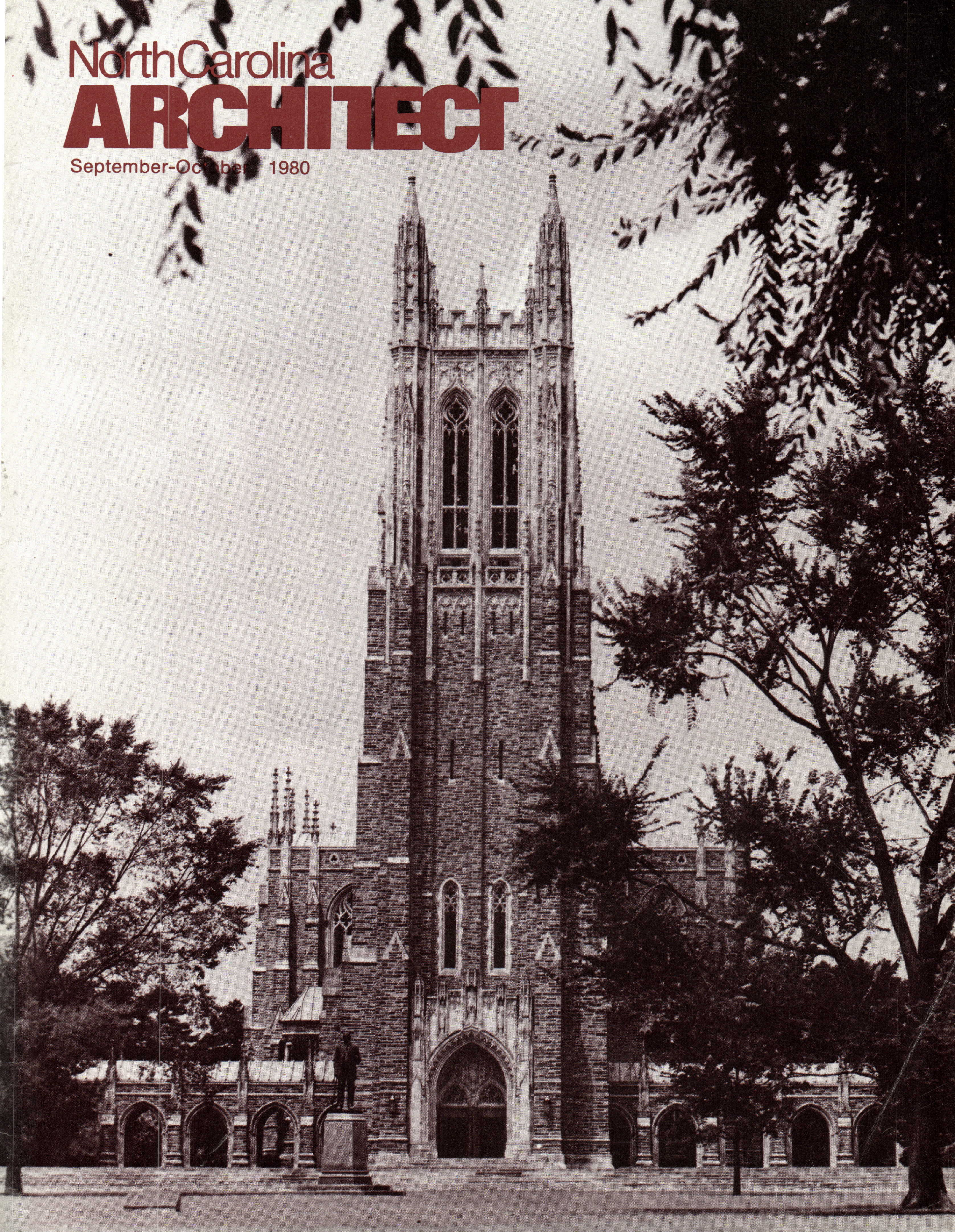
North Carolina
ARCHITECT
September-October 1980



THE STRENGTHS OF THE TRADITIONAL. AND THE MODERN.

The architecture of the Greenwood Forest Baptist Church in Cary, N.C., calls on the strengths of the traditional and the modern. And it makes extensive use of brick. Wallingford Gray by Borden.

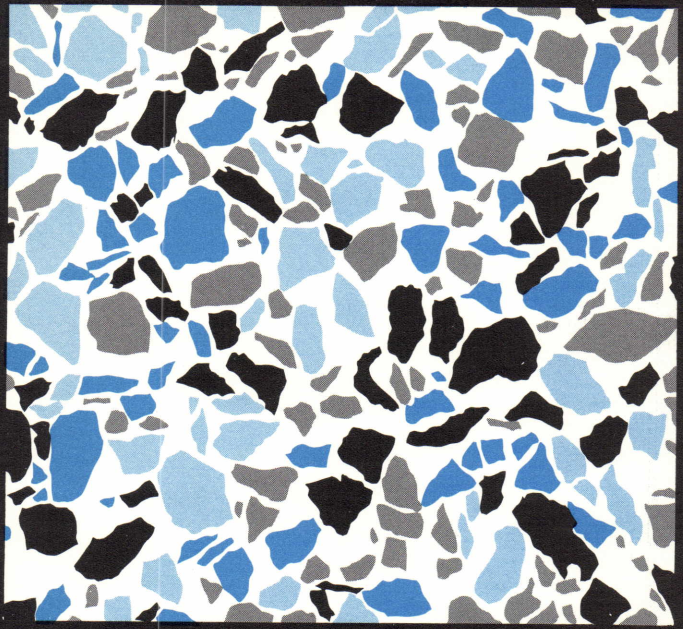
The brick contributes to the strength and beauty of the design; and, because the floors are also of brick, the acoustics in the Greenwood Forest Church are excellent.

Wallingford Gray is only one of the thousands of textures, shapes and sizes produced by Borden. And we've been doing it for nearly seventy years. Whatever brick you need, give us a call. We probably have it — or we'll make it.

And there's one brick made only by Borden. Handtique®, a brick made with the methods of today, and the look of yesterday. By Borden.

In NC call: 1-800-672-0081
Outside NC: 1-919-596-8241

Borden
BRICK AND TILE CO.



Think terrazzo is too expensive?

Look again.

The fact is . . . terrazzo is economical. Look for a moment beyond terrazzo's lasting beauty and elegance. Consider factors like low initial cost, ease of maintenance and durability. The facts are impressive and add up to make terrazzo the most solidly economical flooring choice available.

Cost of Installation

Start with the initial cost. During the last 12 months, over 50% of David Allen Co., Inc.'s terrazzo projects were installed at a cost of less than $1.40 a square foot. Our highly efficient work crews utilize the latest technological advances in order to make terrazzo installation costs competitive with other types of flooring.

Ease of Maintenance

Terrazzo: more economical than vinyl tile? In as little as seven years of use, terrazzo's low upkeep requirements make its combined installation/maintenance costs less than vinyl tiles. Terrazzo never needs waxing, vacuuming, shampooing or the investment in expensive maintenance crews and equipment.

Durability

Some floor surfaces need replacement after as little as two years . . . terrazzo lasts the life of your building.

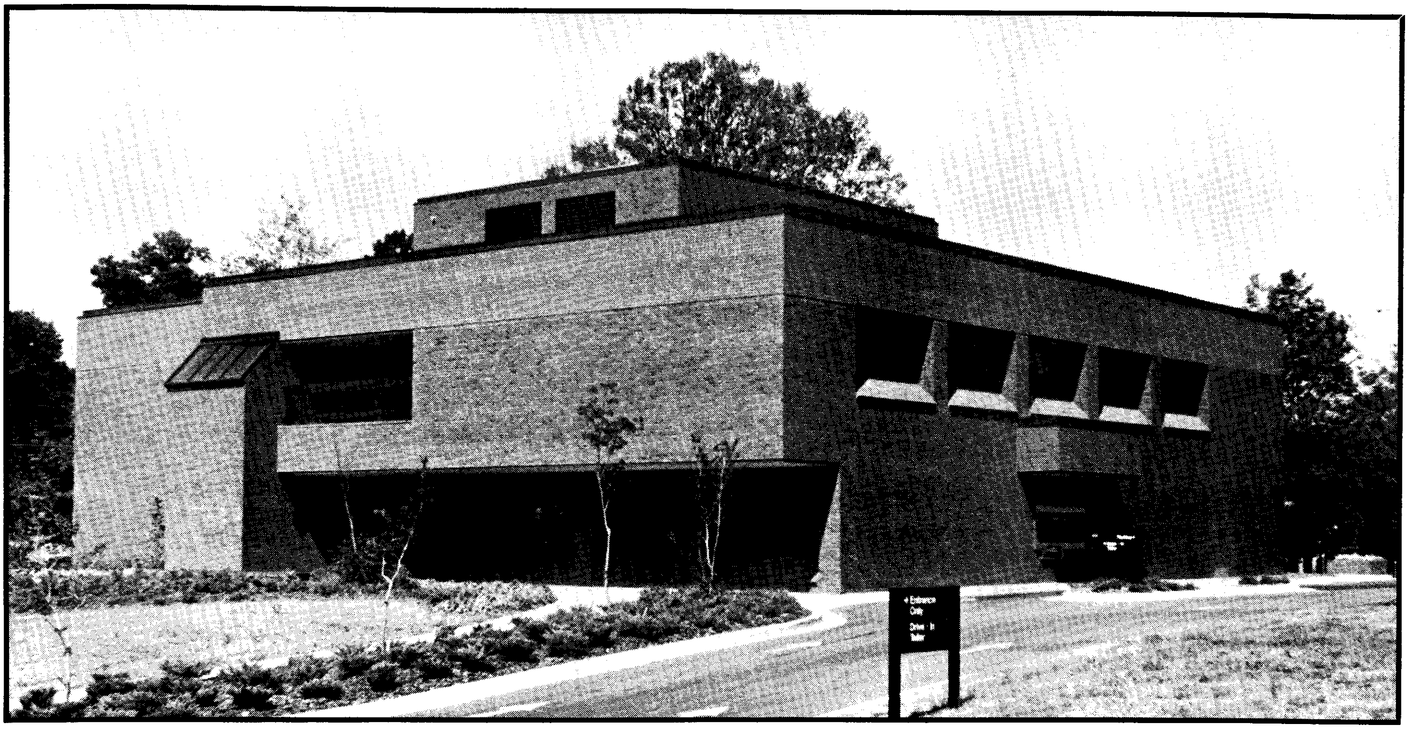
Beauty and durability, combined with economy. If you would like a better look at terrazzo and what it has to offer, get in touch with Dave Roberson of our Terrazzo Division. For over sixty years, we at David Allen have been providing the southeastern United States with the finest in floor materials and service. And when it comes to terrazzo, we have the ideas and the expertise.

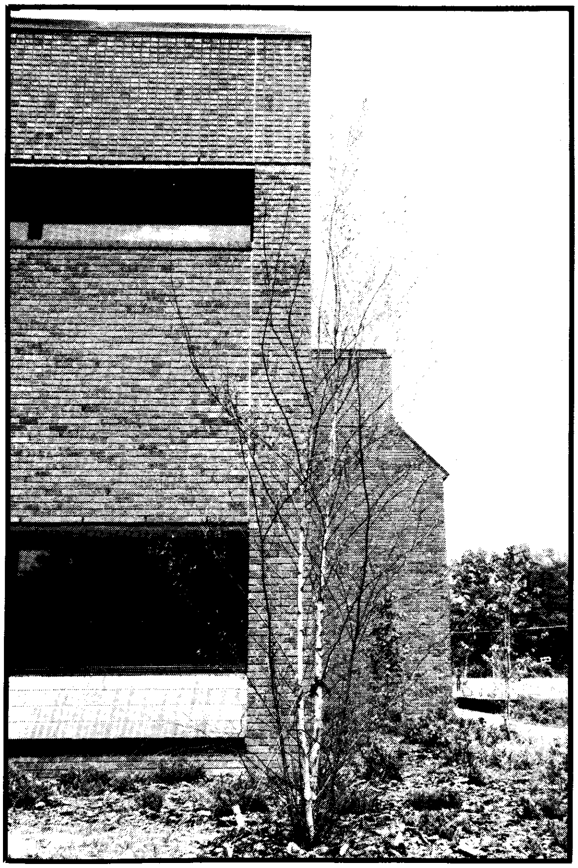
SINCE 1920

DAVID ALLEN COMPANY

P. O. BOX 27705 · RALEIGH, N. C. 27611 · (919) 821-7100

TILES · MARBLE · TERRAZZO · ACOUSTICAL · RESILIENT AND SPECIAL FLOORING · MOVABLE PARTITIONS

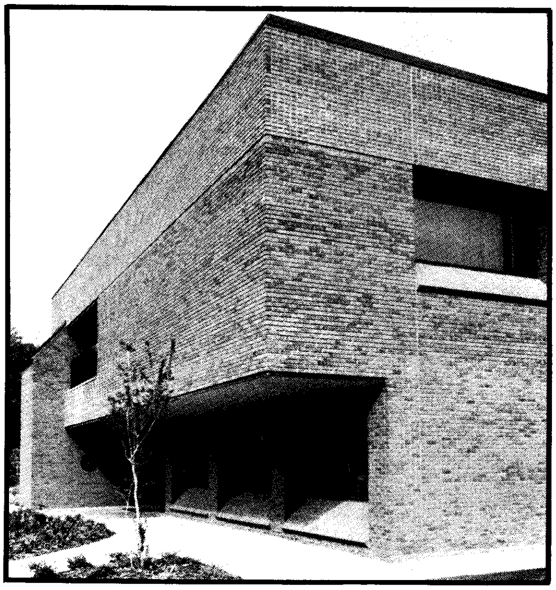




Heins Telephone Company

Sanford, N.C.

