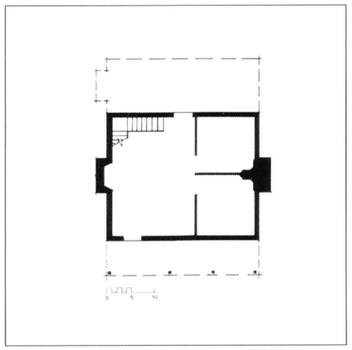
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orientation towards future satiety for the primal dwelling experience of *being in place*. Ever inclined towards more, we scarcely notice the centered sufficiency of the present. And whenever growth's momentum flags, we "stagnate" in utter *dis*placement. Furthermore, our abstract orientation is embarrassingly evident in the environments we build: in the bland or brutal instrumentality of what directly supports production; in the tacked-on image's appeal to our sham fantasies; in the destruction and neglect of existing cultural forms and spaces along the way to profits or an imagined better; and in most new form's complete ignorance of the history and the particularity of its place in time and space. For those of us who cannot muster connecting faith with this current flowing endlessly toward a receding future—as well as for the multitude of economic misfits the current has left behind—these environments fail to *place* us meaningfully in the world. And for revolutionaries of all stripes (many of whom I must quickly disavow any sympathy for) the only meaningful posture is one that actively resists the flow.

One does not have to agree completely with this critique to share our concern for place conservation. That we need a coherent and stable setting upon which to act out our lives meaningfully, as Robert Stipe maintains in his essay on "The Conservation of Place," is realization aplenty. Nor does the critique deny the existence of a rich countercurrent doing a dance of opposites with mass production's monoculture. Indeed, a whole syndrome of movements now advocate the cultivation and preservation of local environments, natural and man-made. Hopefully our own effort will positively and significantly reinforce the public's already considerable agitation.

Initially I said that this book's purpose is to provide a basis for collective reflection upon both the particularity and the process recorded in North Carolina's vernacular landscape. Restated in terms of the organic analogy that purpose is to "compost" some of the cultural debris that is around us so that ultimately we can nourish new growth in "the rich humus of recycled culture past." Since our contributors were not asked to employ a standard definition in determining their subjects, we can also stand back and look at the variety of their approaches as an exploration of the meaning of the concept of "vernacular" itself. And because the affective character of our environment has historically been so grounded in the vernacular landscape, we can take the occasion of that landscape's discussion to reflect upon the concept of place-meaning. Both these related secondary themes are introduced here at the beginning of the book and carried throughout in brief editorial prefaces to each article.

Professional designers and design educators generally look upon the traditional design with unabashed admiration. In *Notes on the Synthesis of Form* Christopher Alexander celebrated the ability of "unself-conscious" cultures to produce artifacts that harmonize with their environments. In *House Form and Culture* Amos Rapoport limited his search for meaningful form determinants to vernacular or folk houses. A slew of books tend toward celebration and admiration of what Rudofsky termed "architecture without architects." The common theme in much of this work is: modern self-conscious design is doing worse. We would do well to look to the more primitive designer for guidance and inspiration.

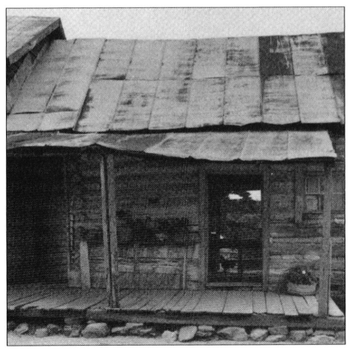
To a degree *Carolina Dwelling* follows in the tradition of these books. It could even be considered something of a test of the more romantic notions they have sponsored. In the following essays a picture of traditional design is collectively drawn that is at once less exotic, more subtle, and hopefully at least as informative as the usual model. Significantly, this book leaves the reader who is familiar with the territory covered in a position to evaluate for himself the relative "success" of the process and its products on this soil.

Yet we are also here trying to do something quite different. In calling for essays on the vernacular landscape the intention has been to highlight the *place-making* aspect of traditional design. In its usual sense, vernacular means the locally or regionally idiosyncratic speech of ordinary people—place-rooted speech. The term has often been applied to architecture but seldom in a precise way and consequently seldom making good use of the opportunity to clearly name something new.

Architectural historians often call unsophisticated translations of high style form and ornament vernacular. In their view vernacular form always exists in relation to higher culture which it apes—usually clumsily, sometimes wittily, but never with *intended* irony. For them the individual example is the vernacularization; it does not have to be one case of a local or regional practice.

Vernacular is also commonly used rather interchangeable with "folk," as in Rapoport's *House Form and Culture*, to name "the direct and unselfconscious translation into physical form of a culture…" Rapoport does go slightly further in distinguishing vernacular building *within* the larger domain of folk tradition by stating that it is the product of tradesmen as opposed to nonspecialized folk. This is about the extent of the term's specificity as it is employed by those architectural historians who specialize in astylistic buildings.

Obviously the concept could stand clarification. Returning to the original meaning of vernacular we recall that there is the sense



that something widespread—a language—has become local, has become *vernacularized*. There is the sense that a vernacular is not a whole thing that appears in one place and no place else, but a local hue or coloration given to something that exists, or has existed, elsewhere as well. If we intend this sense when applying the term to the built environment, we find that we are not naming something as complete and tangible as an object, but rather the peculiar shift that culture takes when it becomes rooted in a place. Vernacular can best be understood, then, as *the place-related inflection of culture*. It has both its conservative aspect—as when a folk survival contributes to the sense of a place—and its progressive aspect—as when adaptation of a folk tradition produces a locally idiosyncratic building vocabulary. A hall-and-parlor type "coastal cottage" in eastern North Carolina exhibits both aspects: its basic two-room plan is continuous with a seventeenth century (or older) English folk tradition, while its porch and raised open foundation are adaptations to its New World context.

Vernacular as local inflection also encompasses the architectural historian's usage that I first mentioned—unsophisticated interpretation of high style. However, whereas the local adaptation of folk form often became *local* practice, the carpenter's rendering of high style ornament was likely a one-of-a-kind attempt. Because it constituted a place-making act of *possession*, I would still consider it essentially vernacular.

Historically the great majority of houses built in this state have been neither purely folk nor purely high style. Most typically the basic plan of a house conforms to local folk tradition while any ornament, inside or out, at least pretends to fashionable style. The ideas for these traditional house plans persisted through time and were rather fixed in *space*—in their region. The changing current of fashion, on the other hand, fixed each architectural style in a "period" in *time*. Thus, considering both aspects, we can imagine our typical old house as frozen in a space-time grid which to a considerable extent determined the terms of its existence. I would propose that such a schema provides a vernacular matrix that can identify the particular intersections of atemporal traditions and historical styles upon this landscape. The matrix generates highly vernacular forms because every intersection within it shows the inflection of its place in space and time. Reflecting this state's "middling" past, every formulation is *uniquely* oriented towards a current outside self.

So, in brief summary, I would maintain that "vernacular" should frame the peculiar coloration, or inflection, given to culture in a place—and that such coloration can be given to any non-vernacular culture. Popular culture is even potentially vernacular. But if there is nothing identifiably unique about the culture of a locale, it is not vernacular, and the locale could hardly hold much meaning as a place.

Robert Venturi speaks of the strip as the "current vernacular of the United States." He has framed America and asked what is particular about our national material culture. And he comes up with car culture's strip. True enough. But I find his statement laden with irony. The United States is not one big place, for we are too easily lost within it. The strip is, instead, monoculture and although it does serve a function, as well as provide a clear counterpoint against which to shore up the particularity of locale, it is by and large a blatant symptom of our civilization's tendency to disease.

