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Texas Architect

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On the Cover Austin artist Mark Stinson renders the struggle between time and our finite supplies of fuel and building materials.

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Architects and Energy

There is nothing really new about the proposal that we may eventually run out of petroleum energy in the world, or the fact that buildings consume about one third of our energy, and waste about 40% of that. What is new is a sudden public awareness that things might not always be the same in the good old USA!

As energy values soar, we can be sure the cost of a building over its life cycle will assume a much more important role to the consumer client than initial costs. The cost of three light switches vs. one assumes a position of real relevance when compared with a 20 year power bill. Energy conservation in buildings, the nuts and bolts sort of thing, is well in the grasp of the individual architect as he designs a building. We all know how to add more insulation, lower illumination standards, re-use heat, etc., ad infinitum. Every architect can do that, providing his client understands it costs a little more initially. That kind of energy conservation has already been thrust upon the architectural profession in the natural course of our work.

There is another side of energy gluttony, to which the professional society urgently needs to direct itself: the relationship of planning to energy conservation, and that of dispersal development to energy waste. For years, American cities have sprawled ever outward in a pattern promoted by FHA, zoning laws, road building agencies, high pressure advertising, mortgage lendors, and uniformed leadership all linked together by the 400 horsepower automobile.

The profession of architecture can, and must, take a role of leadership in reassessing the false values that promote gross energy waste in urban area land use. We are in a unique position to present a rational pattern of development and an understanding of proper land use. The crunch of energy may yet save the cities and give the professional his most important role.

Dave Braden

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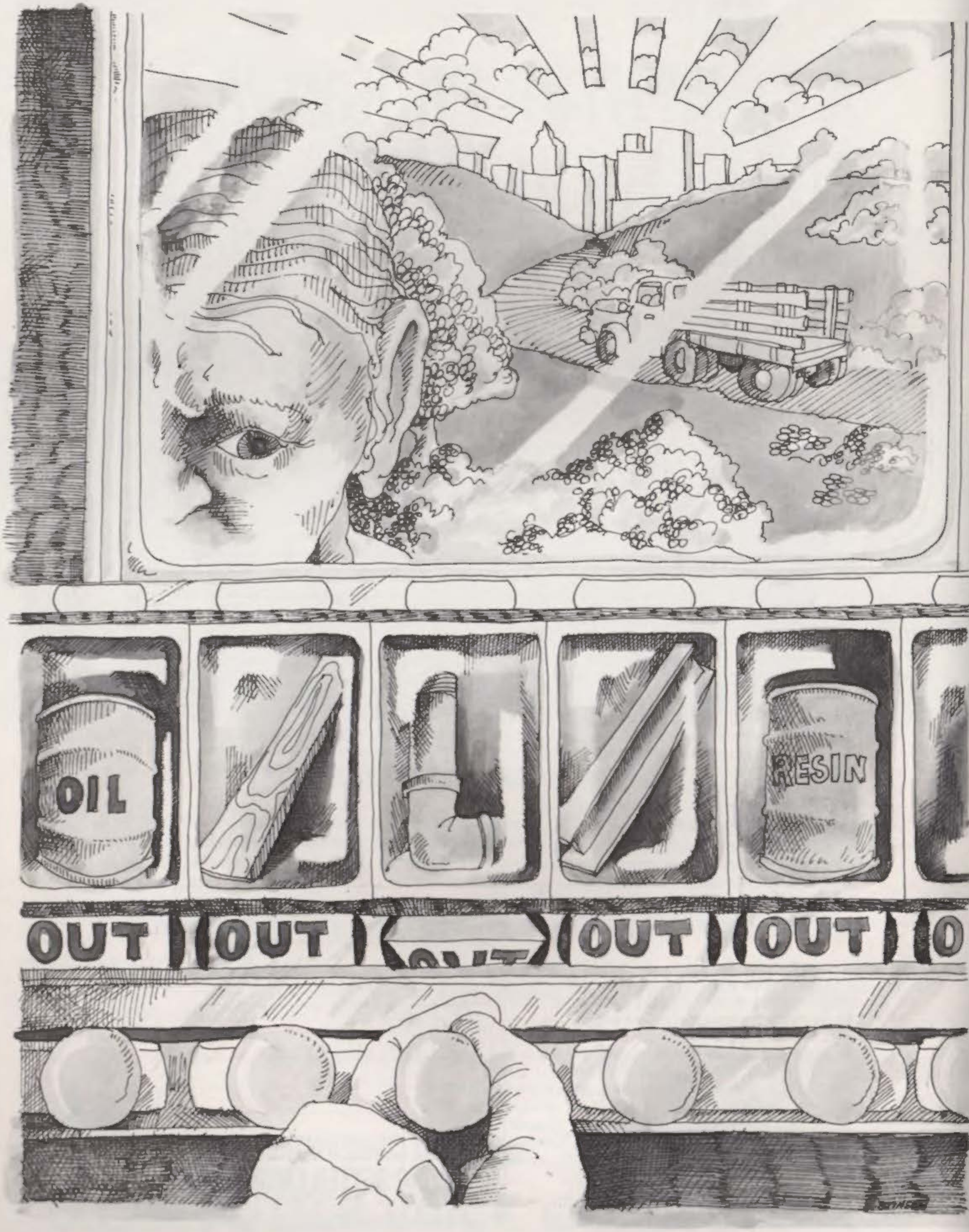
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ENERGY is the ISSUE

By Ray Reece

Let's suppose the energy crisis to be just half as serious as it probably is. Let's say we run out of natural gas in 44 years, rather than 22, out of petroleum in 40 years, rather than 20, out of other resources within a proportionate time-frame (see reference below to *Limits to Growth.*) Let's say we don't have unemployment riots and intra-urban civil strife and nuclear conflicts between fuel — hungry nations until 1994, rather than 1984. Let's say it's our children who will suffer the brunt of the disaster, rather than ourselves. Would we still not have the gravest crisis in the history of the world staring us in the face like a hungry wolf? And if, as the wolf crouches to attack, we do not make every effort to turn him, how are we to explain such fatal inaction?

We at *Texas Architect* began working on this issue with a certain relish. Convinced that the crisis was real, we looked forward to compiling and presenting a body of information that would be of genuine value to architects and students who will have to play a crucial role in meeting the challenges of the crisis, at least in Texas, in the months and years ahead. We felt, like most Americans of this generation, concerned but comfortable. As we have worked, however, gathering and sifting mounting heaps of data, our concern has slowly turned to alarm, our comfort more akin to a sense of being challenged by that wolf.

Two separate lines of discovery have produced this change. One is the true seriousness of the energy problem, as underscored and documented by a growing number of experts, most notably Richard Stein in the July 1973 issue of *Architectural Forum*, who bases some of his ominous projections on computer studies of the global energy situation presented in a book called *The Limits to Growth.*[1] Another derives from the nature of people's response — or lack of response — to the realities of the crisis. It is terribly clear that the three factors of increasing energy demand, shrinking non-renewable resources and environmental damage constitute a threat which challenges us — this generation of earth citizens — to make adjustments in our thinking, our values and our life-style on a scale and with a suddenness perhaps unprecedented in human history. Yet, with notable exceptions, those persons occuping the highest positions of state and national leadership — in politics, business, labor, architecture and engineering — have yet to indicate they are serious about finding solutions that will work.

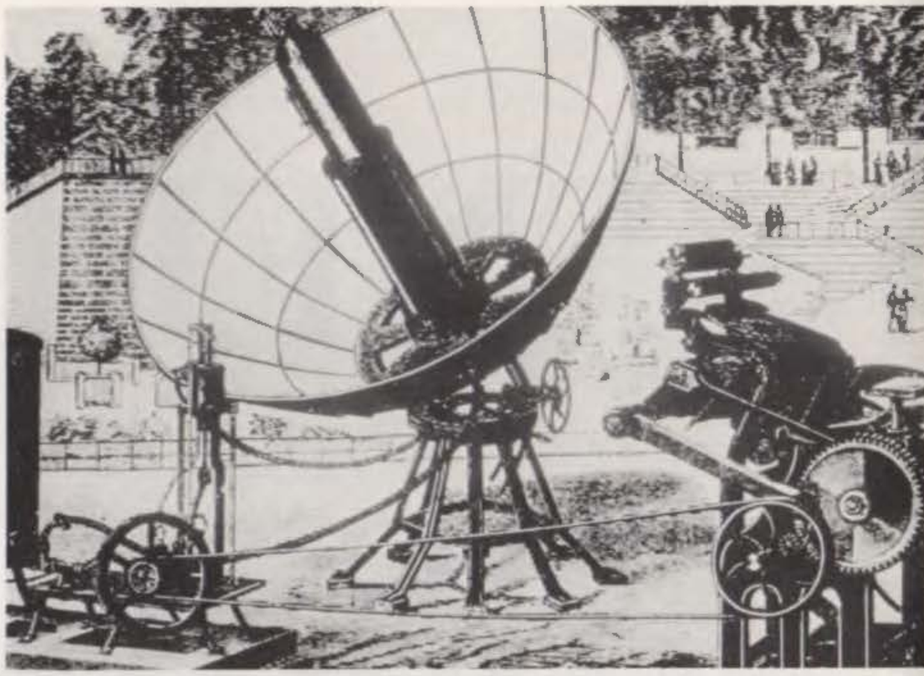
We do not mean to imply that nothing is being done. On the contrary, there are encouraging developments underway, some of which are documented in the following pages. What we are saying is that we in Texas, along with our counterparts in other sections of the country, may be in danger of doing too little too late.

