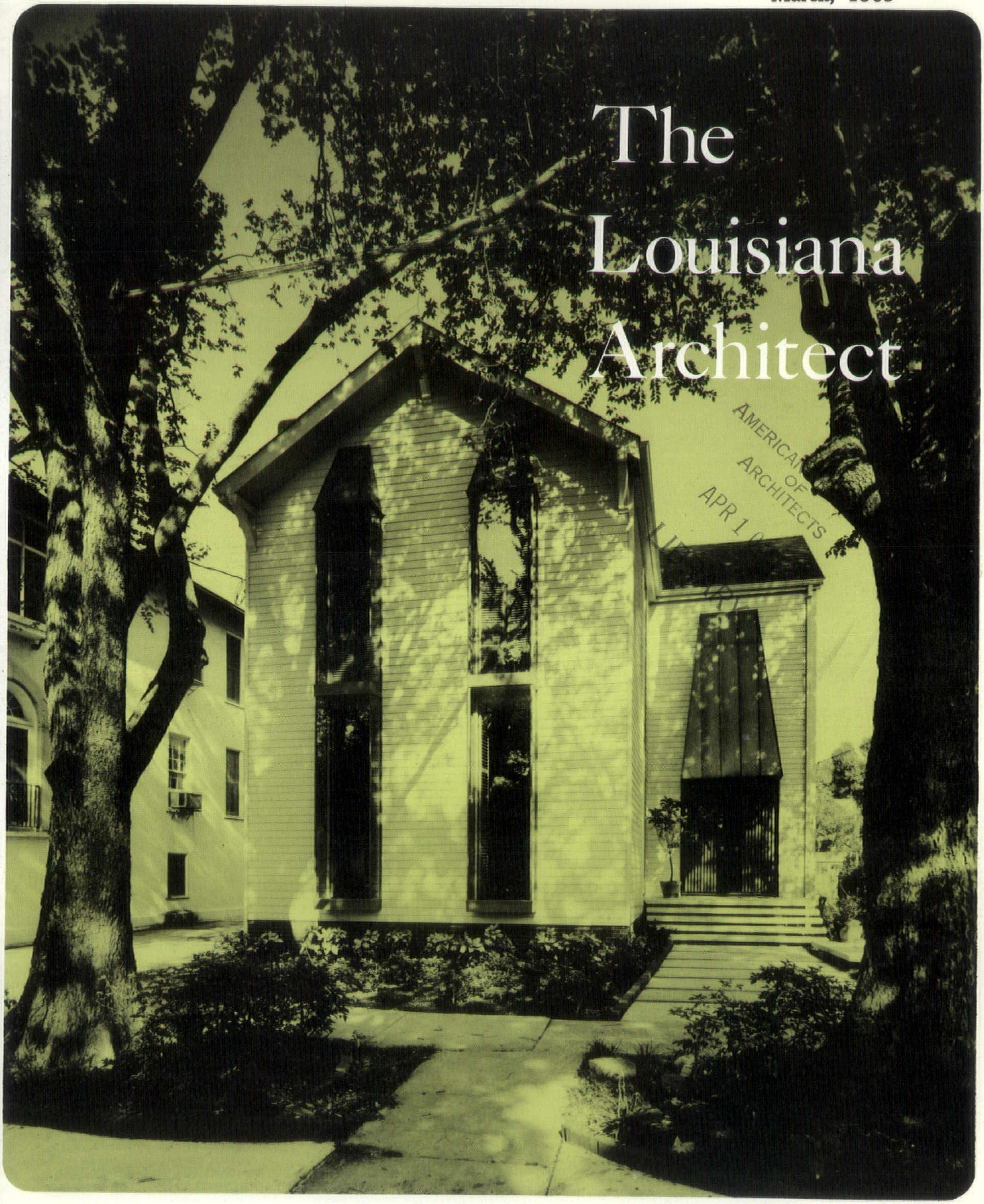
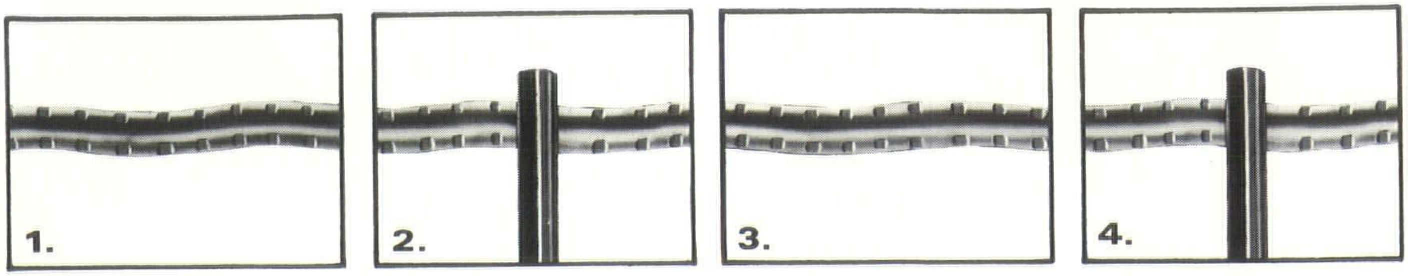
March, 1969

The Louisiana Architect





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. . . Excerpts from a forthcoming brochure

Why Belong to the AIA? . . .

Why did you choose architecture as a career?
In the unlikely case that it was for the money, good luck! If it was for prestige, the answer is simple, join The Institute and put the status symbol "AIA" after your name.
It is a good bet however that, like most of us, you chose to be an architect for reasons having to do with idealism and creativity; not for money and status alone. You want to help create a better world socially and aesthetically; you want things to be better than they are and you want a piece of that action.
The AIA has precisely these ideals and it is acting on them. You need it to further your ideals, and it needs you.
If no such professional society as the AIA existed, one would have to be created. The fact that there is no organization for all professionals in the environmental design disciplines indicates that one will be formed. The AIA already is leading the way toward its creation. Since all of us in all these professions together are so small in number, it becomes essential that we join forces to be effective in today's society.
Here are the objects of The Institute as set forth in the forefront of its bylaws: "The objects of The American Institute of Architects shall be to organize and unite in fellowship the Architects of the United States of America; to combine their efforts so as to promote the aesthetic, scientific and practical efficiency of the profession; to advance the science and art of planning and building by advancing the standards of the architectural education, training and practice; to coordinate the building industry and the profession of architecture to insure the advancement of the living standards of our people through their improved environment; and to make the profession of ever-increasing service to society."

SHOULD I JOIN?

Certainly you should join and certainly you should take an active part in your professional organization, the American Institute of Architects. According to Board policy, every citizen who is registered to practice architecture in one or more of these United States and who is willing to abide by the Bylaws and the "Standards of Professional Practice" of the AIA will be welcomed to corporate membership. The AIA emphatically is not an elite club of old men. In fact, the average age of all corporate members now is something less than 37 years and it is going down steadily. By far the highest percentage of members either have their own one or two man office or work in one; the great, big firms do not dominate The Institute as some have supposed. You join as an individual, you are important to The Institute and you develop within it.