All of the currents that flow through this book are united in the one river: dwelling. Most of the connections should be rather evident—one, however, may not. That is our desire to *celebrate* what we find here. The source of that desire is revealed in Heidegger's etymology:

> *…But in what does the nature of dwelling consist? Let us listen once more to what language says to us. The Old Saxon* wuon, *the Gothic* wunian, *like the old word* bauen, *mean to remain, to stay in a place. But the Gothic* wunian *says more distinctly how this remaining is experienced.* Wunian *means: To be at peace, to remain in peace. The word for peace,* Friede, *means the free, and* fry *means: preserved from harm and danger, preserved from something, safeguarded. To free really means to spare. The sparing itself consists not only in the fact that we do not harm the one whom we spare. Real sparing is something* positive *and takes place when we leave something beforehand in its being, when we "free" it in the real sense of the word into a preserve of peace. To dwell, to be set at peace, means to remain at peace within the free, the pr eserve, the free sphere that safeguards each thing in its nature.* The fundamental character of dwelling is this sparing and preserving.

We celebrate, then, for two reasons: first, to memorialize the dwelling that has preceded us upon this land—then, we celebrate because, as dwellers ourselves, it is *we* who are freed into the same preserve that we have offered to safeguard what surrounds us. It is we who, as dwellers, are set at peace. Not that it needs any explanation or justification: *we are celebrating* life. And I admit no conflict between this jubilation and the all-too-necessary critique we have already unfurled. "That the world can be improved and yet must be celebrated as it is are contradictions. The beginning of maturity may be the recognition that both are true."

The North Carolina Porch: A Climatic and Cultural Buffer

Ruth Little-Stokes

House plans brought to North Carolina from Europe and from the Northern colonies were commonly adapted to the Southern climate by the addition of a "functional sitting porch." This traditional means of inflecting building form toward the regional environment pervades our vernacular landscape. Here, Ruth Little-Stokes, a highly respected historian and observer of North Carolina's architectural heritage, identified the influences upon traditional porch form and presents a thorough typology of traditional North Carolina porches.

One of our most enduring images of Southern small town life is the family sitting in porch swings and rockers on the front porch after supper, exchanging pleasantries with passersby. The "sitting porch" is an appendage no genteel house in the pre-World War I South would be caught without. The porch is perhaps the most valuable Southern contribution to the vernacular American domestic building. This claim might be disputed by those familiar with the exuberant porches of Victorian residences built throughout the United States in the late nineteenth and early twentieth centuries. However a comparison of eighteenth century regional house types indicates that the functional "sitting porch" occurs only on Southern houses, and only within a subregion of the South of which North Carolina is the northernmost state. The Upperland South, Middle-Atlantic States, and New England have only stoops (small entrance shelters). The presence of a porch is perhaps the most distinctive feature of Southern eighteenth century architecture, and the early North Carolina porch has a special significance as an expression of a climatic and cultural buffer element in the vernacular landscape.

During the Victorian period, when such eclectic revival styles as the Greek Revival, the Downing or Gothic Cottage style, and the Italian Villa style replaced local vernacular traditions, porches became common throughout the United States. These styles demanded porticos, porches, and piazzas as elements within the overall decorative scheme of the historical form. These spaces functioned primarily as decoration and only secondarily as sitting areas. Prior to the Victorian era, the porch as a functional sitting room between the indoors and outdoors, and as an exterior corridor between rooms, existed only in those regions of the United States with a subtropical climate. The porch as a functional appendage, rather than a stylistic necessity, is one of the most fascinating elements of early Southern domestic architecture.

The apparent correlation of the cultural South with a humid subtropical climatic region has long provoked comment. The area traditionally defined as the South includes a subregion—a narrow coastal strip from North Carolina to the Georgia-Florida border and including the Sea Islands—which is decidedly Southern in flavor, yet stands apart self-consciously in terms of overall cultural character from other parts of the South. Though colonized directly from Great Britain, it also had significant connections with the West Indies (the Caribbean islands southeast of Florida which were colonized by England and

Fig. 1

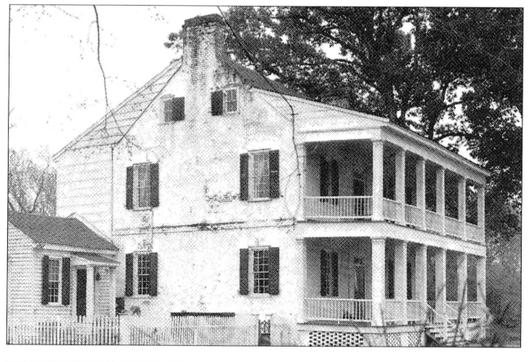
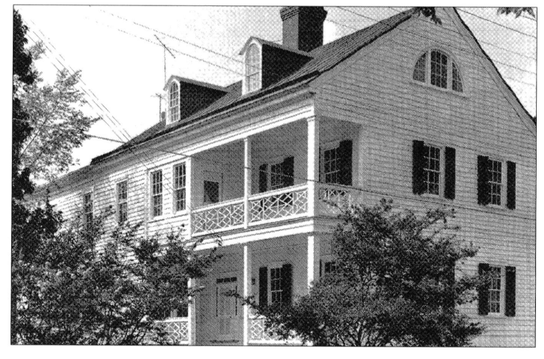


Fig. 2



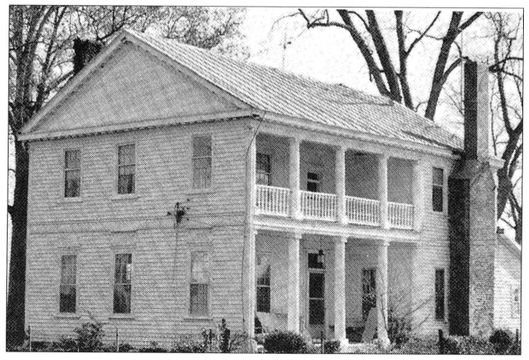


Fig. 3

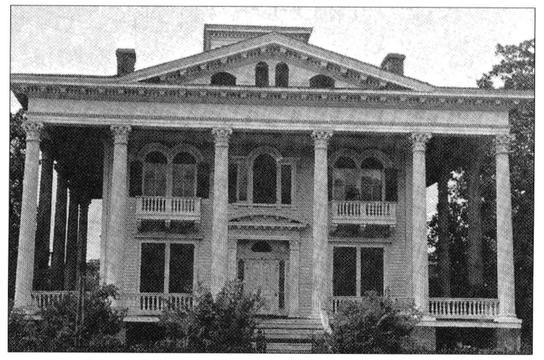


Fig. 4

France in the seventeenth and eighteenth centuries). This subregion is dominated by the cities of Charleston and Savannah. The eighteenth century porch is such a direct outgrowth of climate that it is not surprising that its boundaries of earliest development coincide with this subregion. In the temperate Piedmont and Mountain regions of the Southern colonies, settled predominantly by Scotch-Irish and German colonists who came via the Middle Atlantic States, a more urban, communal, Germanic building tradition shaped the eighteenth century built environment. The eighteenth century sitting porch is not an element in this tradition.

North Carolina occupies a unique buffer position where ecological and cultural elements of the Deep South and Middle Atlantic States intermingle. The state marks the boundary between the upper reaches of subtropical plant and animal species and the lower reaches of temperate species. The greatest single influence on North Carolina's eighteenth century built environment was the building tradition of the Upland South of which Virginia was a part. Yet the presence of the porch links the state with the Lowland (Deep) South. Thomas Waterman, a noted student of Southern architecture, states unequivocally that North Carolina is the northern terminus of the functional porch, and that there is an "almost complete lack of porches of the sort above the border."

What is the precedent for the Southern porch? It is generally agreed that, throughout the Old South, the model for a house suited to the uncomfortable humidity and harsh sun was the West Indian house, a one-story structure set on a high foundation with a long porch extending along one or more sides. This house type, so well adapted to the sultry climate, was perfected in the seventeenth and eighteenth centuries by European colonists of the Caribbean islands who preceded the settlers of mainland America. This West Indian house form also penetrated far into the continent as French settlers carried it up the Mississippi River from New Orleans into Missouri. In the American Southwest, another subtropical building tradition provided the model. The earliest East Coast settlers in this hot, dry climate fused the English detached frame house with the Spanish-Mexican gallery to create another distinctive house type. In it the gallery functioned as an outdoor passageway between rooms and as protection for the soft adobe walls.