We also face the risk of opting for "solutions" that take us out of the frying pan into the fire. Many persons, for example, have virtually welcomed the energy crisis as a means of silencing environmentalists whose zeal has impeded stepped-up oil exploration, coal mining and construction of nuclear power plants. Yet the two crises of energy and environment have become so intricately bound together that *Professional Engineer* has suggested substituting, for the term "energy crisis," the term "eeg," an acronym for energy/environment/growth — none of the three can be ultimately solved without solving the other two.[2]

Any response to a problem of this magnitude demands a leadership not afraid to examine the most sacred of the sacred cows in our society. That leadership will necessarily involve architects, because building design alone affects up to 40% of America's energy consumption. And that is what this issue of the magazine is all about.

The energy crisis, or the crisis of "eeg", is global in its dimensions. It is important to keep this in mind, because of a tendency to try to avoid the full realities of the situation by whispering to ourselves: "Well, it's bad, but really, all we have to worry about is producing enough energy for ourselves, and we're only six percent of the world's population." That's part of the problem: our six percent consumes 35% of the world's yield of energy per annum. More specifically, we use 44% of the coal, 63% of the natural gas, and 33% of the petroleum. As Richard Stein says: "One wonders whether the world will long tolerate the tremendous discrepancy between American utilization of energy in contrast to the low per capita use elsewhere."

When we come, however, to the "nuts and bolts" of tackling the problem *now*, of conserving fuel and developing new alternatives, we must of necessity restrict ourselves to the U.S. in general and to the Southwest in particular. What follows, then — based in part on discussions with Texas architects, economists, and planners — is a survey of the crisis on that scale.



French solar collector in use as early as the 19th century to power a printing press.

Energy and Waste

It is not far from the truth to say that we could eliminate the energy crisis, in the short run, simply by eliminating waste (hence the current emphasis on conservation measures within the context of existing buildings and design concepts). In Texas, for example, where 56.3% of our energy goes for industrial use, the total waste factor is almost 50%.[3] And in Texas as elsewhere, a disproportionate percentage of this waste occurs in the generation, transmission, and consumption of electrical power. A large waste factor (66%, according to Stein) is virtually inherent in this form of energy production (where you are forced to use a primary fuel, like crude oil, to produce energy), so it would seem that a first step in redressing the imbalance would be to move away from a lopsided dependence on electricity. Just the opposite is occurring — due largely to the continuing efforts of the electrical industry further to encourage the use of its product. One result of this campaign has been a dramatic increase in residential electric heating, which, attractive because of its low installation cost, is nonetheless energy-expensive.

In Texas, of course, it's not heating so much as airconditioning and lighting which place such a strain on our electrical resources. Both these items, as presently utilized, are extremely wasteful. (An incandescent light bulb consumes 90% of its energy in heat, 10% in light; the flourescent tube is 80% heat, 20% light.) Richard Stein suggests that a large part of electrical waste through lighting is due solely to "indiscriminate" arrangement and illumination levels not directly related to functions being performed within the building. He proposes, accordingly, a sharp reduction in these levels, along with a functional individualization of light-sources (e.g. more desk lamps and fewer fluorescent ceiling tubes). He also calls for the elimination of most lighting used in outdoor advertising, and sums up his case by estimating that a 50% reduction in U.S. lighting levels would conserve as much energy per year as the annual output of thirty 1,000-megawatt electrical generating plants.[4]

Returning to the question of airconditioning, Austin architects Mac Holder and Lamar Youngblood, both of whom are members of the city's newly formed Energy Conservation Committee, noted in an interview that most new buildings in Austin feature thermostats with a range restriction of 72 degrees to 80 degrees — they cannot be set lower or higher except by an engineer. "The (unrestricted) thermostat is a status symbol," said Mr. Holder. If so — if part of the comfort we take from airconditioning is psychological rather than physical — it is heavily used nonetheless. Austin electric utility director Bill Hancock says that the city consumes twice as much electricity in summer as in winter, most of which can be ascribed to air-conditioning. At least two-thirds of that, recalling Stein's fuel-to-energy figures, is waste.

Another source of needless waste derives from the structural features and materials of the buildings themselves. Stein contends that steel and cement are vastly overused, mainly because of exaggerated safety standards and careless utilization of materials during construction. "It is quite obvious," says Stein, "that reducing safety factors would permit concrete to be designed safely with less than half the material now used." He argues that such a reduction in concrete alone could result in an energy saving equal to the electricity consumed by four million average families per year (20,000 million kwhrs.)[5]

In the final analysis, the arch-villain of U.S. energy waste — and this is particularly true of population centers in the Southwest — is the overall design of our cities, especially given the manner in which suburban growth has locked us into the tyranny of the automobile. At a time when it seems logical to conserve energy by sharing facilities which demand a lot of it, we continue to find, instead, the American pattern of one of each major appliance or gadget per family unit — washer and dryer, air-conditioner, water-heater, automobile (average 1.5 per family), ad infinitum. Because this arrangement is built-in to the disorderly sprawl of the suburbs themselves, some critical observers are now calling not only for mass transit but for its urban-design correlative: thoughtfully planned redensification of population centers. We will examine these and other suggestions presently.

Short Term Prospects

With the problem more or less clearly established, what are the short-term prospects for a meaningful response in Texas and elsewhere? What are the architects and bankers, urban planners and legislators doing or planning to do, say in the next three years, to accomodate the crisis? What will be its effect on the economy, on building contracts, on design, on the curricula in schools of architecture?

In some ways the prospects are less than gratifying, mainly because a problem can't be solved until the problem-solver believes there *is* a problem. Many people don't believe it. A prominent architect in Dallas says that most of his clients are still unready to pay the price for energy-saving design innovations because "they are not convinced the crisis is real." Mac Holder, in Austin, is "disturbed at the continued lack of concern. People are still saying 'I'm going to run my airconditioner as long as I can afford to' " — not realizing, among other things, the connection between this sort of attitude and the rising costs of other materials, like carpet, which require electricity for production. In a similar vein, Associate Dean John Gallery, of the UT (Austin) School of Architecture, theorizes that "people might not believe it until they're thrown against the wall" — possibly too late to avert serious consequences. (Registration at the recent TSA energy crisis seminar in Houston offers little consolation: scarcely 60 out of more than 2,000 Texas architects opted to attend.)

One architect who does "believe" is Ray Reed, head of the School of Architecture at Texas A&M, and he offers a twist on the standard short-term view of the crisis. In a year or two, he says, we may find ourselves in just the reverse of the present situation: rather than a shortage of fuel and materials frustrating owners who still have the capital to fund large projects, we may be sitting on a replenished stock of materials which can't be moved because of a deepening recession that will freeze capital. In that case, says Reed, some of the larger firms that depend on big contracts could find themselves in serious trouble, while smaller firms may get over and even flourish partly on the basis of an owner-tendency to renovate existing structures rather than build anew.

Dr. Stephen McDonald, chairman of the Economics Department at UT/Austin, generally concurs with this prognosis, though he doesn't use the term "recession." Prices will continue to rise, he says, especially in the construction industry, while interest rates may decline, leading to an upturn in the construction of smaller homes (a trend likely to be reinforced by the shrinking size of the average home-buying family). He adds, however, that there will be a continued shortage of materials, at least periodically.

In his role as chairman of the Austin Energy Conservation Committee, UT's John Gallery places a heavy emphasis on short-term measures for saving fuel, arguing that things like alternative sources of energy, for the time being, are virtually moot points, because of the plethora of positive adjustments which can be made entirely within the limits of existing design processes and building codes. He echoes Richard Stein, for example, on the question of illumination levels, and says that improvements in conventional mechanical systems will be forthcoming from manufacturers "simply in response to market demand." These improvements can be hastened, he says, by pressure from architects and clients. He himself is applying such pressure on builders around the state through a series of private interviews.

Gallery also took part in a recent attempt by officials of IBM to cut energy consumption at their Austin plant by 25%. One of the means, interestingly, by which they effected this was a restructuring of their cleaning and maintenance program so as to eliminate the traditional night-shift with lights blazing.

Appliance	Average kilowatt hours used per year	Average annual cost (dollars)
Refrigerator-freezer (14 cu. ft. frostless)	1,829	38.41
Electric kitchen range	1,175	24.68
Toaster	39	.82
Dishwasher	363	7.62
Portable broiler	100	2.10
Electric coffee maker	106	2.23
Hot plate	90	1.89
Radio	86	1.81
T.V. (color)	502	10.54
(black and white)	362	7.60
Electric blanket	147	3.09
Vacuum cleaner	1,148	1.01
Automatic washer	103	2.16
Clothes dryer	993	20.85
Iron	144	3.02
Room air conditioner (9,000 BTU)	1,389	29.17
Auxiliary room heater	176	3.70
Water heater (quick recovery)	4,811	101.03
Total	12,463	350.33

It was complicated, since it called for an integration of maintenance and regular manufacturing operations, but, along with other measures, it has evidently worked — suggesting that the imaginative architect can find any number of new ways to contribute to the short-term struggle to conserve fuel.