IN THIS ISSUE

The Louisiana Architect

Volume VIII
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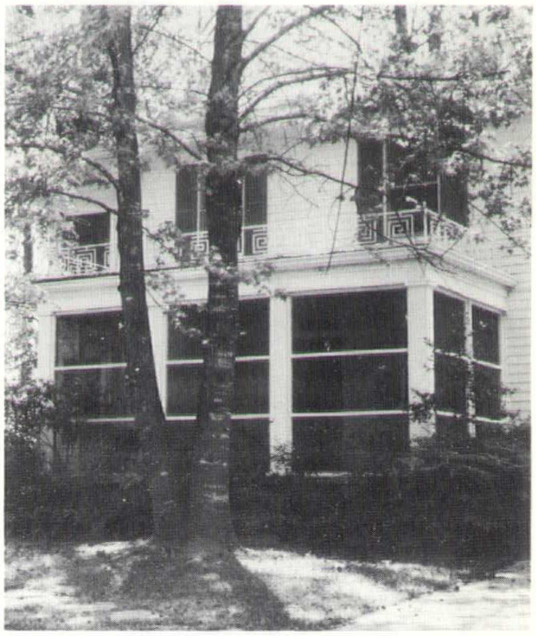
GOOD SOLUTIONS TO COMMON COMPLAINTS

Reprinted from Better Homes & Gardens
"Home Improvement Ideas, 1967"

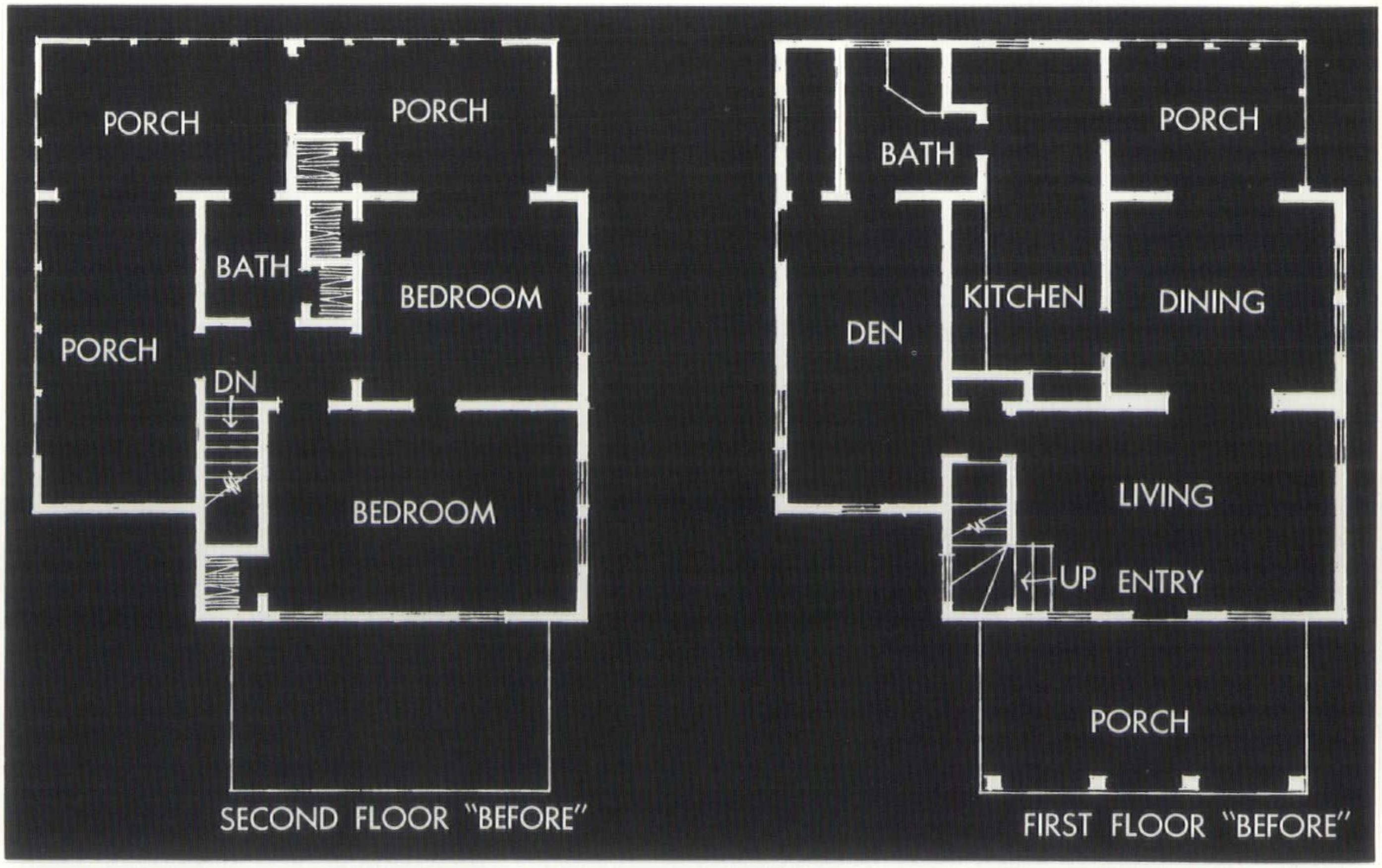
ROBERTS AND BARKSDALE, AIA Architects
Alexandria, Louisiana

"Our house wasn't large enough for a family of five."



So the D. G. McNairs of Shreveport, Louisiana, took their problem to architects Roberts and Barksdale. One request by the McNairs: Don't cut down any of our trees!

Turning the existing house over to the children was one result; building a major space addition for senior family members was another. Joining both units in such a cohesive, architecturally striking manner deserves praise. Traditional Southern styling blends magnificently with contemporary architectural wisdom.

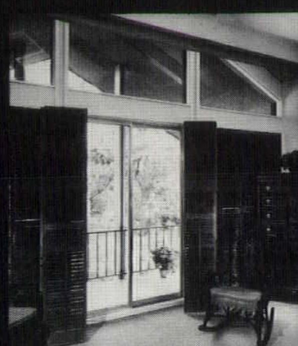


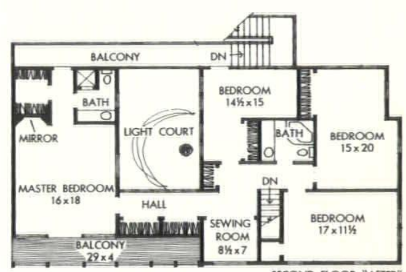
ADDITION'S H-SHAPED columns provide the strong vertical rhythm of new facade, reinforced by ground-to-roof shutters on corner of old house which has been squared off. Pulling old roof forward 2½ feet to match addition's 4-foot roof overhang further strengthens the sense of order, helps disguise old, new sections. Enclosed brick courtyard draws visitors from side drive to front entry located in new addition.
Sunken living room (above), large foyer, portion of redirected stairway, a spacious master bedroom suite, make up addition.

