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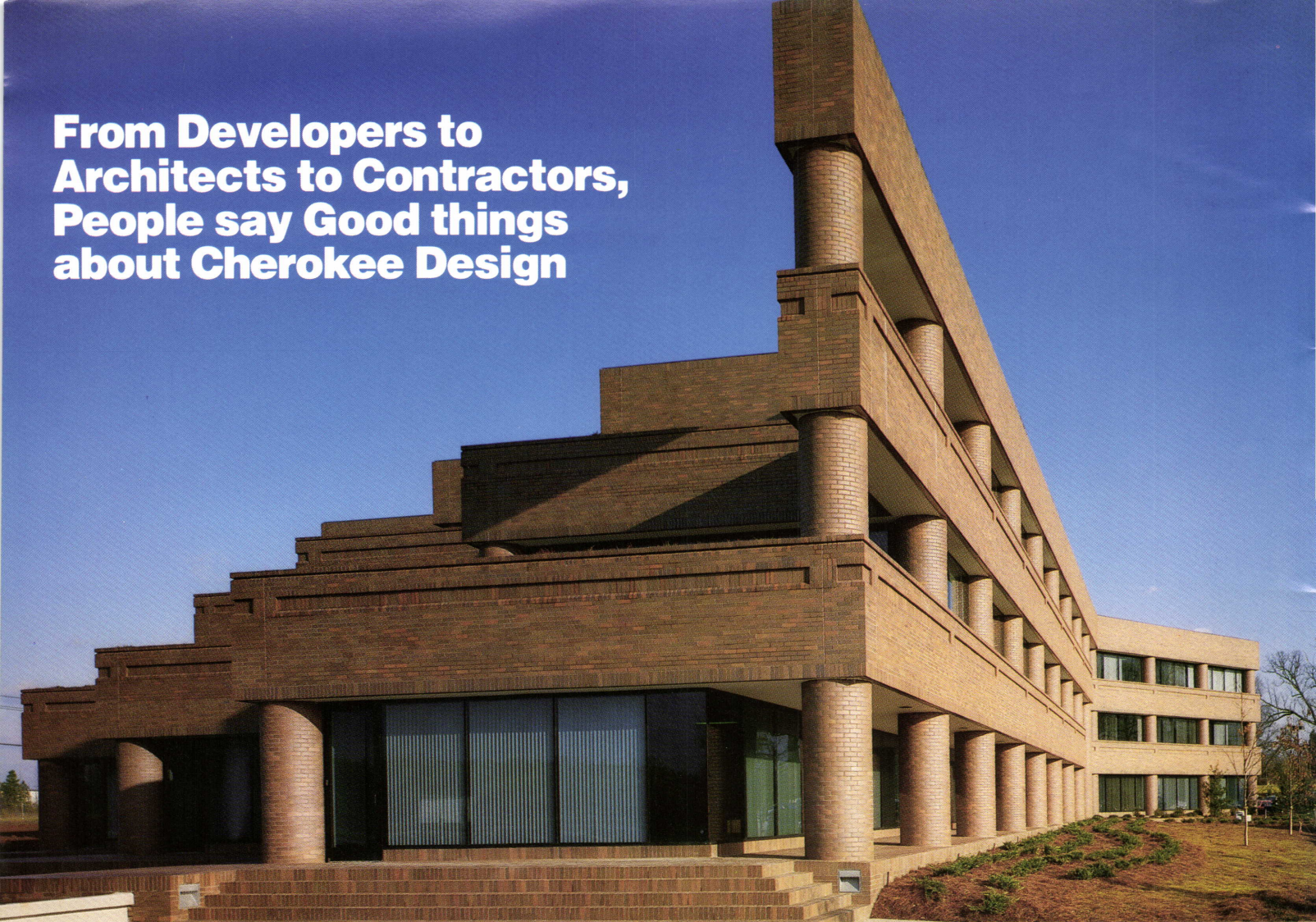
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Cover Photography by Gordon H. Schenck, Jr.



MIXING PEOPLE AND AIRPLANES

Three airport terminals in North Carolina presented varying design challenges.

By Gaylord Shaw

In a bygone era, when the world seemed bigger and life's pace slower, train stations were the gateways to America's cities.

With their marble faces, Corinthian columns and graceful arches, they sported impressive names—Grand Central Station, for instance—and they sought to impress arriving travelers with a sense of space and dignity.

Nowadays, the world seems smaller and life's pace more hurried. Trains are almost extinct. Airplanes have replaced them. And airports have replaced train stations as the gateways.

With the modern era's emphasis on efficiency and economy, is it possible to design and build an airport with a sense of space and dignity, an airport that allows legions of people and scores of machines to move easily and confidently, an airport that serves as a suitable gateway to a proud and growing city?

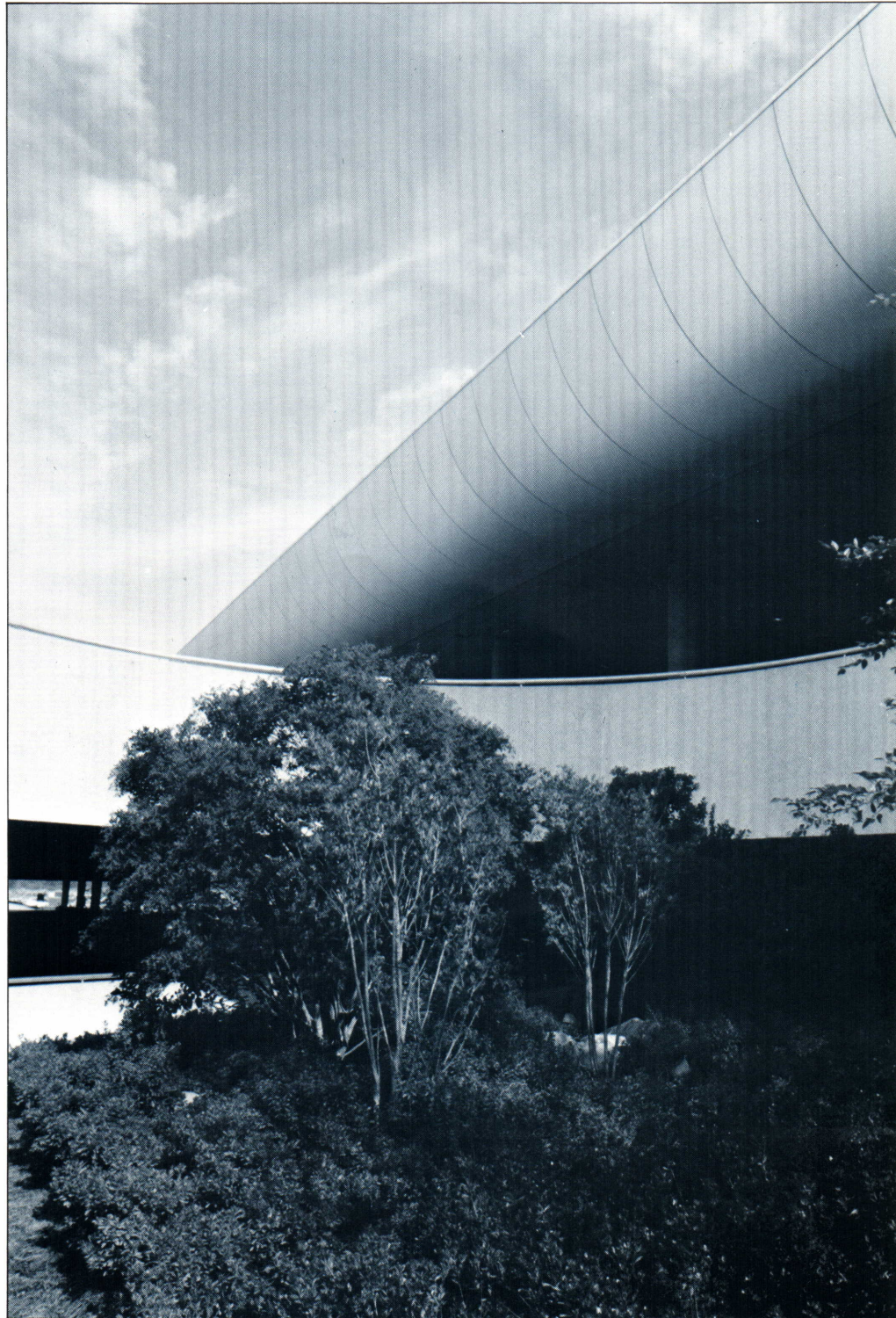
That was the complex assignment given to architects who designed new terminals at three of North Carolina's largest airports—Charlotte/Douglas International Airport, Raleigh-Durham Airport and Greensboro-High Point-Winston-Salem Regional Airport.

The fact that the architects succeeded is evident from the public acceptance and professional acclaim that followed the opening of the airports—Charlotte and Raleigh in 1982 and Greensboro in 1983.

To say that designing an airport is a complicated, demanding, sometimes frustrating task is an understatement as large as an airport itself. Not only is development of an airport usually years in the making, with the predictable strains caused by fixed budgets in an inflationary age, it is a process where changes come suddenly: Airlines can quadruple their flights—or pull out of an airport completely—almost overnight; public officials who head the responsible government agency can resign or lose an election, to be replaced by someone with different ideas.

But the importance of an airport de-

Photo by Larry Amato



Near Greensboro, a glowing horizon provides the backdrop as an airliner takes off at the new regional airport (left) while the terminal's graceful curves blend with extensive landscaping (above).

sign to a city cannot be overstated. The instructions given to architects by the City of Charlotte in 1978 give an indication why.

"The terminal in Charlotte," the document said, "will be one of the most visible and heavily used public buildings in the city. It will be frequently shown in the media; it will provide the first and last impression of the city for many, and as such should reflect the dignity and sophistication of one of the most dynamic, growing cities in the country."

Odell Associates Inc., architects for the Charlotte terminal, took the instructions seriously.

"The gateway to the city was a concept we kept in the mind throughout," says Roy W. Johnson, lead architect on the project. "An airport can be a tremendous source of pride for a city, and we wanted passengers to say, 'Gee, look at this airport—Charlotte must be a big, impressive city,' because with the old terminal, they would say just the opposite.

"Of the basic criteria, the most important one was the 'gateway.' And we wanted a clean, contemporary image for

the building; we wanted a terminal that was friendly, warm, comforting and easy to use," Johnson says.

The move to build a new airport in Charlotte dates back more than a decade. In the early 1970s, plans called for an airport featuring two satellite concourses connected by an underground subway, somewhat similar to the Atlanta airport. But voters in 1975 rejected a bond issue to finance the airport's construction.

Airport advocates didn't give up, though. They came up with plans for a scaled-down facility and "put more effort into telling the story of the airport," Johnson recalls. "By then, crowding at the airport had become very obvious, so it was an easier story to tell."

A new election was held in May 1978, and the voters approved a \$47 million bond issue for buildings, parking and all site improvements. Odell Associates quickly went to work designing the terminal, estimated to cost \$23 million.