Architect:
Hayes, Howell & Associates



BRICK
IN NORTH CAROLINA
ARCHITECTURE

Structural Engineer:
W. H. Gardner, Jr. & Associates

Landscape Architect:
Lewis Clarke & Associates

General Contractor:
DWC Contractors, Inc.

Masonry Contractors:
Watson Brothers

Brick Association of North Carolina

Vol. 27 No. 5
September-October 1980

North Carolina ARCHITECT

Official magazine of the North Carolina Chapter
American Institute of Architects

Cover photo: Duke Chapel, the "heart" of the campus, according to University Architect James A. Ward who is interviewed in this issue.

Architectural design for energy conservation 4
Brian Shawcroft, AIA, discusses the wholistic approach to building designs for energy efficiency by considering regional climatic differences and conditions

Planning for tradition 11
An interview with James A. Ward, Director of Physical Planning and University Architect for Duke University

Books 16
Two new publications of interest to architects: *Contemporary Architects* — featuring 600 world leaders in contemporary architecture, and *Accessible Housing* — a fully-illustrated manual on North Carolina's building code requirements for accessible housing

Chapter Notes 18

Publisher
R.B. Reeves III
Design Director
Sally Bruner-Johns
Assistant Editor
Kim Johnson Devins
Director of Marketing
Thomas H. Smith, Jr.
Contributing Editor
Ernest Wood

North Carolina Architect Editorial Committee
James C. Buie, AIA
Brian Shawcroft, AIA
Frank A. DePasquale, AIA
Herschel G. Walters, AIA
Dennis Nicholson, AIA

Controlled circulation postage paid at Raleigh, NC 27611. U.S.P.S. No. 539-590.

Subscription rates: $10.00 a year for AIA members; $15.00 a year for non-members.

Opinions expressed by contributors are not necessarily those of the North Carolina Chapter of the American Institute of Architects.

North Carolina Architect is published six times a year on February 6, April 2, June 4, August 4, October 6, and December 3 by Spectator Publications, Inc. P.O. Box 870, Raleigh, North Carolina 27602 for the North Carolina Chapter of the American Institute of Architects, 115 West Morgan Street, Raleigh, North Carolina 27601. NCAIA telephone: (919) 833-6656. Publisher's telephone: (919) 828-7393.

President
Marvin R.A. Johnson, FAIA
President-Elect
Conrad B. Wessell Jr., AIA
Vice-Presidents
E.H. (Jack) Copeland, AIA
A.J. Hammill Jr., AIA
Michael R. Tye, AIA
Secretary
John F. Sinnett Jr., AIA
Treasurer
John E. Cort, AIA
Directors-1980
Elizabeth B. Lee, AIA
James C. Buie, AIA
Herschel G. Walters, AIA
Directors-1980-81
Ralph B. Reeves Jr., AIA
Ernest K. Sills, AIA
Ex-Officio
Betty W. Silver, Hon. AIA
Tharrington, Smith & Hargrove Attorneys
Wade M. Smith
Steven L. Evans
Richard Schwartz

©Copyright, 1980 by the North Carolina Chapter, AIA. All rights reserved.

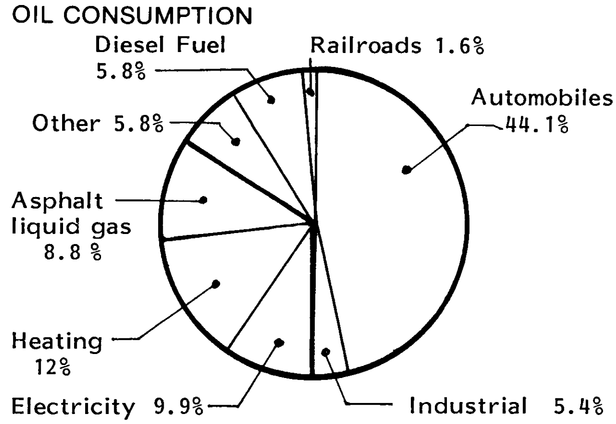
North Carolina Architect was formerly published as *Southern Architect*, Volume 1, No. 1, through Volume XI, No. 11, 1954-1964.

Architectural design for energy conservation

by Brian Shawcroft, M. Arch., AIA, RIBA

This article deals with the wholistic approach to the design of buildings for energy use efficiency by responding to regional climatic differences and known conditions.

The Department of Energy estimates that 33 percent of the nation's energy is used in buildings. With that figure in mind a strong case can be made for conservation in this area of use. Emphasis is made particularly on the consumption of oil but it has been stated recently that much of the energy for buildings comes from gas and coal, currently not in short supply. The following diagram shows the current distribution of oil consumption:



Source: Bureau of Building Marketing Research, 1980

With 12 percent of the oil used directly for heating purposes, 9.9 percent used in the production of electricity, 8.8 percent used in liquified gas (both electricity and liquified gas used essentially to heat, cool and light buildings) and a current trend toward more use of electricity as a fuel source, it is evident that the reduction in use by conservation of all types of energy would divert the dwindling oil supplies to uses where alternate forms of energy cannot be used.

The most direct effect other than fuel shortages is one of economics. The additional utility costs in commercial buildings are passed on to the consumer by direct escalations in rental rates and indirectly through taxes for the increased cost of maintaining public buildings such as government offices, education buildings, etc. The homeowner is already aware of the changes in utility costs and the effect on his or her lifestyle.

As a result of the 1973 oil embargo and the rise in fuel costs, there has been considerable interest in solar energy as a potential solution to building energy uses. Much of it is in the form of "add-on" or retro-fit technology solving the problem partially. The strong traditional American desire to solve a problem through a readily marketable technological solution has not proven cost-effective and is often unsightly. The addition of solar panels on the roof of a Victorian townhouse or a Williamsburg-style suburban home has much to be desired in terms of aesthetics and public acceptance. The integration of creative engineering solutions and architectural design is the potential solution to the problem. This approach can be applied to new buildings in the planning stage but much of our built environment will need retro-fitting because of the volume in existence today. Most of these buildings have an effective life of 40 to 50 years; demolition is out of the question. Therefore, a great emphasis will be placed on retro-fitting with the knowledge that existing buildings will not meet the same potential standards of energy use as new buildings.

In addition to the present "state of the art" and economic conditions, other factors are known: 1) The cost of energy will continue to rise and the cost of all goods and services dealing with the building industry will increase; 2) Energy shortages will occur in all forms of fuel sources and will continue for a foreseeable 30 years from the mid-1980s; 3) The national response to crises is slow. There will be long periods of debate in Congress before any enforceable legislation is passed.

As a result of these pessimistic predictions, the need for conservation of energy in buildings is vital. The co-operation of everyone in both government and the private sector is essential to create and support realistic solutions before serious shortages occur and the potential economic and social chaos they will generate.

The architectural profession, in association with related professions and the building industry, must take the lead. The architectural profession is presently involved in a series of programs through both the AIA Research Corporation and the stated policies of its officers in making energy and design the main thrust for the 1980s.

Style and Regionalism

Some members of the architectural profession, as evidenced in the architectural press and the work presented in the schools of architecture, are engaging in a polemic of style with much of the rhetoric calling for a return to earlier periods for familiar imagery and scale. This is based on the alleged rejection of the Modern Movement by the public. In the past we solved the comfort conditions of our buildings by the simple approach of dealing with the climate by direct methods, developed regionally and continued from generation to generation until the Twentieth Century. With the advent of mechanical air conditioning systems, the form of the architecture was no longer dependent on traditional methods. Along with the development of new building techniques, the proponents of the International Style were able to design buildings for both the desert and the northern climates with identical appearance, the only variable being the choice of cladding material and the amounts of energy consumed in either heating or cooling to counteract the climatic extremes. This has resulted in many of our larger buildings, especially in cities, now being very energy inefficient due to both the stylistic approach and the period of low fuel cost at the time they were built (post World War II to the present).

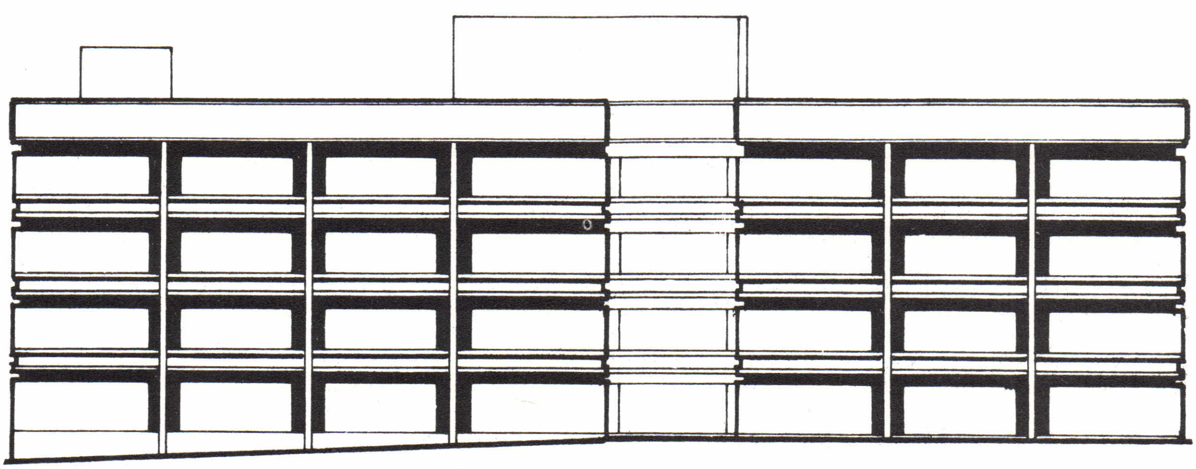
A more meaningful "return" to building design would be to re-examine the natural and regional methods used in solving comfort conditions to develop a style with energy design as the prime form-giver.

This approach has been recognized as a sound basis for future architectural form and expression as stated by Howard R. Lane, FAIA, in his defense of the Building Energy Performance Standards (BEPS): "I see the possibility at last of the re-emergence of regional architecture, which in its building and urban forms acknowledges the uniqueness in space and time while responding creatively to the new reality of limited resources."

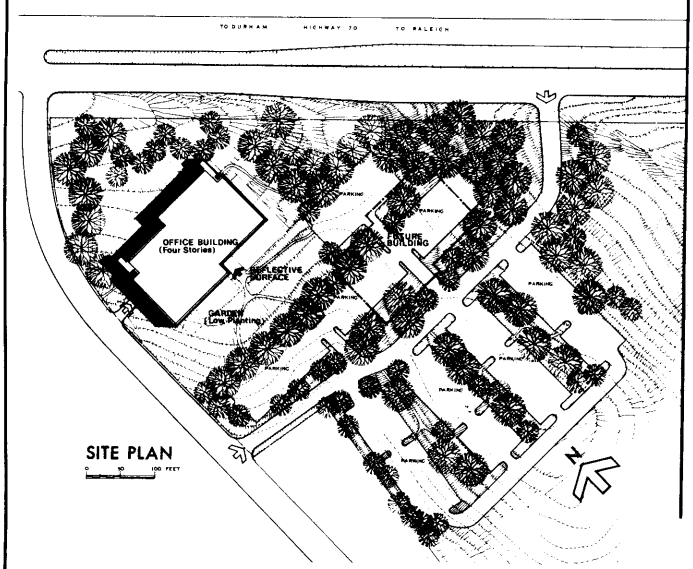
Another proponent of this approach is Charles C. Hight, AIA, PE, Dean of the College of Architecture at UNC-Charlotte. In his work in environmental design and planning as a senior Fulbright Research Fellow in the Netherlands, 1974, he stated: "I contend that there are three aspects to the future of regionalism in architecture and urban developments: 1) Relating any new buildings or building complexes to a district's or region's unique spatial and visual ordering systems; 2) Involving users in the design and planning processes in order to understand the unique cultural values and needs of the inhabitants; 3) Responding to the issues of *energy and ecology* pertinent to each region. Building form and organizations must therefore correlate with climatic forces. In so doing, we shall deal positively and integrally with the issues of energy, ecology and economy."