Some clever ideas resurrect old house, sustain design style in new addition

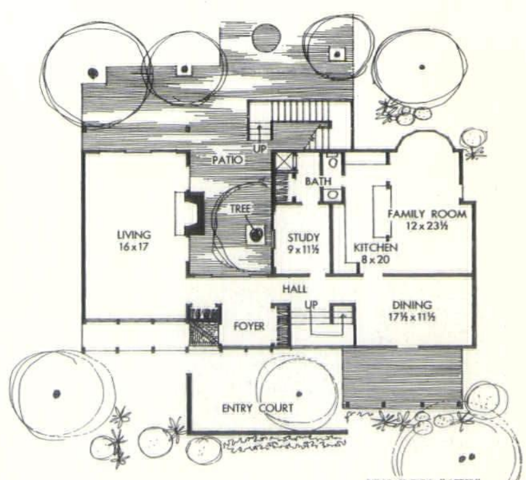
A WOMAN'S TOUCH — three-way mirror purchased from store selling its fixtures, installed in well-lighted corner of master bedroom. Louvered doors keep its sartorial aid suitably unabtrusive.
Columnar design theme developed by architects continues within open-gabled end of bedroom (above, right), by means of heavy ceiling trusses and suspended iron railings protecting adjoining open-air balcony.
Textured bedroom ceiling was uniquely arrived at: Rough-sawn sides of a new paneling material remain exposed, with reverse side laminated to ¾-inch exterior plywood sheathing. Sections were tongue-and-grooved, glued at joints, nailed on four-foot centers to design trusses.
WINDOW BAY of new family room gets its charm from grouping of five up-ended oval transoms once part of old New Orleans antiquity. Transoms are solid red cypress 3½-inches thick, with beveled glass, offer a good view of roomy, tree-studded outdoor deck.
Sustaining woody atmosphere of family room are pecan wall panels, oak flooring (which is oil-mopped, not polished). Acoustical ceiling tiles absorb up to seventy per cent of the noise in this all-purpose area.

SAVING ALL TREES wasn't an idle request; building proceeded around tall tree safely preserved within U-shaped patio, using tree wells as the recreational area extends rearward. Redwood decking, nailed to platform superimposed upon hilly knoll, forms large, level surface usable even during Louisiana's wet season.
Redwood catwalk bridges old, new buildings, makes necessary fire escape a structural enhancement. Cedar siding on new wing seems a natural choice.





SECOND FLOOR "AFTER"



FIRST FLOOR "AFTER"

Destrehan Plantation

ST. CHARLES PARISH

The great plantation house that gave its name to the thriving industrial port town of Destrehan in St. Charles Parish, has for the past ten or so years been falling into a most deplorable state of dilapidation, a victim of unpardonable neglect and vandalism. Destrehan is one of the oldest houses in Louisiana and one of the best documented structures of the colonial period. It represents three major phases of construction and illustrates the changes in style in Louisiana architecture of over half a century, from the time of its original construction in 1787 to its remodeling in the popular Greek Revival style in the 1840's.

When the house was first built, this was the plantation of Antoine Robert Robin de Logny whose daughter, Marie Claude Celeste Leonore Robin de Logny, in 1786 had married Jean Noel Destrehan de Beaupre, son of Jean Baptiste Destrehan des Tours, Royal Treasurer of Louisiana when it was a French colony. It was perhaps for the newly married couple that Robin de Logny built the house in 1787. On January 3rd of that year, he entered into a contract with Charles, mulatto carpenter, for its construction, a contract in French filed in the archives of St. Charles Parish and of such interest as to be given here in translation:

Before us Jacques Masicot, sub-lieutenant of the Armies, Judge and Commandant of St. Charles Parish of the Germans, there residing, have appeared in person Mr. Robert Antoine Robin de Logny, Lieutenant of the Armies of His Majesty and planter dwelling in the said Parish, and Charles, free Mulatto, who have agreed to what follows: To wit—that the said Charles, Carpenter, wood worker, and mason by trade, obligates himself to construct for the said Sieur Robin de Logny, a house of sixty feet in length, by thirty five in width, including the semi-doubles, raised ten feet on brick piers with a surrounding gallery of twelve feet in width, planked top and bottom, five chimneys which shall be contracted in the said house, two of which double and one single. The gallery pillars shall be of wood or of brick piers, with doors, windows, sash and panelled doors inside, balustrade all around the gallery, casings at the doors of communication inside; three dormers above the three principal doors of the front, and one on the rear, with the roof in full over the body of the building, and finally all the wood-work necessary for the said house, according to the plan which he has in hand, which work, when finished, shall be subject to inspections and statements of Experts in order to be accepted or refused, the whole done and perfect without the said Charles being able to contract any engagement with any other, for the sums and price mentioned hereafter, to wit—

That the said Sieur Robin de Logny has given to the said Charles on account on the said enterprise, one brute negro from his plantation named l'Eveiller (Rouser) with a cow and her calf, which the said Charles acknowledges having received, the said Sieur Robin de Logny obligating himself besides to the said Charles, fifty quarts of rice in chaff, and fifty quarts of corn in husks, half this year and the other half next year, and one hundred pisatres at the end of the said work. The said Sieur Robin de Logny obligates himself besides, to furnish to the said Charles, two negro wood squarers (hewers), three other negroes from his plantation, who are those named François, Louis and Jean Louis, and one other negro to help him with the masonry and to furnish him all the materials necessary for the construction of the said house, the wood squared, the rafters moulded, and the shingles dressed, the whole delivered on the place, and the said negroes listed at his disposal, until the finishing of the said work. Done and passed in our office, in the presence of the Sieurs Jacques Rixner and Antoine St. Amant, both inhabitants and residing in the said St. Charles Parish, witnesses, who have signed with us in the present original after reading made, as well as the interested parties, with the exception of the said Charles who has declared to not know how to write nor sign on this request according to the Ordinance, of which I give faith, this day, three January one thousand seven hundred eighty seven. Besides and the said Charles agrees to build two stairways in the said house.

Jacques Rixner
Antoine St. Amant
Robert Robin de Logny
Jacques Masicot

On April 22, 1790, Charles again appeared before Judge Masicot to record the acceptance and final payment for his work.

Robin de Logny did not live to enjoy his new home for very long, dying in 1792, two years after its completion. When Judge Masicot inventoried the estate, he described it as a plantation of twenty eight arpents fronting the Mississippi with

. . . a principal house sixty feet in length by thirty five in width, in masonry, raised ten feet, containing six rooms on the ground floor and six on the upper, the main floor twelve feet between sills, built in colombage, having twelve feet of surrounding gallery, and roofed with shingles, estimated at five thousand five hundred piastres.

Also listed in the inventory were a kitchen built in colombage on sills, 34 by 20 feet, with front and rear galleries, double chimney and shingle roof, valued at 800 piastres; a storehouse 48 by 24, two old hospitals 17 by 11, "a pigeon house, twelve feet square, in colombage above and below, surrounded with planks and roofed with shingles," . . . a cabin of posts in the ground, 30 by 18, serving as a coach house, three cabins, 18 x 12, "a negro camp composed of nineteen cabins, good as well as bad, of posts in the ground, roofed and surrounded with stakes" . . . a mounted bell; nine pairs of vats (for indigo processing); "a shop of posts in the ground surrounded and roofed with stakes, 30 x 16 feet;" a drying house, 30 x 15; a shed for repairs, 48 x 20; a shed covering the works of the pump, together with the said works and the said pump; two old sheds covering the grinding machines; three wheels with their trundle trees to grind and freight tea and "all the fences of the said plantation, amounting to around 15,000 stakes . . . the enclosure of the yard containing 2,400 stakes and 480 stakes surrounding the garden."