Johnson coordinated the efforts of as many as 50 of the firm's staffers, plus outside consultants, and worked closely with Day & Zimmerman, the Philadel-

phia firm which managed construction of the airport.

Airport design requires close and continuing consultation with a number of groups—airlines, concessionaires, municipal agencies—and Johnson estimates there were 40 to 50 major meetings during the design process "to make certain everyone got what they needed."

Ideas and suggestions came in notes and telephone calls from business leaders and area residents, and Johnson welcomed them. "It is a good feeling to know that there is a broad base of concern that things are done well, that people want to see something good.

"Had they not cared at all what it looked like, then the balance might have been struck for just basic function," he adds.

Two examples of features that were not sacrificed for economy or function are the terminal lobby's high ceilings and its clusters of skylights.

"High ceilings are not necessary," Johnson notes. "For a space that size, a 12-foot ceiling would have worked. It's 25 feet. The reason for this is a sense of place—at least have some feeling of

Clusters of skylights and a 25-foot ceiling help bring a "sense of place" to the lobby of the new terminal of Charlotte/Douglas International Airport.



Photo by Ron Chapple

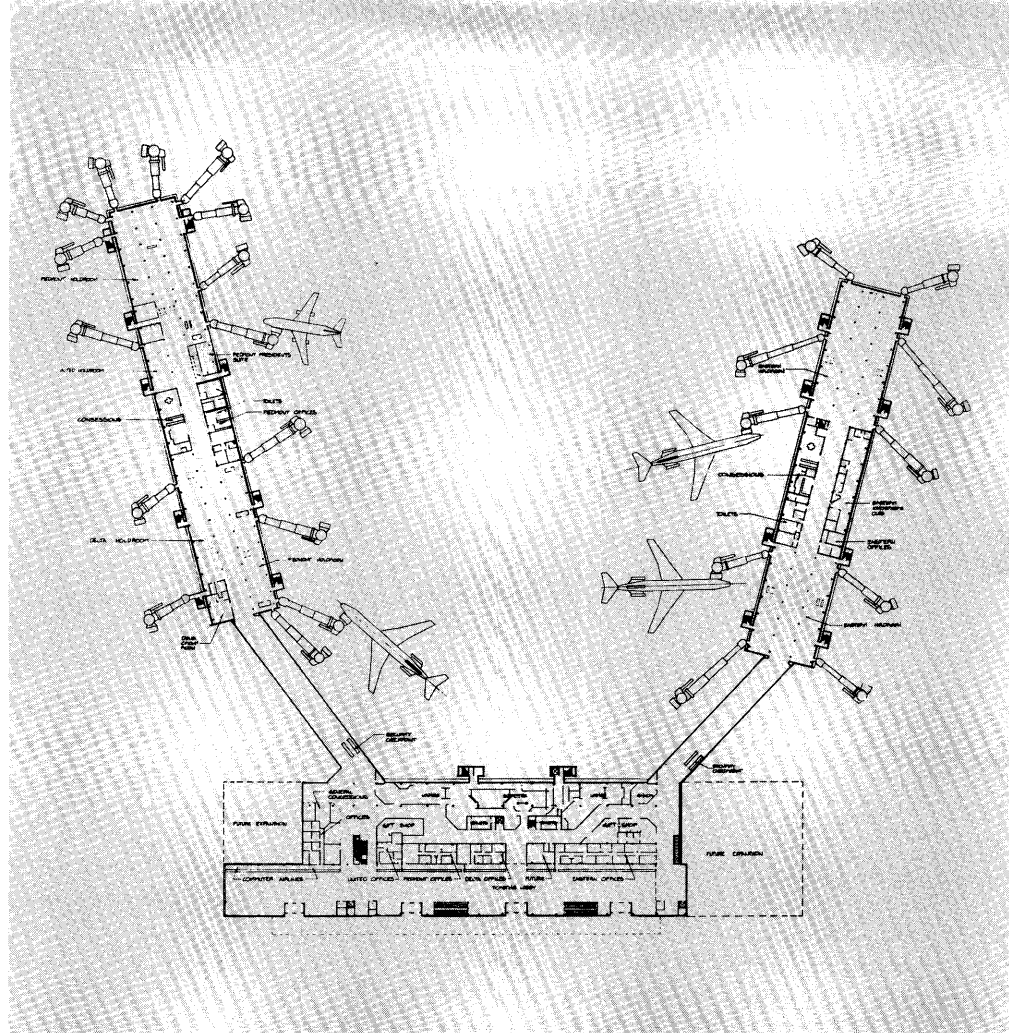
graciousness, that there's space around you."

The skylights "were very important to us," he adds. "They give a unique appearance that few other buildings have." During the daytime, the skylights help flood the lobby with natural light, and at night they "make a very strong visual impression" from the outside through use of sodium lights—"they are like glowing jewels," Johnson says.

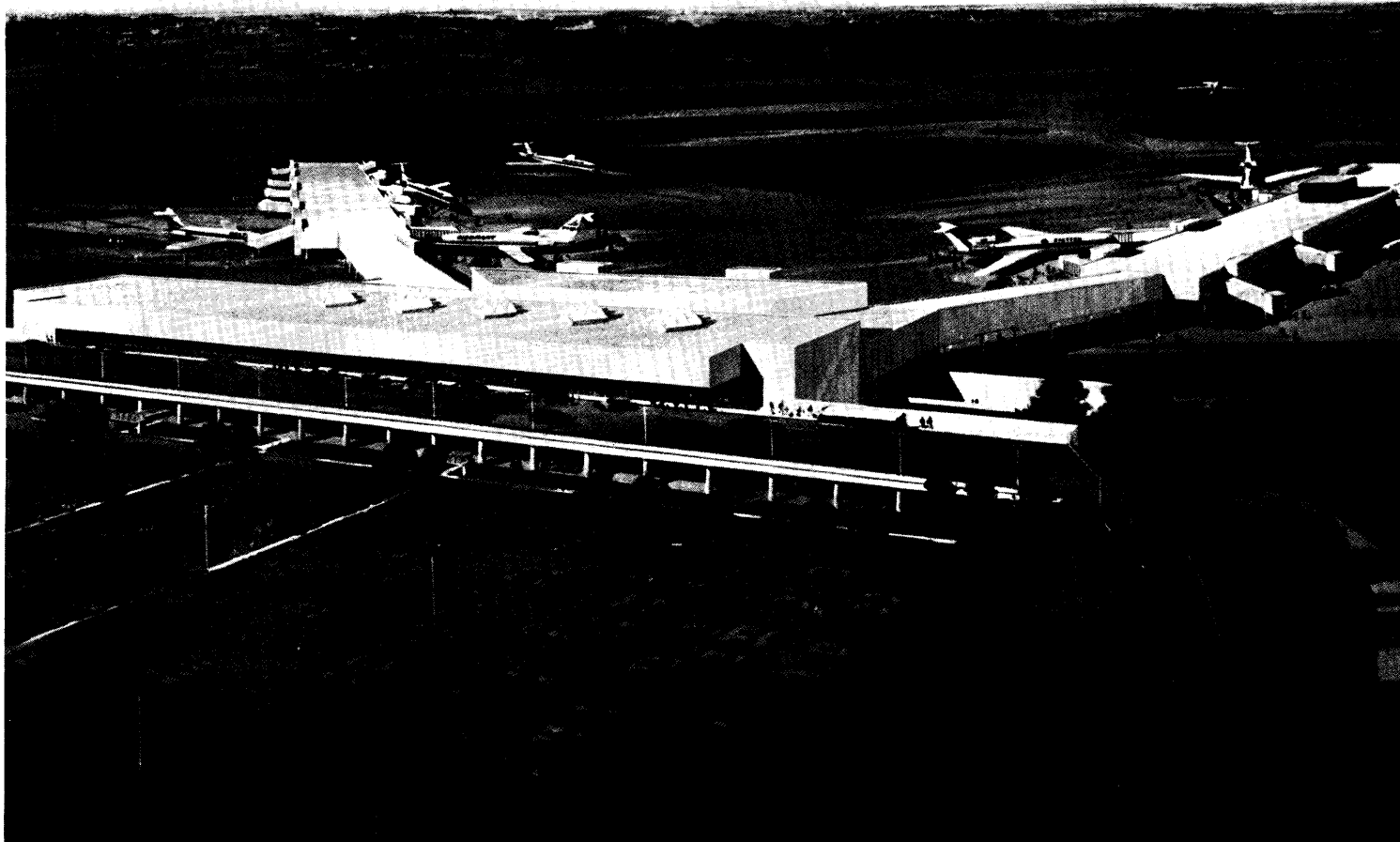
For the twin concourses, the architects designed a "long horizontal ribbon of glass." In the old airport, "there wasn't much of a view, and people like to see what is happening at airports," he adds.

The initial design called for 20 gates, but after construction started, Piedmont Airlines decided that it would use Charlotte as one of its "hubs" and would need more gates, so 25 were built. The design plan will allow two more concourses to be added later for a total of 50 gates.

Energy efficiency was a major criteria. "Our major thrust was to minimize energy consumption during peak hours and spread it over a 24-hour period,"



The terminal at Charlotte/Douglas International Airport (diagram above, artist's rendering below) is designed to allow legions of people and scores of machines to move easily and confidently.



Johnson says. The terminal is heavily insulated and overhangs shade large areas of glass. The fully automated heating and cooling system uses chilled water storage, variable air volume for cooling and radiant panels for heating. The design, which power company officials say saves about \$80,000 in energy costs a year, has won an award for energy conservation.

The exterior of the terminal is white and "we tried to be fairly subdued with colors in the interior, except for the carpeting (which is green in the lobby area), so the graphics would be distinctive," he says.

"Graphics is one of the toughest parts of airport design," he adds. "We had a goal of minimizing graphics in the building, and we put in as few signs as possible at first, and then added the few more we saw were needed."

For ease of circulation, deboarding passengers exit through baggage areas at the lower level, while ticket counters are on the upper level. The previous airport did not provide for this separation, often producing severe congestion of incoming and outgoing passengers at the

baggage claim area.

Relieving congestion and increasing passenger convenience also was a goal at Raleigh-Durham Airport, which has undergone a \$25 million facelift since 1979.

A centerpiece is a \$9.6 million terminal designed by O'Brien/Atkins Associates of Chapel Hill and Durham.

During design and construction phases, the terminal was called an "interim facility" because the airport authority planned to use it in the future as a hangar. Thus, decisions on size, height, structure and materials were based on the building's planned future use. Then the airport authority changed its mind and decided that the building would be a permanent, rather than interim, terminal.

"It is a permanent facility now, and I think it works as a permanent facility," says John L. Atkins III, principal in charge.

One challenge faced by the designers was the narrow depth of the site. Because of other buildings and roads, the building could be no more than 125 feet deep and, as Atkins notes, "that's not a lot of room."