In the late eighteenth century, the academic Classical Revival style began to reinforce the functional Southern porch tradition derived from the West Indian model. The classical portico, derived from the front porches of Roman temples, served primarily as an ornate surround for the main entrance, but was often large enough to function as a "sitting porch," Among the earliest and most outstanding examples are the portico of Mount Vernon, completed by 1787, and that of Monticello, completed about 1803. Mount Vernon's portico, which extends the length of the main facade, is closer to the functional eighteenth century model than that of Monticello. The mature Southern porch, an integral feature of the early nineteenth century plantation house in the coastal subregion, is a blend of these two traditions, dependent upon the West Indian model in overall form, the Classical Revival model in decorative detail.

The Southern functional porch takes four major forms: the one-story gallery, the two-story (double-tier) gallery, the gallery extending the length of two or more elevations, and the sub-gallery, or paved basement porch. North Carolina has examples of each form. The earliest known porch in North Carolina, a one-story gallery, is nearly coeval with the earliest extant buildings in the state. Although the very oldest known dwellings—the Newbold-White House in Perquimmans County, Cupola House in Edenton, and "Sloop Point" in Pender County, all built around 1725—were not constructed with porches, "Clear Spring," built about 1740 and believed to be the oldest dwelling in Craven County, does have an original porch. The superstructure of the porch has disappeared, but the coquina (marl) foundation, an extension of the main foundation, still exists. The porch extended completely across the front elevation. A Victorian era photograph shows "Clear Spring" with a simple classical porch which is probably original.

The double-tier porch, engaged beneath the main roof and extending the length of the main facade, and often along the rear elevation as well, becomes a typical feature of pretentious late eighteenth century North Carolina houses, whether rural or urban. Among the outstanding examples are the Burgwin-Wright House, Wilmington, ca. 1771, the "Homestead," Edenton, ca. 1775, "Ashland" (the John Skinner House), Perquimmans County, 1775, "Somerset" (the Josiah Collins House), Tyrrell County, ca. 1800, and the Purdie Place, on the Upper Cape Fear River, Bladen County, 1803–1809 (Fig. 1). North Carolina has no existing tradition of urban housing, and no evidence exists to show whether North Carolina's coastal towns ever developed an urban townhouse idiom such as those which characterize Charleston, Savannah, and New Orleans. This is one of the most perplexing mysteries of North Carolina urban history, for every other Southern coastal state contains at least one city with pre-twentieth century row housing. Most of these cities also developed a typical urban porch which is

a variation of the double-tier gallery.

The most distinctive of these is perhaps the Charleston porch. The dense urban development of Charleston necessitated placement of the narrow end of dwellings to the street, thus utilizing valuable street frontage more efficiently. A double-tier porch extends the length of the side flank, a placement which not only affords greater privacy since it is hidden from the street but also acts as a wind tunnel, channeling the prevailing breeze from the harbor through the porch length. The street end of the porch is weatherboarded and contains the only street entrance, although the entrance into the house itself is usually located in the center bay of the flank.

Wilmington, the major deep water port in North Carolina, located just north of Charleston, was perhaps the most likely area for development of the Charleston porch idiom. However, the city suffered a series of disastrous late eighteenth and early nineteenth century fires, and its present fabric dates from the mid-nineteenth century. A 1757 description of Wilmington dwellings by Peter Dubois notes: "Many of Brick, two and three Stories High with double Piazas which make a good appearance." Perhaps Wilmington had an urban residential fabric with Charleston-type porches in the eighteenth century. The oldest known building in the city, the Smith-Anderson House, ca. 1745, has been remodeled but apparently had an original engaged double gallery along the side flank. The house is placed with the narrow end to the street and is located just a few blocks from the Cape Fear River. It may be the last remaining example of a once dominant house type.

Isolated examples of the Charleston double gallery are found along the North Carolina coast. The most beautiful example is the Color-Gaston House, New Bern, built around 1767 (Fig. 2). It is set narrow end facing the street with a double flank gallery. Unlike the Charleston prototype, however, the porch entrance is located in the center flank bay opposite the main entrance to the house. Nor is the street end of the porch weatherboarded, but it is distinctive as the earliest known example of the porch treated as an interior room, with flush wall sheathing, a molded cornice, chair rail, and baseboard.

The few North Carolina houses with porch ends weatherboarded in the manner of Charleston porches are quite illogically located in rural settings. "Piney Prospect," Edgcombe County (Fig. 3), "Eagle Nest," Jones County, and the Preacher Ferebee House, Currituck County, all dating from the early nineteenth century, have weatherboarded end porch walls with sash windows and traditional center bay entrances to the main blocks.

Both one-story and two-story galleries often function as exterior stair halls in early coastal houses in North Carolina. This placement of the stairway outside the house, accessible only from the porch, is a typical feature of mild climates, and occurs not just on modest farmhouses but on pretentious plantation houses as well. The most common arrangement consists of a recessed (in antis) porch, usually in the rear, with the stairs ascending from the porch floor in a single flight, the upper half of the flight enclosed within the main block of the house. Examples of this stair porch are found at "Millprong" in Hoke County and at the Van der Veer House in Bath. In another common arrangement a stairway, usually partially enclosed, is located on the gallery itself leading from one porch level to another. Typical of this arrangement are the stairs at Harmony Hall, built in the 1770's and the stairs at the Purdie Place, early nineteenth century, both located on the Cape Fear River in Bladen County.

The third major porch form, the gallery which extends around two or more sides of the house, providing an exterior passageway identical in function to the colonnade inside the Roman atrium house, is a distinctively Deep South porch form. The earliest known example of this peripteral form in North Carolina is the "Homestead" in Edenton, ca. 1775. The double gallery originally extended around the front and side elevations, but the side galleries are now enclosed as rooms. The most famous example of a semi-peripteral gallery is that of the Bellamy Mansion at Wilmington, built in 1859, which has a massively scaled Classical Revival portico extending around the front and side elevation (Fig. 4). In general, however, North Carolina porches do not begin to turn corners until the late Victorian era. During this period, throughout the United States, the picturesque Queen Anne Style transformed the relatively staid porch into a limber acrobat which performed gymnastic stunts all over the house. This flamboyant Victorian porch is beyond the scope of our present study.

The last major porch type, the paved sub-porch, developed in the coastal subregion as a logical outgrowth of the raised basement house, a climatic necessity in areas with high water tables. This form was a continuation of the *piano nobile* building tradition of European cities, where principle living spaces were located at the second story level above the unsanitary, noisy street environment. The first story was reserved for service activities, including food preparation and storage, and was generally the domain of the servants. When a porch was wrapped around a raised basement house, a basement gallery was created. Often these were paved and functioned as circulation corridors and sitting areas for the basement.