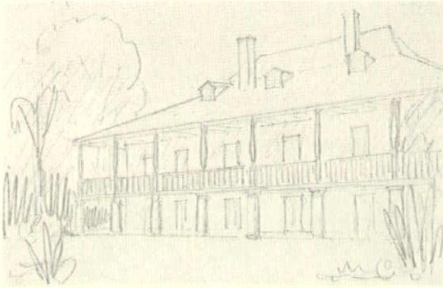
These were the buildings as they existed on an important Louisiana indigo plantation during the Spanish colonial period. This was, however, the plantation of a Frenchman and the house and its outbuildings were all built in the same style that had been developed in Louisiana during the French colonial regime. After Robin's death the plantation was inherited by his daughter, the wife of J. N. Destrehan, who in 1802 acquired the share of her brother Pedro Robin de Logny.

In its original form, the main plantation house was probably quite similar to other plantation houses of the colonial period such as Homeplace across the river at Hahnville, Parlange on False River or Elmwood at Harahan. The first story of heavy brick masonry, had short masonry columns supporting the second floor gallery. The upper gallery columns were of wood, turned in the form of an elongated baluster. Mon Plaisir, the plantation house of the Chevalier de Pradel, built by the architect Alexandre De Batz in 1750, is described by Pradel as having wood gallery columns "made according to the order of architecture and painted like white marble." Perhaps those at Destrehan were similar.

Sometime before Destrehan's death in 1823, the two, two-story wings were added to the house, enlarging it considerably without changing the basic structure. The idea probably came from neighboring Ormonde Plantation, to which Richard Butler had added similar wings, probably designed by Henry S. Latrobe who was building a house for Butler in New Orleans in 1817. Butler probably intended to replace his old Spanish colonial plantation house with a more modern one in scale with the new wings, which would then flank it, forming a forecourt in the Virginia manner. Destrehan evidently had no such intentions, for his wings were built in the same scale and at the same levels as the old house. When Madame Destrehan, daughter of Robin, the builder, died in 1824, the house was acquired by Stephen Henderson who had married Destrehan's daughter, Eleonore Zelia. She died in 1830 and upon the death of her husband, Henderson, in 1838, the house was acquired from the heirs by Pierre Adolphe Rost who had married Louise Odile Destrehan, a sister of Mrs. Henderson. It was probably during the Rost ownership, in the 1840's, that a major renovation of the main house took place. The old colonial gallery columns were removed to be replaced with full length Greek Doric ones of plastered brick and the old cornice was remodeled to conform to the taste of the Greek Revival period. New mantels were installed and every vestage of early doors, windows, and trim was removed and replaced with new millwork in the Greek Revival style. The basic colonial house, however, remains just as described in the contract of 1787, with the doors and windows in the same relative positions, the great double pitched, hipped roof, the four chimneys, the three dormers in front and the one in the rear.

The house remained in the possession of the Rost family through the Civil War years and for many years after. In 1914 the plantation was acquired by the Mexican Petroleum Company which constructed an oil refinery in the rear of the property. This eventually became a refinery of the Pan-Am Southern Corporation which used the house for office and recreational purposes, maintaining both house and grounds in excellent condition. Some ten years or so ago, the refinery was sold to the American Oil Company which dismantled it and abandoned the mansion house which soon became prey for vandals. Hopefully it will soon be acquired by a local historical group and one of the most important examples of Louisiana's architectural heritage will be saved and restored.

By Samuel Wilson, Jr., FAIA



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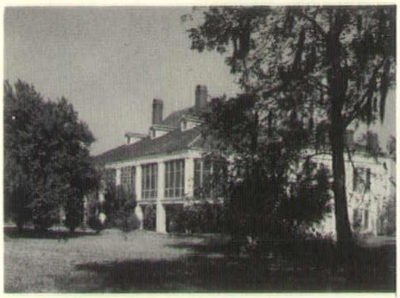

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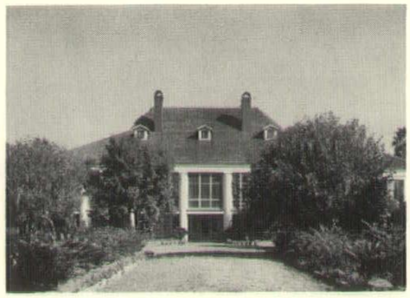

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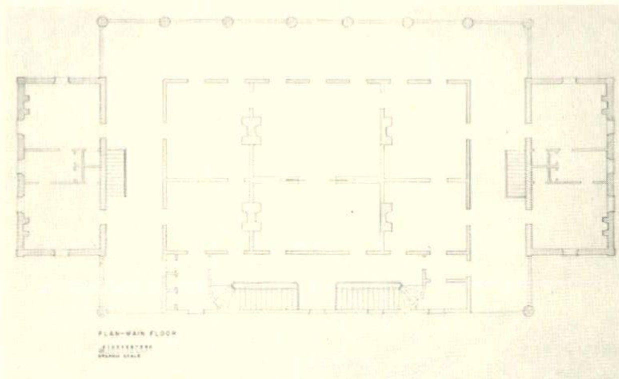
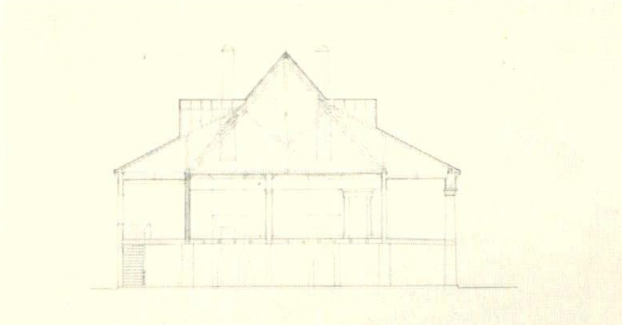


5

DESTREHAN

List of Illustrations

1. Destrehan Plantation, probable appearance as built in 1787. Sketch by Samuel Wilson, Jr.
2. Destrehan Plantation, as it appeared about 1900, and as remodeled in the Greek Revival style in the 1840's. Photograph by Morgan Whitney.
3. Destrehan Plantation, about 1935, from the side. Photograph by Richard Koch.
4. Destrehan Plantation, about 1935, from the front. Photograph by Richard Koch.
5. Main floor plan. Measured drawings by Broadwell, Dent and Kellogg.
6. Transverse Section. Measured drawings by Broadwell, Dent and Kellogg.
7. Longitudinal section. Measured drawings by Broadwell, Dent and Kellogg.