"But as you move through the building, you don't sense that," he adds. "We tried to dramatize the space and have the lobby viewed as public, grand and full of activity."

"In many airport terminals, it is easy for passengers to be confused because they aren't able to get their orientation, their bearings. What we did was come up with a way that you have a sense of where you are when you get off the plane—you can see the lobby, the baggage area, the car rental counters. You know where you are right away."

"Airports generally are not people oriented, but often seem to be set around the dimensions of the airplane. We wanted to make this one people oriented."

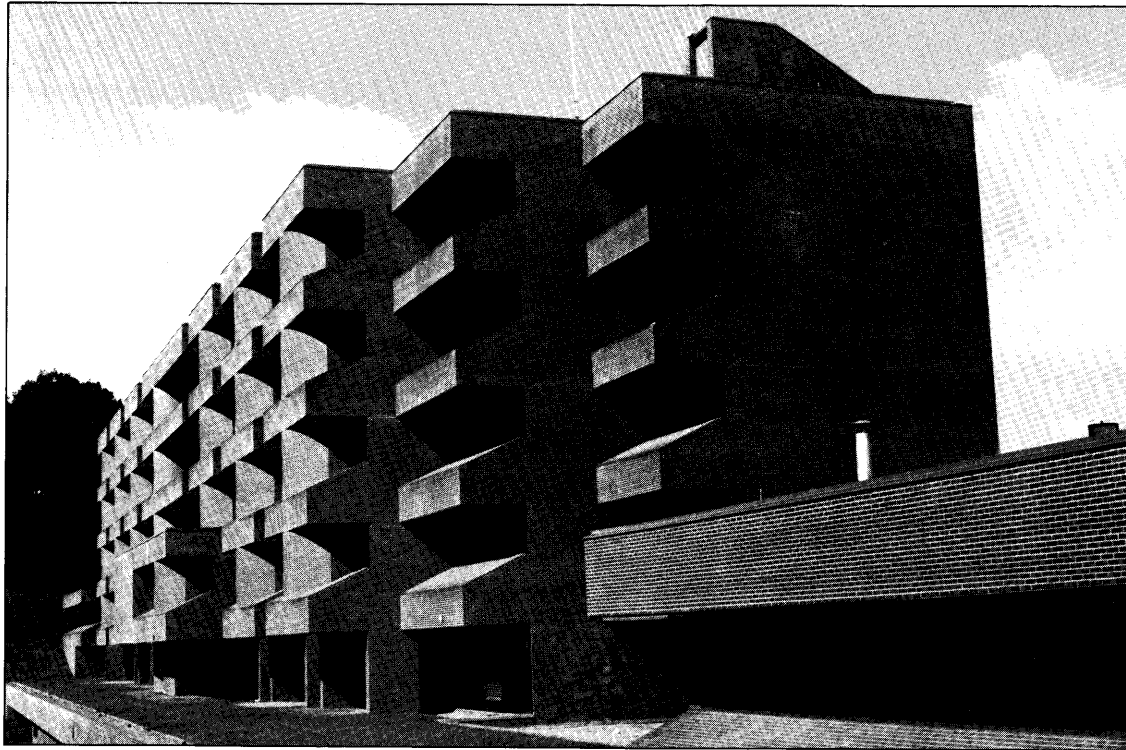
Internally, the building has an "H" configuration with one stroke of the figure at the first floor lobbies, the other stroke being the concourse and the crossing of the "H" being security. Ticketing and baggage claim areas are separated horizontally, and security is simplified to one point.

The lobby area is tall—ceiling heights vary from 30 to 39 feet—and flooded with natural light from skylights

At Raleigh-Durham Airport (below), designers sought "to dramatize the space and have the lobby viewed as public, grand and full of activity."



Photo by Jerry Markatos



BRICK
IN NORTH CAROLINA
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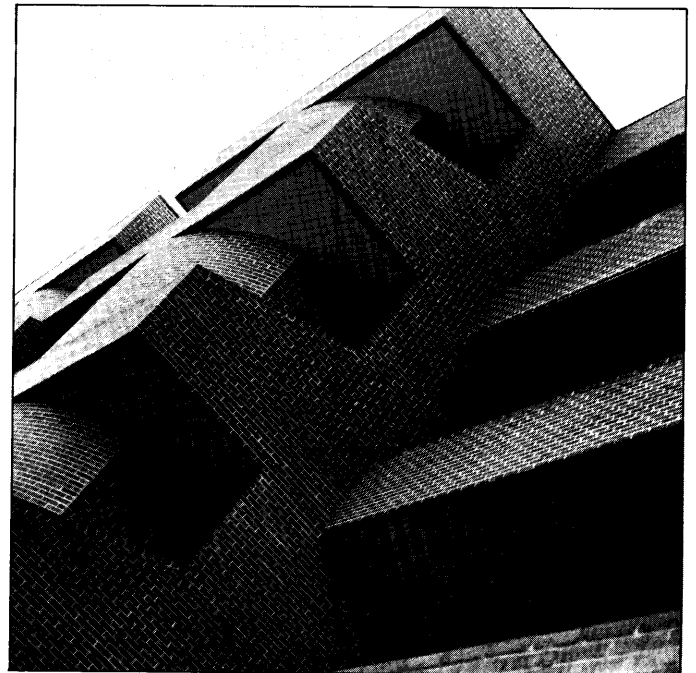


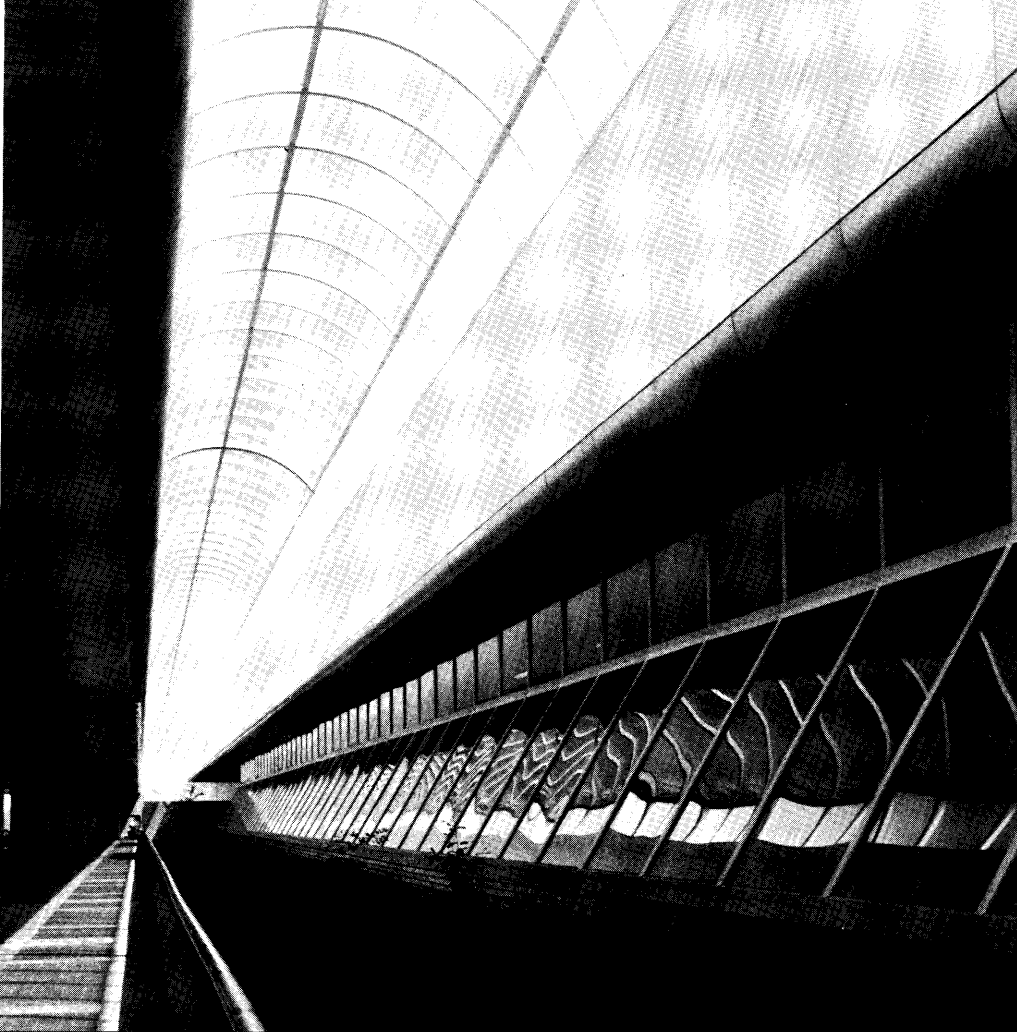
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and large window areas. The concourse area is more intimate, quiet and subdued but still offers opportunities to view the activity of the lobby or to watch airplanes. The Illuminating Engineering Society of North America gave a Lighting Design Award of Merit to the designers for their efforts to provide an attractive and efficient lighting environment throughout the 135,000 square foot building.

Greensboro is the latest of the three airports to open. After more than a decade of planning and construction, the \$65 million in new facilities went into operation this year.

The terminal was designed by RS&H, a Jacksonville, Fla. firm which also has done work on airports from Austin, Tex., to Hartford, Conn., and from Tampa, Fla., to Geneva, Switzerland. In fact, the Greensboro terminal has a touch of "European flavor" in the arrangement of its parking facilities.

"Short-term parking is right at the door—you literally park right in front of the building," says Bob Boardman, the project designer. "This is something that is used in Europe quite a lot."

An arched canopy links parking area with terminal at Greensboro (above) while extensive lighting and reflective surfaces brighten the parking area (below).