Fig. 5

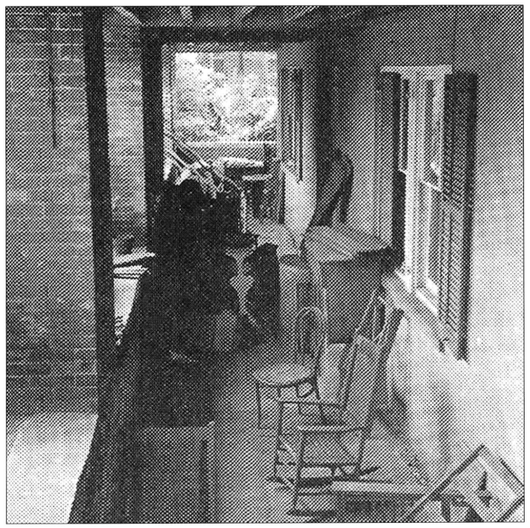


Fig. 6

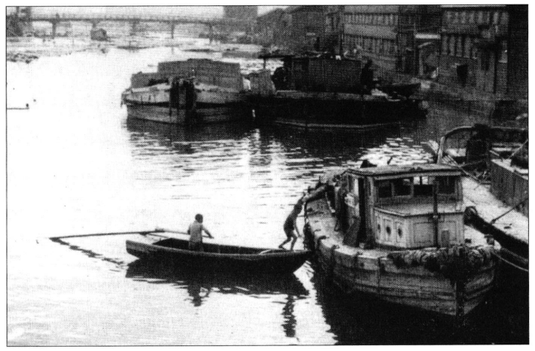
The only examples of such sub-porches in North Carolina are in Wilmington and date from the mid-nineteenth century. Beneath the wrap-around gallery of the Bellamy Mansion is an excellent example of a slave gallery (Fig. 6).

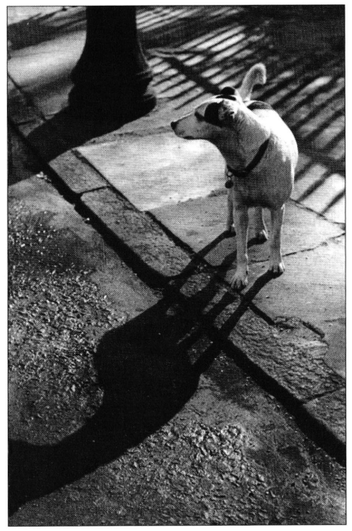
North Carolina antebellum porches have many interesting construction features which reflect both practical and aesthetic concerns. Flush sheathing was often used instead of lapped siding on the wall area protected by a porch, and the porch ceiling was often plastered, giving the porch the appearance of an interior room. The most popular paint color for porch ceilings was sky blue, a tradition common to many subtropical and tropical regions of the world. Many porches were built with freestanding porch supports resting on masonry bases, with a separate foundation recessed behind the posts to support the porch floor. This retarded floor rot since water dripping from the roof was carried out beyond the porch floor. The Humphrey Williams House in Robeson County, which dates from the mid-nineteenth century, has such a porch. Another example is the Dennis Lennon House in Columbus County, also mid-nineteenth century (Fig. 5).

Double and triple leaf doors which could be folded back allowed the interior hall of some antebellum homes to be converted into a recessed porch. One of the best examples of such a double-duty interior hall occurs at the mid-nineteenth century Buckner Hill House in Duplin County. Here the wide cruciform hall has a double door at each of the four exterior entrances, and one arm of the hall has sash windows in each side wall. "Vernon," the Kornegay house built in Wayne County in the mid-nineteenth century, has a triple-leafed front door which can be folded back to open nearly the entire width of the center hall to the exterior. A similar feature resulted where French doors or floor length windows were used beneath the porch instead of traditional windows. In the Isham Faison House in Faison, Duplin County, two pairs of French doors open to the façade length gallery.

Perhaps the most interesting construction feature found in North Carolina porches is the primitive air conditioning system which occurs in a group of late eighteenth and early nineteenth century houses in Beaufort, a port town founded about 1713. Southern antebellum houses utilized a variety of ingenious methods of ventilation, all dependent upon orientation toward prevailing winds and adequate air flow to living spaces. The Beaufort porches, characterized by Thomas Waterman as being very closely related to the West Indian porch, are a homogenous group of one and two-story porches covered by shed extensions of the main roofs. Instead of ventilating the attic space with dormer windows which are exposed to the full sun and consequently cause glare, ventilation is provided by a system of openings in the porch ceiling. Typical examples are found at 817 Front Street and 119 Ann Street, story-and-a-half cottages whose porch ceilings contain trapdoors which open to floor level wall openings in the attic (similar to air ducts in an automobile dashboard) to allow for full cross-ventilation in the attic space. A variation on this system is found at the Jesse Piver House, 125 Ann Street, another story-and-a-half cottage built in 1791. The front porch has no ceiling, and at the floor level of the attic story are small casement windows which open to ventilate in the same manner as the first examples. The only example of this ventilation system occurring outside of Beaufort known the author is at "Sloop Point" in Pender County. The front porch, added in the late eighteenth century, has small square boxed openings in the ceiling through which air is channeled to the loft rooms. This system was probably a common feature of early coastal houses, but only rare examples have survived. New Orleans shotgun houses of the late nineteenth century contain a more sophisticated version of the same system, consisting of factory made cast-iron ventilators located in front porch ceilings.

Within the realm of the built environment, North Carolina's early porches are the state's most distinctive link with the Deep South. The informal, close-knit society of the "porched South" was dependent upon the casual atmosphere of these in-between living spaces. Special care should be taken to preserve these early North Carolina porches which carry such a significant geographic and cultural message.





1978: Models

VOLUME 27.0 GREAT MODELS

EDITOR'S INTRODUCTION

Suzanne Buttolph

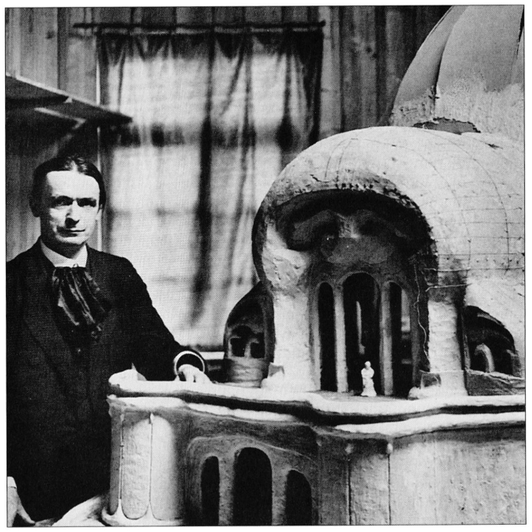
This scholarly essay by student editor Suzanne Buttolph provides an historical survey of the varying purposes of architectural models since antiquity. In addition, this volume included twenty illustrated articles by prominent architects, most of whom are identified by brief quotations printed on page 123, who offered their personal views on the uses of the model in contemporary practice.

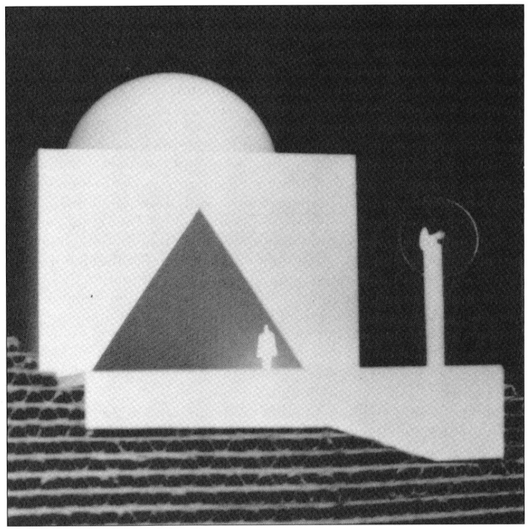
Architectural models offer a record of architecture older than the profession itself; a record which expresses all the varying spirit and meanings which both architects and their public give to buildings. It is an enchanting journey through entombments and religious devotions, through records left in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