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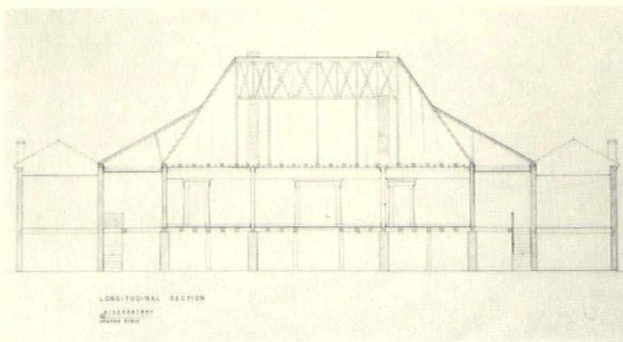

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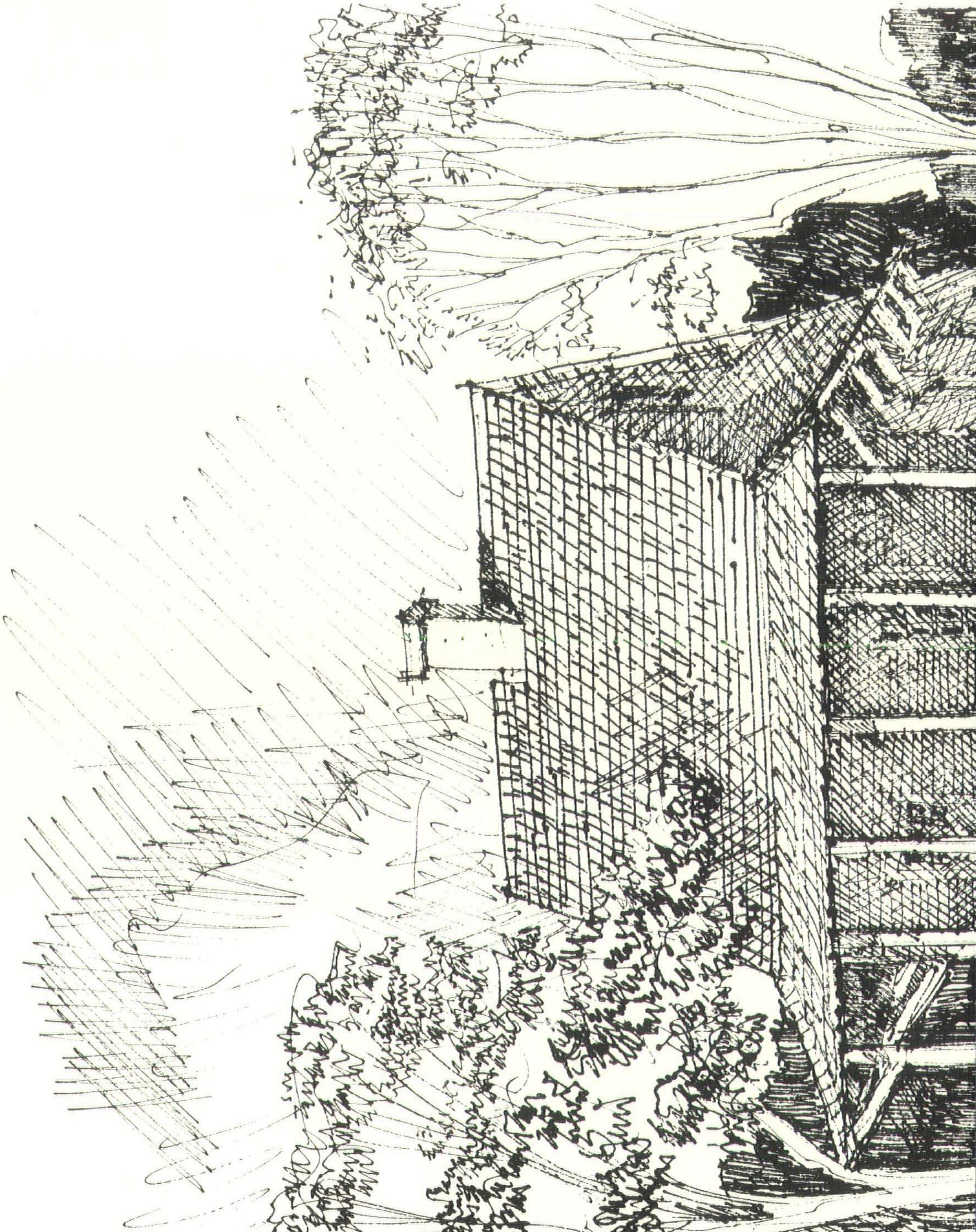
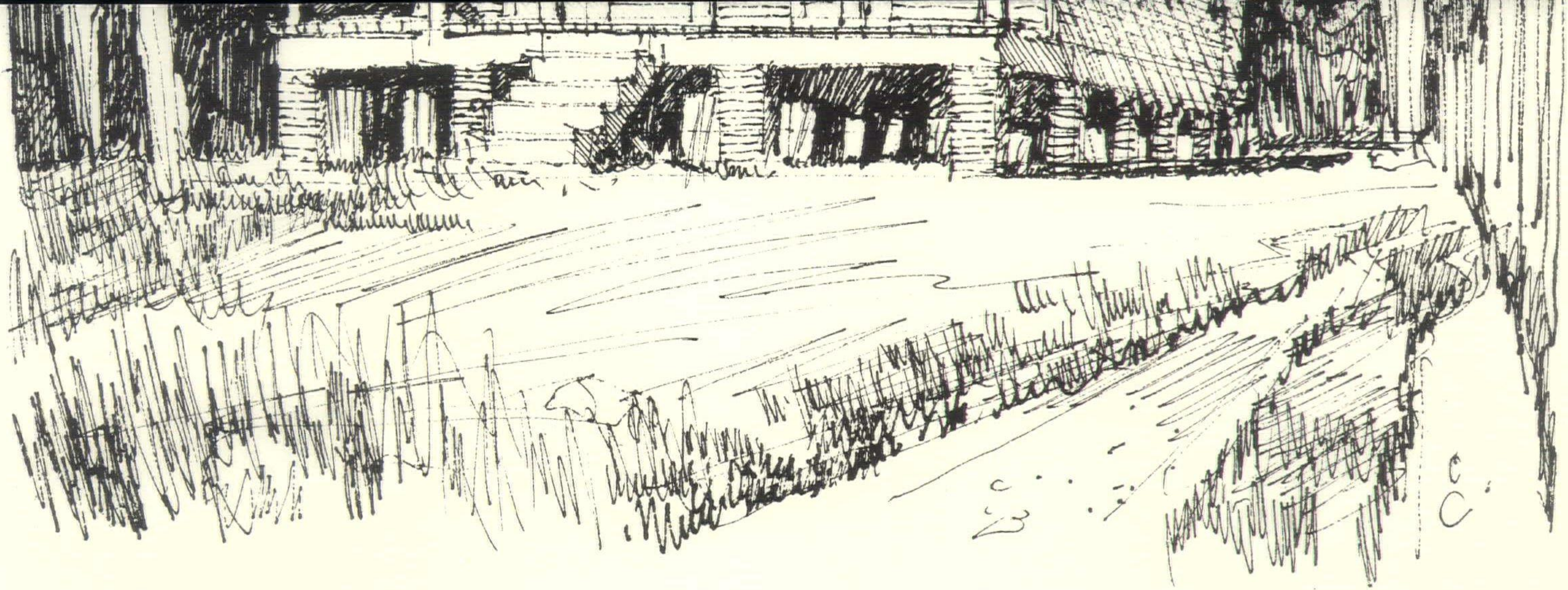




Town Hall

French Settlement, La.