Photo by Larry Amato

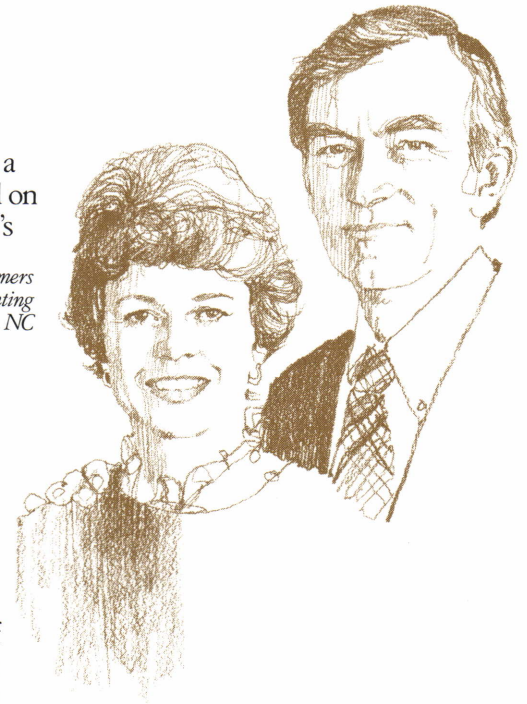
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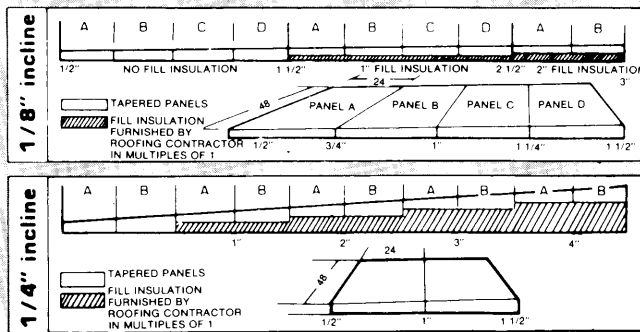
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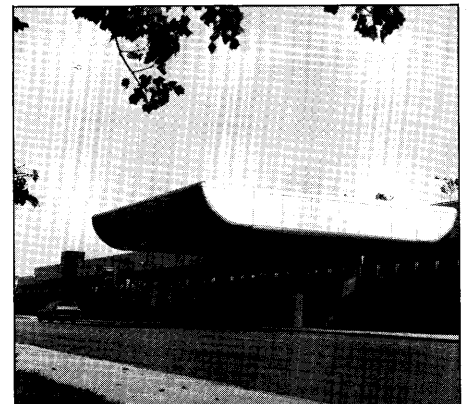
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Roger Sekadlo, executive director of the airport, says the parking arrangement is similar to one he saw at the airport in Hanover, Germany. "By putting the parking right close to the building, and by having a canopy on top, we can say that our passengers are under cover from the time they get out of their car until they get to their destination," Sekadlo adds.

The canopy, arched and with an aluminum skin, is intended "to give a hint of relationship to flight . . . to resemble the sweeping shape of an airplane," says John Barley, project manager for RS&H.

The roof of the short-term parking area is outfitted with an array of solar panels to provide hot water and help heat and cool the terminal. "The airport authority elected to do that . . . to show the community, 'Hey, we're committed to energy conservation,'" Barley adds. "The system will pay itself off."



Greensboro-High Point-Winston-Salem Regional Airport.

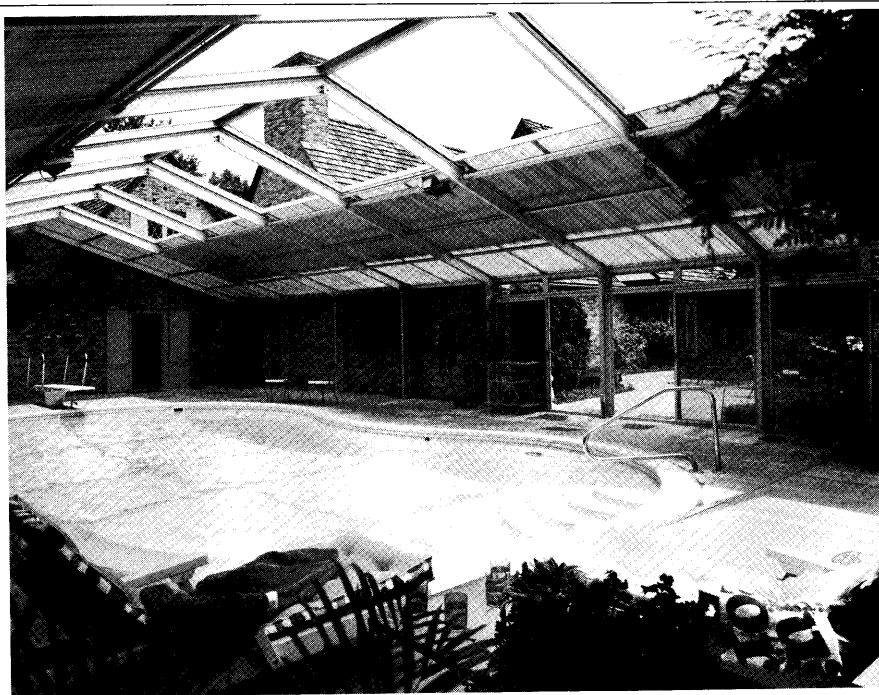
Inside, signs directing passengers to their gates are neon "to give a splash of color here and there," he says. When viewed with some of the building's reflective surfaces, "it added a sparkle," he adds.

Barley says one of the top criteria in designing the Greensboro terminal was to have "a very functional flow."

And, according to Sekadlo, the designers succeeded. "It is a very efficient building," he says. "The beauty of it is its efficiency."

The regional airport was moved from its original 42-acre site to a 200-acre site because expansion of the old terminal was impractical. "We were hemmed in," Sekadlo says, adding that the new site "is adequate to go from 16 to 52 gates."

Ease of future expansion is important, he says, "because this is a rapid growth industry."



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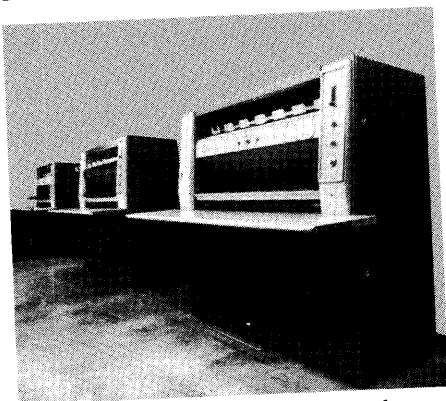
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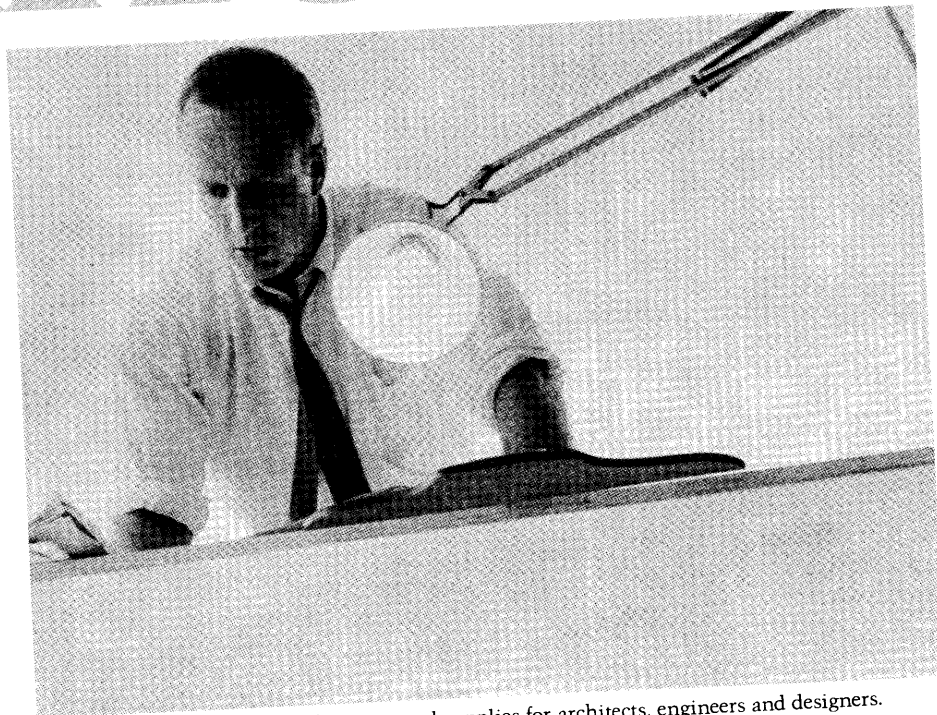
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ELBOW ROOM FOR PIEDMONT

Sleek new maintenance facility has space to work on four planes at a time.

Photography by Rick Alexander

Piedmont Airlines had a pressing need in 1981. It was growing rapidly, adding new routes as it headed toward becoming America's most prosperous carrier of people and cargo.

More routes meant more planes. It was investing millions of dollars in the new aircraft, but it didn't have the right place to perform the necessary service and maintenance on them.

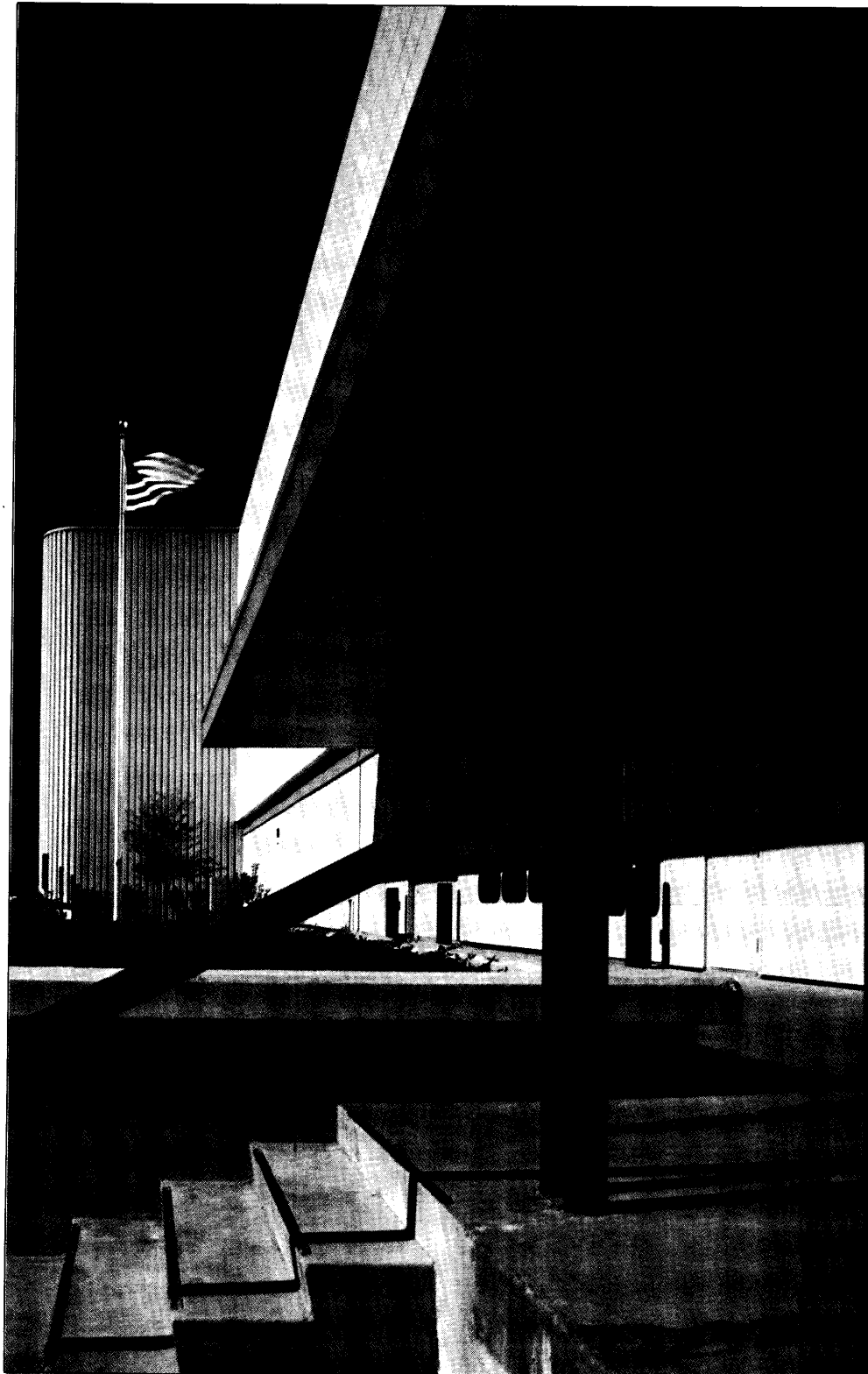
It needed a big hangar, equipped just right but built at the lowest possible cost. And it wanted the facility to project Piedmont's image as the "up and coming airline."