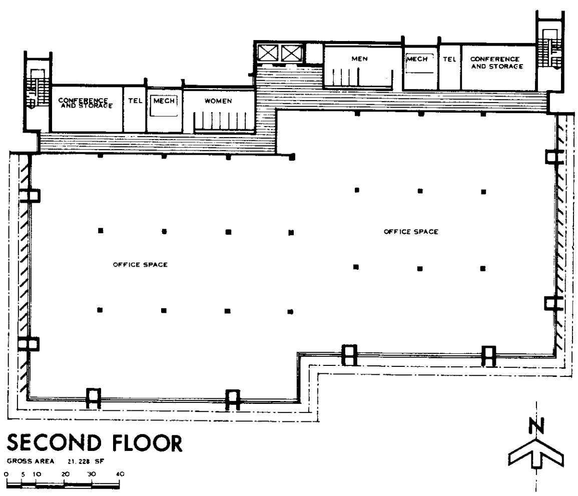
AIA Research Corporation Study for the Development of Building Energy Performance Standards (BEPS)

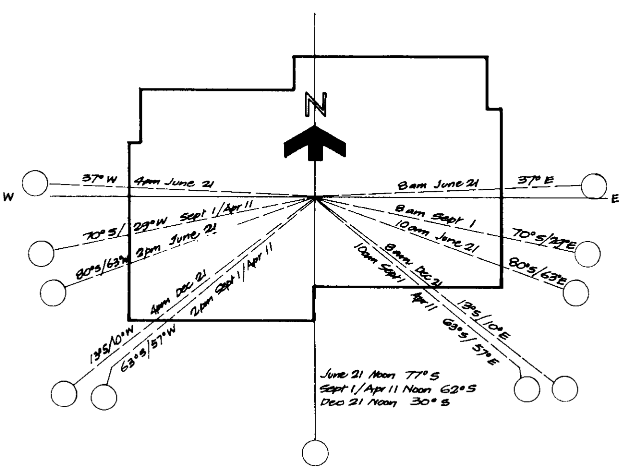
Through a grant from the United States Department of Housing and Urban Development, Office of Policy Development and Research in co-operation with the United States Department of Energy, the AIA Research Corporation developed the following approach:



Northeast elevation, original building, Raleigh







RALEIGH NC 36°

Profile angles of the sun in Raleigh, N.C.

Phase I - Base Data

A survey was conducted of 1,800 buildings designed and built after 1973 in the various climatic regions, grouped with Standard Metropolitan Statistical Areas. Two basic groups were established: residential and non-residential.

Building types were then established as follows:

Group I - Residential
- a) Single family detached
- b) Single family attached
- c) Multi-family low rise
- d) Mobile homes

Group II - Non-residential
- a) Assembly
- b) Educational
- c) Medical
- d) Mercantile
- e) Office
- f) Restaurant
- g) Storage
- h) Residential non-housekeeping (hotels, etc.)
- i) High-rise apartments

Climatic Classification: Seven basic climatic regions based on Heating and Cooling Degree Days and the results established a matrix of Annual Energy Performance in 000's BTU's per square foot for each building type in each region. The figures resulted in a mean consumption range for each basic region. This data was used as a base for the next phase of the project.

Phase II - Re-design

By a random selection, based on building types and climatic regions, 150 architect/engineer teams were invited to participate in the re-design of their buildings using the most recent data and design strategies.

Data from the original buildings were programmed to create a computer model of the buildings' energy use on a yearly basis. The information was derived from the construction documents, specifications and actual energy use to form a base for comparison with the re-design strategies. The following information was used to form a comprehensive model of each building:
- a) Program
- b) Use, typical and internal design conditions
- c) Occupancy
- d) Base Loads
- e) Mechanical Systems
- f) Envelope
- g) Construction techniques
- h) Energy simulation areas

Re-Design Seminar

With the completion of the data input, the 150 architect/engineer teams were assembled in Santa Monica, California to initiate the re-design process. With input from architectural and engineering design consultants, the members of the seminar were divided into building-type groups working in teams to formulate design strategies by the "charette" approach (formulating ideas and recording them in the form of sketches and notes in an open group discussion).

A strong sense of co-operation and interchange of ideas was experienced by the architect/engineer teams, resulting in some interesting new design strategies.

Regional Presentations: Schematic concepts and drawings were presented regionally to be evaluated and criticized by teams of consultants. A strong emphasis was placed on maximizing passive design with comparative evaluation of mechanical and lighting systems. One of the restraints of the re-design was to maintain the client's original intent and use of the building including any specific conditions imposed at the time of the original design. After several reviews and refinements, re-designs were finalized and a set of drawings for reproduction with new computer data was completed for each re-design. This new data and the data for the original building were evaluated by the staff and consultants of the AIA Research Corporation.

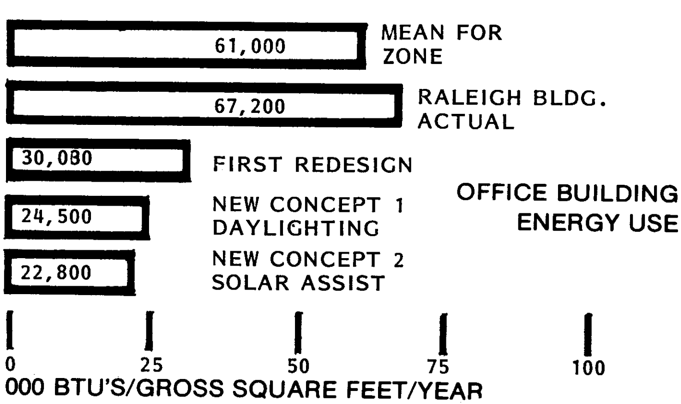
Large Office Buildings: Based on the results of the re-design process, the group "Large Office Buildings" was chosen as the vehicle for further re-design and a Life Cycle Costing Study. The following criteria determined the selection of three participating teams:

a) Projected volume of construction of each building type.
b) Typicality of the building within its type.
c) Regional climate variation within the building type.
d) Completeness of the design team's documentation on the building, its mechanical and electrical systems and cost estimates.
e) Existing building constructed as originally designed and availability of operation and maintenance costs.
f) Availability and interest of the original members of the design team.

The three buildings selected were in: Denver, Minneapolis, and Raleigh.

With the results of the computer run on the re-design, each team met in Washington, D.C. with the AIA Research Corporation staff and consultants for a day's intensive exploration of further strategies to reduce energy use. Some of the strategies were rejected by mutual agreement leaving an agreed number to be pursued for further re-design, data input and cost estimates. This represented the second and third re-design with new concepts and the various combinations of strategies using the computer data and new input. In the fall of 1979, all three teams were assembled in Washington, D.C. with all the consultants and staff to review the final results of the energy use and life cycle cost studies. The final illustrated report was published in April, 1980.

RESULTS OF AIA/RESEARCH CORP.
RE-DESIGN PROJECT



Design Methodology

The design methodology used in the re-design process as outlined above is a basis for approaching the design of new buildings of all types and locations. It is a systematic approach which emphasized the designer *team* as a necessary concept to ensure the proper integration of building form and systems. The acceptable goals of both physiological and visual comfort levels must be agreed upon and established to form the basis of evaluating the design. Much of this can be subjective but the public will have to accept a broader range than in the past. Some of this is already in effect with required thermostat control settings in public buildings.

The cost effectiveness of energy strategies as defined by the Life Cycle Costing Analysis method can be readily seen, given accurate and up-to-date cost information, but not all buildings will necessarily have this method included unless it is required by the owning agency or client.

The purpose of a building is to provide an adequate work or living environment for its occupants. The systems within the building consume energy to modify the external effects of climate of this environment.

In addition to the structure itself, the occupants and work activities contribute to the building's energy consumption. All these systems interact and changes made in one system will affect the others. Using the knowledge and data of these various systems, the designer can ensure the maximum efficiency of the total system.

The approach to the design should include the following basic steps:

A. **Program:**.

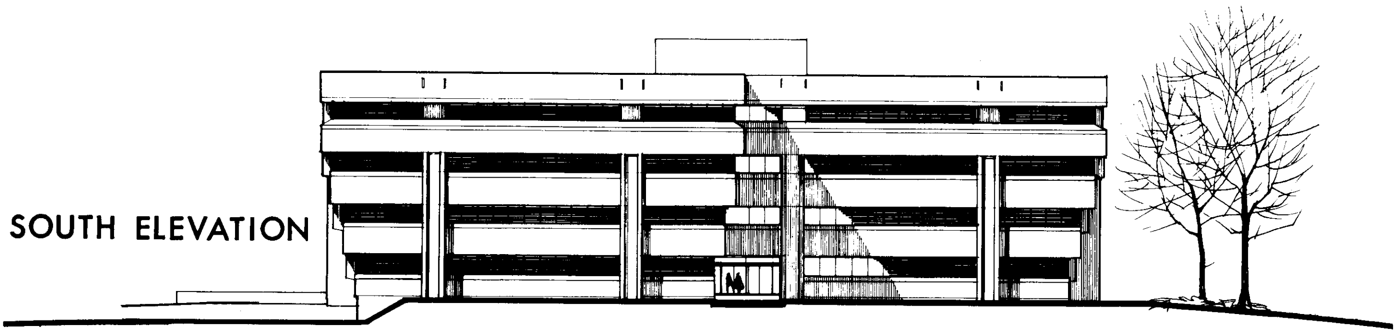
Examine by discussion the client's space needs and the probability of expansion in the future to ensure that the program for design is optimized and not excessive.

The volume of space built will directly influence the amount of energy needed to modify the internal conditions. Careful analysis of growth projections and the multiple use of space can determine a realistic building program with phased expansion as needed. It is possible that future needs, if known, may be planned into the original structure and not finished or used initially. A gain on inflated future building costs can be achieved by this method.

B. **Climate and Micro-Climate:**

Establish data concerning the prevailing climatic conditions and any advantages or disadvantages of any micro-climate relative to:

1. **Temperature and Humidity:** Using local data it is possible to represent graphically the changes and extremes in the local climate in terms of both temperature and relative humidity.
2. **Solar Radiation:** An awareness of the basic principles of solar radiation is necessary for design strategies to maximize or minimize its impact on the building. Due to the sun's constantly changing relationship with the surface of the earth from latitude and time of year, a knowledge of these variables will enable the designer to describe precisely the building's surfaces in relation to the position of the sun. Design Tools: Sun Angle Calculator; Sun Index, published locally in many areas giving the number of sun days.



SOUTH ELEVATION

3. **Wind and Precipitation:** To protect a building and its occupants from the harmful effects and to maximize the beneficial effects, the designer must be familiar with the yearly, seasonal and daily wind and precipitation patterns of the area. Design Tools: Wind/Rose Map showing variations graphically.

C. **Site Selection:**

Examine, in addition to the basic site requirements of access, services, etc., the climatic modifiers inherent in the site. These modifiers may be in the form of natural physical conditions or man-made structures. The principal modifiers are:

1. **Topography.** Topographic changes will both facilitate and restrict certain design strategies. The combination of sloping terrain and the orientation of the slopes will determine such strategies as the number of stories and the possibility of solar gain or shading.
2. **Vegetation.** Tree cover can act as wind breaks, natural shading elements and a temperature modifier. The cutting of trees to obtain a solar gain strategy may require consideration to be carefully weighed against the loss of landscaping features and the visual qualities of established, mature tree growth.
3. **Water.** Natural and man-made bodies of water will have potential cooling effects and advantages in reflecting daylight into the building. A large, stable body of water may also be a constant temperature source for heat exchange systems for both cooling and heating the building.
4. **Other Buildings.** In an urban environment the climate will be modified considerably by adjacent structures. The effects will be most evident in relation to the following:
   a. Structures may act as both windbreaks or a generator of increased localized wind velocities.
   b.) Solar reflection and shading. Adjacent buildings may act to reflect solar gain causing an increase which must be dealt with during the cooling cycle. The problem of shading or the loss of solar gain may be a more serious problem to overcome. Rights to solar access are now being studied from a legal and constitutional standpoint. Similar to water rights in certain states, it is fraught with problems and at this time only relatively small progress has been made.

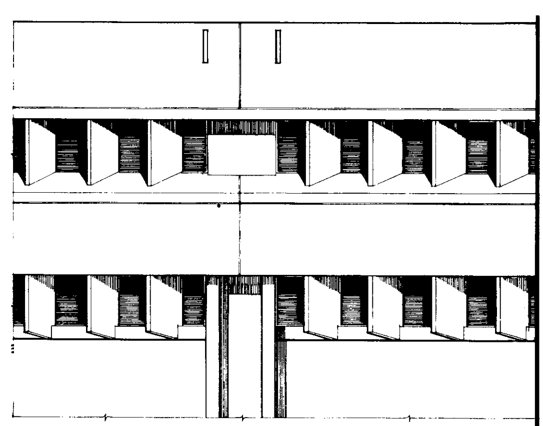
D. **Orientation:**

The location of the building on the site is particularly important in terms of orientation to maximize the effects of sun and wind. Using the sun angles for a given location, the placement and orientation will determine the effect of solar gain on the surface of the building. Each exposure will experience a different climate and therefore will determine a different design solution. In a larger, more complex building or a complex of buildings, self-shading of the building or buildings will occur and can be used to an advantage when considered as a design strategy. Similar projections for orientation to the prevailing wind pattern must be considered in some locations. The net effect on both solar gain/shading and the cooling effects of the wind can be determined, leading to the correct orientation decision. This will have particular import in urban, high density areas where the micro-climate may be more severe.