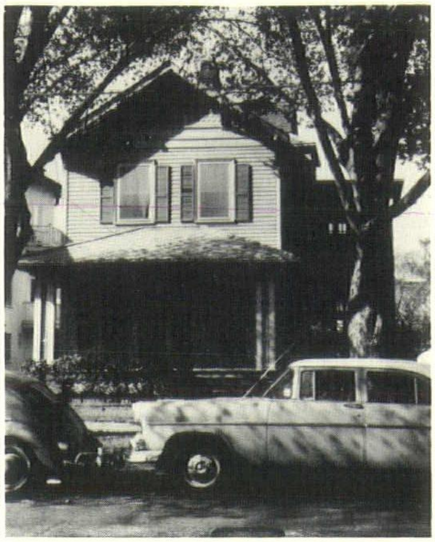
This is the second of the Louisiana provincial building types which has been shown by this series of drawings. As in the earlier drawing, it portrays a type unique to a certain area. Southeast of Baton Rouge, and centered around the village of French Settlement are found repeated examples of this one type. Basically a gabled house with varying rear additions, it is distinguished by the somewhat gay and witty porch extensions which breaking the fall of water on the front turn and continue down each side in the manner shown here.

These buildings are gradually being replaced by the ubiquitous brick veneer standard—which lack the simple dignity and presence in relation to the rural landscape which this type possesses.

Fortunately one of the purest and simplest of the type has been taken over by the village of French Settlement as a town hall and it remains in a good state of preservation, complete with the original cypress roof shingles.

John Desmond, FAIA

RENOVATION OF A RESIDENCE



Architectual Imagination Gives Old Home New Life

Can an old New Orleans home meet the demands of the jet age? It can with the help of an imaginative AIA architect. Harry Baker Smith, AIA says that many old homes can be made to meet the needs of modern family living and provide the luxury of spaciousness not found in smaller, less conveniently located, new subdivision homes. Careful planning of the tranformation can save you money.

To perform alterations and additions on a residence originally built during the Audubon Exposition, as a midwestern style display house, and then moved to its present location surrounded primarily by traditional New Orleans Classic Victorian homes.

The design criteria was to remodel in a contemporary manner, and to create a vertical scale characteristic of the Victorian period. Sufficient additional living area had to be added to house a family with five children, done in two phases of construction. The primary interior planning problem was to convert this tight, small roomed dwelling into an open, flowing plan with clean line details that would be compatible with the existing classic millwork and embellishments. Verticality has been emphasized in the interior to compensate for the lower ceiling that existed.

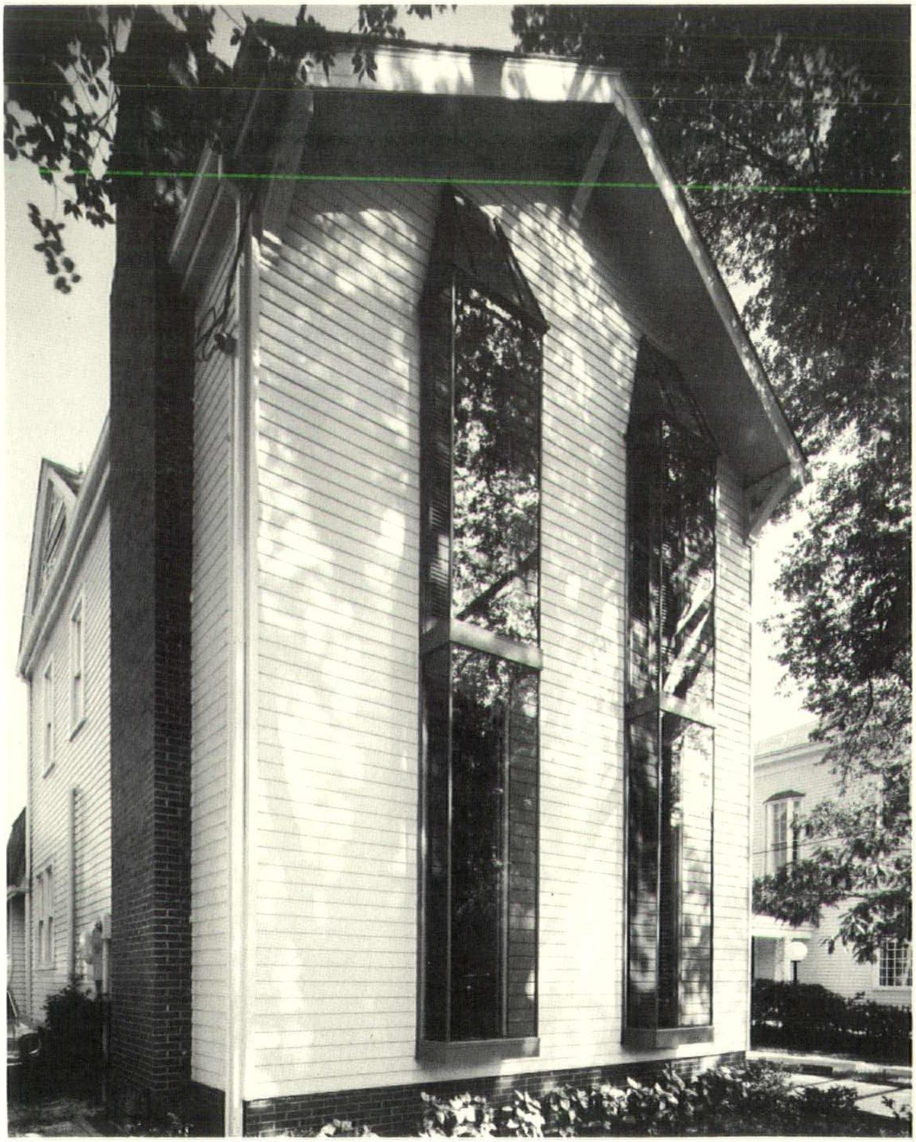
CONSTRUCTION

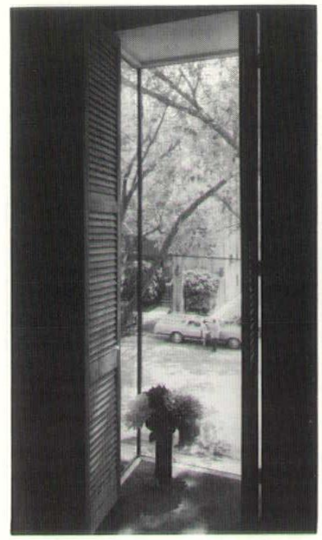
Brick Piers
Wood Frame
Weather Boards
Brick Veneer
Asbestos Roof
New Plumbing
New Electrical
New Heating and Air Conditioning

COST

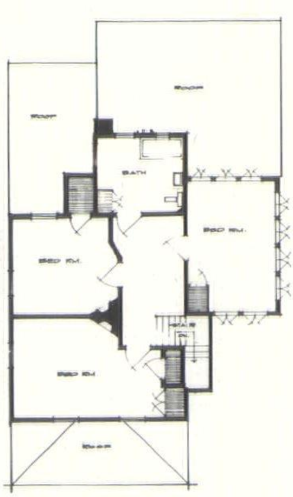
Original House
1742 SF @ \$5.00 = \$ 8,710
Additions
1827 SF @ \$10.00 = \$18,270.00
Total House Area
3569 SF
Cost per SF
\$7.56
Total Cost
\$26,980.00

Note: No cost figures included for work done by owner and family.