When Piedmont executives approached Odell Associates Inc., a Charlotte planning, architecture and engineering firm, they "knew we had a reputation for doing quality 'image' buildings, and they asked politely if we could do a hangar building that would be cost effective," recalls architect Roy W. Johnson, one of the firm's principals.

Once convinced that Odell could handle the job, Piedmont officials gave the go-ahead and work progressed rapidly at the 15-acre site at the Greensboro/High Point/Winston-Salem Regional Airport. "It was a very restricted time schedule," says architect Michael Tye, another Odell principal. "They already had the planes, and they couldn't get the hangar soon enough."

The architects' challenge was to design a huge building — it is clear span and measures 379 feet by 301 feet, has a ceiling height of 46 feet and contains 136,500 square feet of floor space — that was both efficient and attractive.

For the exterior, they decided to use "color, shade and shadow to create an image we felt was fitting to Piedmont," Tye says. The result was an appearance that is "very much like an airplane itself



Both 737s and 727s fit comfortably into work bays of maintenance facility (left). Designers used "color, shade and shadow" to enhance front entrance (right).

— sleek, clean lines, a touch of color,” adds Johnson.

The white metal panel exterior features clean, bright graphics: the red letters spelling out “Piedmont Airlines” are 17 feet tall, and the company’s blue logo, patterned after a soaring bird, is 31 feet tall.

“It’s a great billboard,” Johnson says. In fact, the north side of the building, which faces across the runway toward the new passenger terminal and features the bold graphics, was finished first — just in time for the terminal’s grand opening.

Before work started on the hangar, Odell did extensive site studies. “We had to take into account the turning radius of a huge aircraft,” Tye says, and other requirements such as a “very minimum slope” in the taxiways and apron. “While these airplanes have very powerful engines, they want to be able to move them on the ground by running the engines at idle,” he adds. And because of the planes’ immense weight, the pavement had to consist of 15 inches of concrete poured on a stabilized 20-inch-thick bed.

Inside, the building was designed especially to accommodate the workhorse of Piedmont’s fleet, the Boeing 737 (with 63 of the twin-engine planes, Piedmont has the world’s largest fleet of

737s). After the design was completed, Piedmont bought a group of Boeing 727-200s. Although longer and with a wider wing span than the 737, these 727s also fit into the hangar’s work bays.

Each of the four work bays was constructed to handle flying working platforms as well as the bridge cranes needed to work on the airplanes. Although the planes are huge, Johnson notes, it was essential that the cranes and platforms be very stable “because just a little bit of movement could poke a hole in the plane’s skin.”

A clear span design was required to provide ease of access for the big planes, and the massive girders, each 115 feet long, were fabricated by Carolina Steel of Greensboro.

Another major feature is the hangar’s doors. There are 16 in all, each 45 feet tall and 30 feet wide and each separately controlled on its own “railroad track.”

In addition to the four work bays, the building has a central core containing three levels of shops, storage areas and offices. “It was like building a four-story building within a building,” Johnson says of the central core.

The maintenance facility operates on a seven-days-a-week, three-shifts-a-day basis, and the 300 employees assigned to duty there include Piedmont’s avion-

ics experts as well as a range of other skills — from sheet metal and welding to fabric and fiberglass. The landscaped automobile parking lot can accommodate up to 200 employee and visitor cars.

In addition to the hangar and shop facility, there is a separate 5,000 square foot paint and welding shop with a 2,500 square foot boiler house and a 1,500 square foot sanitation station with a 1,000 square foot fire pump station.

The facility has a specially designed fire protection system, including tanks holding one-half million gallons of water and four diesel pumps able to deliver a rapid “deluge” of water for fire suppression.

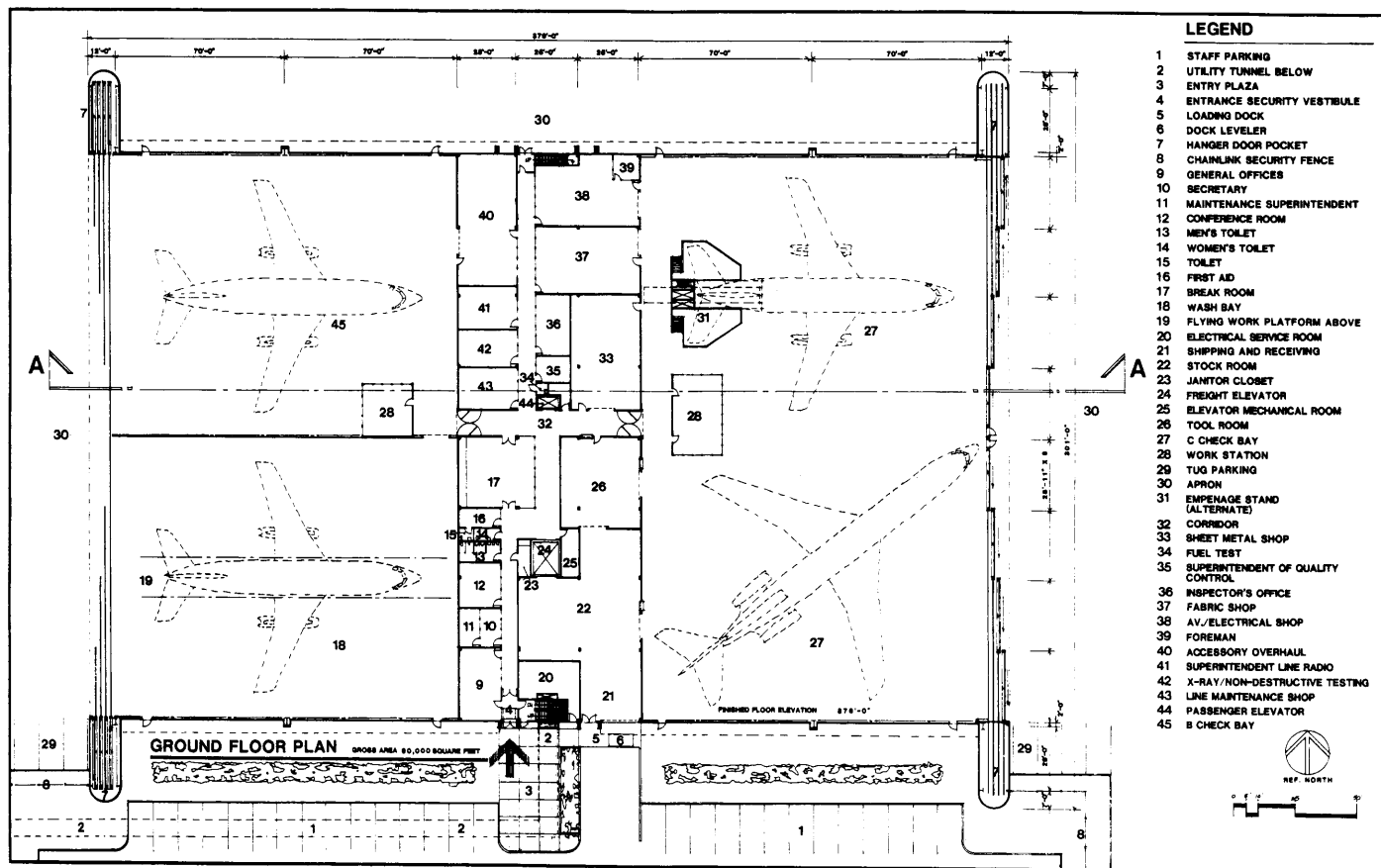
And there are other special features. For example, the hangar’s floor is highly reflective white concrete. The reason? “These airplanes create a large shadow area when parked,” Tye notes, “and much of the maintenance work is done from beneath them, so we used highly reflective concrete to help with the lighting.”

Piedmont officials say they are pleased with the \$11 million maintenance facility, which opened in May 1983. “It is working out very well,” said Don McGuire, vice president for public relations. “It is nice to have elbow room for our planes.”

By Gaylord Shaw

Large, bright graphics make building “a great billboard” (below). Plan includes three levels of offices and shops in addition to fully equipped work bays (right).





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INTRODUCING Lillian Woo

*Interview with new executive director of
N.C. chapter of AIA.*

Lillian Woo describes her new job as executive director of the North Carolina Chapter of the American Institute of Architects as "a wonderful opportunity because architecture is so often on the cutting edge of what is happening" in the state.

"After I get a handle on what's going on, I hope the Institute will be able to relate its function to the public and increase the public's interest and awareness of architecture's role in the development of North Carolina," Woo says.

She adds that one of her goals for the first 12 to 18 months as executive director is to "create atmospheres and plans for the future," much like an architect working on a major, long-term project.

Before joining NCAIA on November 1, Woo was executive director of the North Carolina Mental Health Association, where she was responsible for day-to-day supervision of the association, fund raising and lobbying on behalf of the organization's position on actions being taken by the state legislature.

NCAIA president Michael Tye of Charlotte-based Odell Associates Inc. says Woo "has a unique combination of experience and talents."

Tye says Woo "can be most effective helping NCAIA achieve its goals," including providing "more and better service to NCAIA's membership and better communication with members."

Woo follows Betty Silver Howison as NCAIA executive director. Howison retired November 1 after 23 years with the association. The NCAIA board received applications from a dozen people interested in becoming the association's new executive director, Tye says. He adds that Woo was the only applicant with current experience with a major professional or trade association.

Two days after Howison retired, she was honored at a luncheon sponsored by the association.

"Betty is a tough act to follow," Woo says. "She did an exceptional job. I don't think anyone can ever take her place. We each have different skills and tem-



peraments we bring to a job. I will simply concentrate on fulfilling my responsibilities as best I can."

Woo says she is still working with the NCAIA board "to set the priorities that will be emphasized in the next year."

As executive director, her responsibilities will include direction of the association's daily activities and working with architects and related professionals on a variety of matters.

For several years, Woo, a Raleigh resident, worked as a lobbyist for two major consumer groups in the state. Since the NCAIA has lawyers representing the association's interests in the legislature already, Woo does not anticipate spending much of her time on lobbying. Woo adds, though, that she'll help as needed.

"Lobbying becomes a very personal medium," she says. "I'm one of the vet-

erans; if I can help the Institute, I will."