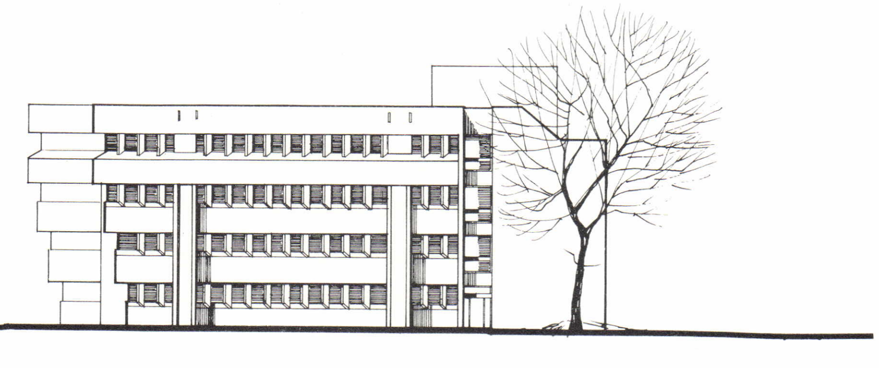
E. **Form:**

One of the prime concerns of the architect is the form he gives to the building in its overall shape and proportions. To ensure the most effective solution, the designer should look at alternative approaches by a series of study models which take into consideration and respond favorably to the following:

1. **The Program.** The total built space needs.
2. **Function.** Does the solution allow the basic functions of the building to take place? This would be determined by using a functional analysis diagram showing the desired relationships of activities within the program.
3. **Shape and Surface to Volume Ratio.** Buildings with less exterior surface exposed to the elements will be less susceptible to radiant and conductive heat gain or loss. Further, the larger the volume the greater will be the internal thermal inertia or lag. This involves using more internal space away from the exterior of the building most affected by the climate.



PART ELEVATION



EAST ELEVATION—
WEST SIMILAR

4. **Daylighting.** When considering daylighting as an energy strategy to reduce the need for artificial lighting, more habitable space must be placed close to the exterior of the building with its greater loads in both cooling and heating. In existing office buildings, approximately 40 percent of the energy use is in the lighting system. In association with maximizing the use of daylight in a building, the design of the artificial illumination system to reduce the energy use may be approached using the following:
   a.) Task lighting systems, a general ambient light level with higher levels at work spaces as required by the user.
   b.) Photo-cell dimming techniques for lighting in exterior spaces.
   c.) Reduction of present light level standards without impairing visual comfort by reduction of glare and contrast factors by more efficient light sources and the placement of sources.
5. **Relationships to other buildings and modifiers.** In the determination of building form many other considerations must be taken into account. Many of these are traditional and are not necessarily efficient in terms of energy use. These include historic precedent, compatibility of scale, texture, materials and fenestration patterns in the context of existing buildings. Some value judgments will have to be made and certain compromises understood before an architectural solution will be accepted by the client and community.

F. **Envelope:**

The envelope of the building comprises the exterior surfaces that separate the interior spaces from the exterior conditions. The function of the envelope is to insulate and control the interior spaces. The physical make-up of the envelope should be determined by the following:

1. Orientation
2. Solid to void ratio (fenestration and daylighting)
3. Shading requirements
4. Thermal lag and mass
5. Color—reflective or absorptive
6. Choice of building materials
7. Permanence
8. Desirability of views from interior

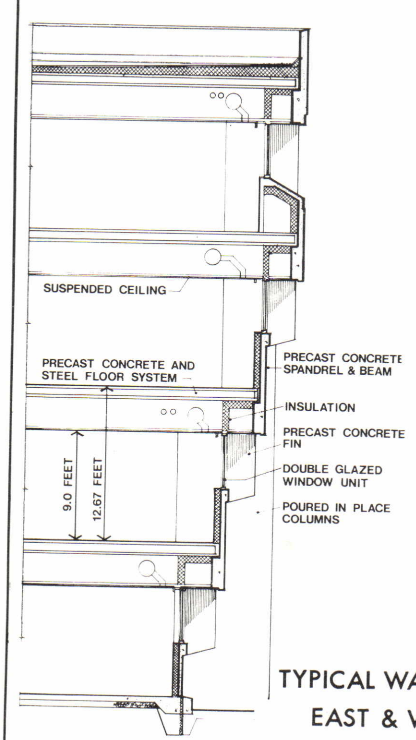
The envelope of the building will determine its visual and aesthetic impact which, in association with form, will be of prime importance as an architectural statement.

G. **Mechanical Systems:**

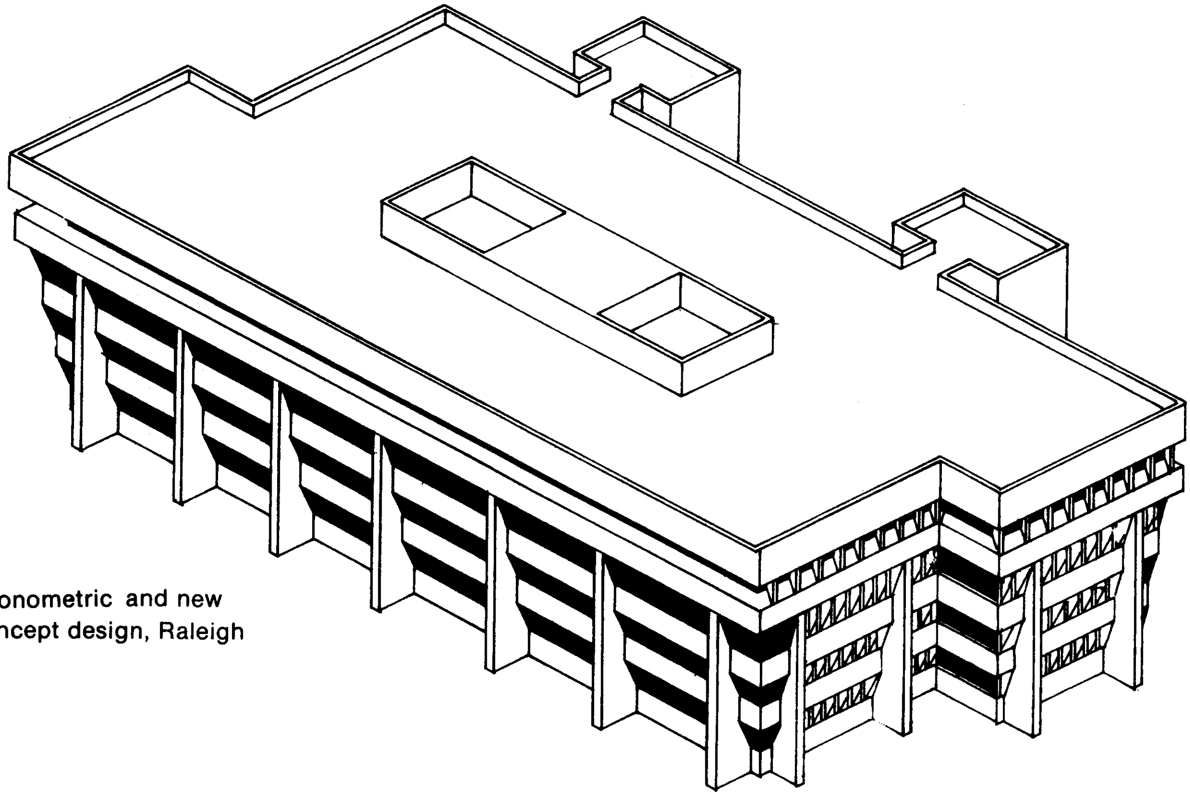
It is necessary for the architect to have a sound understanding of the principles involved in the design of the mechanical, electrical and structural systems used in the design of buildings. The integration of these systems and their spatial requirements is an essential part of the building form and structural ordering system. Unless the architect is aware of these needs, the efficiency of the systems themselves will be compromised, resulting in a less than satisfactory solution. Selections of systems may be checked by computer simulation methods at an early point in the design process to establish the most energy efficient choice. This is the basic responsibility of the consulting engineer and it is the architect's responsibility to ensure that the co-ordination of the design strategies in both architecture and engineering are carried out in principle and detail.

H. **Active Solar Design:**

The investigation of the feasibility of active solar strategies for space heating, cooling and domestic hot water must be based on a life cycle costing analysis to establish the cost effectiveness and payback period. The design must be established to incorporate these systems at the outset or planned to be added later. Cost



TYPICAL WALL SECTION
EAST & WEST



Axonometric and new concept design, Raleigh

effectiveness will depend on the reduction of first costs due to advances in the technology of hardware in conjunction with fuel cost increases.

Summary

The prime thrust of this article has been to present a methodology and approach to energy efficient building design. The emphasis is placed on the architect/engineer team as the necessary co-operation effort in this approach. This requires further understanding of each profession's design principles and goals by the other profession. This will ensure the compatibility and integration of energy systems.

A review system based on an accepted methodology must be devised, to ensure that the design of major public and private buildings can achieve the energy performance standards necessary to the further survival of our building and cultural heritage. ■

Copyright © American Institute of Aeronautics and Astronautics, Inc., 1980. All rights reserved.

Bibliography

Charles C. Hight, AIA, PE, REGIONALISM FUTURE, *North Carolina Architect*, January/February, 1978, NCAIA, Raleigh, North Carolina.

Howard R. Lane, FAIA, WHY BEPS WILL WORK, *Building Design and Construction*, May 1980, A Cahners Publication, Chicago, Ill.

AIA Research Corporation, FINAL REPORT PHASE ONE/ DATA FOR THE DEVELOPMENT OF ENERGY PERFORMANCE STANDARDS FOR NEW BUILDINGS, Washington, D.C., 1978.

AIA Research Corporation with Syska Hennessy, ENERGY INFORM DESIGNING FOR ENERGY CONSERVATION, Washington, D.C., April, 1978.

Dennis R. Landsberg and Ronald Stewart, IMPROVING ENERGY EFFICIENCY IN BUILDINGS, State University of New York Press, Albany. New York, 1980.

Planning for tradition

An interview with **James A. Ward** *Director of Physical Planning and University Architect, Duke University*

by Kim Johnson Devins

James A. Ward is a very envied man, and he knows it.

"At conferences, other architects say to me, 'Jim, I hope you realize how lucky you are.' Others will ask me where I'm from, and when I say Duke, they're obviously impressed."

James Ward, AIA, is Duke University's architect-in-residence, one of 150 university architects in the United States. Since 1964 he has served as architectural "guardian," or more officially, the Director of Physical Planning and University Architect, for one of the most admired university campuses in the nation. It is his job to advise the administration and faculty in all architectural matters concerning the university, to coordinate the planning and acquisition of new facilities "and other activities that affect the beauty, utility, and continuity of the campuses." All architectural decisions must be cleared through his office. All design and construction contracts and agreements are under his jurisdiction.

And, yes, he does realize how "lucky" he is.

"I love my work," he smiled. "This is a great and wonderful campus, and it's my privilege to see that it stays that way, to see that it maintains the quality with which it was originally built and intended. I've traveled a good bit and visited other campuses where there are university architects, and I know that Duke is recognized as one of the foremost universities in the country, architecturally as well as academically. I'm extremely proud to be a part of it."

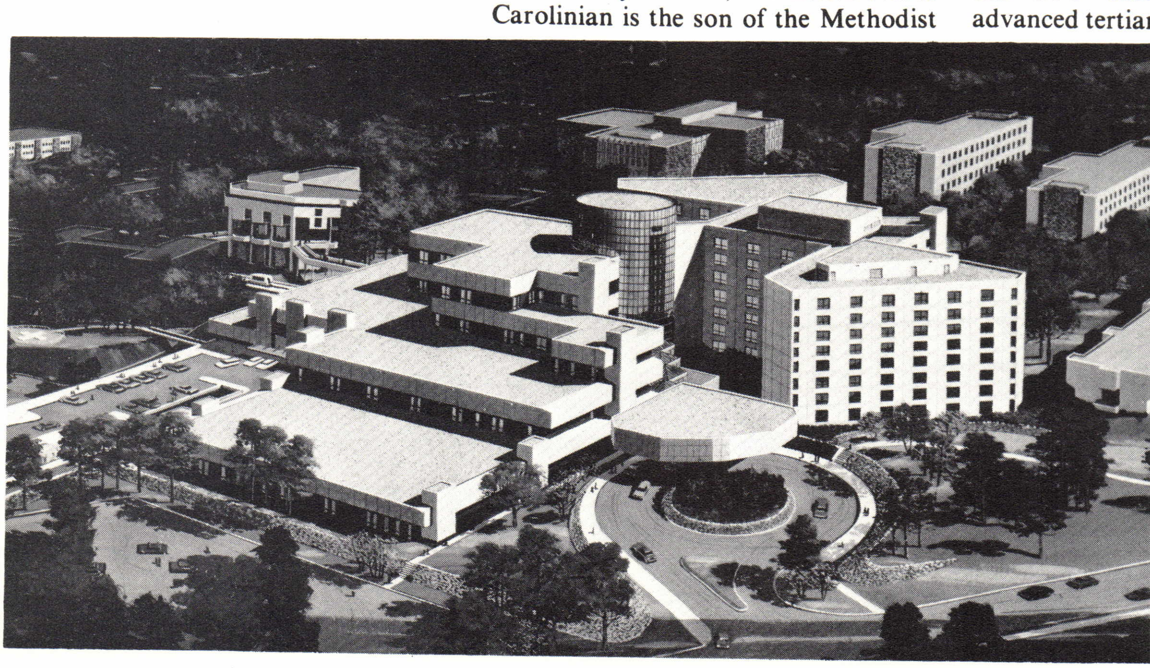
Now 65 years old, the native North Carolinian is the son of the Methodist minister. He came to Duke in 1964 after serving as architectural designer then vice president of the M.A. Ham Associates firm in Durham for 16 years. He has seen 3.5 million square feet added to the total university since then, and has interviewed or worked with some of the most respected architects in the nation, including Paul Rudolph, Phillip Johnson and Edward Durell Stone.