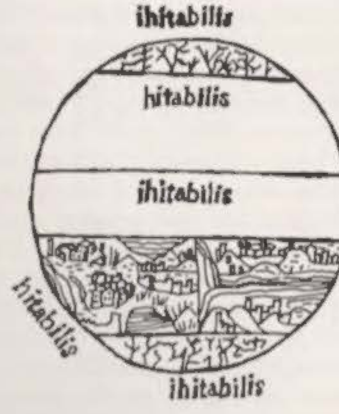
Long Term Prospects

In discussions with architects of the longer-range implications of the energy crisis, talk frequently turns to possible changes in the role of the architect himself (or herself). Assuming that one of the consequences of the fuel situation is a gradual but nonetheless pervasive shift in the whole socio-economic structure and average lifestyle of the society, how will the architect fit in? Will he or she become less a design specialist and more a planning generalist? What will the typical firm look like? Will it exist at all or will its function be absorbed into some new institution, like a community or a regional planning and design center?

Most of the architects we spoke with restricted their opinions to the medium range, say the next 10 years, rather than the longer range. Mac Holder, in response to a question pertaining to the architect and engineering skills, said that "the competent architect already has to know a lot of mechanical engineering — how to specify ducts, locate mechanical systems, etc., and he has to know which questions to ask." What the architect will have to learn, according to Holder, is how to get his knowledge of energy-economy from the drafting table to the building site. "It's our responsibility to put the whole thing together — legally, professionally, morally, and in the client's eyes."

Mac Holder, Lamar Youngblood

Something else the energy-conscious architect will have to become more familiar with is microclimatology — the specific behavior of the atmosphere at and around a given site location. "Many people don't realize," says Holder, "that here in central Texas, in the winter, the sun at midday drops to an angle of 30 degrees, while in summer it's directly overhead." This has obvious implications for energy-sensitive design, and Holder suggests that the architect ought to start getting routinely involved in site-selection, a function presently carried out almost exclusively by clients and realtors.



John Gallery does not envision significant changes in the role of the architect. "The real question is will the architect start doing what he should have been doing all along?" One thing this doesn't mean, he says, even assuming a dramatic shift in the urban design process, is more architects in government. What it does mean is that the architect will have to become more conscious of general cost factors, i.e. "real-estate economics, the regional economic structure within which a given structure is to be financed and built." It also means, according to Gallery, that the architect must become "more sensitive to the ways people use the buildings we have designed." He suggests that architects start going back to their completed buildings to learn firsthand "how the people fit into them, how they furnish and use their space."

Our schools, of course, are faced with new responsibilities, among which Gallery lists a more active schedule of post-graduate architectural education — with an emphasis on the energy problem. "Most architects," he says, "have no opportunity for testing out their own ideas and innovations." Theoretically, the school of architecture can and should provide such opportunities in terms both of space and resources. Gallery further suggests the construction of "model projects" to demonstrate some of the newer design concepts in relation to energy. He would like, for example, to see a model application of Francisco Arumi's heat-transfer theory (see page 22) installed on a building in downtown Austin, thus providing "an open experiment" for concerned architects. And eventually, he says, there ought to be entire "model complexes" through which such "continuing education" might be carried on.

This gets us to the difficult question of long-term changes in the design not only of individual structures but of whole cities and regions. Most of the people with whom we have spoken appear at a loss on this point. They are certain, of course, that the shape of the built environment will change, but they are much less certain of the specifics of that change. Mac Holder said simply that we must develop a "society based on walking, a built environment in which a man can comfortably walk" — to and from work, to the store, to visit with friends, etc. This meshes with a Dallas architect's conviction that we must carefully densify our urban space. John Gallery was more specific: "If I were asked to design an office building in downtown Austin, I'd build a multi-functional building," that is, a structure accommodating most of the primary functions of urban life — commercial, residential, recreational. Should such a pattern come to dominate an entire city the size of Austin, then some of the energy problems stemming from auto transportation and duplication of service facilities would be at least partially alleviated.

A fundamental correlative to *densification* is the idea of *regional decentralization*. This refers to an urban setting composed not of a central commercial hub ringed far and wide by residential suburbs, but rather to an orderly system of *urban modules*, each based on an integrated pattern of commercial, residential, and service facilities. The inhabitants of each module would live, work, and play in the same immediate environment. If they needed to visit or to ship something to another module, they would do so via a streamlined mass transit system linking the modules together. Part of the logic of this arrangement, however, is to minimize the necessity for mechanical transportation, especially of freight. Thus a popular variant of the plan incorporates the notion of *community self-sufficiency*, whereby each module or at least each cluster of modules would produce and maintain as many of its own basic commodities as possible. Food, for example, would be raised on the inner peripheries of "green belts" surrounding the modules, while the outer reaches of the "green belts" would be preserved as recreation and wilderness areas. Within the modules themselves the inhabitants would work in a highly diverse array of factories and commercial facilities — from lumber mills and electrical generating plants to bakeries, waste treatment centers, and shoe factories — oriented toward manufacturing for local consumption. This would, among other things, take some overland trucks off the road while cancelling the need for wasteful, long-distance transmission of electrical power.

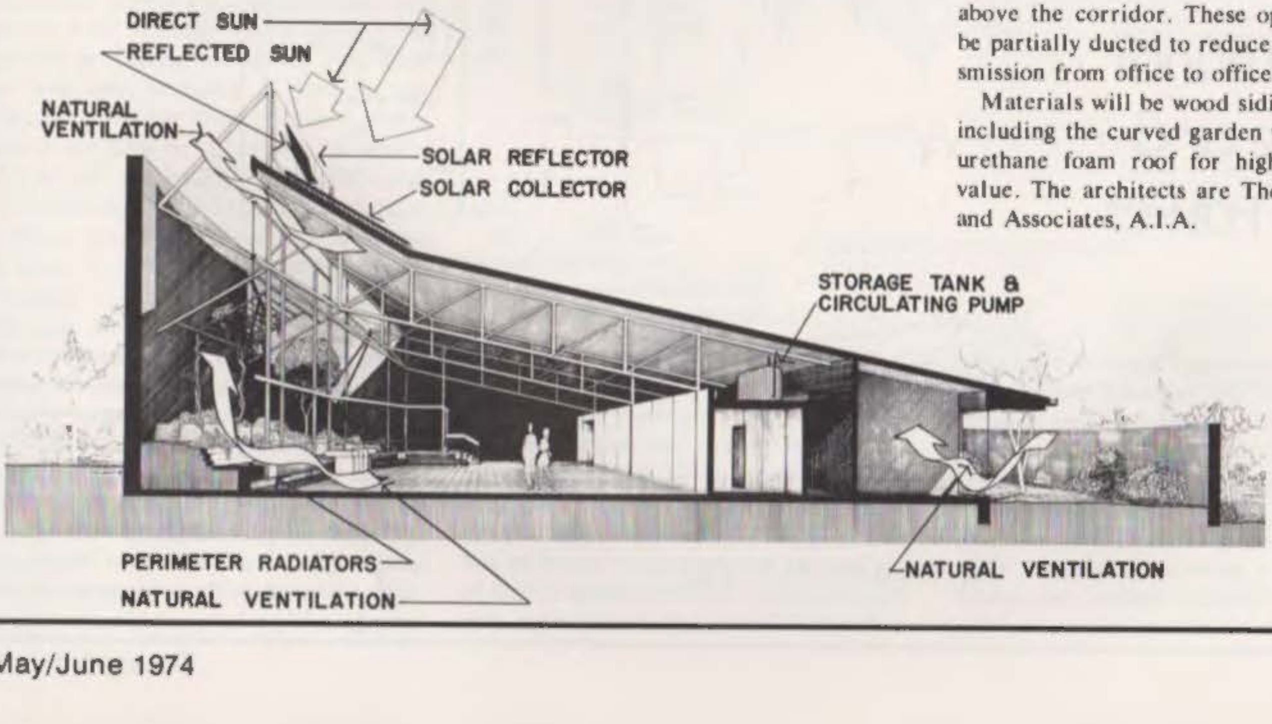
What would individual structures look like in such a system? It's hard to say, apart from Gallery's reference to multi-functional buildings, and tantalizing to imagine. Presumably, at least here in the Southwest, much of the local roofspace would be covered with solar collectors and windmills generating electrical power for the people at work and leisure

Trapping the Sun at San Marcos

The Catholic Student Center, located in San Marcos, Texas, and directed by Father Gielot, will be built with energy conservation and utilization of direct solar heat as part of the overall design. The roof of the chapel, slanted to the proper angle for maximum heat absorption in winter, will be equipped with several solar reflectors to intensify the heat cast down on solar collectors. The reflectors will be adjustable in order to allow for the varying angle of incidence of the winter sun, and also to turn the heat away from the roof in the summer. A large storage tank for heated water will supply the water to a collector on the roof, circulated by a small pump.

The balance of the design consists of limiting glass areas to small areas in the office section, overlooking an enclosed garden, deeply shaded by long overhangs. The fenestration is arranged to allow the prevailing southeasterly breeze to sweep across the roof to the upturned highest portion, creating a low pressure area to increase air flow through the building. The hotter air rises to the upper windows in the chapel. Ventilation in the office area is through windows below desk-level and out at the upper level above the corridor. These openings will be partially ducted to reduce sound transmission from office to office.