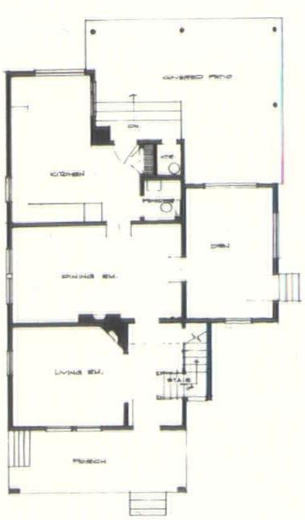




Photos by Frank Lotz Miller



ORIGINAL SECOND FLOOR PLAN



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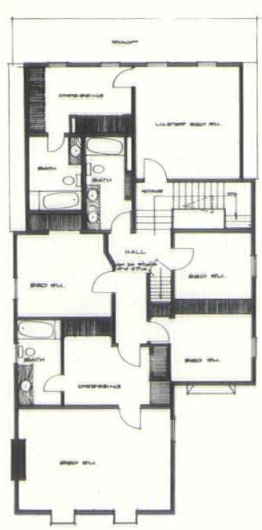
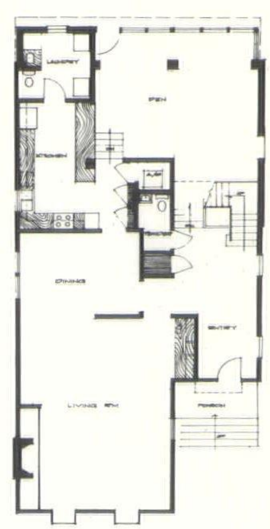


SECOND FLOOR PLAN



FIRST FLOOR PLAN

architecture and the information machine

By Charles B. Thomsen

Not too long ago in an article for *Fortune Magazine* Walter McQuade referred to the "tweedy old profession of architecture." It is a tweedy profession, isn't it? We are rich with tradition. There is a sound and sturdy base of history — a wealth of cultural heritage which guides our actions, and conditions our values.

For the most part this tradition is good and paradoxically, one of the deepest traditions among architects is that of questioning the traditional forms of architecture.

But while we constantly question and challenge the traditional forms of architecture, we are slow to challenge our methods of practice. In fact, most architects continue blindly to use out-dated and antiquated techniques of design, management, and production.

Nevertheless, I am optimistic. During the last three years I have had the good fortune to meet and work with a number of architects at Caudill Rowlett Scott, and in other offices who are challenging some of these old methods — and in the process have become committed to the half-veiled promise offered by computer technology.

This technology — the art and science of processing information will have the most far reaching consequences on the practice of architects of any contemporary technological development.

Those are bold words. And I must admit that there is not yet proof of their accuracy. Indeed, the delight and wonder of working with computers is seductive and has caused many of us who seek this work to overstate our case

But some facts bear us out. In the last 10 years, computers have developed at a tremendous pace.

Compared to 10 years ago, computers have increased their speed 100 times, they are one-tenth their former size and the cost of computation is one-thousandth that of a decade ago. By one estimate, our capacity to process information is a million times greater than 10 years ago. Presently there are 30,000 computers in the nation worth about eight billion; 1000 times as much strict computational power as 10 years ago. And all indicators point to an increased rate of development. Those are impressive statistics and we can't afford to scoff at them — or say, "That's interesting, but we are architects, not engineers. This doesn't affect us." It does.

Speculation aside, a number of practical applications exist which one might profitably pursue.

First you might use a computer as an arithmetic machine, a calculator, or a super adding machine and with it, do some of your accounting, cost estimating and engineering. You might also build mathematical models of some of your designs — and test their functioning under various conditions.

Secondly, you could use a computer as a meter, like the speedometer of your car, or a barometer. But you would probably be metering the conditions of your firm, perhaps forecasting your manpower demands, determining the amount of overtime that is being recorded, testing your overhead, or sampling the net profit of an active job.

Thirdly, the computer could serve as an electronic filing cabinet which collects, stores, creates, combines and retrieves data.

Used this way, the computer produces your specifications, determines the properties of building materials, or collects some statistics on the successes and failures of your past practice to guide you around future mistakes in management.

All of these things can be done for you with impressive speed. A medium size computer can make a million additions per second, read 90,000 characters of data per second from magnetic tape, and output 1000 lines of information per second on a highspeed printer.

These capabilities will help us as architects to provide better services to our client, to prosper, and at the same time free us of tedium and make our work more enjoyable.

At CRS we are trying all these things, and although we have only begun, I believe the prognosis for success is good. It may be too early to tell. As a concentrated research effort, this work has been underway only a year.

But let me explain how we began.

Three years ago, we solved a major problem for a high rise office building project with a computer. We determined how high it should be built for maximum economic return.

We had clients who wanted to build a building on a very choice site in downtown Houston. It was to contain a home office as well as general rentable office space. Our client's charge was, "Tell us the optimum building size for maximum economic return."

The answer was complicated, but possible. We needed data in three areas: business economics, construction costs, and the implications of height on the building's efficiency. We were able to formulate the data and with a computer's help, we rapidly calculated the return on investment for buildings from 15 to 50 stories. Incidentally, in this instance, 32 stories was the answer we found.

This success encouraged us and we have pursued many other applications. At present we are working with several other approaches which will affect design. The most promising appears to be — simulation. Simulation is the art of model making and testing. A model (or a simulator) is a device which, in some way, can be made to act like a part of the real world.

Of course, a model can be a diagram, a girl in a new fashion, a cardboard physical replica of a building, or a numerical structure. But all have one purpose — to imitate something. A computer implemented simulator is no different.

Normally we think of models as a physical tangible entity. It's not necessarily so. We can use numbers as the materials with which to build the model. In the high rise project, we built a model of the economic activity of 35 different buildings and predicted which would be the most profitable.

Now we are trying to build a model of a university — to test its growth and functioning over the next 10 years — and to see how it would respond to varying design criteria.

Our approach is this. When we are asked to develop a master plan for a college or university, we must first establish potential growth and determine how the institution uses its facilities. Precise answers to these two issues require processing enormous quantities of information. Then we must find ways to "grow" the campus. Each new building causes a department to move. The vacated space is filled then by another department and eventually the effect ricochets throughout the campus.

We are now working, assisted by an EFL grant, with Hewes, Holz, and Willard of Cambridge, Massachusetts, and Duke University to develop a series of programs which will simulate this affect. The programs will show the need for future facilities, help Duke use existing space more effectively, help us determine proper location of new buildings, simulate pedestrian circulation and eventually simulate the physical evolution of the institution.