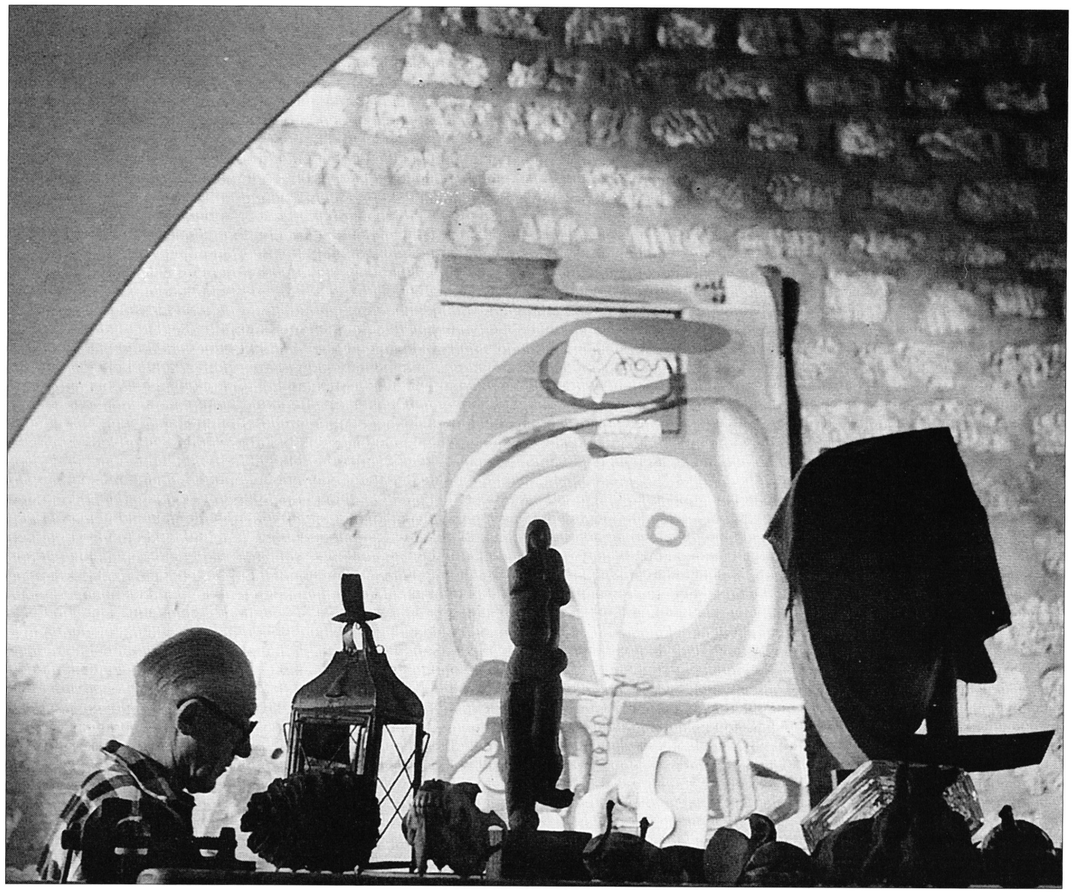
The early donor as seen in paintings and mosaics is usually a highly placed religious or political personage, shown presenting the model of the church to Christ or to the Virgin. In *The Nativity* by the Master of Hohenfurth, the small Jesus has only just been born and He is already being presented the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





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



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 on 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 facsimiles 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 craftsman. Matteo *Di Giovanni's beautiful Madonna and Child with Angels* pictures neither architect nor donor, but an indigenous model of the intended building with the donor's request for funds to build the church: behind the Madonna the scroll reads "Let every man help on this good work begun in honor of Mary, if you wish the blessing of the Lord," 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 or 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 today models often reveal more about the architectural ideas and personalities than about buildings.

The image of the small building answered by 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 Costanze in Pesaro, the fortifications of which were begun in 1474, the year of the painting; 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 elegiac *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." 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. 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 craftsman 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 of both wood and clay, and many still remain. Often they required craftsmanship of the caliber 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." 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 models 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 proferred by an apprentice. Competitions such as that for the façade 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 Rosenburg house for the Paris competition of 1923.

The gradual deemphasis of the model and preeminence 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. 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, "modeling," 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 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 in 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." 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*.

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

But Robert Stern stated in his article states 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, 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 LeCorbusier 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 teamwork 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.

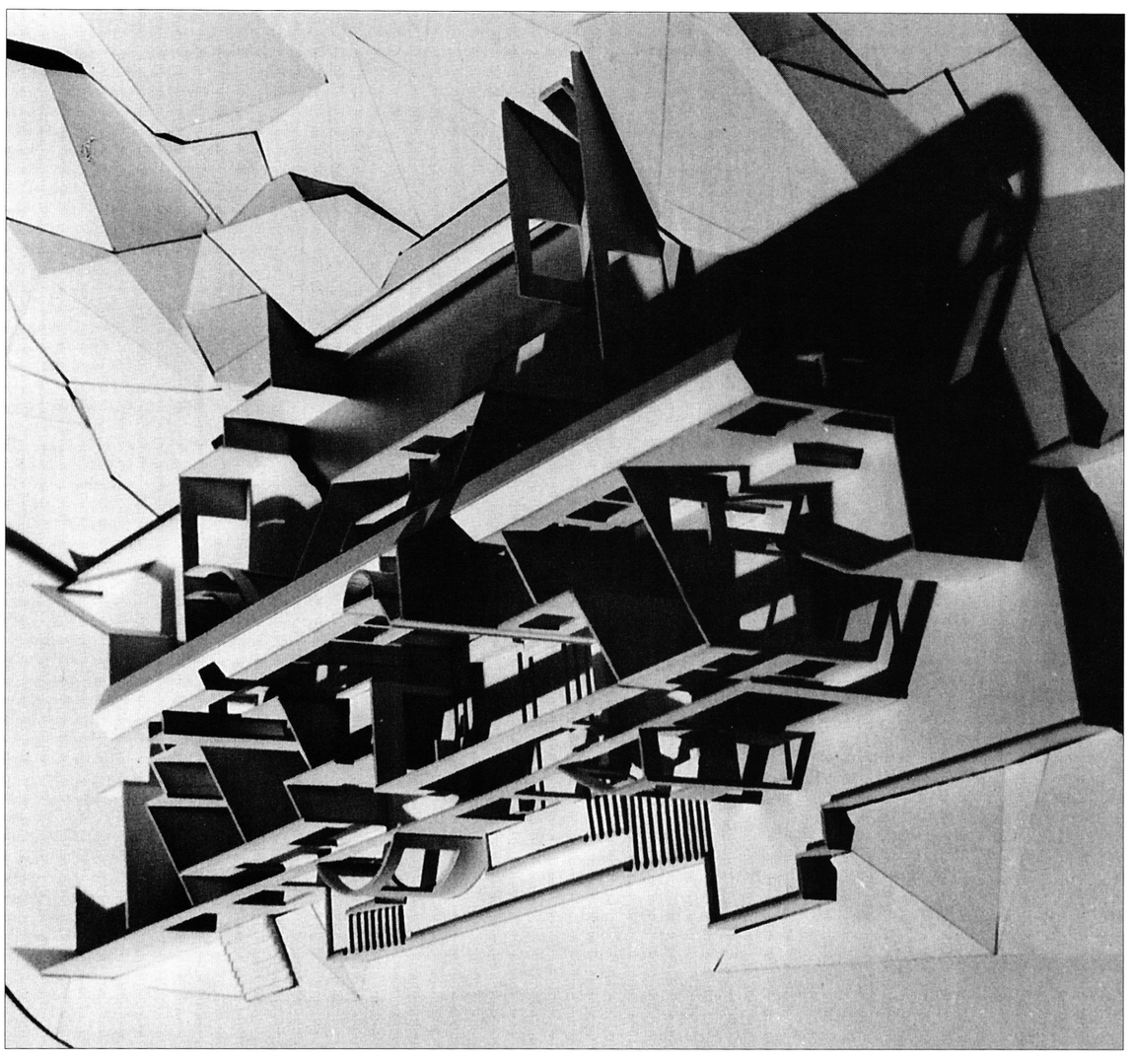
Thus we see now the new study model whose intention is a building, and the architectural study which finds little purpose in buildings but in the expression of ideas about buildings, and whose genesis is perhaps closer to the allusive model of the Renaissance painter than to its contemporary counterpart.