Duke North

Of the many major projects Ward has seen through to completion at Duke (including 46 new buildings and countless renovations), the recent opening of the new North Division of Duke Hospital, informally known as Duke North, is a pinnacle:

Already this year, the prestigious Duke Medical Center has made headlines in microsurgery, nerve regeneration studies, the fight to halt the high infant mortality rate, and a ground-breaking cholesterol study. The Center is also leading the nation in the study of Alzheimer's Disease, a severe nervous disorder, and its recent experiments in hyperbaric (high pressure) chambers to determine the limit of man's ability to work safely under deep water, have attracted attention from medical minds across the country. The Medical School at Duke was also ranked third in the nation, behind Johns Hopkins and Harvard, by United States medical school deans in a survey conducted this year.

With the addition of the North Division of Duke Hospital, the complex has now been deemed the "most advanced tertiary regional facility in the



Duke Hospital's new North Division

country," according to Dr. Roscoe R. Robinson, chief executive officer for the hospital. (A tertiary hospital is one to which patients are referred for specialized treatment.)

The decision to build the $94.5 million wing was made after a study was conducted in 1970 to determine whether or not a new hospital should, in fact, be built. In March of 1973, the Board of Trustees was presented with three alternatives: to raze the old hospital and build a new 1,000-bed structure, which would cost approximately $135 million; to renovate the old hospital, providing temporary facilities in the meantime, at a cost of only $70 million but with a construction period of 12 to 14 years; or to build a new wing. The Trustees adopted the third proposal and Hellmuth, Obata, Kassabaum, Inc. of St. Louis, Missouri was selected as the architectural firm to design the North Division.

Larry D. Nelson, AIA, director of the planning office for the Medical Center, was enlisted as "project architect" representing the university for this extremly specialized design. "I worked with Nelson," Ward said, "and of course I had to give final approval, but I would have to consider the project more to his credit than mine."

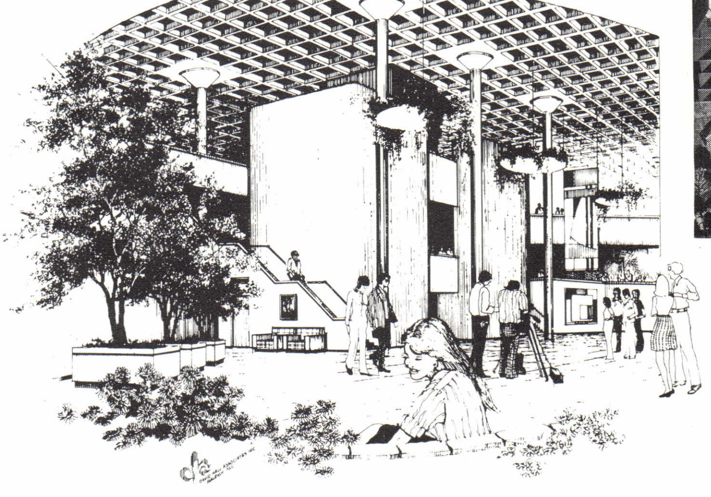
Construction began in 1975, using "fast-tracking" design. But the building process was not without major complications. Bitter winters and a sporadic labor supply greatly hindered progress. (The Shearon Harris nuclear plant construction drained countless workers off the hospital project, according to Duke officials, and a pipeline being laid in High Point kept construction bosses in a near constant search for pipefitters.)

Then, in 1977, a huge crane crashed to its side in the middle of the building, destroying a large wall area. (Fault was never clearly determined, reports stated, although the crane operator wasn't heard from again.) At the peak of construction, over 700 workers were employed. The cost of the building process alone, Ward noted, was almost $70 million.

Despite the obstacles, Duke North was officially opened April 27 of this year, with over 3,000 on hand to watch the ribbon cutting; the new wing was finally occupied at the end of August.

Ward said he is a devout believer in "form follows function," and that this new hospital is a monument to that theory. The ultra-modern building consists of a central core containing elevators, three bed towers each nine stories high, a prodigious ancillary section which houses radiology, laboratories, 19 operating rooms — including the hospital's first operating room reserved for emergencies only — and an emergency room. It also features what Duke officials consider to the a "world's first" for hospitals: an internal Personal Rapid Transit System (PRT) which connects the new building to the original, or South Division, hospital.

The $5.9 million PRT system is a space-age subway of sorts, consisting of white cars — trimmed in "Duke blue" of course — that travel on 12 cushions of air above concrete guideways to



Above, the dormitories of Edens Quadrangle, featuring pre-cast "Duke stone" panels.

Opposite page, Perkins Library addition.

Right, interior drawing of the new University Center under construction.

transport patients and staff over 1,200 feet. At an estimated cost of $4,000 per foot, the cars are computer controlled with special motors that create a magnetic field to move them along the guideways. Each car holds 18 passengers, with cargo vehicles capable of carrying one hospital bed or two stretchers. Duke officials call the system an "horizontal elevator.

The new wing was also designed for the most critical patients or those who require the most care, Ward said. It also houses most of the complex's pediatric inpatients. A myriad of special features was incorporated into the design to keep the wing as sterile as possible, including closed-circuit television for students and faculty to observe operations instead of the usual galleries around operating rooms. The 616-bed facilty (which will eventually house over a thousand beds, Ward said) was also designed for one occupant per room so that tests and treatments can be given to patients in their rooms.

"Duke North is without a doubt the most functional hospital I've been privileged to see," Ward interjected.

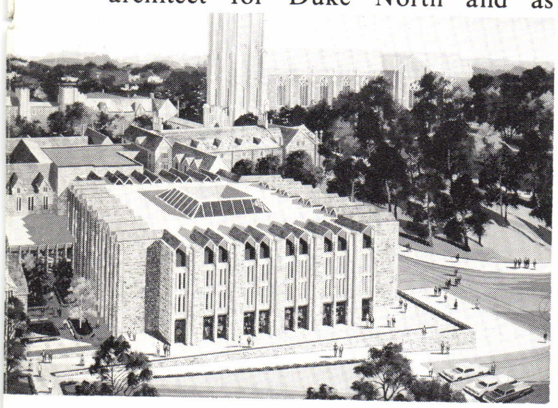
Perhaps the most consequential aspect of Duke North, however, according to Dr. William G. Anlyan, Duke's vice president of health affairs, is its flexibility; new health care technology can be blended into the building with remarkable ease as soon as that technology becomes available. "We'll no longer be trying to fit space-age medical equipment into a building designed in the 1920s..." he told reporters at the Grand Opening in April.

Two-thirds of the cost for the 750,000-square-foot wing was provided through a bond issue. An additional $10 million came from the Duke Endowment, and over $9 million was supplied by the Center's medical faculty. (As agreed at the opening of the hospital in 1930, four percent of the faculty's earnings go to the Medical Center Development Fund.)

The entire Medical Center now consists of Duke Hospital, North and South Divisions, the Cancer Center, the Medical School, the Eye Center, the School of Nursing, the Private Diagnostic Clinic, and two satellite hospitals: the Highland psychiatric hospital in Asheville, and Sea Level general hospital in Carteret County.

Unity on a Gothic Revival Campus

Larry Nelson acted as project architect for Duke North and as



director of the hospital's design and construction office, but it was James Ward who made certain that this building, as all new facilities on the Gothic Revival style campus, maintained its architectural relation to the original university buildings.

"The mass of this building," Ward said, "made it very difficult to relate to the Gothic. We had to keep the cost down as much as possible, so we used pre-cast stucco panels combined with what I call 'Duke stone' (mined from the univeristy's own quarry in Hillsborough) on retaining and feature walls, and on the base of the building."

Maintaining continuity on the Gothic campus has always been one of Ward's primary concerns and responsibilities, he said. Of course, all new buildings cannot be built exactly the same way as the original structures; it would be far too expensive and time-consuming.

Yet any building can *relate*, Ward insisted, if the basic elements of Gothic Revival architecture are judiciously employed in its design. "By elements," he said, "I mean the verticality, the relation to human scale, the formation of outdoor statements and spaces. And in our particular case, we can maintain a sense of continuity by using, at least in part, the same stone as much as possible — the Duke stone."

The main portion of the original university was built in the late Twenties and early Thirties. "This had its advantages and disadvantages," Ward said. "Since it was built at one time, the same architect and materials were used. The problem, however, is that all of those buildings began needing major repairs and grew obsolete at the same time."

The architect was Horace Trumbauer of Philadelphia, one of the world's foremost classical architects, Ward said. With Trumbauer were Julian Able and William O'Frank. Able, Ward noted, was one of the first black graduates of the University of Pennsylvania, and acted as the chief designer for Duke University.

Very little construction took place at Duke during World War II. After the war, however, there was a great need to expand the facilities. And that was when, according to Ward, a great architectural faux pas was committed...

"The university decided, at one time, that any buildings constructed northwest of the main quadrangle, in the wooded area we call the Green Belt, could differ in architectural style," he explained. "So in the late Forties, a series of red brick buildings, mostly Georgian in character, were built along Science Drive."

These buildings, on what Ward calls "Red Brick Row," could, in themselves, he said, be considered "fair" architecture.

"But by the time the third building was up, it became very obvious that they didn't belong on this Gothic campus. The decision was reversed in the early Sixties when plans for more construction were made. It has always been understood that any buildings on or near the main quadrangle had to be related to the Gothic, but after Red Brick Row, the university decided that *all* new buildings at Duke must also relate."

Since that decision, Ward has refused many otherwise fine designs, he said, because they didn't mesh with the other buildings.

The Allen building, immediately right of the gates to the main quadrangle, was built in 1953. This truely Gothic structure was a part of the original university plans, and was simply built according to those plans. Ward's offices are located in what many call the basement of this building, although he prefers to call it the "garden level" since the Sarah P. Duke gardens are immediately across from the back of the building.

Other additions to the university followed in the Sixties: the main entrance building to Duke Hospital, the Perkins Library, and the four dormitories southwest of the main quadrangle which comprise "Edens Quadrangle."

As beautiful as the grey-brown Duke stone is, and as solid and everlasting as it has made the original buildings, the cost of laying 12-inch-thick solid rock walls on all the university's massive buildings would be *beyond* exorbitant, Ward noted. So how does the university maintain the "Duke stone" look?

"The library and dormitories, which are adjacent to the main quadrangle, are laid-up stone like the original buildings," he explained. "Most of the newer buildings, however, feature pre-cast stone panels, using the Duke stone as aggregate. This way we can build a five-inch-thick wall instead of 12-inch, and still cover wide surface areas. Of course, some buildings, like the new hospital and the Eye Center, show the stone only on feature walls, etc. But by using the pre-cast panels, the cost is much less than building laid-up walls, yet the relation to the other buildings is retained."

Under Construction

A tremendous structure now under construction at Duke, which features the pre-cast stone panels, is the new $16 million University Center, "one of the most outstanding buildings on this campus," Ward predicted. Located southwest of the Chapel and adjacent to the old student center, the facility will house a performing arts theatre, movie theatre, a "Rathskeller," offices for various student organizations, and much more. It was designed by Hayes-Howell Associates of Southern Pines with the Houston, Texas firm, Caudill, Rowlett and Scott, acting as design consultants.

"It's going to be a fantastic building," Ward said proudly. "It's massive and complex, but it's designed in such a way that the feeling of that great mass isn't realized from ground level."

The new center is very close to what Ward considers the "heart" of the university — the main quadrangle and, in particular, the great Duke Chapel...which brings up one of the university architect's strongest convictions about the campus: absolutely nothing, he declared, must overshadow the Chapel.

"Nothing must be allowed to compete with that marvelous structure," he said flatly, his eyes widening in accustomed awe as he pointed toward the edifice that rises above the entire campus like a great stone king. "Since the new center is so close to it, the architects were told that their design could not be multi-storied because it would then be seen from the main quadrangle and detract from the Chapel. It won't. It is enormous, seen from above, but its cascades and undulations keep it in its place, so to speak, and flowing beautifully with the valley it sits in."

(As an aside, Ward noted that the Chapel cost only $2 million when it was built in the late Twenties and early Thirties. "Imagine what it would cost to replace it today!" he laughed.)

Nearing completion now is the $12 million Graduate School of Business Administration classroom and office building, designed by Edward Larrabee Barnes of New York City — who, Ward added, recently won the AIA Architect of the Year Award. A major addition to the Engineering School is on the drawing boards, designed by Nicholson and Associates of Durham.

Designing for Duke University

Although many out-of-state architectural firms, including the numerous "paragons" of the profession, have had their hands in Duke's buildings' designs, a considerable number of North Carolina architects have also been used over the years, Ward said, including J.N. Pease Associates and Odell Associates, Inc. of Charlotte, F. Carter Williams of Raleigh, and Holloway-Reeves also of Raleigh who worked with Edward Durell Stone on the Music Building.

"I'm frequently asked how the university goes about selecting an architect for a job," Ward said. "Well, it's a somewhat complicated process, and I am by no means the sole source in the selecting process." For every job, he explained, a selection committee is convened. Ward is always an ad hoc member of the committee, and at least one Trustee is involved. "We, as a committee, then look at all the brochures, etc. and decide upon four or five architects to interview," he said. "After the interviews, we recommend one architect to the Board of Trustees' Buildings and Ground Committee, and that body makes the final decision."