Of course, this is a very ambitious effort but there are other applications which are very simple although also very helpful. Perhaps the most important requirement for good design is sound information. The computer, not as a simulator, but as an information machine, helps.

We are experimenting with a program to retrieve data on building materials. Using this, it is possible to rapidly compare relative characteristics of many construction systems. In this case, the value of the program is not its ability to calculate, but in its ability to select information in a specified way.

One afternoon Don Wines, one of the Partners in Design, and I, were discussing the usual chore involved when a designer translates a list of programmed areas to modular room sizes. Don asked me if we couldn't run out some statistics on various modules — from 2-feet to 10-feet in 2-inch increments — with combinations that would give net and gross areas for various room sizes. We wrote the program in one evening; ran 40 pages of it the next day; and now use it on almost every project. Later, Bob Mattox of our Programming department (architectural programming) developed a similar program to estimate classroom sizes based on almost any furniture size or arrangement. Again a very simple but helpful program.

Probably one of the biggest impacts on architectural design may come from a new field of computer capability — graphic data processing. Computers were first able only to process numbers. Then they developed the capability to handle letters. Now graphic data processing is becoming a reality. When graphic data processing becomes more economical, it will have a tremendous effect on the process of architecture — not only in the production of working drawings, but in design.

At CRS, we are very anxious for this technology to come. During the last two years, we've been working hard to change our approach to construction systems and accompanying graphic systems. The philosophy is this: we should view construction as an assembly, not of details, but of total systems — a structural system, window wall system, a partitioning system. And if we are able to think about building in this way, we will be able to detail these systems separately, without thinking of them as applied to a specific building. These systems theoretically will then apply to more than one project. The information which describes their properties, their details and graphics will be stored on magnetic tape, or discs — which then can be retrieved by computer, modified by light pen and cathode ray tube by a designer, and then produced on working drawings by a computer driven plotter. This will allow the architects in the firm to spend their efforts to create better systems, working on specific designs rather than grinding out another set of working drawings.

Now this isn't as "cloud nine" as it may sound. It is possible to make architectural drawings with a computer. CRS and others have done it. Hardware is available. At the moment, the problem is not hardware but software — the programs to operate the machines. It's still difficult to get drawings into the computer — lengthy, clumsy instructions have to be written. The techniques for filing these drawings, retrieving them and reproducing them again are still difficult and expensive. But if the progress in graphic data processing over the next five years equals the progress in alphanumeric data processing over the last five years, we shall all be working with computers in our drafting department.

One of the most useful applications of computer technology will be in the area of the firm's management. Again, modeling techniques are useful. Our management information system, still very much an infant, abstracts a portion of the real world. It represents part of our firm's activities. In this case, the purpose of the system is to determine how profitably we are working, how much work we are going to have to do in the future, and how this work compares with the work we've done in the past. This system can really be divided into three general areas:

1. Individual Project Metering and Control.
2. Forecasting and Projecting for the Total Firm.
3. Information System for Management Decisions.

The need for the system is obvious. As our firm becomes larger, with greater abilities and diversifications, it becomes hard to manage. Our internal problems of operation compound. No longer is it possible for one person to keep in touch with all phases of our work. Many projects compete for the diverse and specialized talents of many men and women. Matching talents to project needs becomes a complex task. To solve some of these problems we have developed a series of computer implemented reports which give us a barometer reading of the climate of the firm in terms of project schedules and manpower.

The systems include the project schedules, which define the work we must do, and time sheets, which define the work we have done. This information is adequate to model part of the firm's professional operation. From this model, we can forcast manpower needs, detect schedule crises before they occur, determine how the manpower in the firm is expended, and check on the status of individual projects.

These are a few rather general areas in which we are using computers.

Some question no doubt come to mind:

1. *How much does it cost?*
   Computer time is surprisingly inexpensive. It is often calculated and charged in hundredths of a minute. The real cost of computer operations is developing the capabilities of people and programs. We haven't thorough experience yet, but a wild swinging guess would estimate computer operations at 4 to 5 times the actual hardware costs. The hardware costs vary. You might run a routine program in accounting at a local service bureau, for $50 a month, or lease a small but complete computer for $1500 a month. An elaborate system with a light pen and a cathode ray tube might go for $20,000 a month.
2. *Should we train our own staff in programming or hire a specialist?*
   We found that both are necessary. Some of the members of our firm, both architects and engineers, have become good programmers — and have developed most of the programs I have mentioned in this paper. But eventually, we have discovered that an architect needs to know something about computers, in very much the same way that he should understand structural engineering. For example, while all of us, as architects, understand the principles of structure, few of us would undertake the design and analysis of a highly sophisticated structural system. We need consultants, specialists who view this as their major profession. The same is true in the area of computer sciences.
3. *How big does a firm have to be before it can use computer operations?*
   I really don't know. This varies a great deal with specific applications. For instance, the study that we did for the high rise office building would have been just as useful if CRS was a one-man firm. On the other hand, our management information system would be useless to a firm of only 15 or 20 people. It simply would not be necessary.

Certainly there's a basic cost to writing a program. The more it can be run the more the initial cost can be amortized. Big firms, then, have a better opportunity for amortization than small firms. On the other hand, the collaborative project at Duke that we are working on has nothing to do with the size of our firm.

The best answer is that some knowledge of the potential of computer technology in architectural practice should exist in every firm its size.

4. *Will computer technology save architects money?*
   I really don't think so. We should be interested in computers as a means of improving our capabilities. Our management information system allows us to run our firm more efficiently. This may reduce costly inefficiencies. There may be greater earnings in fees if computer technology can expand the scope of professional architecture. But few ways will be found to save labor with a computer in a firm that isn't geared to growth.
5. *Will computer technology produce more beautiful architecture?*
   Perhaps — by freeing designers from tedious chores or by providing more precise information which will establish order and discipline.

In design, numbers can be as helpful as butter paper and soft pencils. We use numbers to describe many parts of an architectural problem — dollars per square feet, quantity of students, length of construction time.

One of the problems we have with numbers and architectural design is that we have not yet found a way to measure beauty, elegance, or grace. Is it because these things are not tangible? Of course not — we can use numbers to define all sorts of non-tangible things — weight, time, speed, heat — and we have assigned units to these things — pounds, hours, miles per hour, degrees F. Perhaps the trouble is that we have no units for beauty. Heat is measured by dimensional change in mercury produced by expansion. Perhaps we need a beauty scale. Larsen Hall at Harvard, then, might be "8 degrees Caudill."

Of coure, that's foolish because beauty doesn't mean anything specific; it's a term that we use to cover a whole concert of emotional responses. Beauty is a highly personal reaction. It's inconsistent and unpredictable. Furthermore our problems of ugliness are problems of confusion, not of willful malice. And if, as architects, we limit ourselves to solving only visual problems, we limit ourselves unduly.

The computer, as an information machine, can help us to bring order, to think with more discipline, and to establish, through knowledge, reasonable limits of design freedom. And thus, we will continue to build a more viable tradition in architecture.

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