Materials will be wood siding exterior, including the curved garden walls, and a urethane foam roof for high insulation value. The architects are Thomas Leach and Associates, A.I.A.



below. Adjacent to these devices might be huddled solar-watered greenhouses producing additional food supplies. These innovations alone would sharply alter the design of the buildings themselves, as well as the materials employed, and micro-climatological factors would alter it further. (See page 28 for an account of experiments with the application of these alternatives.)

The Costs of Change

While such ideas may appear futuristic, significant changes in planning and design are inevitable if we are to confront the energy crisis with any seriousness at all. Hence the question of ways and means: how are we to administer and finance the changes that are called for?

Never mind the long term — this dilemma is chewing at our ankles now, mainly in the form of the old contest between "initial costs" of financing construction and "life-cycle" costs. Owners and their bankers have traditionally been more concerned with the initial expenses of erecting a building than with its later operating costs, especially when the project is a speculative investment scheduled for resale. Now, with energy-conscious architects trying to sell their clients on design features that tend to raise initial costs, the problem has become more critical. Owners are still resisting these outlays, despite the fact that most of the suggested innovations would so reduce operating budgets, particularly in view of rising fuel costs, as to effect a net saving. "It's not the total amount that concerns the owner," says Francisco Arumi of the UT/Austin School of Architecture, "it's the rate at which the money comes out of his pocket."

Following a year and a half of glaring publicity concerning the energy crisis, some owners are bending on this issue. Mac Holder reports that in just the past year he has been able to sell his clients on a number of conservation items that he had been recommending, unsuccessfully, for several years prior to that. "Good glass, careful orientation, and proper overhangs are all well accepted now," he says. The same is true of insulation. But he also reports that more expensive features — like high-efficiency mechanical plants, operating windows, and cross-ventilation systems — still are being rejected.

Dr. McDonald, the UT economist, believes that eventually this impasse will more or less dissolve itself. "Client fears of higher initial investment," he says, "are based on the assumption that the crisis will be shortlived." Once the builder knows it's here to to stay, he will accept the higher initial cost. "And it makes no difference," says Dr. McDonald, "whether the investment is speculative or not. Buildings that consume a lot of energy won't be salable." (This doesn't, of course, address the danger of illusion. Suppose that a combination of improved relations with the Arab countries and accelerated domestic production lead temporarily to a higher inventory of fuel at reduced prices, giving the impression that there isn't, after all, an energy problem. Won't the client then go ahead with his sealed glass highrise? And where will that leave us a year or two later, when the squeeze returns?)

College House

Communal Space and Solar Power

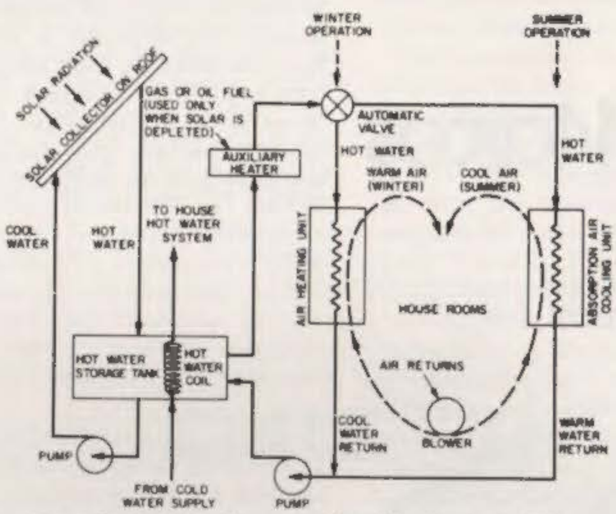


Fig. 7 Residential heating and cooling with solar energy: Schematic diagram of one alternative. (Courtesy NSF/NASA and the University of Maryland)

New lifestyles both allow and call for new concepts in building design and allocation. So it is that a student housing cooperative to open this fall at the University of Texas at Austin will feature both collective living spaces and solar-powered heating and air-conditioning—at a projected saving of 40% over the mechanical system that would have otherwise been used.

Plans call for a flat-plate solar collector to be mounted on the roof of an adjacent building (too many trees around the College House). The unit will employ a photo-thermal technique to heat water which will then be pumped through a grid of pipes and air-warming devices to operate the heating system in winter and the absorption air-conditioning system in summer. This particular design was chosen because of the relatively low temperatures needed (200°) to produce heat. For those overcast days, a conventional back-up system is also being installed, but its use will be strictly minimal.

The project was designed by architect Bill Tamminga and sons, with UT architecture instructor Forrest Higgs providing counsel on the application of solar energy.

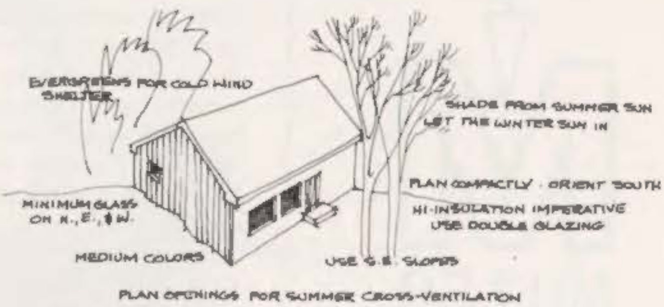
Remaking the Grid

Beyond the problem of adjusting the energy consumption of individual buildings there lies, again, the more staggering imperative to rebuild entire communities on the basis of energy economy. Not only is cost a factor here, but orderly planning and design in relation to a whole region — its climate, its resources, its economic structure. This implies a conceptual and operational sophistication far exceeding that of the average builder in today's market. Nonetheless, says Dr. McDonald, the private sector can handle the job, assuming a time-frame of something like 25 years. The capital for this, he adds, will derive from a continued economic growth rate, in the U.S., of 3% through the year 2000 (down a percentage point from 1973.) Funding for mass transit, however, as well as for certain other items, will, according to Dr. McDonald, probably have to come from the government — due to the fact that such installations would have to operate for the first few years at a loss.

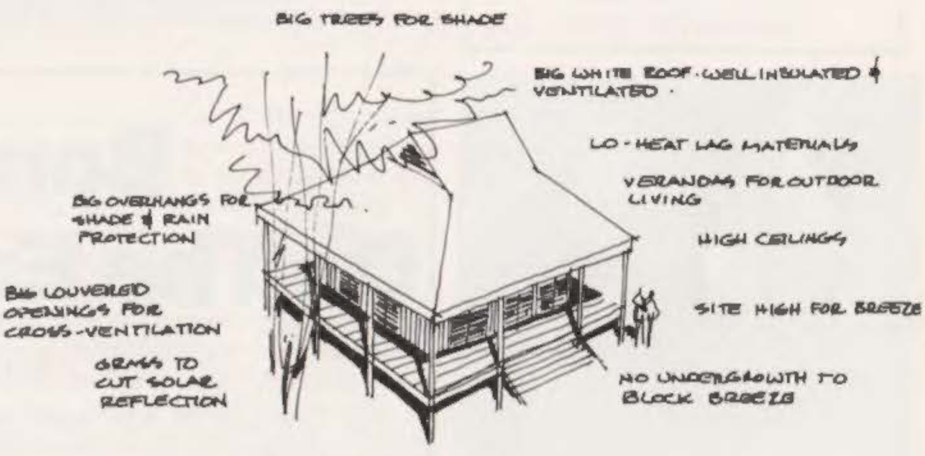
All this suggests not a reduction but a continued bloating of the demand for fuel (especially the projected 3% annual increase in GNP). Where, in the next 25 years, is this fuel to come from, and how, given projected inflation, is it to be purchased? Dr. McDonald concedes the difficulty, but says it can be solved or at least diminished through the development of alternative sources like nuclear and solar power. He emphasizes, like others with whom we have spoken, the former, predicting that by the year 2000 we will take as much as 50% of our domestic energy from nuclear power plants. He goes on to say that because of this we will probably see more and more new buildings converting to electric heat.

There are serious problems with this analysis, most of which have been neatly summed up in the *Forum* article by Richard Stein (who is so disillusioned with the prospects for nuclear power by fission — the only functional method we have — that he doesn't apparently consider it a viable alternative). The most alarming problem is safety. Not only is there no proven emergency core-cooling system for the light water reactor (the type most commonly used today), but there is no existing method for disposing of the radioactive wastes which that reac-

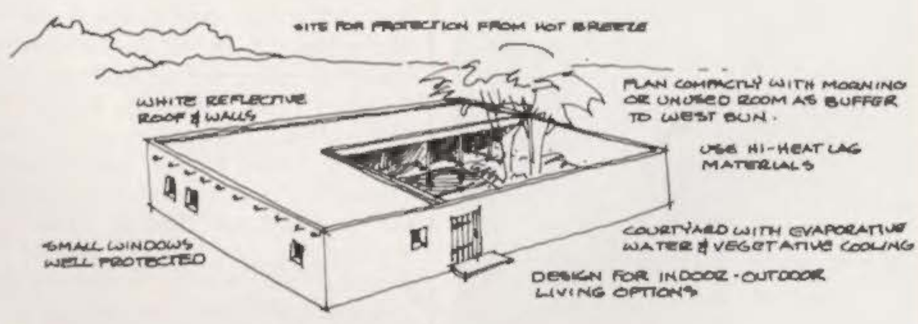
TEMPERATE CLIMATE



COLD CLIMATE



HOT-HUMID CLIMATE



HOT-ARID CLIMATE

Energy conservation through microclimatology. Drawings courtesy of Gary Long.

tor produces. Such wastes are presently being "stored," in greater and greater abundance, in Atomic Energy Commission depositories located across the United States. This hazard is compounded almost beyond calculation by the spectre of 100 nuclear generating stations by the year 2000 (there are now 36). It is further compounded by a plan to start using the liquid metal fast breeder reactor as a supplement to or even a substitute for the light water variety. The fuel for this reactor is plutonium, which has a half-life of 24,000 years — meaning, says Stein, "that we would be passing along the responsibility of monitoring these wastes for thousands of years." So acute are the dangers that a federal court in Washington, D.C. has enjoined development of the breeder reactor indefinitely — until the full scope of the danger can be determined.[6]

A second problem with the fission reactor is performance. To date, it has achieved an average efficiency ratio of about 50% largely due to expensive and time-consuming breakdowns. "Already," says Stein, "certain utility companies are voicing disillusionment with its light water nuclear generators, three of which projected for the Potomac River area have been dropped from the growth program for that region." England and Pennsylvania, moreover, have banned any further nuclear installations at all.