The B&G Committee must also approve the location of the new facility and the "scope" of the project, he added. The architect awarded the contract then works with Ward to prepare the design. Ward monitors the progress of all design work to ensure that the project stays within the intended scope and meets the university's standards for quality and design. After the plans are completed, Ward reviews them and they go back to the B&G Committee for final approval. After construction begins, Ward, as university architect, is then responsible for supervising the entire process, including the final inspection and acceptance of the new building for the university.

After Sixteen Years, Enthusiasm Is Still There

James Ward is openly and honestly proud of the time and effort he's expended at Duke University and is still, after all these years, thrilled with his work.

"This is the best job I've ever had," he smiled. "I've had the honor and pleasure to work with over 25 different architects, some of whom are giants in the field. And I feel it's been an incredible privilege to be a part of one of the most beautiful, quality examples of architecture as we have — old and new — on this campus. I've always believed in the idea that the quality of our physical surroundings greatly affects the quality of our lives." He paused, then grinned. 'I would never recommend that anyone build a Gothic campus again. That time is past; it's now time to move on. But what we have here...it's wonderful."

Ward stressed that he's had invaluable help in his work from his 16-member staff, particularly his two assistants, Jake Kanoy, AIA, and Robert Trotter, AIA, and his contract and construction administrator Fred Miller. He also added that his office "wouldn't be able to operate" without his prize office manager and general assistant, Florence Underwood.

Although he could retire now, Ward said he will probably stay on "a couple more years" at least. "I would like to see the Business School completed," he said. Then he turned and gazed slightly south of his beloved Chapel and, in a voice laced with intrigue and excitement, added, "And I've got to see that Center completed. Fantastic building...just fantastic." ■

Distinctive. Durable. Easy to install.

It's Coronado.

Don't be fooled by another pretty face. Insist on Coronado cast stone for new construction or renovation contracts.

As feature or accent, Coronado's 10 patterns offer an infinite range of color and texture combinations. Readily available, the stone is made right here in North Carolina.

Coronado Stone is easy to install on any sound surface. Corner-cast pieces add the truly authentic touch. Like real stone, Coronado grows more beautiful with age.

Naturally.

CORONADO™
Stone Co. of North Carolina
(919) 483-7777
P.O. Box 53268 / 134 Drake St.
Fayetteville, N.C. 28305

There are Coronado dealerships available in a few areas of the state. We welcome your interest. Please call collect.

There are a lot of factors to consider when you design a highway for safety. Guardrails, sign placement, pedestrian access, smooth traffic flow.

All of these are important. But underneath it all, safety begins where rubber meets road. That's why Solite gives you a skid resistant lightweight aggregate for safer asphalt pavements. To stop accidents before they happen.

Fired at 2300°F in rotary kilns, Solite lightweight aggregate has a unique microtexture cellular structure. This creates a superior friction surface for optimum traction in all conditions. Tests conducted by highway engineers show Solite lightweight aggregate skid resistance figures are consistently 4 to 10 units higher than natural aggregate skid numbers.

And hydroplaning is reduced because a Solite open graded friction course allows water to drain easily across the surface to shoulders.

With no organic matter to break down, Solite resists abrasion and weathering. What's more, unlike ordinary aggregate asphalt, Solite aggregate's microtexture structure will not polish smooth under normal traffic wear.

Stop accidents where they begin...on the road. With Solite lightweight aggregate.

SOLITE®

Lightweight Masonry Units and Structural
Concrete Skid-Resistant Asphalt Paving

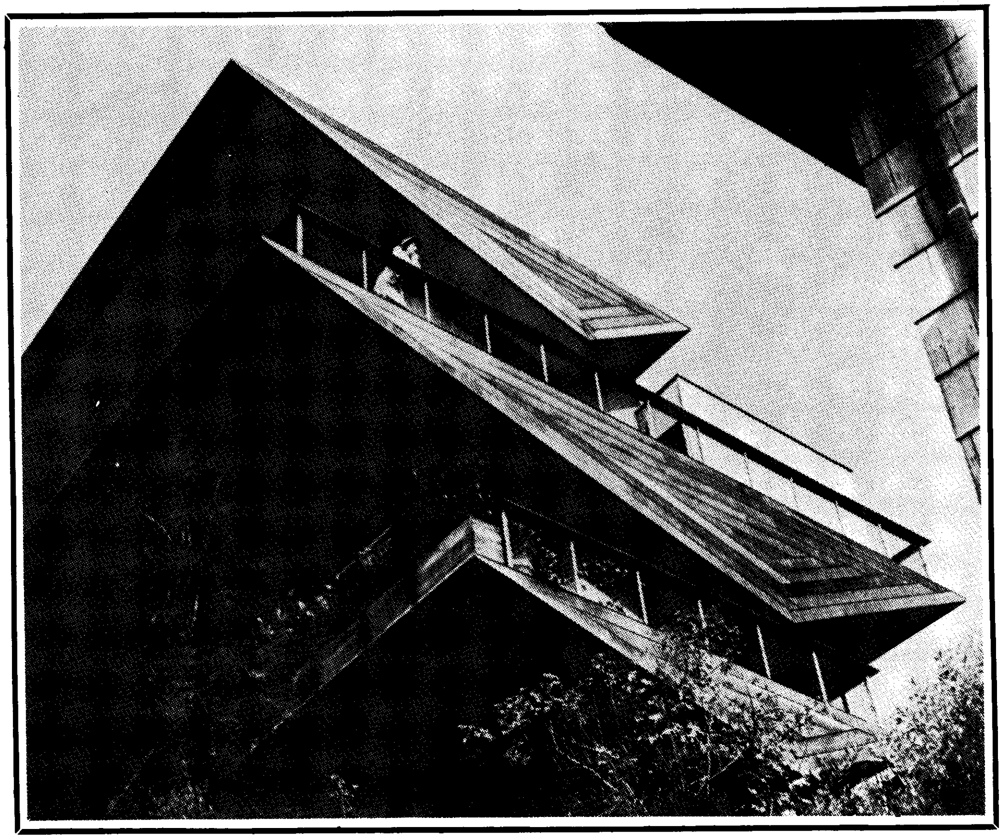
Offices

P.O. Box 539, West New York, NJ 07093 (201) 868-1911
Koger Executive Center, 8001 Franklin Farms Drive, Suite 242, Richmond, VA 23288 (804) 282-8533
3203 Womans Club Drive, Suite 114, Raleigh, NC 27612 (919) 782-8837
P.O. Box 297, Green Cove Springs, FL 32043 (904) 264-6121
P.O. Box 38, Brooks, KY 40109 (502) 957-2105

Plants

Saugerties, NY
Leaksville Junction, VA
Bremo Bluff, VA
Aquadale, NC
Green Cove Springs, FL
Hubers, KY

Books



Harwell Hamilton Harris:
Havens House, Berkeley,
California, 1941.

Contemporary Architects. *New York, St. Martin's Press, 1980. 933 pages. $70.00.*

Everything you could possibly want to know about the world's leaders in contemporary architecture is now available in one book, **Contemporary Architects**, from St. Martin's Press. This enormous volume gathers the thoughts, works and lives of 600 internationally renowned architects with thoroughness and accuracy.

With each entry, *Contemporary Architects* includes: a biography, a complete list of constructed works and projects, a bibliography of articles on and by the architect, a signed critical essay, and a black and white illustration or photograph of the subject's work.

The selection of entrants was based on the suggestions of a 13-member advisory board. "The emphasis," explains editor Muriel Emanuel in his Introduction, "is, of course, on living architects and on those who have recently died; as well, we have included those architects of the modern movement of the 1920s - 1950s who, in the view of the Board, continue to exert an important influence on architecture."

Research work for this volume took place at the Royal Institute of British Architects and the Architectural Association in London, the Avery Library of Columbia University in New York, and the Burnham Library of the Art Institute of Chicago. In many cases, the architects themselves — 400 of whom are still living — provided information, which was then checked and rewritten by an international team of editors. A few also wrote special comments on their work for the book.

Included along with the world's foremost contemporary architects are planners and theorists who, the Board felt, have profoundly influenced architects and architecture with their ideas and innovations, plus internationally recognized landscape architects and structural engineers.

Of the 600 listed in the book, four have served on the faculty of North Carolina State University's School of Design:

The late Polish architect, Matthew Nowicki, was the first head of the department of architecture at NCSU after the School was established. "As a teacher, Nowicki is well remembered for his brief stint as a Senior Professor of Architecture at North Carolina State College in Raleigh," B.S. Saini notes in the book, "where he was able to introduce important changes in a new curriculum... In many ways it was the forerunner of courses that schools of architecture later adopted during the 1960s and 1970s."

Nowicki, particularly celebrated for his design of Dorton Arena at the N.C. State Fairgrounds, was killed in a plane crash in the fall of 1948, days away from the beginning of that school year. The next official head of architecture at the School was the Argentine architect Eduardo Catalano, who "believes that contemporary architects must abandon individualistic design and turn to the paths opened by science and technology and industrialization," wrote Stephen P. Hamilton about Catalano. During Catalano's five years in Raleigh, he designed and built his own highly acclaimed residence which employs "the simplest of structure...the hyperbolic paraboloid."

Author, inventor, cartographer, mathematician, engineer, futurist, philosopher, poet, teacher and resource expert — these are the attributes assigned to Buckminster Fuller who spent one month of every year for seven years at NCSU while Dean Emeritus Henry Kamphoefner served as the School's dean. NCSU was the first design school to invite Fuller to come as a visiting lecturer, according to Kamphoefner, and the first also to award the now 85-year-old architect an honorary as well as an official degree in his profession.

Another giant in contemporary architecture who served the School as a design instructor, and who still lives and practices in Raleigh, is Harwell Hamilton Harris. "A measure of Harris's gifts is his ability to order and simplify exterior forms that expand the life within," Esther McCoy wrote in one of the longest entries in the book. "He could do beautiful little exercises in wood..."

Contemporary Architects is unique in its international breadth and its informational depth. "This is a very important document," Dean Kamphoefner commented recently. "It ties the whole modern movement together."

From the Commissioner's Office

Another significant publication has recently come from the State Insurance Commissioner's Special Office for the Handicapped in the Engineering and Building Codes Division called **Accessible Housing: A Manual on North Carolina's Building Code Requirements for Accessible Housing.**

The fully-illustrated manual explains the requirements for accessibility features in residential projects as stated in the Handicapped Section of the Building Code. It also covers acceptable alternatives to the requirements which have been established by the Engineering Division — alternatives which often prove to be more economical than the requirements, and which provide the designer with a degree of flexibility.

The 68-page publication includes details for publicly-owned housing, hotels, motels, and various other residential and institutional projects. It also features a section on privately-owned apartment projects, complete with illustrations of such adaptable and adjustable particulars as removable cabinet segments for toe-space, variable height kitchen work surfaces, and more.

The book can be ordered for $2, plus four percent sales tax, from the Special Office for the Handicapped, Engineering and Building Codes Division, Insurance Commissioner's Office, P.O. Box 26387, Raleigh, N.C. 27611. (All orders must be prepaid. A discount is available for large quantity orders.) ■

Andco

- interior, exterior sign systems
- cast and fabricated letters
- cast plaques
- building directories

Please see our catalogs in Sweet's Architectural Files

Andco Industries Corporation • Post Office Box 7366 • Greensboro, NC 27407

Design Marketing

Creative brochures and promotional graphics for design professionals. Send for our brochure.

Kenn Compton Graphics

6740 Queensberry Dr./Charlotte, NC/28211 704/365-0946

Chapter Notes

"Changing Architectural Practice — Things you have to do now that you never did before" was the theme for the 1980 Summer Convention of the NCAIA, held at the Blockade Runner Hotel in Wrightsville Beach July 17 - 19.

The keynote speech for this year's convention was delivered Friday morning by S. Scott Ferebee Jr., FAIA, on "Contracts, Fees and Accounting," followed by a panel discussion of "Plans and Spec Production" involving Gary W. Partin, AIA, A. J. Hammill Jr., AIA, and Charles C. Dixon Jr., AIA. Later that day, a presentation and discussion of BEPS — Building Energy Performance Standards — was conducted by Brian Shawcroft, AIA (see his feature article in this issue of the **North Carolina Architect**) and Conrad B. Wessell Jr., AIA.

The Saturday, July 19 convention highlights included an early morning discussion on "Legal Ramifications of Architectural Practice in North Carolina — Illegal Practice and How to Stop It," by Wade M. Smith and Steven L. Evans, attorneys for the NCAIA, and a noon discussion of "Office Costs, Wages, Insurance, Fringe Benefits, Retirement" by Sam T. Snowdon Jr., AIA, and other members of the Office Practice Committee.

The summer convention also featured numerous social events for the attending architects and their families, including golf and tennis tournaments, kite and sandcastle contests, and a Saturday evening dance sponsored by Buckingham-Virginia Slate Corp., Joe S. Williams Co., and Woody Atkins Co.

A view of the atrium in a new restaurant designed by Ferebee, Walters and Associates. The 100-year-old building is the former Wagener-Ohlandt warehouse in downtown Charlotte.

Charlotte

Ferebee, Walters and Associates of Charlotte has spanned the design spectrum recently: they completed a major renovation of an historic property; opened Duke Power's District Office in Gastonia, which is the first example of the power corporation's new philosophy to incorporate energy conserving and load management features into its own buildings; and gave a 20-year-old bank a "facelift" that involved a "first in the state" design feature.