Tye, who will turn over the NCAIA presidency to Raleigh architect Clay Taylor in early 1984, says Woo's contacts in the legislature can benefit the association substantially, even if she does not become involved in the actual lobbying effort.

Woo is also a political veteran. She ran for state auditor in 1976 against a 20-year incumbent and, although she lost, she surprised many by capturing 48 percent of the vote.

"From there, I went into political consulting, which is something I still do," says Woo.

Woo has an undergraduate degree from Vassar and a master's degree in economics from Columbia University in New York City. In addition, she held a fellowship at the Duke University Institute of Politics.

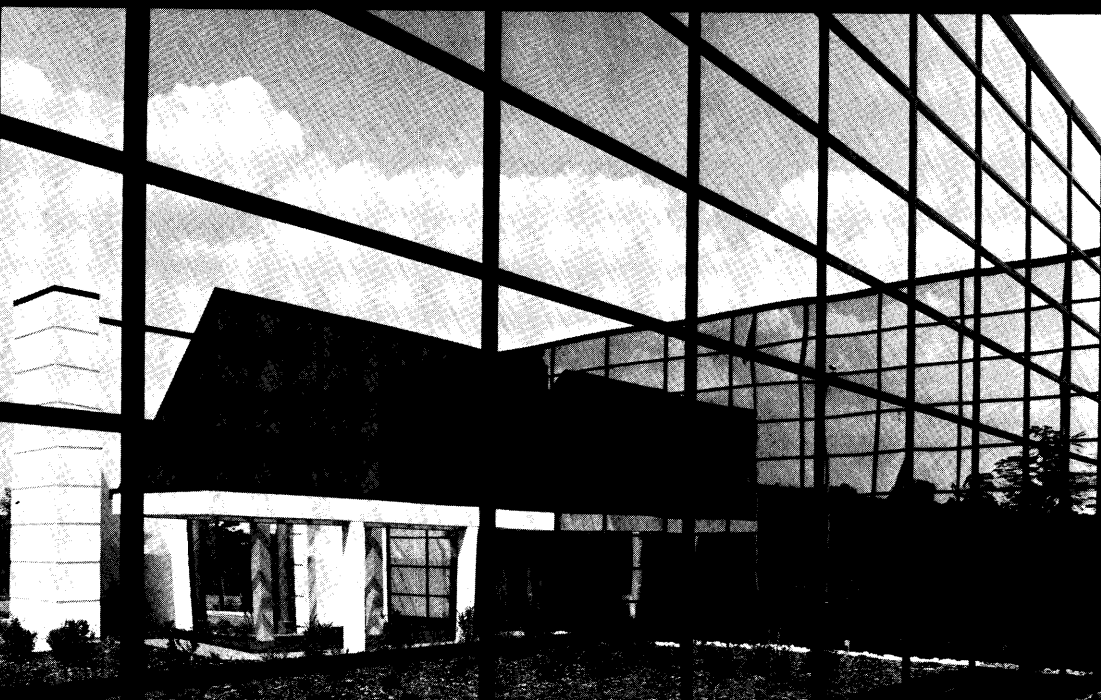
By Whitney Shaw

Architectural Photography
from a different
viewpoint.

Wilton Obel
photographic illustrator



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Off The Drawing Board

High Tech Laboratory Demands Sophistication in Design, Construction

As soon as North Carolina started attracting high technology industry, the demand for highly sophisticated construction took a quantum leap forward.

The Research Triangle Institute's \$6.6 million Semiconductor Laboratory and Engineering Office Building is a prime example.

Consider the task of building a facility where:

- There are no corners.
- A concrete slab must be completely free of vibration.
- Air has to be filtered to almost absolute purity.
- Scientific piping must be purged of air during installation.
- The requirements of one room necessitate vacuuming construction material of dirt and dust.
- Measurements are in degrees of a radius and not feet and inches.

Those are just a few of the challenges facing Engineers-Constructors Inc. of Greensboro as it builds the "clean room" of the facility, designed by Clark, Tribble,

Harris & Li.

Sam Ashton, vice president of the Research Triangle Institute calls the facility "extraordinary, complex, unique and the finest building on the campus."

The building ranges from one to three stories high and includes 73 office areas, four print rooms, two seminar rooms, two conference rooms, a lounge, reading room, two libraries, ten laboratories and a semiconductor lab.

Its graceful, curved lines require special attention from construction crews. A radius point on top of a steel pipe in front of the building was used to guide placement of ten columns exactly nine degrees apart. Taken together, they form a complete 90-degree angle of cords.

In addition, craftsmen skilled in steel, wood, brick and concrete construction techniques made templates while the building was being laid out in the parking lot before construction began about a year ago.

Other challenges included double sheet rock walls for fire protection, four times the air conditioning of a similarly sized normal building, and 17,000 square feet of colored concrete sidewalks that had to be poured in smaller-than-usual sections to maintain color consistency.

The building is expected to open early next year.

"Careful planning, attention to detail and cooperation between owner, architect, contractor and subcontractors are necessary ingredients for successful construction of a project as complex as this one," says John Martin, who directs Engineers-Constructors' work in North Carolina.

BUIE OPENS TAMPA OFFICE UNDER BRANDEN'S DIRECTION

Raleigh architect James C. Buie has opened a Tampa office under the direction of J.P. Branden.

Branden, a graduate of North Carolina State University and Florida Atlantic University, was formerly with Beemer Harrell AIA Architects & Consultants of Hickory.

Much of Branden's recent work has been in active and passive solar design. He's also served as the Governors Coordinator for the Showcase of Solar Homes in Catawba County and has taught at Catawba Valley Technical College and the Newton campus of Gardner Webb.

As associate-in-charge of the Tampa office, Branden's work will include office, shopping and industrial complexes in several Florida cities. Projects under contract in the Tampa office include work for Trammell Crow Co., the nation's largest commercial real estate developer.

LANDSCAPE ARCHITECTS SALUTE PRESERVATION OF BILTMORE GARDENS

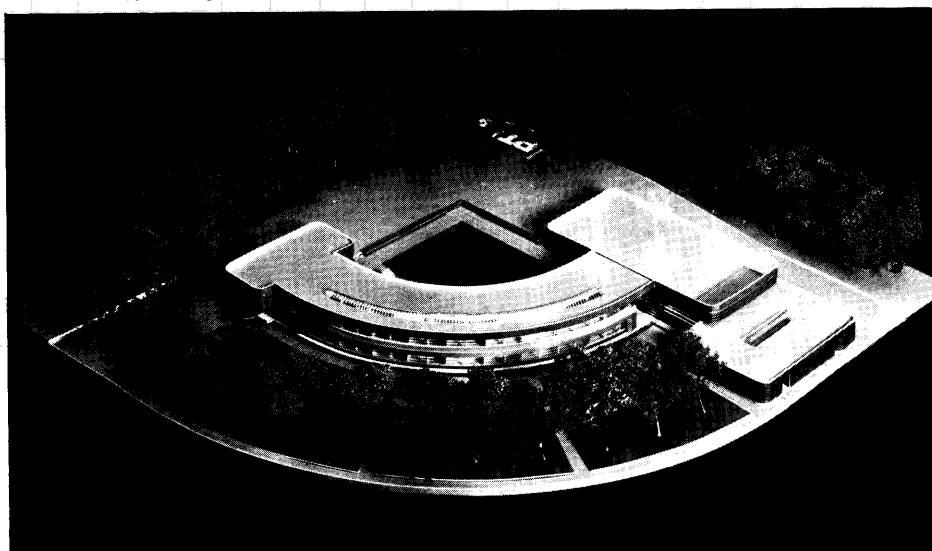
Biltmore Co. president William A.V. Cecil won the 1983 Special Award of the North Carolina Chapter of the American Society of Landscape Architects.

Cecil, the grandson of George Vanderbilt, is the driving force behind the preservation and promotion of Biltmore House and Gardens in Asheville.

Under Cecil's direction, the Biltmore staff has preserved and maintained the gardens in keeping with the plans of Frederick Law Olmsted, who designed New York's Central Park, Fairmont Park in Philadelphia and the Boston Commons in addition to the grounds surrounding Biltmore House.

Others honored by the landscape architects' association were:

Coulter Associates for the R.J. Reynolds Forest Aviary, the Greenway Staff of the City of Raleigh for the Gardner Street Trail, Jordan/Evans/Williams Design Collaborative for Hornets Nest Park in Charlotte and Jerry Turner Associates for the Cary Downtown Development Plan and Greystone



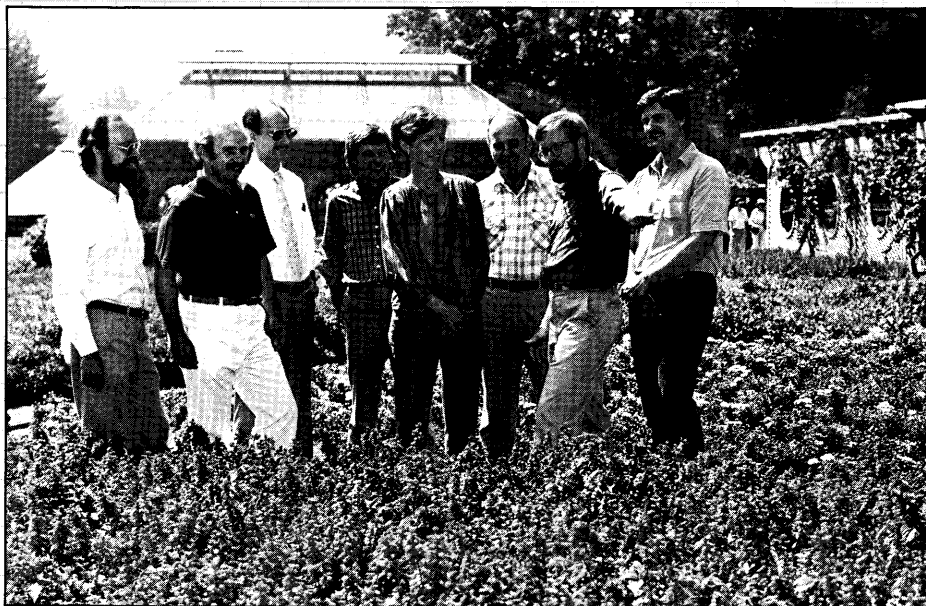
Architect's model of Research Triangle Institute's Semi-Conductor Research lab.

Village.

Also, Landdesign Inc. for Farrington I and II, Little and Little for the Raleigh-Durham Quarry, William G. Danial and Associates and Charles Smith Jr. for Lockmere Planned Unit Development, Kenneth Pitiman of the North Carolina State University School of Design and Brian Scott of the City of Raleigh Planning Department for Hillsborough Street Visual Analysis and the City of Raleigh's Planning Department for a community appearance questionnaire report.

Student winners were James E. Thiem III for Open Channels and David Swanson for a report on quality and quantity of daylight in landscape architecture.