This leaves the highly touted fusion reactor, which carries few of the hazards connected with fission, but remains at least 10 years from being functional even in the laboratory. It would take another 10 years beyond that, says Stein, to begin lighting homes with the device "*if* the technical problems can be overcome."

How Much Government?

The evidence is clear that any meaningful response to the energy crisis will involve some form of government intervention at the federal, state and municipal levels. The only questions are how and how much?

In Texas, there are two state agencies concerned specifically with energy. One is the House of Representatives Interim

Boning Up On The Energy Crisis

By Gary Fleming

TSA now has the AIA—published *Energy Bibliography* in stock. Prepared by A. Peters Oppermann for a University of Michigan seminar on Energy Conservation, the bibliography lists generally accessible publications and articles which deal with a wide range of energy matters. Bibliographical entries are conveniently classified under six-subheadings: "The Energy Crisis," "Building Design and Construction," "Solar Energy," "Energy Sources," "Wind Energy" and "Climate." Topics vary in approach from the general and philosophical "Energy Crisis—Are We Running Out?" to the specific and technical "Solar Optical Properties, Heat Transfer Coefficients and Shading Coefficients of Architectural Glass."

Also available is an *Addendum* to the *Energy Bibliography* which deepens and updates the original. Recently prepared by Mr. Oppermann for TSA, the *Addendum* follows the same format as the *Bibliography* and considerably expands the source materials listed under "Building Design" and "Construction and Solar Energy."

Both the *Energy Bibliography* and the *Addendum* are invaluable tools for the architect seeking creative solutions to the fundamental energy and environmental problems facing us today. They are available from TSA at a cost of $2.00 and $1.00 respectively. We will also be happy to make available free of charge the "Energy Inventory: A Selected List of Energy Research Organizations," originally selected and published by *The Architectural Forum*.

LOOKS LIKE J.B.'S SERIOUS ABOUT TURNING OFF HIS AIR-CONDITIONING.

Committee on the Energy Crisis. The second, established in August, 1973 by request of the Senate, is the Governor's Energy Advisory Council, headed by Lieutenant Governor William Hobby. The Council has been charged, according to a letter from the governor, with "six broad areas of consideration": energy policy, adequacy of supply, potential for conservation, constraints on energy production, economic effects of energy demand, energy research needs.

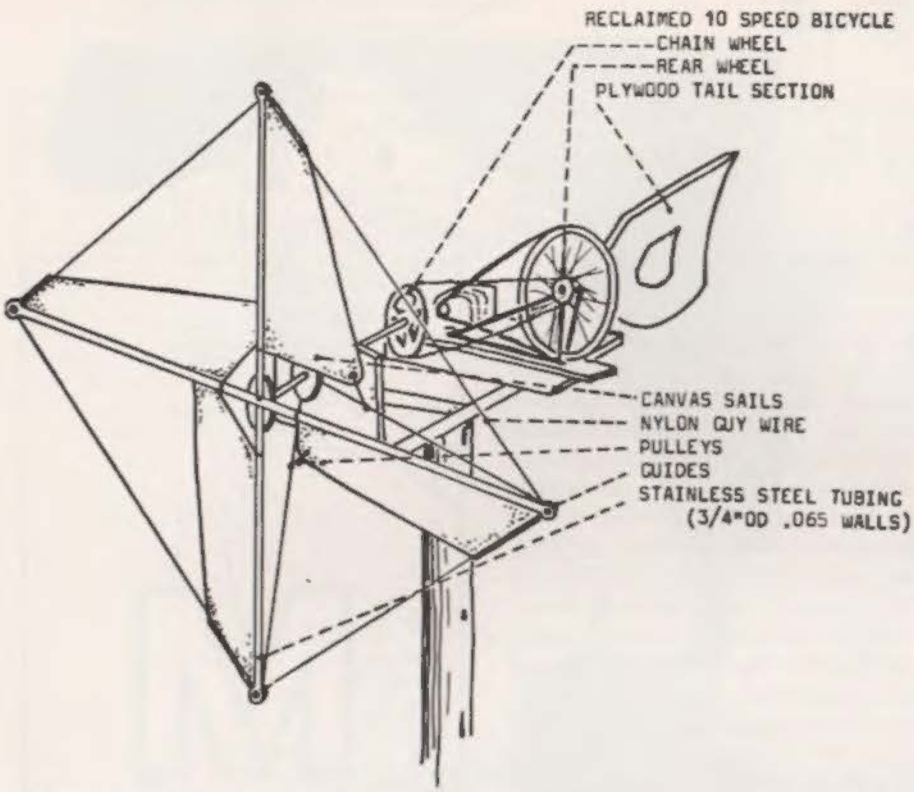
The research phase has been initiated with a recent grant of $20,000 to a group of professors at Texas A&M, including Ray Reed, who are expected to submit a report detailing areas in which further research is necessary. Additional studies are being conducted on supply and demand, transportation, socioeconomic dimensions, public information, new technology, and policy questions in relation to nuclear power. "We're starting from the ground up," says Council staffmember Larry Veselka, "on state energy policies." He expects initial reports by the end of the summer, and public hearings on policy alternatives by late fall.

It is worth pointing out that while the nuclear alternative is already being woven into the fabric of official policy, almost nothing is as yet being done, according to Mr. Veselka, in the area of "new technologies." This jibes with current plans for construction in Texas of at least four large nuclear generating plants (two in Houston, one in Bay City, one in Dallas) and reinforces other indications that the state is committing its resources and its people to the path of nuclear power through fission. (One of the members of the Energy Advisory Council is also the "Texas member of the Southern Interstate Nuclear Board").

Most municipal governments in Texas appear to have taken little action on the energy crisis, except in San Antonio and Austin, whose city councils have designated local energy conservation committees. The Austin group, with a membership including three architects, is divided into four subcommittees: education and media, electricity and lighting, transportation, and building code revision. The latter is chaired by Mac Holder, who in March presented the city with initial recommendations on insulation and ventilation in residential construction. The suggested code, based on but stronger than its FHA equivalent, includes the following provisions: (1) a minimum of three and a half inches of insulation in wood frame walls, six inches in ceilings; (2) a minimum of two inches around airconditioning and ventilating ducts; (3) reinstatement of compulsory ventilation systems in new homes and apartment buildings.

All this is to the good, but it still falls short of addressing the full urgency of the problem. How, then, can some of the rest of us begin to make a substantive response? Richard Stein calls both for an immediate reappraisal of the ways we design our buildings — from orientation through materials and mechanical systems — and for modification of existing structures. He further suggests "organizational action," referring to programs by groups ranging from AIA to the National Academy of Sciences. Dave Braden, in his editorial on page 2, urges the architects to consider a renovation of land-use patterns. And a forthcoming position paper by the TSA Task Force on Energy Conservation, chaired by Mr. Braden, will presumably make more explicit suggestions along the same lines.

By way of focusing these proposals, let



us return to the question of "the role of the architect," because any significant architectural response to the energy crisis will mean a shift, however modest, not only in the way the architect works but in the way he *views himself and his responsibility* within the larger socio-economic order of things.

Architect as Energy Expert

The first and most immediate priority is self-education. One cannot grasp the almost inconceivable implications of what lies ahead for us, nor the range of alternatives being discussed, except through first-hand exposure to the hard data and literature now being generated on the crisis (see bibliographical note on page 14). Such a program could be initiated *today* — through individual reading and thought, through chapter study groups, through other means — without waiting on the initiative of someone else.

Architect as Conservationist

It is surely not enough to persuade one's family and clients to turn off lights and turn down airconditioning. Dramatic changes in planning and building construction would appear to be called for, along with a new thrust toward imaginative "recycling" of existing structures (eliminating the energy-expense of demolishing in order to rebuild). Perhaps this means, among other things, taking a firmer stand with recalcitrant owners and clients — possibly involving some form of *systematic* client-education conducted by local chapters. In the longer run, it may even mean a kind of "guild spirit" among architects whereby they refuse, as a professional body, to work on projects that will depend rather than diminish the energy problem. And finally, it seems to follow that design award programs should make energy-economy as important a criterion of architectural excellence as any other element in a building's composition.

Architect as Lobbyist

One way the individual architect can help bring a new rationality to the design process without overly jeopardizing his own "competitive position" is to help see that laws are passed which impose this rationality on everyone equally; hence the logic of becoming involved directly in the legislative process, either through stepped-up lobbying and other pressure activities or through election to office. It seems appropriate to suggest that local and regional coalitions of architects start presenting their own candidates for such relevant posts as county commissioner, city councilman, mayor, schoolboard member, and state and federal representative.