The speculation that architects' reliance on models for study had 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 modeling) 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. Fillippo 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 modeling 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 and 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.



"a peculiar kind of professional atavism"
-Reyner Banham

"a healthy suspicion of the techniques by which we represent space"
-Richard Oliver

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

"few models… are built at even one-fiftieth the size of the actual building"
-George Hartman

"the model generates the dialogue of the eyes, provokes the indicative gestures of reverent hands…"
-Rodolfo Machado / Jorge Silvetti

"interaction of emotional intensity"
-Roland Coate

"a matter of continuing reciprocity between thought and object"
-Michael Graves

"an acquired formal store of models of excellence"
-William Turnbull

"the real model is a design project at a degree of abstraction"
-Eugene Kupper

"often models may be clearer in their ability to express the intentions than some of the actual built works"
-Richard Meier

"all art ultimately ends up as product in our consumer culture, no matter what the intent"
-James Wines

"the drawing gives a much better presentation of the idea of the space"
-Romaldo Giurgola

"each one of my works in its development has a different history"
-Luis Barragan

"after all, why think about mouldings and corner beads when straight pins and glue will do?"
-Robert Stern

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

"a painting painted three-dimensionally in space"
-Kinsaku Nakane

"it is no greater leap of the imagination to expect people to see cardboard as brick than broccoli as tree"
-Hugh Hardy / Malcolm Holzman / Norman Pfeiffer

"the synthesis is the model"
-Warren Schwartz / Robert Silver

"each model of a concept…is, in a sense, only one toss of the dice"
-Anne Griswold Tyng

1979: Precedents

Volume 28.0 Analysis of Precedents

Introduction
Roger Clark & Michael Pause

Roger H. Clark, FAIA, and Michael Pause, Ph.D., conceived this publication more than two decades ago as a practical tool for both understanding architectural form and generating design concepts. Its impact has been extremely wide: the authors' successor publications titled Precedents in Architecture *have been published in several languages and have been adopted as textbooks in numerous architecture schools internationally. Professors Clark and Pause continue as faculty members in the College of Design.*

This volume is a collection of diagrams which systematically analyze the works of eight architects. For each architect four representative buildings have been documented. The architects were purposefully selected from various periods of time to represent seemingly different approaches to architecture.

Diagrams have been utilized to capture the essence of particular issues for each building. The issues studied are divided into three categories: elements, relationships, and ordering ideas. Physical attributes which can be compared independent of building type or function have been addressed in the diagrams. The analysis is not all inclusive in that it is limited to characteristics which can be diagrammed; thus, material palette is one obvious omission. Our analysis and interpretation has been of built form and therefore may not necessarily coincide with the architects intentions or the interpretation of others. In order to make the diagrams memorable, they have been intentionally simplified. Likewise the accompanying text has been abbreviated to reinforce the information contained in the diagrams. Presentation of the diagrams permits this document to be used for the understanding of one building, one architect, or an approach to an idea by several architects.

The intentions of the study are to assist the understanding of architectural history, to examine the basic similarities and differences of architects' designs over time, to identify generic solutions to design problems which transcend style, and to develop analysis as a tool for design. Of paramount importance is the development of a vehicle for the discussion of design ideas through the use of example.

The material in this volume began as a graduate architecture seminar presented by the authors. This seminar was generated by the observations that the concept of parti was unfamiliar to many students and that while history is discussed it is seldom useful or applicable. We are indebted to these students in helping us develop the technique for analysis, but for this publication we have totally re-analyzed the work of the architects, developed new diagrams, and generated the text. The diagrams were drawn by Roger Cannon and Don Self, with the exception of some of the diagrams of Charles Moore's work, which were drawn by Paul Haynes. The work of these graduate students was supported in part by university research assistantships.

To the best of our knowledge the information presented here has not been previously available. By making the information available through this publication, we hope to expand the understanding of precedents in architecture, and to illustrate an educational technique that is useful to students, educators and practitioners.

PREFACE

George E. Hartman, Jr.

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

The fragmentation of architecture into the separate disciplines of design, criticism, history and education is a relatively recent phenomenon. The unfortunate result of this specialization has been the limitation of most architects' knowledge of history to little more than names and dates. Few architects have any real understanding of the evolution of architectural ideas or even what constitutes them, and thus are denied a vocabulary that has been developed and tested over time. This introduction into the study of architectural ideas is an important step in the bridging these artificial distinctions between practice and theory. By making comparisons easier and clearer, it should also help to separate that which is being attempted from the memos by which it is being achieved.

The following diagrams of architectural concepts at once reduce buildings to their essentials, intricate use programs to a few lines, and hundreds of complex relationships to a few important ones. This elimination of all but the most important considerations makes those that remain both dominant and memorable.

I believe designers benefit from a comprehensive understanding of the widest possible range of architectural organizational concepts or parties. One of the best ways of becoming familiar with these ideas is to study those used by important architects throughout history. The basic *parti* and its variations can provide the first step in recalling a building, comparing several schemes, or beginning a design. In addition, familiarity with the major *partis* should encourage the selection of ideas from a greater range of possibilities on the basis of their appropriateness in a particular situation. It should also facilitate the comparison of contemporary designs with solutions to similar problems throughout the history of architecture. It is no accident that our most creative architects are also often those who have the best working knowledge of architectural history (Charles Moore, Robert Venturi, Louis Kahn, etc.) or those who are working within an established historical context (Alvar Aalto), or both (Andrea Palladio).

Obviously, a sound organizational diagram will not lead inevitably to a good design any more than a classic chess opening will lead to certain victory, but a sound beginning can forestall an early defeat while greatly increasing the chances of an ultimate success.

ENTRANCE

CIRCULATION

MASSING

STRUCTURE

SPACE DEFINITION

NATURAL LIGHT

BUILDING TO CONTEXT

The examination of the primary relationship between a building and its immediate proximity; focusing on site specific information of access, boundary conditions, typography, views, and vegetation. Another focus is contextual issues which may have influenced the design; such as, adjacent activities patterns, form languages, and geometries.

CIRCULATION TO USE

The examination of the relationship between static and dynamic activities. As such, it is the combination of the circulation and space definition diagrams. the basic relationships are that circulation is separate from use space or through the use of space. If either defines, serves, or links use spaces. Circulation through a use space can be either defined or implied.

GRID GEOMETRY

As an ordering idea grid/geometry embodies the use of geometric relationships to determine formal results. This includes the use of pure geometries; such as square, circle, triangle, and various manipulations are: proportional derivation, rotation, extension, overlapping, subdivision, and combination.

PLAN TO SECTION

The examination of the relationship between two dimensional information as represented in a plan and the third dimension represented in section or elevation.There is either a direct or indirect relationship between the plan and the section. Direct relationships exist when the section is the plan rotated ninety degrees, similar articulation occur in plan.

PLAN TO SECTION

UNIT TO WHOLE

The examination of parts of a built form as units and the relationships of these parts to the total building. Alternative relationships are; that the unit is the whole, the units aggregate to form the whole, and the whole is more than the aggregation of the units.

INSIDE TO OUTSIDE

The examination of the configuration of the membrane which separates the exterior from the interior. The configuration can be such that the outside and the inside are the same or different. Contrast between inside and outside can result from differences in geometry, alignment, articulations, or form language.

REPETITIVE TO UNIQUE

The examination of the relationships between multiple elements and singular elements. The repetitive elements can be aggregated to form the unique, interrupted by the unique, originate from the unique, or serve as a counterpoint for the unique.

SYMMETRY/BALANCE-POINT/COUNTERPOINT

Generally symmetry and balance refer to the relationship of parts about a real or implied axis. Symmetrical order is achieved when equal elements have the same but opposing relationship to a axis. Symmetry embodies three basic manipulations: reflection, rotation, the movement of the element.

HIERARCHY

Hierarchy is the rank ordering of parts relative to a common physical attribute.