The historic renovation project was the transformation of the century-old Wagener-Ohlandt warehouse in downtown Charlotte into a new 18,000-square-foot "Gay Nineties" restaurant. The new Duke Power office design features a "thermal storage system" and other energy conservation methods to serve as a showcase of energy saving techniques for commercial builders and developers. The "new look" for the N.C. Federal Savings and Loan Association in Charlotte involved a new exterior finish with a bronze linear metal panel system — the first of its kind in the state — which will provide solar screening for the glass windows.

Godwin Associates of Charlotte has completed the new corporate headquarters for the Stanwood Corporation, a southeastern-based company previously headquartered in one of its manufacturing plants. The corporation wanted a "light and airy" building, which the firm provided through the use of white stucco with colored accent panels, skylighting, and projecting trellises for shade and shadow. The design also involved a showroom to display manufactured products within a skylit curvilinear form which serves as a focal point and transition element leading to the lobby.

J.N. Pease Associates of Charlotte has two new staff members: Dennis E. Yates, 28, a registered architect, and Henry L. Hopper, 31, a professional engineer in the Mechanical Department. Steven M. Mead, 38, a professional engineer, also recently joined the Structural Department of the firm.

Endowments and Fundings

The National Endowment for the Humanities has awarded a grant to four Raleigh historians and writers to study the history of building practices in North Carolina. The 18-month study, beginning in October, will culminate in a book that will both describe the evolution of building in the state and provide a biographical dictionary of architects, masons, carpenters, housewrights, contractors and others who practiced in North Carolina from 1650 to the present.

The four are: Catherine W. Bisher, head of Survey and Planning, N.C. Division of Archives and History, who will study the period ca. 1750 to 1870; Dr. Charlotte V. Brown, architectural historian, who will study 1870-1948; Carl Lounsbury, social and architectural historian specializing in vernacular architecture and building technology, who will provide essays on 17th century architecture and 19th and 20th century technology; and Ernest Wood, former editor of the **North Carolina Architect**, now a free-lance writer specializing in architecture, who will write on the modern period, 1948 to the present.

The team envisions working closely with the state's practicing architects and the NCAIA on the project, which the Chapter and its Publications Committee have endorsed.

The National Endowment for the Arts recently awarded a matching grant to the Association of Collegiate Schools of Architecture to establish a permanent fund for the continued support of the *Journal of Architectural Education*, a quarterly magazine, published since 1947, that is recognized for its contribution to literature on the built environment. "This award is an important step in insuring the future of the *JAE*," said ACSA President Robert Burns of Raleigh. "The creation of an endowment for the *JAE* will be a major focus of the ACSA Board of Directors for the early 1980s."

The most recent issue of the *JAE*, entitled "Beginnings," was guest-edited by educators Peter Collins and Lawrence Anderson. It is available for $4 from the Association of Collegiate Schools of Architecture, 1735 New York Ave., NW, Washington, D.C. 20006. Subscriptions are $12.

The N.C. Design Foundation allocated $74,292 in July to help support teaching research and public service programs in NCSU's School of Design. The allocation, drawn from both general and special funds of the foundation, was unanimously approved at the annual budget meeting of the School's directors.

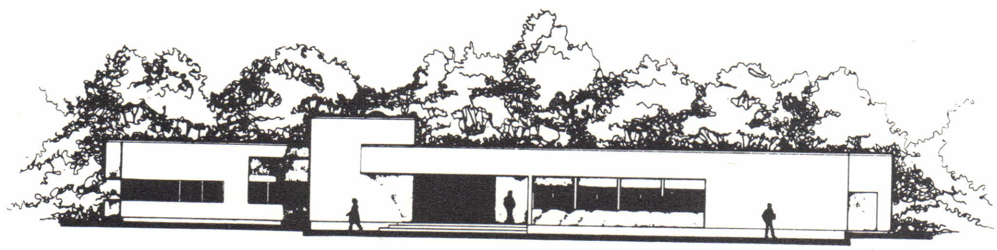
Special Exhibit

A new and exciting display entitled "Visionary Drawings: Architecture and Planning" is now on exhibit at the N.C. Museum of Art. Organized through The Drawing Center in New York City, the display features futuristic works by Frank Lloyd Wright, Buckminster Fuller, Louis Kahn, Frederick Kiesler, Frei Otto and more. The drawings, which date between 1900 and the late 1960s, include buildings, towns, residences, megastructures, artificial environments, floating submarine and subterranean structures and settlements in space. They were selected for the show for their graphic qualities as well as concepts, and are exhibited "as is," according to George R. Collings of The Drawing Center, meaning as they were found — coffee stains, creases, mold and all.

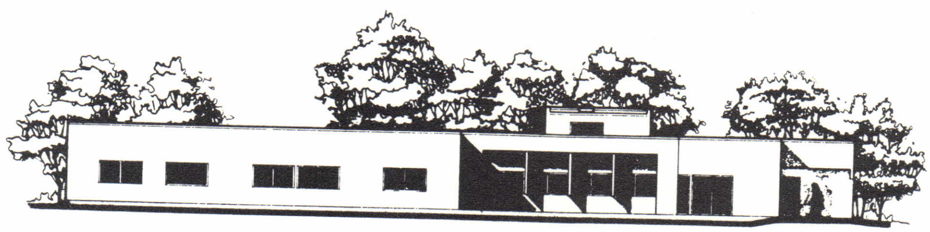
Extra Note

Be sure to see the most recent edition of the *AIA Journal* which contains a fully-illustrated article on the late Matthew Nowicki by the **North Carolina Architect**'s contributing editor, Ernest Wood. ■

Stanwood Corporation's new headquarters, by Godwin Associates of Charlotte.



FRONT ELEVATION



REAR ELEVATION

CUSTOM BRICK CO.

1613 Old Louisburg Rd. - Raleigh - Ph. 832-2804

VISIT OUR SHOWROOM
COMPLETE DISPLAY OF SAMPLES

PRODUCTS

FACE BRICK
GLAZED BRICK
HAND-MADE BRICK
GLAZED TILE
PAVERS

SUPPLIERS

Nash Brick Co.
Hanley Co.
Taylor Clay Products Co.
Old Virginia Brick Co.
Pee Dee Ceramics Co.
(And other manufacturers.)

SERVING RALEIGH and EASTERN NORTH CAROLINA

H&M TECHNICAL SERVICES, INC.

1220 NOWELL RD.
RALEIGH, NC 27607
919/851-4937

Roof Moisture Surveys with
Troxler Nuclear Guages

Ezra Meir Associates, Inc.

CONSULTING ENGINEERS

- SOILS AND FOUNDATION ENGINEERING
- STRUCTURAL AND CIVIL DESIGN
- DESIGN AND SUPERVISION OF EARTHWORKS
- QUALITY CONTROL TESTING & INSPECTION
- SOILS—CONCRETE—STEEL—ASPHALT

P.O. BOX 12447 / RALEIGH, N.C. 27605 / 919-828-0801

TRIANGLE DESIGN CENTER

TRIANGLE DESIGN CENTER

5216 Hollyridge Drive Raleigh, North Carolina 27612 Oak Park

• Kitchens **• Baths •** **Dens •**

Custom Design Services
Over 14 Years Experience

SPECIFY ***"QUAKERMAID"***
*THERE **IS** A DIFFERENCE IN FUNCTIONAL CABINETRY*
We Invite You to Visit Our Unique and Beautiful Showroom

Helen and Jack Raiser, C.K.D.

Showroom Hours — Mon.-Fri. 9-5
For Eve. or Sat. Appointment Call **787-0256**

"ASK THE WOMAN WHO OWNS ONE"

Subscribe to NorthCarolina ARCHITECT

$15 A YEAR NON AIA MEMBER

Gift Subscriptions:
AIA members $8.50 per year
Non-Members $12.50 per year

***Call* 919-828-7393**

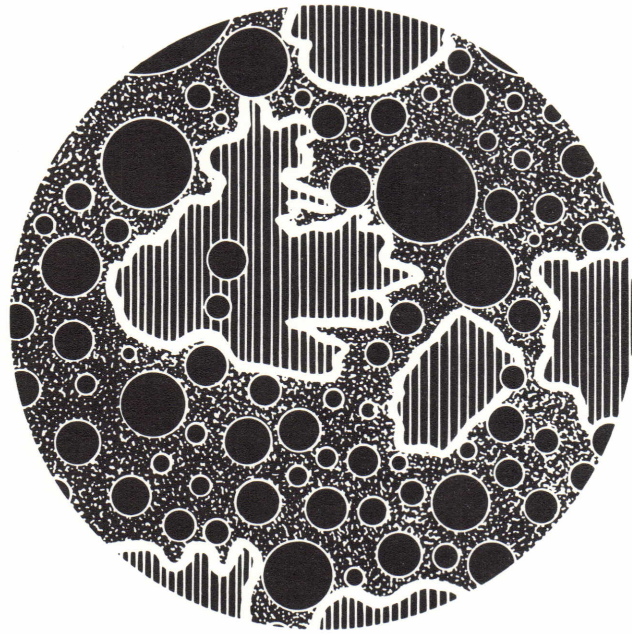
North Carolina Architect,
the official magazine of the North Carolina Chapter, American Institute of Architects.

Air-entrained GIANT-MIX mortar is better.

Air-entrained mortars are more workable. The entrapment of millions of microscopic air bubbles serve as lubricants acting like small ball bearings to yield a superior workability.

Air-entrainment imparts better retention for mortar, minimizing the bleeding of mixing water from the paste. Thus, the GIANT-MIX mortar stays plastic longer for improved strength and bond.

For a full explanation of the role of air-entrainment in mortar, write for your free copy of "How to Make-Up and Use GIANT-MIX." Department FM, Giant Portland & Masonry Cement Co., P.O. Box 5907, Columbia, S.C. 29250.



GIANT MIX
Makes Up Better Mortar

GIANT PORTLAND & MASONRY CEMENT COMPANY

Sales Offices: Columbia, S.C. • Raleigh, N.C. • Tucker, Ga.

MAKE IT A LASTING DECISION

☐ HIGHWAYS ☐ BRIDGES ☐ TUNNELS ☐ RAILROADS
☐ PORTS ☐ TERMINALS ☐ PLANTS ☐ HIGH RISES
☐ SCHOOLS ☐ HOSPITALS ☐ HOTELS ☐ STADIUMS

BUILD WITH MARTIN MARIETTA AGGREGATE

As professionals in aggregates for over 40 years, we can be depended upon to supply the related know-how, experience and materials needed in planning and constructing major projects throughout the southeast.

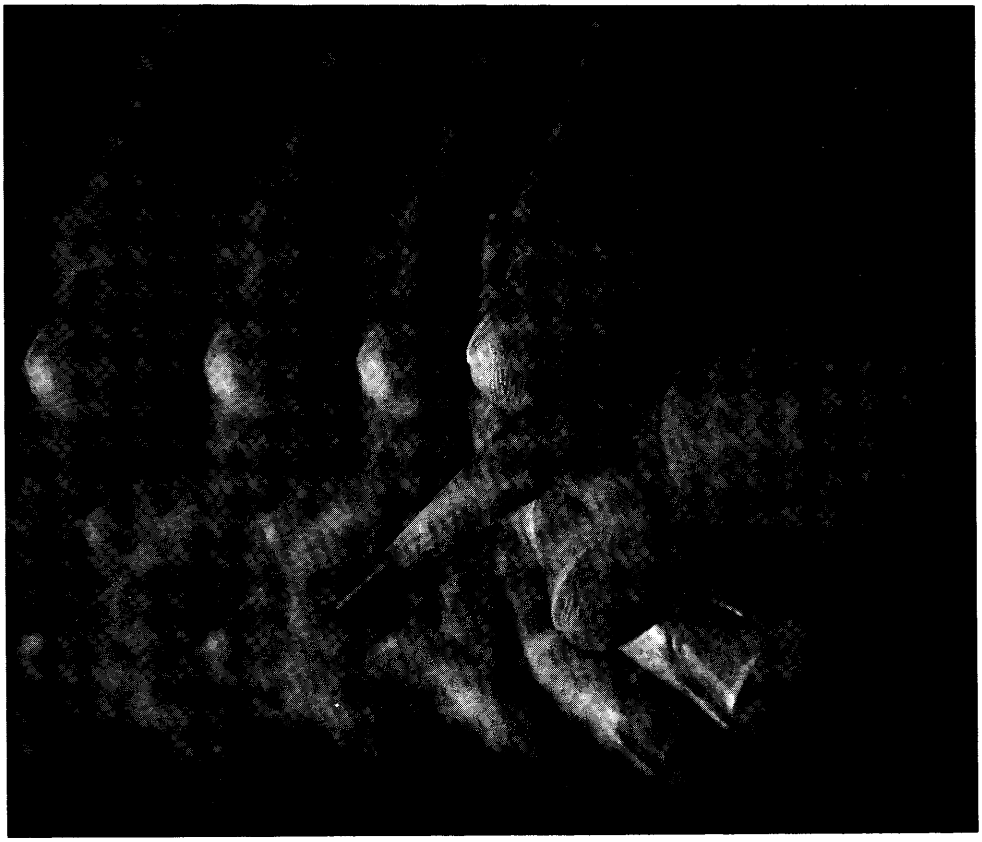
MARTIN MARIETTA

Camp Hill, PA 717-763-0240
Raleigh, NC 919-781-4550
Greensboro, NC 919-292-1133

Martin Marietta Aggregates
Southeast Division
P.O. Box 30013
Raleigh, NC, 27612
919-781-4550

Charlotte, NC 704-525-7740
Columbia, SC 803-796-6360
Augusta, GA 404-860-1762

A GOOD DESIGNER CAN SAVE HIS CLIENTS THOUSANDS WITH A FLICK OF THE WRIST.