The winners were honored at the association's annual awards ceremony in late September.



Bill Alexander, Biltmore House and Gardens greenhouse and gardens manager, explains Frederick Law Olmsted's plan for the English Walled Garden to the Executive Committee of the North Carolina Chapter of the American Society of Landscape Architecture.

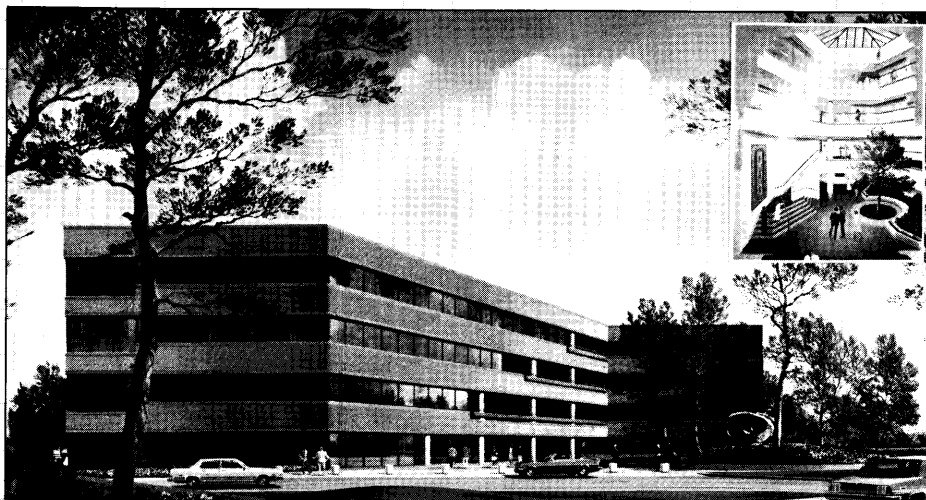
Spaulding & Slye STARTS ON Two Office Buildings

Spaulding & Slye, a major commercial real estate developer, has started construction on two office buildings designed by Clark, Tribble, Harris & Li of Charlotte.

Building 5250 is the largest of ten buildings in Spaulding & Slye's 71-acre 77 Executive Center. The 80,000-square-foot building, the first office in phase two of the complex, is scheduled for completion in summer 1984.

The four-story building will feature a skylit atrium penetrating each floor, front and rear entrances opening into a flow-through lobby, two elevators to each level and a ceremonial staircase.

Spaulding & Slye has also started the second of eight buildings planned for another Charlotte office complex,



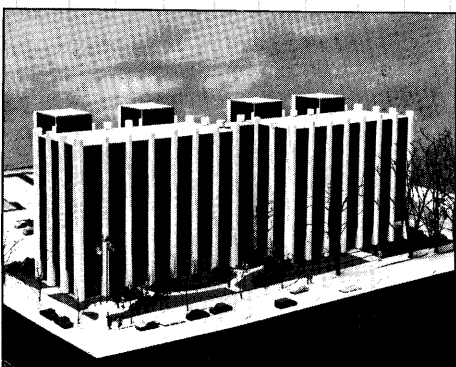
Artist's rendering of Building 5250, 77 Executive Center.

CharlottePark Executive Center.

SunHealth, a multi-state hospital management system and supplier of professional and technical services for hospitals, will occupy two-thirds of the

60,000-square-foot CharlottePark Two building.

In addition to its Charlotte headquarters, SunHealth has offices in Raleigh, Atlanta and West Columbia, S.C.



The proposed Home Office Complex of BB&T.

Wilson Firm Designs TWIN for BB&T TOWER

Skinner, Lamm and Highsmith, a Wilson architectural firm, has designed a seven-story addition to Branch Bank & Trust Co.'s headquarters complex.

The new 91,000-square-foot tower will be a mirror image of BB&T's office in downtown Wilson.

The addition will repeat the original building's use of white stone columns,

bronze window frames and bronze reflective glass.

"By constructing the new addition farther back from Nash Street than its counterpart, space in front of the new building will be created which can be used to host outdoor community events," says L. Vincent Lowe Jr., president and chief executive officer of the bank.

BB&T's first tower was completed in 1971. The new tower is expected to be finished in early 1985.

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AIRPORT FIRE STATION CONSTRUCTION UNDERWAY

Construction has started on a new
fire station at Charlotte/Douglas Inter-
national Airport designed by Middleton,
McMillan, Architects Inc.

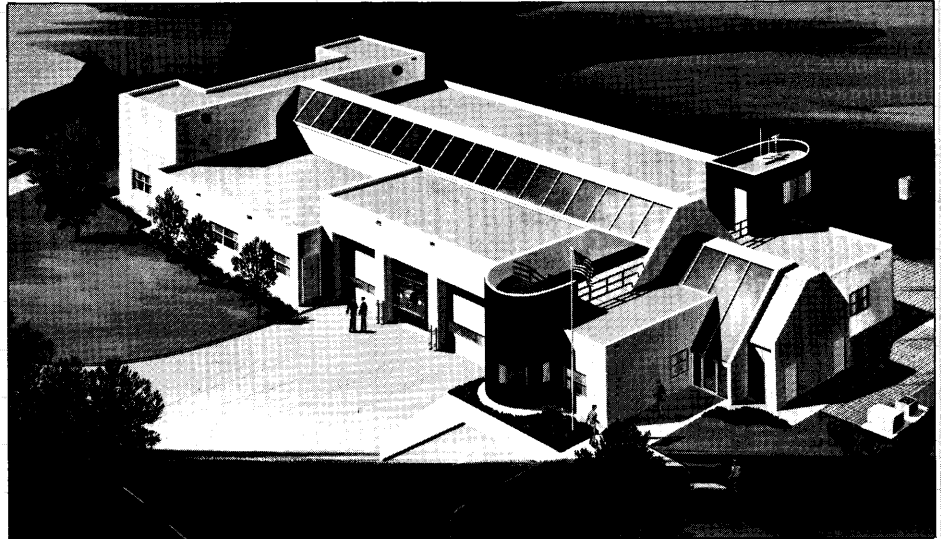
The North Carolina Air National
Guard's Fire Crash Rescue Facility will
have room for 10 fire fighting vehicles,
residential and support areas. Comple-

tion is scheduled for next June.

The building will use solar energy to
heat water.

Middleton McMillan has completed
another project, the Knight Gallery at
Spirit Square, downtown Charlotte's
performing and visual arts center.

The Knight Gallery opened about a
month ago. It will be used to exhibit the
work of noted artists on a rotating basis.



Proposed fire station at Charlotte/Douglas International Airport.

CHAPEL HILL ARCHITECTS WIN FOR COMPACT HOUSES

Houses designed by two architects
from the Chapel Hill area have been in-
cluded in the recently published *Com-
pact House Book: 32 Prizewinning
Designs*.

Bob Giddings and Dail Dixon were the
only winners from North Carolina.

The contest was sponsored by Gar-
den Way Publishing.

Entrants had to keep their houses
under 1,000 square feet of space, ex-
cluding patios, decks, garages and car-
ports. The plan had to include a living
area, dining area, kitchen, two bed-
rooms with closet space, one full bath, a
laundry with washer and dryer and stor-
age shelves and a storage room with at
least 36 square feet of space.

More than 420 entries were received
by contest sponsors.

The Compact House Book is available
at book stores or from the publisher at
Schoolhouse Road, RD #1, Box 105,
Pownal, Vt. 05261. The cost from the
publisher is \$10.95 plus \$1.50 for post-
age and handling.

MARKETING SOCIETY SEEKS NEW MEMBERS IN CAROLINAS

The Carolinas Chapter of the Society
for Professional Marketing Services is
looking for additional members.

The association is open to marketing
employees of architectural, engineering,
planning, interior design, landscape ar-
chitectural and construction firms.

More information about the associa-
tion can be obtained from Kitty Culp of
Middleton, McMillan, Architects at (704)
364-8660.

NORTH MARKET SQUARE NOW OPEN IN RALEIGH

Raleigh homebuilder Frank Robuck
has opened North Market Square, a new
shopping center.

The 15-store center is located at
Wake Forest and Old Wake Forest roads
in Raleigh.

Quincy Johnson Associates of Boca
Raton, Fla., designed North Market
Square. The architectural firm has also
done work in Charlotte and Jacksonville,
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A STYLISH HOME FOR THE BIRDS

Aviary at Asheboro blends natural habitat with ease of viewing for visitors.

By Whitney Shaw

When architects at O'Brien/Atkins Associates started talking to officials of the North Carolina Zoological Park about the aviary they wanted to build, it became evident almost immediately that a major challenge awaited.

Not only were there no appropriate examples to glean information from, a monumental — but elusive — goal was set.

"When we started on this project, one of the things all of us tried to do was maintain the philosophy of a natural habitat," says Bill O'Brien of the Chapel Hill architectural, engineering and planning firm. "In doing that, the building itself had to disappear. The ideal situation would be to walk in and not see any structure at all, but you've also got to

have some way to keep the birds in.

"In this case, we want visitors to be unconcerned with the structure, to give them a sense that they are, indeed, outdoors in a tropical forest."

The resulting R.J. Reynolds Forest Aviary is a success, judging from its popularity with the more than 400,000 people who visited the North Carolina Zoological Park near Asheboro last year. To most visitors, the aviary is first and foremost a lush, tropical wonderland, home to 150 birds and 2,400 plants.

Nothing could make zoo officials, Durham landscape specialist Kenneth Coulter, a tropical bird consultant on loan from Tampa's Busch Gardens, O'Brien, principal in charge of the project, and his associates happier.