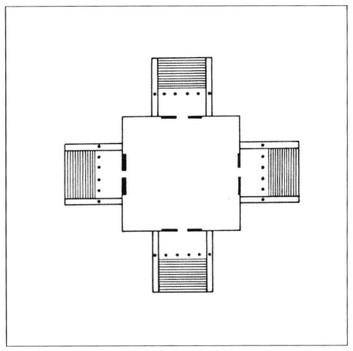
LAYERING

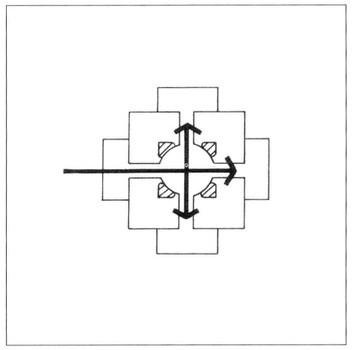
Layering is the vertical or horizontal juxtaposition of parts wherein one part is in front of or on top of another. Most of the time the layers are physically distinct elements with the surfaces or limits of the elements forming the layers. However, at times the layers can be implied, resulting from color or material changes.

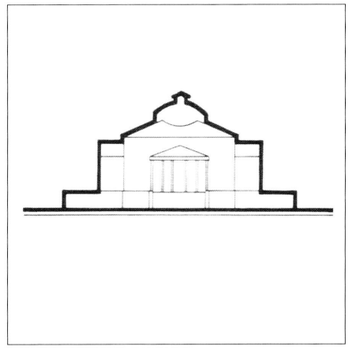
PARTI

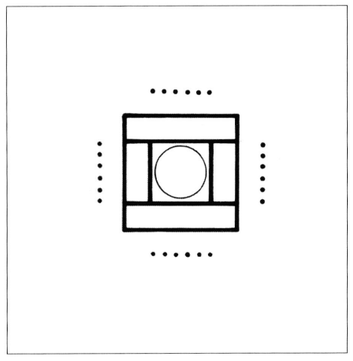
The *parti* is the dominant idea of the building which embodies the salient characteristics of that building. The *parti* diagram encapsulates the essential minimum of the design, without which the scheme would not exist, but from which the form can be generated.

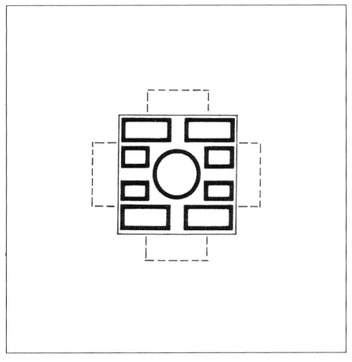
The elements, relationships and ordering ideas described above are shown in diagrams for Rotunda and Ronchamp on the following pages. The cell locations are consistent for the 3-page spreads.

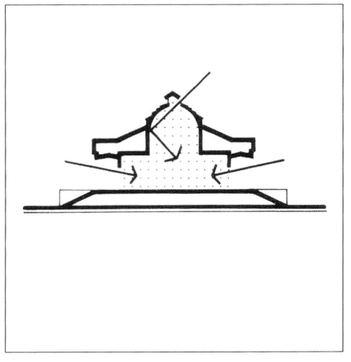


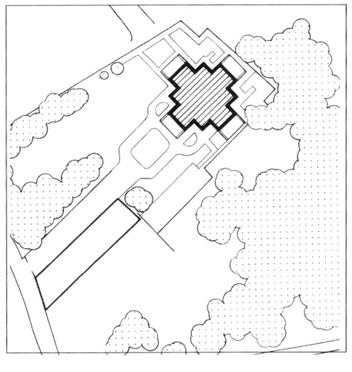


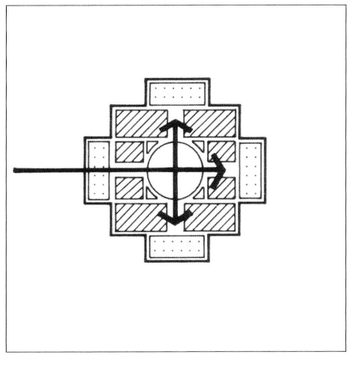


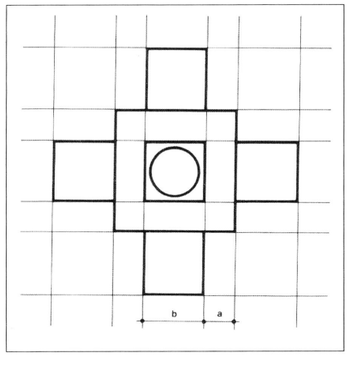








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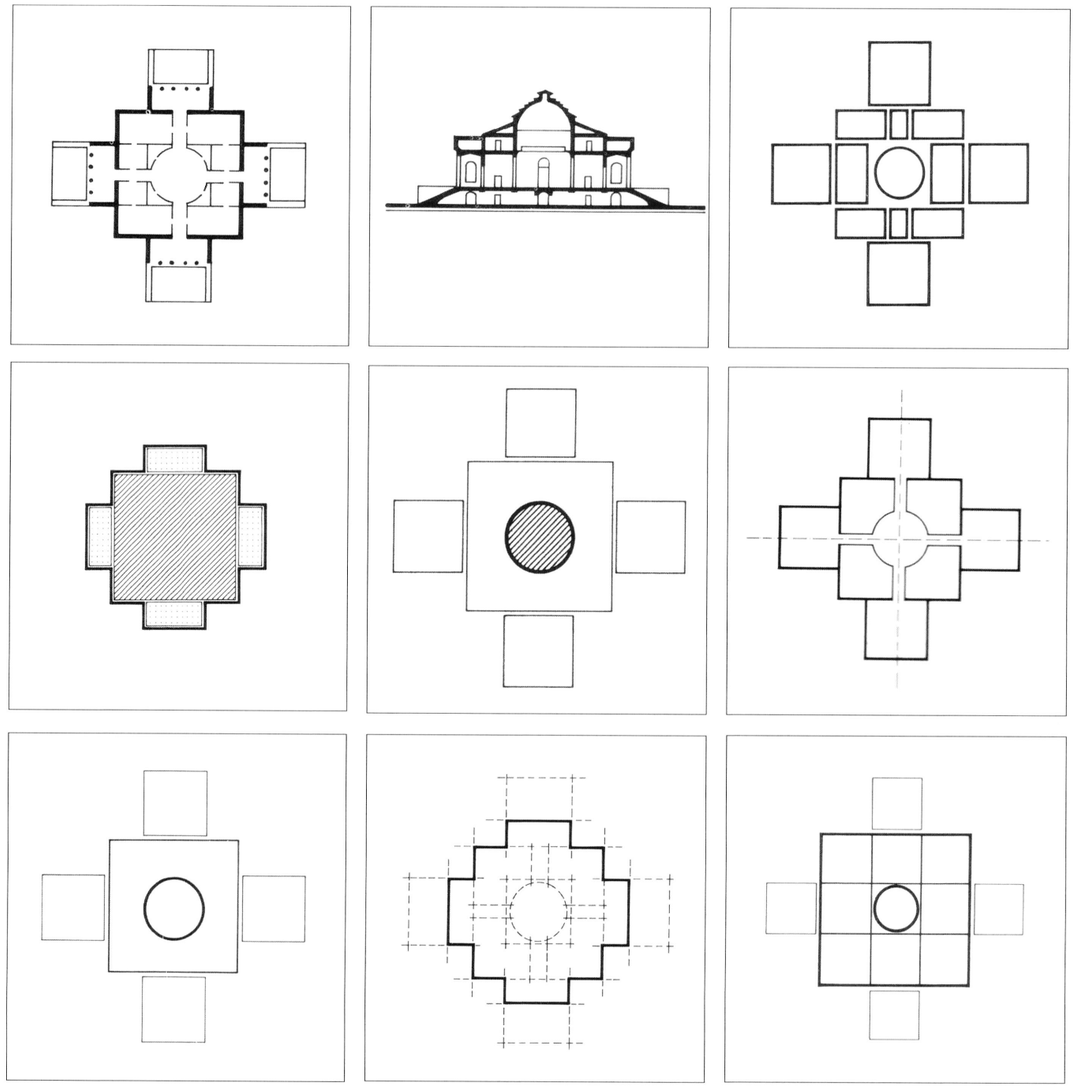