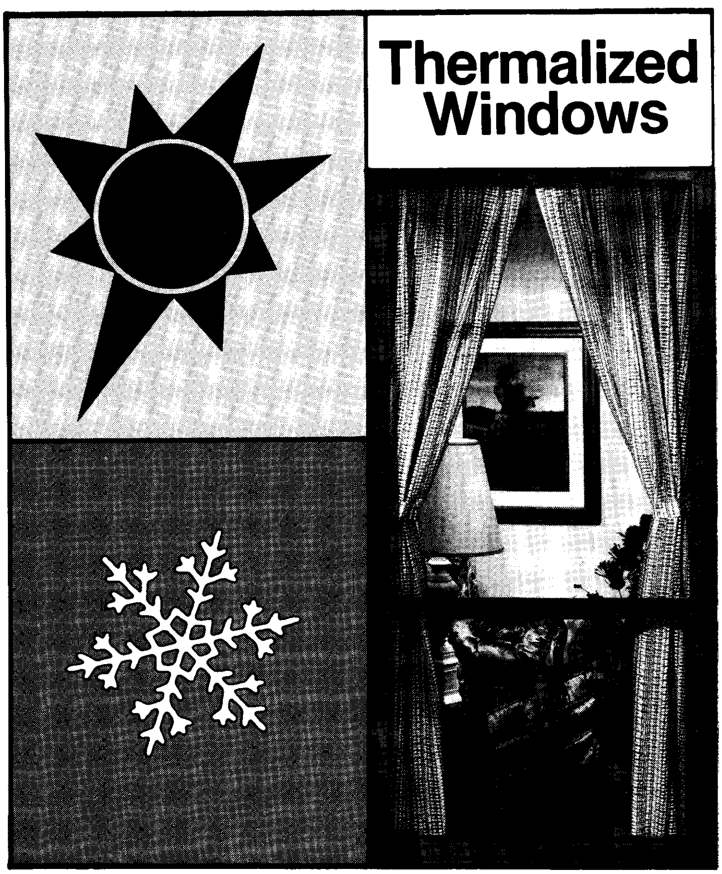
You can help your clients, your country and yourself, in a single stroke.

By designing structures that are energy efficient, you help your clients save money on energy costs, you help your country resolve the energy problem and you help yourself by having clients who will gladly recommend your firm since you're saving them so much money.

At Duke, we have the resources to help you solve almost any energy-related problem. If we can be of assistance, contact J.M. Foreman, Jr., General Manager of Energy Services, at 704/373-4697. Or write P.O. Box 33189, Charlotte, N.C. 28242.

By contributing to a happier nation and happier clients, you'll wind up with a smile on your face, too.

Duke Power



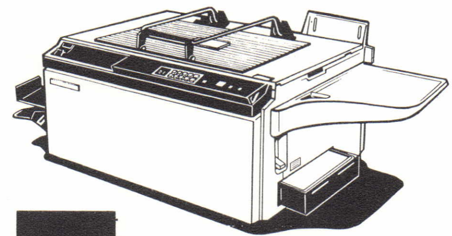
There's more energy-saving quality built into new construction with Binning's Thermalized Windows.

For more information and a free brochure, contact:
Binning's, P. O. Box 868,
Lexington, N. C. 27292.
Telephone 704-249-9193.

Binning's Building Products

National Gypsum Company

WHAT MADE THE ROYFAX BOND COPIER 115 AMERICA'S BEST SELLER?



Reliability is the answer. Reliability so advanced one leading research report gave the Royfax 115 the highest reliability rating ever given a copier in its class. A perfect "10." The Royfax 115 has other advantages. It delivers dry, smudge-free, permanent copies in six paper sizes from 5½" x 8½" to a *big* 11" x 17". It copies on plain paper, letterheads and other stock at the rate of 15 copies per minute.

ROYAL Royfax® 115

ALFRED WILLIAMS & CO.

1813 North Boulevard
P.O. Box 591
Raleigh, N.C. 27602
919-832-9570

AW
Since 1867

1108 Imperial Dr.
P.O. Box 10398
Goldsboro, N.C. 27532
919-778-7700

ENERGY EFFICIENT GAS HOME

Build better for the future with a Natural Gas Home designed to save energy and money.

PUBLIC SERVICE
COMPANY of NORTH CAROLINA
INCORPORATED

GENERAL OFFICES
400 COX ROAD GASTONIA, NORTH CAROLINA

Serving 77 cities and towns in 26 North Carolina counties.

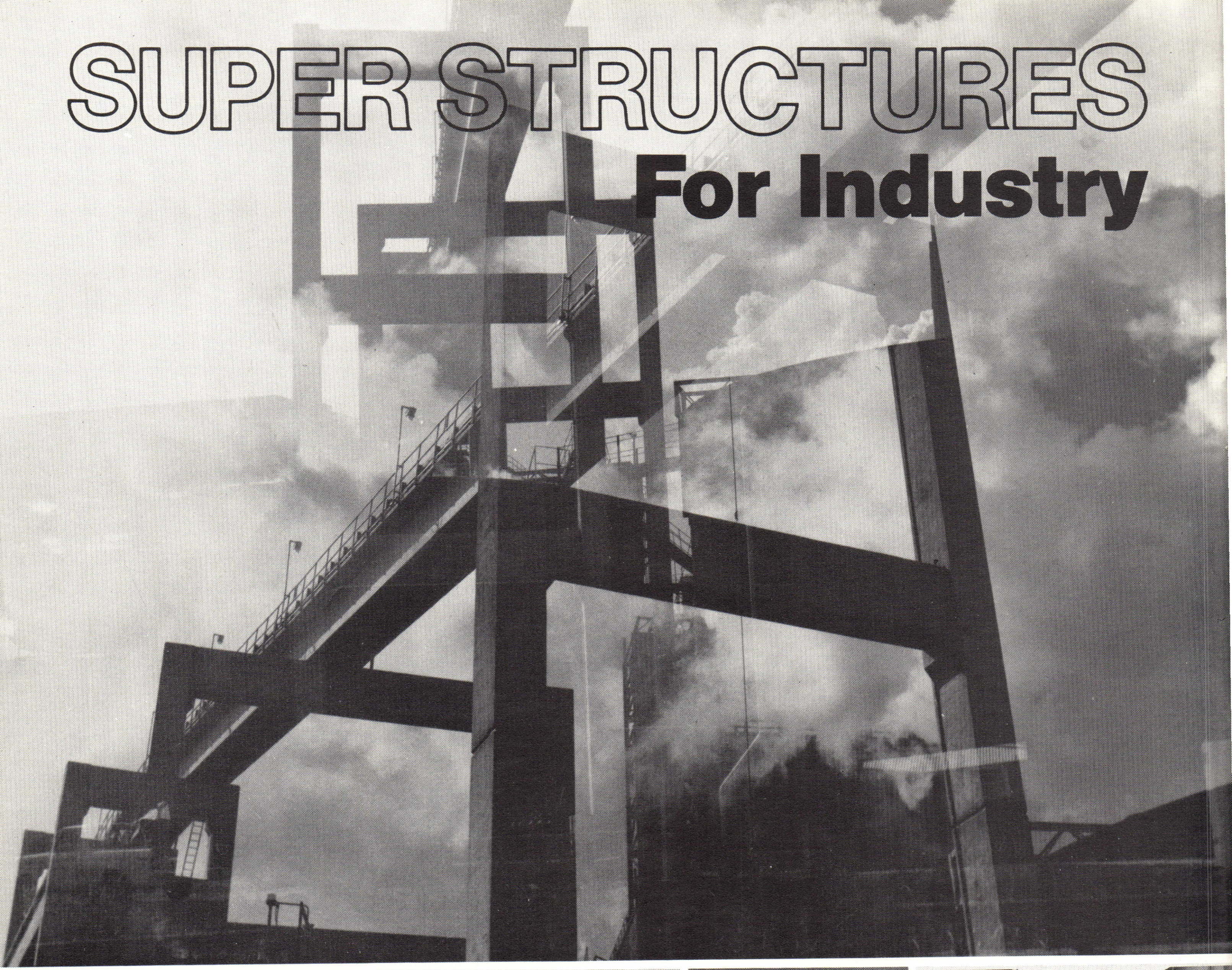
GRAPHIC SYSTEMS
INTERNATIONAL
INCORPORATED

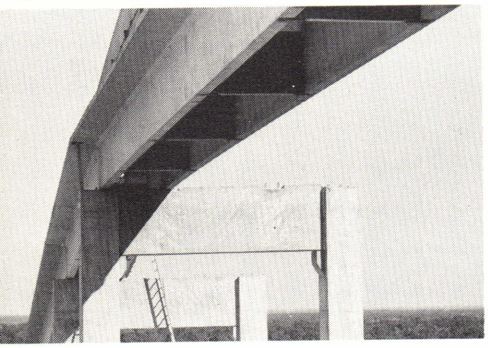
431 Spring Garden Street
Greensboro, NC 27401

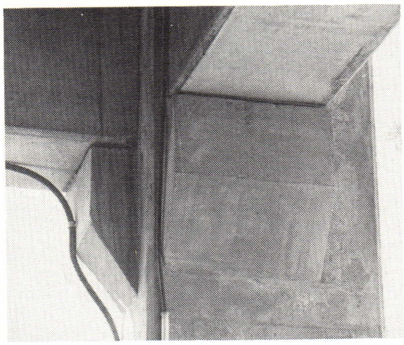
telephone 919 273 2891

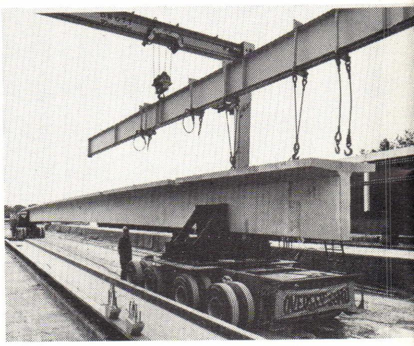
Designers & Manufacturers of Letters, Signs, Displays and Sign Systems

SUPER STRUCTURES
For Industry









Tindall Prestressed Concrete Building Systems . . . Quick to install. Combat corrosion. Last and last.

Maintaining and replacing steel structures, which corrode frequently, particularly under salt air and chemical vapor attack . . . is no longer the cost and safety engineers' plague . . . When Tindall furnishes your project with modern prestressed structural concrete.

For example: this dynamic wood chip conveying freeway is breaking all records for cost-efficiency, speed of erection, and low maintenance.

Precast, Prestressed Towers, Pipe Bridges, Double T Roof Framing, Beams, Columns, and Wall Panels . . . just some of the many structural components readily available from Tindall's certified custom manufacturing plant.

Talk to your Tindall sales engineer today. Arrange to see his short, informative audio-visual describing Tindall's supplier capabilities . . . with Super Structures For Industry.

Tindall
CONCRETE PRODUCTS, INC.
The Budgetmakers

TINDALL CONCRETE PRODUCTS, INC. • P.O. BOX 1778 • SPARTANBURG, S.C. 29304 • TELEPHONE (803) 576-3230 ©1980

MAKING STEEL WORK.

You may never know everything we can do to a piece of steel unless you ask. At Peden's Steel Service Center, we've been turning steel into working parts for nearly 50 years. Punching, grinding, sawing, threading, burning, drilling. At the Steel Service Center, it's the combination of the steel and the skill to make it into whatever you need that makes steel work.

Steel Service Center — the name says it. A place where you can get steel. And where you can get service. For steel that works, call Peden. We're ready.

Peden Steel Company, P.O. Drawer 26208, Raleigh, NC 27611. 919/832-2081, or call 800/662-7134 toll-free in NC. *Fabricating subsidiary: Volunteer Structures, Inc., Nashville, Tenn.*

PEDEN STEEL

James M. Edwards, III
420 N. Boylan Ave. AIA
Raleigh, NC 27603

It saves maintenance.

Wood rots, burns, splits and warps. And it needs repainting or staining about every 2 years. That means wood continues to cost you money. Forever. Sanford brick doesn't.

And energy.

Wood siding is a very poor insulator. Brick is a good insulator. That's why, when you build with Sanford brick, you not only save substantially on the cost of fuel and electricity but you can also temperature control your home with a smaller heating and cooling unit. And, if you build with insulated brick cavity walls, you can reduce your heating bill by 28% and your cooling bill up to 9%.

And pest damage.

Wood invites termites, pine borers, woodpeckers, carpenter ants, etc. Sanford brick is pest-proof. A lot of wood home owners wish they had thought of that.

Here's the beauty part.

Sanford Handcraft brick styles give you all the savings plus a truly beautiful home. They come in a wide range of colors and textures that recreate the mellow warmth and dignity of old landmarks. You'll find one just right for your building project.

And the final payoff.

Brick homes always maintain a higher resale value than wood homes of comparable size. And their values appreciate faster.

If you're thinking of building with wood siding, you should get <u>all</u> the facts first.

Call Toll Free:

1-800-672-7555

Sanford Brick Corporation

Sanford makes the difference in brick.

Sanford, NC
27330