Architect as Visionary

The ultimate example here is Buckminster Fuller, an accomplished designer who has melded his perceptions into a personal crusade for survival on a global scale. Wherever Fuller goes, thousands of people come to be exposed to the richness and humaneness of his world-view. There is no reason that a spirited architect in Waco, say, or Dallas, couldn't become a local Buckminster Fuller, delivering a new and unified vision of rational community design to an audience of people who, faced with a crisis that seems to dwarf them, are thirsting for inspiration and guidance. Whatever particulars such a spokesman chose to present — densification, radical design alternatives — he could hardly become too "utopian", because, as a noted writer on social evolution has said: "What was 'utopian' yesterday is today the means by which our civilization is to survive. Either we drive forward into 'utopia' or we slide backward into the darkness of chaos and disintegration."

FOOTNOTES

[1] Meadows, Donella H., et. al., *The Limits to Growth*, New American Library, New York, 1972.

[2] *Professional Engineer*, Feb. 1974, p. 17.

[3] "State Energy Policies — Policy Research Project," Bulletin No. 1, Nov. 1973, L. B. Johnson School of Public Affairs.

[4] Stein, Richard, "Architecture and Energy," *The Architectural Forum*, July/August, 1973, p. 51.

[5] *Ibid*, p. 48

[6] *Ibid*, p. 40

ENERGY AND YOU,
THE PRACTICING ARCHITECT

A TSA Professional Development Program

Taking all "Energy Crisis" communication and eliminating the hubbub, ballyhoo and chatter, one still finds a vast array of facts—most of which require new application rather than new discovery. But the task of collecting and digesting the written-here-spoken-there bits of pertinent information is formidable at best. (Who has time for libraries any more?) Addressing this problem for its members, TSA recently conducted its first Professional Development Program of 1974, "Energy and You, the Practicing Architect." The seminar, held March 29-30 at Houston's Hyatt Regency Hotel, was what PDP Director Marc Brewster termed "an attempt to bring into meaningful perspective the current deluge of information on energy . . . to put it into a palatable, quickly digestible form, at a reasonable price." Responses from the 65-or-so architects, engineers and interested individuals who attended indicate that the attempt was in large measure successful. And a market study is now underway to determine what PDP topics merit consideration for additional programs this year.

Among the distinguished guests at the seminar was General James Rose, of the Governor's Office, Division of Planning & Coordination, who suggested continuous governmental liaison with the architectural profession as an important measure in coping with the energy problem. Input from the PDP faculty appears in the following partial summary, which we present realizing the inherent inadequacies of such drastic capsulization.

Keynote
John P. Eberhard
President,
AIA Research Corporation

It is the responsibility of the architect, to his client and to his community, to sift through the reams of propaganda on the Energy Crisis and determine how he will alter his role and how he would have the community alter theirs.

The U.S. uses 30% of the world's energy while it represents only 6% of the world's population. We compete for energy in the world markets at an increasing disadvantage at the same time as the thirst for energy and the purchasing power of the rest of the world increases.

Using all available and all likely-to-become-available technologies, we cannot achieve Project Independence in the next six years. U.S. energy consumption, even if projected only at present rates of increase, cannot help but far outstrip supplies. Whether one believes the recent energy "crunch" to have been real or contrived is irrelevant. The fact is that over the next many years much of our national goal must be the vast *conservation* of energy.

Design and Climate
Gary Long
Associate Professor
Rice University
Partner,
Ambrose-Long Architects

A major business of the architect is design for thermal comfort of people. Some twenty percent of the nation's energy goes to that task: the heating and cooling of buildings for work, for play, for recreation, and for dreaming. It takes energy to keep people warm in winter and cool in the summer—but it doesn't take as much energy as we now use to overpower the problem. It is time to relearn an energy-conserving architecture derived from design with common sense and climate.

We must survey the elements of climate, the way man responds to climate, and the technology of providing thermal comfort short of the introduction of mechanical systems. We must be anchored in a theory of architecture that includes as a first premise the economy of means.

The Challenge of Change
George Wolbert
Vice-President & General Counsel,
Shell Oil Company

Unless architects plan with energy savings in mind, they are going to find themselves in the same bog of government red tape as the oil companies. The oil industry today is operating under strict regulation, which will not magically disappear simply because the embargo has ended.

That industry did not appropriately seize the initiative to prepare for the future they knew lay ahead. If architects do the same, they will wake one morning to find that the choice is no longer theirs and that the choices made for them are likely not very intelligent ones.

Energy Allocation
I. A. Naman
President,
I. A. Naman Associates, Inc.
Houston

By assessing the principle factors which affect building energy use — glass, walls and roof, people, lights and power, fan motors, outside air — in terms of their impact on cooling load and total energy input, we may develop a better perspective for design of energy-saving buildings.

- Reflective glass deflects the sun, but still allows heat to enter the building. Thus, energy is required both for compensatory cooling and for light which might have been supplied naturally through use of non-reflective glass.
- Building geometry and uniformity of window spacing are energy factors. Solid walls and roofs account for a relatively insignificant degree of heat transfer.
- Suggested lighting levels for building interiors are generally excessive. "Task" lighting is encouraged.
- Individual air handling units for each floor provide the energy-saving option of special use operation, though they do require exterior venting and location on an exterior wall. Operation of fan motors should be considered carefully to insure efficiency. For example, undersized ductwork aggravates energy input by requiring more fanpower.
- Use of outside air should be kept to a minimum because it costs more to *condition* it than to *clean* inside air for reuse.

G.S.A.'s Test Building
Fred S. Dubin
President
Dubin-Mindell-Bloome Associates
New York

Because of observations made in the design of G.S.A.'s Manchester, N.H. energy conservation demonstration building, we may safely say that energy conservation through design—using off-the-shelf hardware, systems, and methods—can reduce the yearly energy consumption of new buildings by 35 to 50 percent and of existing buildings by 15 to 20 percent. *More than half the savings in energy can be accomplished with no appreciable increase in initial cost.*

Design analysis of the demonstration building indicates that energy conservation benefits would accrue by utilizing natural light if windows are blocked off by thermal barriers at night and weekends in the winter, and if artificial illumination and natural illumination are integrated with photocell control, and if window glare and solar radiation are properly handled. In Texas, natural illumination—with proper solar control—becomes even more energy conservation-effective.

Financial Aspects
Max Stearns
First Vice President
First Mortgage Company
Houston & Dallas

"Life-cycle costing" is an attempt to look at the combined expenses of original building construction cost plus operating cost. Saving money on operating cost doesn't necessarily require higher original costs. But when saving operating expenses means a somewhat higher original expenditure, we are in a new and as yet untried area of development financing. Primarily, developers and financeers are interested in the "bottom line" expense of a proposed investment. When—as is most often the case—the developer owns a building for only a few years, he has no incentive to consider the operating expense of his building.

The financier's attitude is reactive. If the public is paying $X/S.F. for office space and a developer comes forward with an energy-saving building which will cost $X+1/S.F., the more expensive building will go without support. At least one way around the problem would be for the Progressive Developer to borrow only for $X/S.F. on his better designed building and if, after five or so years, the building is indeed saving what he said it would—then borrow for the remaining $1/S.F..

In cases where the developer finds operating costs high today, even over the short term, he is increasingly (especially in apartment projects) requiring direct tenant payment of utilities. This means individual metering of tenant spaces and further means that the renter at least has an incentive to shut off power when not required.

Legislation which encourages economy has been suggested, but there is a fear among investors that such laws would tend—as often in the past—to be more restrictive than wise. Legislation would more properly be used to set reasonable energy budgets than to require that specific materials be used.

The best solution would be for architects and other professionals to convince developers and the public of the logic of energy conservation.

In short, the developer (and therefore the lender) in today's market, is concerned primarily with energy *non-availability* rather than energy *cost.* The cost is easily transferred to the public.

The following materials are available from the TSA/PDP library at the prices indicated. Please mail orders to: TSA/PDP, 800 Perry-Brooks Building, Austin, Texas 78701.

Dubin, Fred S. "Aspects of Mechanical Engineering to Building Design." 13 pages. $2

Dubin, Fred S. "Energy Conservation Through Building Design and Wiser Use of Electricity." 19 pages. $2.50

Dubin, Fred S. "Energy Conservation Through Building Design and Perspective." 13 pages. $2

Long, C. G. Jr. "Design and Climate." 13 pages. $2

Naman, I. A. "Tables Presented at the PDP on Energy." 8 pages. $1

Oppermann, A. P. "AIA Energy Bibliography." $2

Oppermann, A. P. "TSA Energy Bibliography Addendum." $1

Wolbert, George S. Jr. "Energy and the Architect: The Challenge of Change." 41 pages. $5

Wolbert, George S. Jr. "Outline of Presentation." 2 pages. 30 cents

"33 Money Savings Ways to Conserve Energy in Your Business." U. S. Office of Energy Programs. 6 pages. 25 cents

"The National Energy Problem: Potential Energy Savings." Shell Oil Company. 28 pages. 25 cents


WHAT MAKES THIS ALL-GLASS BUILDING SO ENERGY EFFICIENT?
UNITED FIDELITY LIFE

THE GLASS. PPG SOLARBAN® 480

The First International Building in Dallas is a brilliant example of the efficiency of glass buildings.