Together, they created an environment that emphasizes the aviary's birds

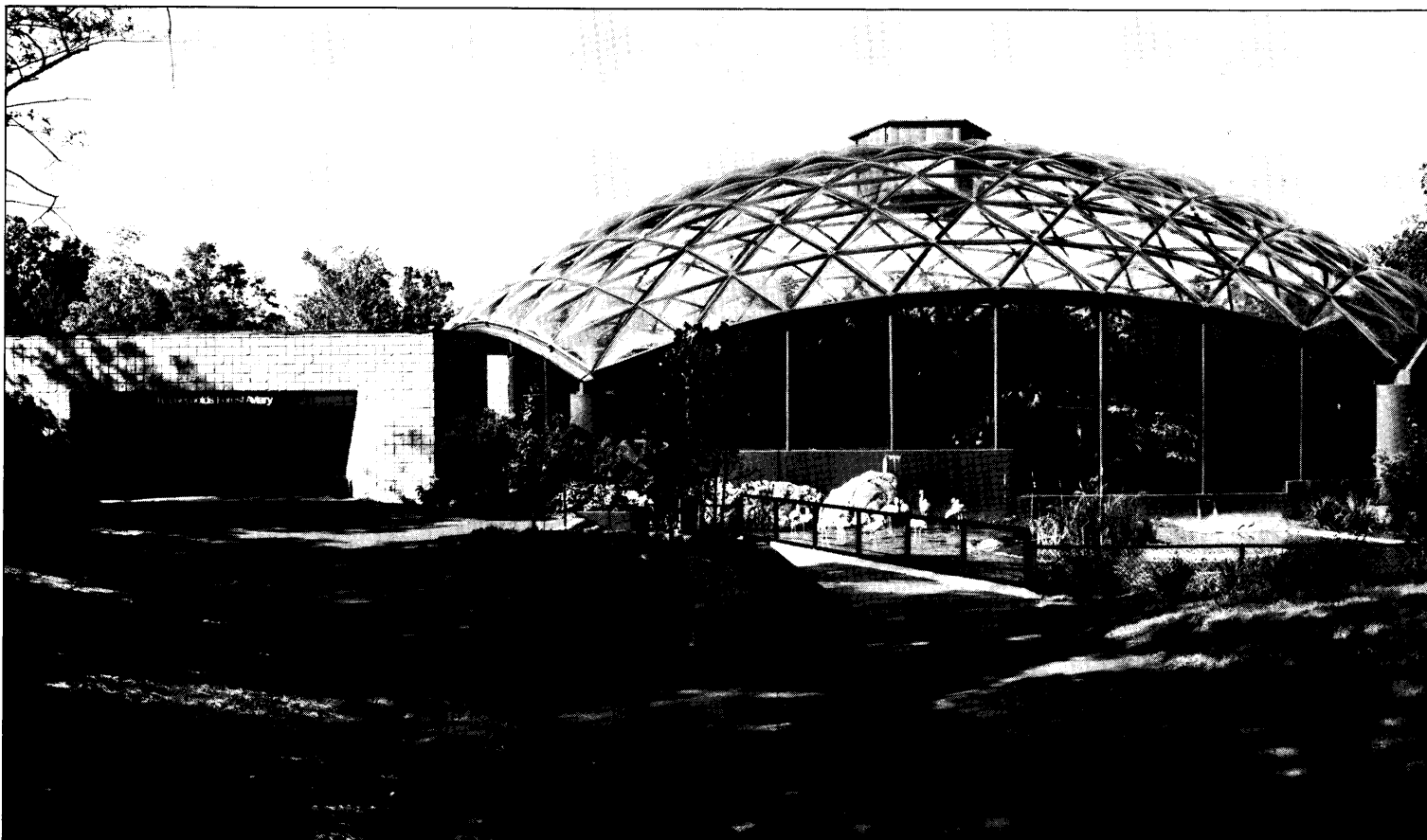
and plants rather than the building itself.

From the outside, though, the aluminum-frame, hexagonal dome is hard to miss, thanks primarily to its size and bronze-tinted plexiglass panels.

Zoo director Robert Fry calls it a "jewel in the middle of North Carolina."

As impressive as the dome looks from the outside, it's even more spectacular inside. The plexiglass panels admit a large amount of light, which provides a proper environment for the tropical plants and makes it easier to maintain temperatures between 60 degrees and 95 degrees. The clear-span, spherical design of the dome, which stretches nearly 139 feet across and reaches 55 feet above ground, allows the carefully selected tropical birds nearly unlimited flight patterns.

The interior of the aviary successfully



A "jewel in the middle of North Carolina" is how the zoo director describes the R.J. Reynolds Forest Aviary (above and left) at the North Carolina Zoological Park near Asheboro.

mirrors the layers of growth found in an actual rain forest.

"The soaring birds prefer the canopy while the perching birds tend to remain in the understory, vines and shrubs," says a zoo spokeswoman. "Others dwell on the ground or in the stream or ponds under the dome."

The \$1.5 million aviary, the newest addition to the 1,371-acre park, features some species of plants and birds not found in any other zoo, says spokeswoman Elise Gillman.

With such a valuable — and fragile — collection, creating an environment that was both pleasing visually and appropriate for the birds and plants be-

came a major challenge.

"The electrical considerations were really very minimal because it was not designed to be operated at night," says O'Brien. "The only lights are for maintenance or emergencies."

"But, a lot of things have to happen mechanically. The circulation of air is a major consideration. It's very hard to find a way to distribute and return all the air that is needed. We chose to use very large, steel culverts that are actually big enough to drive a car through. We'd traveled extensively to look at other structures, but in each case the mechanical system was a detriment. You either had ductwork in the air, or there

were vents on the ground, which was noisy and occasionally hurt the plants.

"We developed the idea of supplying air under the floor, with the vents actually in the sidewalk. We'd heard there was a very old conservatory in Delaware that used something very similar to this, so we went up there to look at it. It's all worked very well. And these tunnels gave us an added benefit of actually working as a service corridor. All of the piping for the water system and the filters for the ponds can actually be serviced through these tunnels. We achieved a flexible arrangement at a comparatively low cost."

The architect adds that a "fail-safe situation" had to be developed to protect against power outages or the resulting fluctuations in temperature that could endanger the birds and plants.

"We've got uninterruptable gas service, emergency generators, systems that could run on propane if necessary, dual boilers and similar features."

But O'Brien quickly points out that such innovative solutions would be worth little if the aviary was not attractive to visitors.

"We wanted people to enter on an upper level (where a man-made rock outcropping allows people to view the aviary's 18,133 square feet of floor space) and then flow down to the floor," he explains. "We wanted to create a variety of vegetation and have people pass running water, still water, under rock bridges and so forth."

Zoo officials say one reason the aviary has become so popular is that it presents an impressive collection of mature plants, even though it has been open only a little more than a year.

O'Brien says that impression is not an accident, thanks to the contributions of Reynolds and other zoo supporters.

"We could have opened with two-foot plants that wouldn't have worked visually for years," he explains. "The other alternative was to buy plants that were more mature. The private contributions that were raised enabled the zoo to spend \$200,000 on plants and another \$50,000 on putting them in the ground. The mature plants make the aviary work. When we were working on the project, several of us went to Des Moines to see something similar there. We went there just a week or two be-

Lush vegetation provides a natural habitat for the aviary's birds (right).

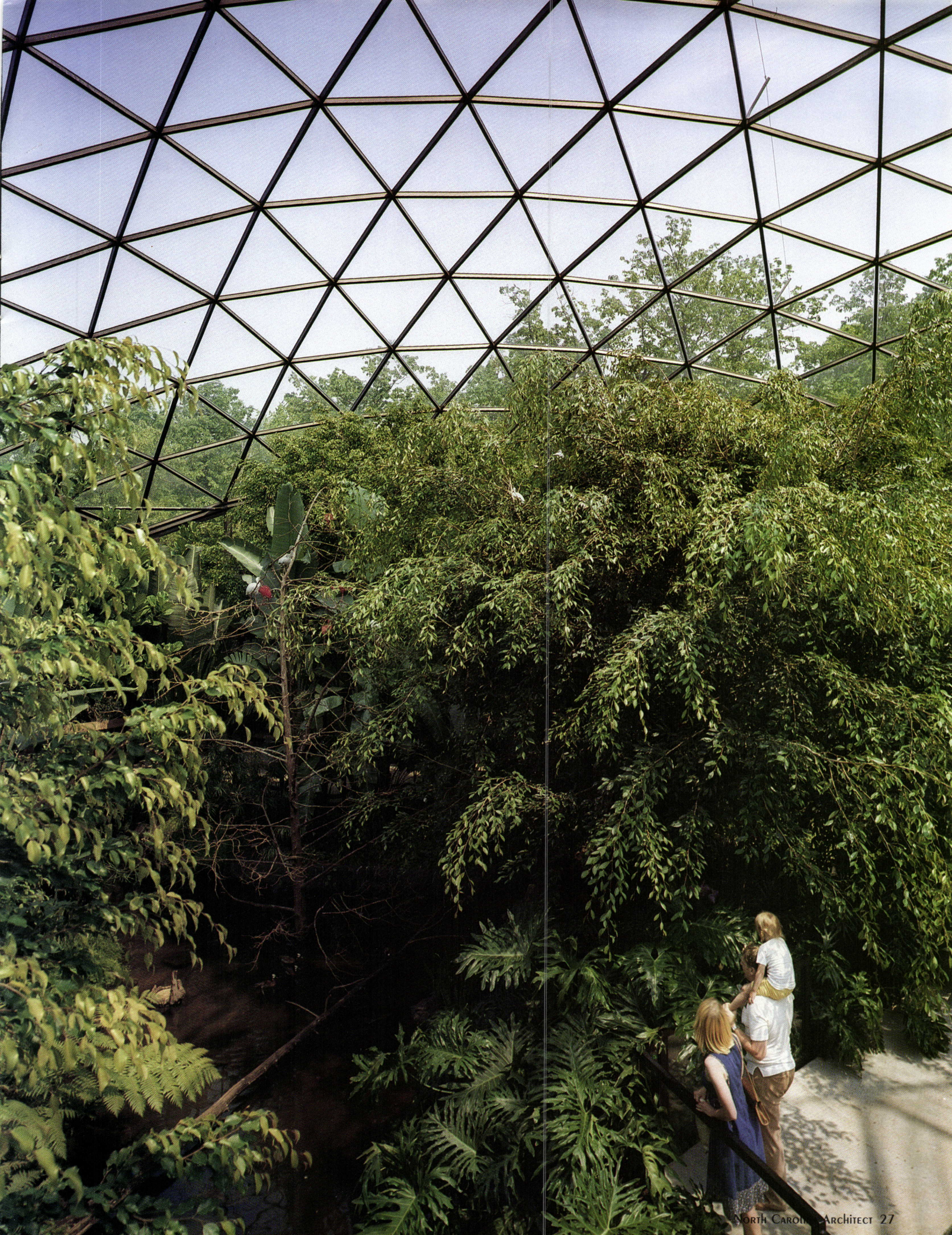


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fore this \$3 million to \$4 million project was to open. There wasn't anything taller than three feet; it just doesn't work.

"This is a one-of-a-kind structure from a requirement standpoint," O'Brien says, noting that Temcor, the California company that designed, engineered and manufactured the dome, had never built an hexagonal structure before, nor had one of its products been used to house a tropical rain forest and aviary.

"We traveled extensively to look at other, similar facilities but could not find anything this size to look at. We had to go our own way."

Despite the lack of examples, zoo officials say the result of O'Brien/Atkins' work is "spectacular."

And the aviary is a prelude to next summer's scheduled opening of the zoo's African Pavilion, which will house 200 animals, and the adjacent African Plains habitat, with another 200 animals. Hayes, Howell Associates, a Southern Pines architectural firm, designed the Pavilion and several other buildings at the zoo.

"These aren't the types of structures you can really make any money at," says O'Brien, "but from a public relations and exposure standpoint, they offer something. We're really very happy with the way the aviary's turned out. Because of the things we've been able to accomplish and because of the way the dome has worked, the chances of another, similar project coming along are better. Realistically, though, I've got to admit the chances of getting another are rather slim. There just aren't very many projects like this one."



Visitors stroll beneath rock outcroppings (above) and past mature tropical plants (below).



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