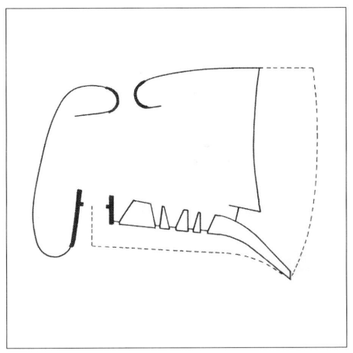

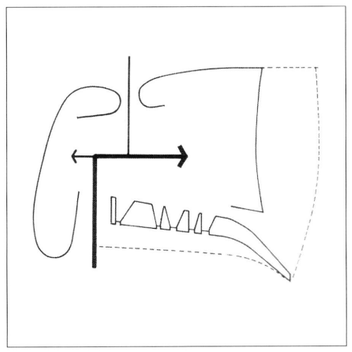

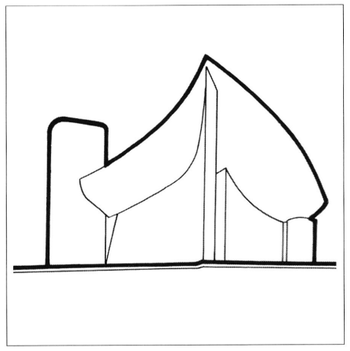

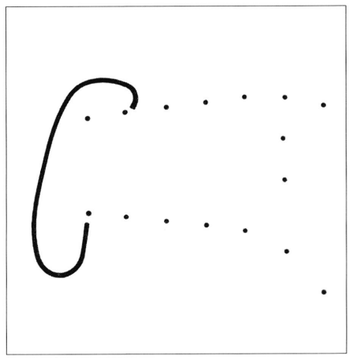

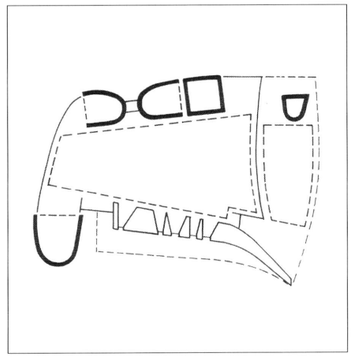

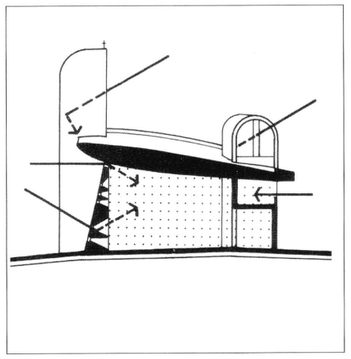

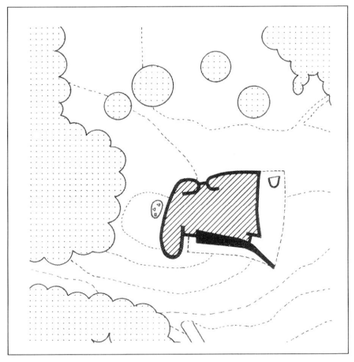

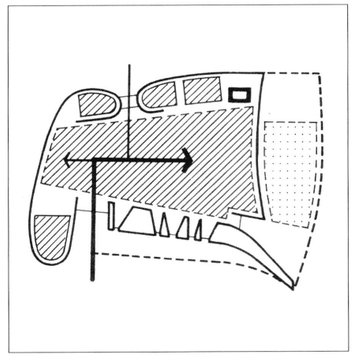

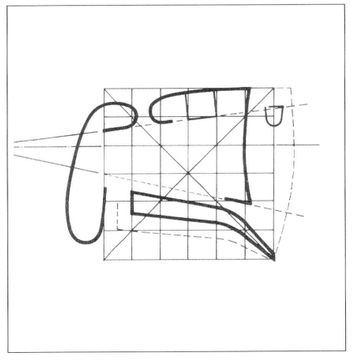

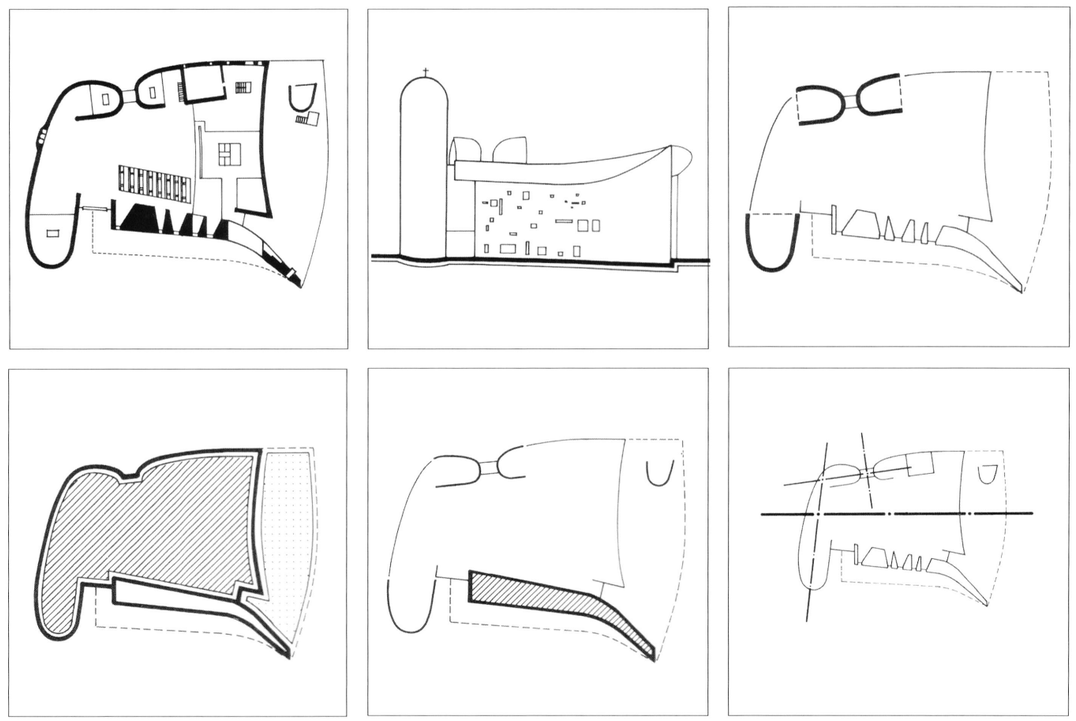

Preview Volume 31 Relevance

Publication date Fall 2004

Volume 31 *Relevance*, to be published fall 2004, will explore new ways that designers today are questioning traditional practices in an effort to deliver the benefits of their creative work to more people outside the boundaries of academia and their own profession.

Evolving technologies in mass customization are allowing some designers to respond with non-traditional solutions to the needs of a diverse range of clients. These designers are addressing new problems that can be solved through practice, and they are finding new markets for their work.

Others are rethinking the traditional client-designer relationship to involve their clients as an integral part of the design process, while broadening the reach of architecture to include a previously unserved client base.

And while our cultural landscape has become increasingly fragmented, other architects are attempting to understand and reinterpret this contemporary context as they seek to make their individual voices heard.

Each of these approaches is an attempt to find new voices for architecture and design as well as new audiences. Volume 31 will explore this evolution of the profession as designers seek a new relevance for architecture.

Co-editors: Adam Brakenbury, David Jason Miller and Thomas W. Ryan

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