Its skin is nearly all glass.

Yet the press has hailed it as "...the most energy-efficient building in Dallas."

This is not in spite of being glass, but because it is PPG Solarban 480 Twindow insulating glass.

Where the energy goes.

In planning this building the design team saw (as you can see on the chart) that about 50% of the energy would go to light it.

Another 14% to run the fans, elevators and various office machines.

About 7% to heat it.

And because it's Dallas, 29% to cool it.

So they decided to cool it—with the most innovative, energy-conserving air-conditioning system technology could provide.

But they needed high-performance glass to do it.

It reflects, insulates and saves.

PPG Solarban 480 Twindow reflective insulating glass has a shading coefficient of 0.22.

This reduces solar heat gain by 78% compared to single-glazed clear glass.

And the double glazing drastically reduces the conducted heat gain (or loss) through the skin of the building.

The bottom line is this:

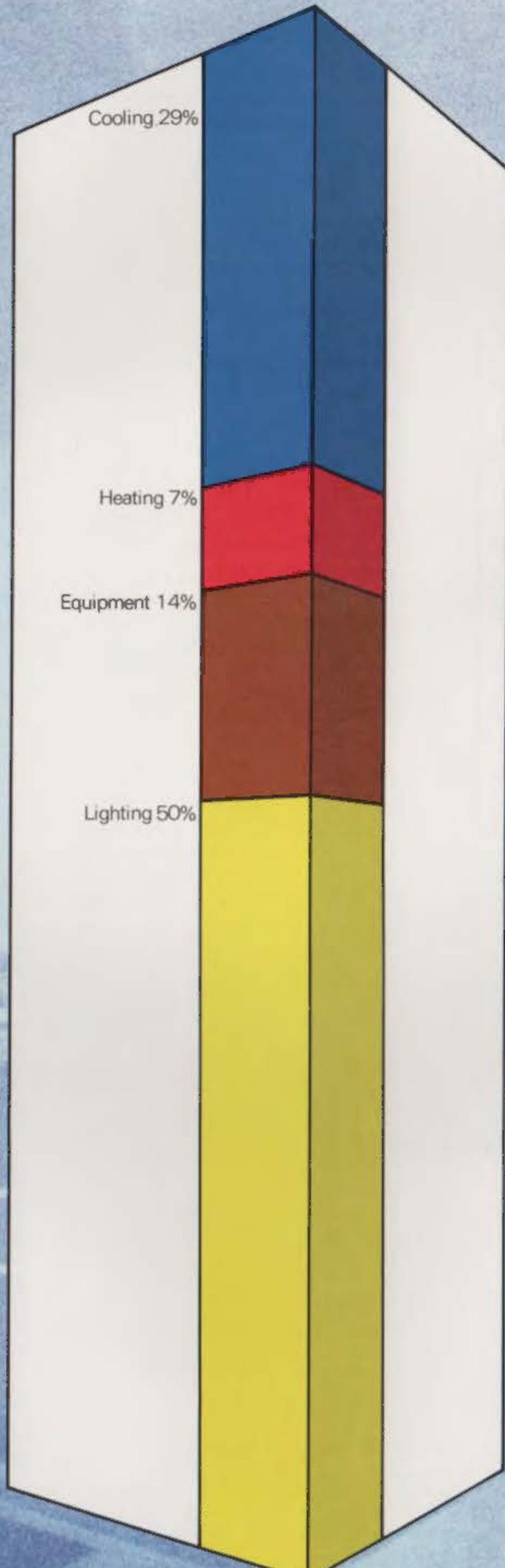
The innovative, all-air mechanical system saves both energy and money. It reclaims heat from the lighting and large interior spaces and redistributes it for perimeter heating when needed.

And the simplicity of its design saves even more money.

As the Herman Blum Consulting Engineers put it: "If you're going to use an all-air system in a high-rise building, you've almost got to have a high-performance glass."

The right glass is the right answer.

Today, there is a flurry of antiglass invective.



TWINDOW® INSULATING GLASS.

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Not necessarily so.

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And buildings like the First International Building prove it.

Our graph illustrates one important point to keep in mind with "all-glass" buildings.

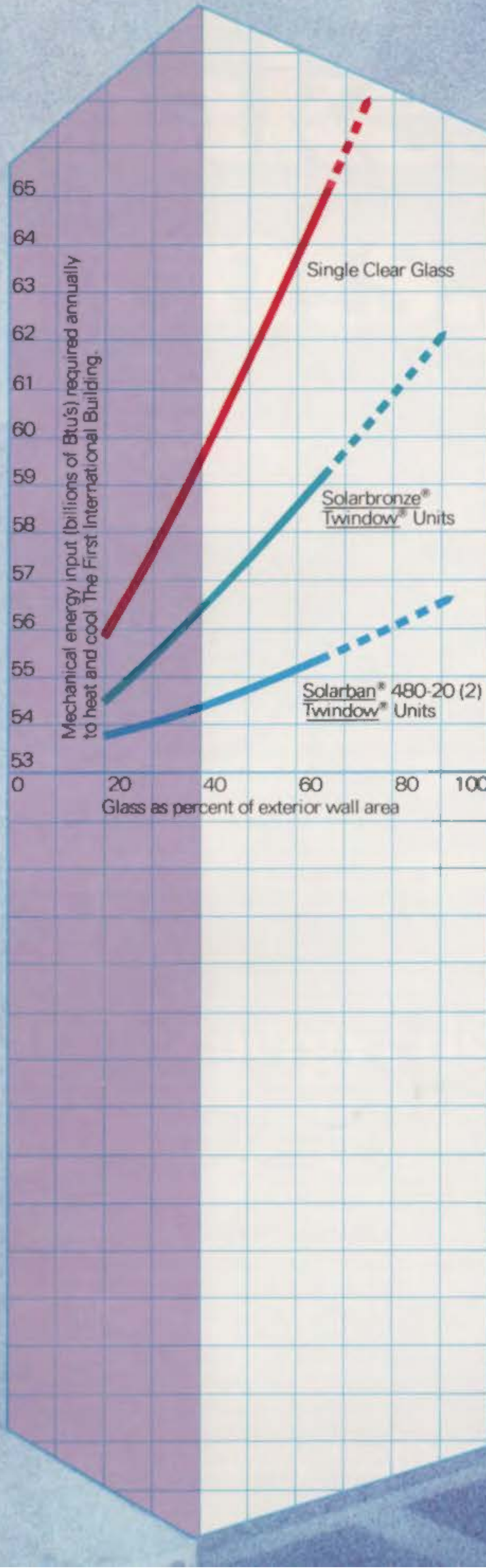
A building that's 70% Solarban 480 Twindow insulating glass (and that's 70% vision glass we're talking about) is more energy efficient than the same building using cramped little clear glass windows totaling only 20% vision area (and that's an 80% opaque wall).

The transparent advantage.

If a glass wall can be used instead of an opaque wall, it's obviously better.

It's transparent.

Experienced owners agree that tenants find a building much more desirable when they can see the outside from the inside. And certainly an important measure of the success of any building is the effect it has on the satisfaction of its tenants.



Economically, esthetically, psychologically—no matter how you look at it—glass is a building material of remarkable potential.

Especially in conserving energy. An important point to remember.

PPG High Performance Glasses come in a wide range of performance values to suit your building's economic and esthetic considerations.

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The First International Building, Dallas, Texas
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Architects: Harwood K. Smith & Partners, Dallas and Hellmuth, Obata & Kassabaum, Dallas and St. Louis
Mechanical Engineers: Herman Blum Consulting Engineers, Dallas, Texas

PPG: a Concern for the Future

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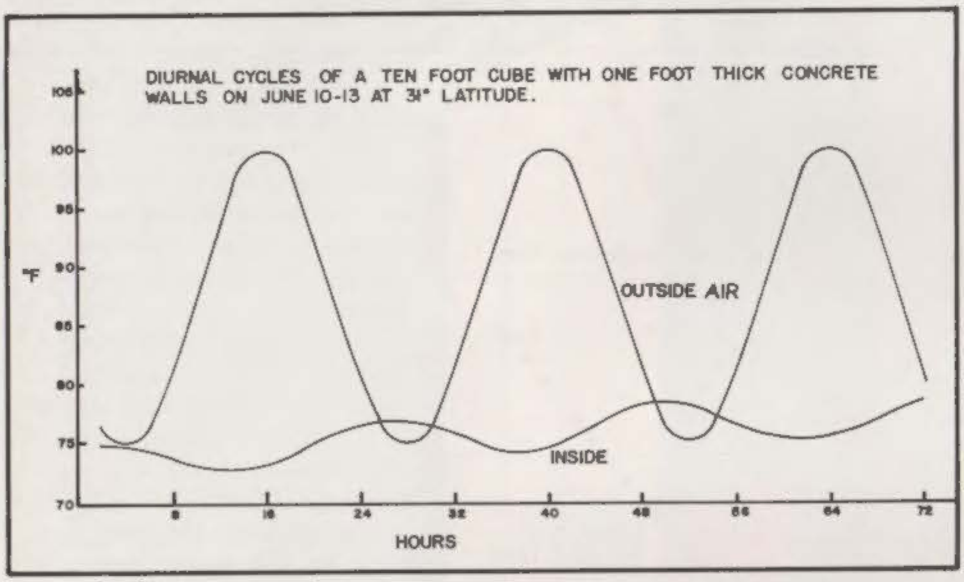
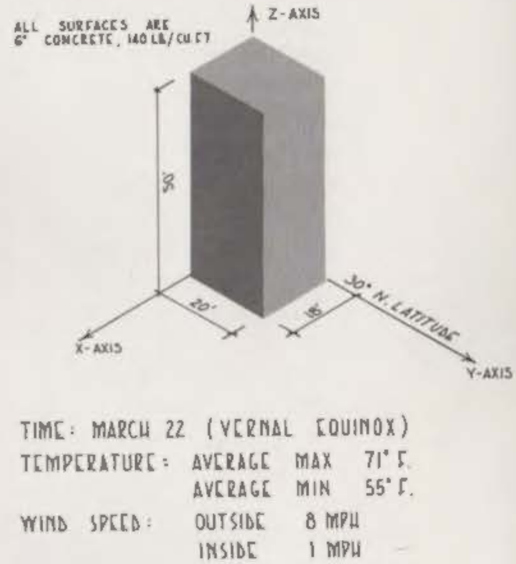
DEROB: a new tool for energy-efficient design





By Dr. Francisco Arumi

By the time an architect hands the plans of a building to an engineer, he has already committed that building to an irreducible level of energy demand.

The energy environments within and outside the building are subject to ever-changing dynamic processes. The conditions arising from these processes are seldom, if ever, the same as the design conditions envisioned by the architect or the engineer.

The response of the internal environment to external and internal conditions are controlled to a large measure by the relative arrangement of the internal spaces. Shape, size, orientation, neighboring shapes, choice of materials are all factors that determine the dynamic internal energy environment of a structure.

The architect is responsible for the decisions that determine these parameters. In order to accomplish more energy-responsible design, the architect must have a quantitative understanding of the tradeoffs among the various choices he faces during the design process.

Complexity of Systems

The complexity of architectural systems coupled with their dynamic nature requires sophisticated computational facilities (software and hardware) in order to establish these trade-offs. As a faculty member in the School of Architecture at the University of Texas at Austin, I have developed over the past 18 months the necessary software to simulate numerically the dynamic energy response of buildings (DEROB).

The programs included in this package permit the quantitative comparison of the energy impact of various decisions.

DEROB takes into account energy exchanges by conduction, convection and radiation. Conduction accounts for energy transfer across solid walls; convection accounts for energy transfer between walls and air; and radiation takes into account energy exchange with the sun, the atmosphere, the ground, surrounding external objects and among the internal surfaces and masses. All of these interactions are solved simultaneously as functions of time. The necessary input includes: latitude, time of the year, weather conditions, arrangements of walls and objects within the structure, and the thermal properties of the building materials.

Measuring Output

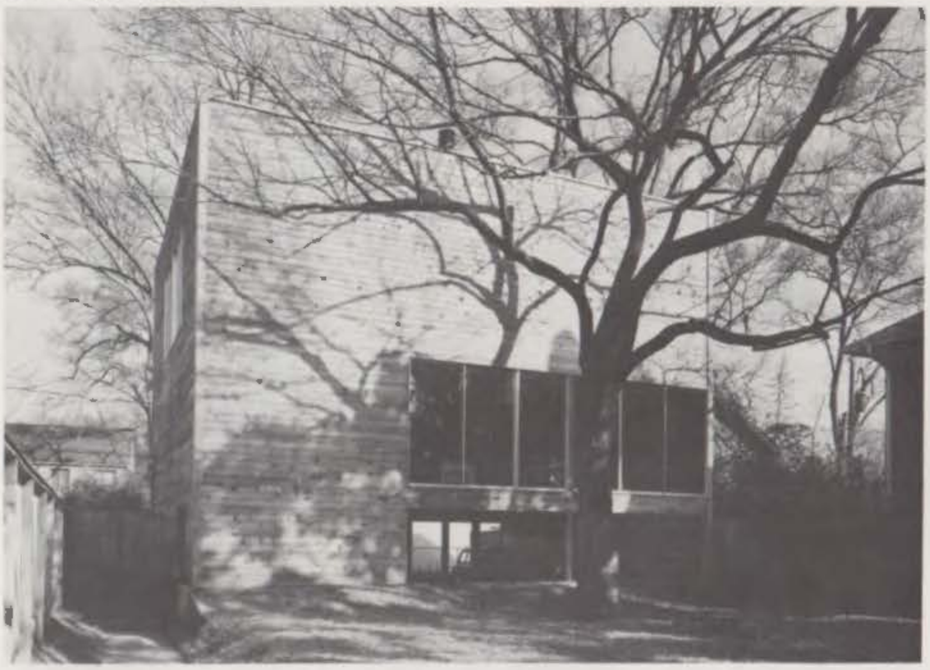
The output is determined by the needs of the user. It may include internal air temperature room by room for every hour of the day. If mechanical systems are included, it may provide the energy load hour by hour, room by room. If the user can define the necessary constraints, the appropriate optimum values may also be identified. The output may also be broken down into partial contributions from various walls or structures by the various mechanisms of energy exchange. Graphical output in the form of solar views of a building is also available, the size of the picture being proportional to the solar exposure. These programs are used as instructional aids in the architecture curriculum. They are also used as research tools.

Plans for the future include the preparation of learning packages and continuing education courses for the profession.

Editors Note: Dr. Arumi has said he is willing to meet with architects and others interested in learning more about possible design applications of his computer system. He can be reached at the School of Architecture, UT/Austin, 78712. The phone number is (512) 471-1922.

Honor Award
Texas
Architecture
1973

Photos by Richard Payne



a maximum house of cedar

Sometimes the design requirements of an architectural project become so manifold that the casual observer is given to wonder that they can all be solved in one structure. So it was with the striking house portrayed on these pages, a private residence built in Houston by owner-architect William T. Cannady. There were, in addition to the desire for a unique and pleasing style, four basic design problems: (1) 3250 square feet for a family of four on a budget of $48,500; (2) maximum utilization of space on a lot of 49 feet by 120 feet, with a "buildable area" of 3400 square feet; (3) preservation of existing large trees; (4) "maximum effect with minimum means."

Given the energy difficulties with which this issue of the *Architect* is concerned, it is the last of the four items above that is perhaps the most interesting. The award-winning house was built as a prototype for a whole series of "custom-designed" homes, and, according to Mr. Cannady: "the theoretical premise behind the design of this project is based on a broad concern for conservation: minimizing wastes of natural resources which are the basis for building material, minimizing inefficient use of energy through special efforts to reduce heating and air conditioning loads by utilizing efficient forms, shading devices and natural ventilation, and reducing unnecessary efforts of people involved in the design

William T. Cannady, Joe Milton, Mark Boone

and building process by the elimination of complicated details and reliance upon existing construction practices."

Besides a carefully designed mechanical system, optimized by a semi-vertical, three-story shell concept, the house incorporates other reflections of energy-consciousness. The basic material, for example, both for exterior and interior walls and roof, is rough-sawn cedar, which comes in relatively low on the energy-cost/production scale. It also requires less energy to transport and to install than some other materials, and, in a place like Houston, it's an ideal skin relative to the climate. Another energy factor is a large tree in front of the house which aids in heating and cooling by providing shade in the summer while allowing the sun to come through in the winter.

In order to maximize space and aesthetics, the house has been fixed at the rear of the lot and constructed above the garage. This leaves a broad expanse of lawn and trees which provide the occupants: (1) an extra margin of seclusion; (2) a playground for the children; (3) a pleasing view through the "social window" on the second floor. The roof of the house contributes still more outdoor space (bringing the utilization ratio to 100%), where, among other things, the adults conduct their parties and cookouts.

The interior of the house continues the motifs of simplicity, utility, and aesthetics. A spacious "open plan" pattern was used for the second floor, which is covered with Mexican tile; the carpeted third floor "provides privacy and long views because the house is pulled out of line with the neighborhood pattern." The third floor also incorporates "sliding glass doors used as windows throughout so that each room becomes a balcony." On the lower level, however, much of the window area is flush with the ceiling, "creating a handrail at the bottom" and a "minimization of exposure to break-ins, window-peepers, etc."

For a house so visually unimposing, this one offers more than the usual combination of thoughtful elements of design.

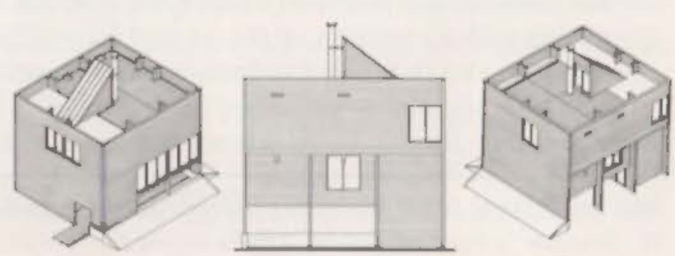


Photo by Dick Madaus

TEXAS ENERGY FLOW

By Marlan Blissett

Current shortages of energy and building materials are forcing architects to examine the relation between energy flows and building design. Although the subject is exceedingly complex, one can learn a great deal about architectural practice by studying an energy profile of a state or region. Such a profile may not reveal the intricacies of a building schematic, but it can point out the relative availability of fuels for purposes of planning mechanical and electrical systems. Since these systems consume most of the energy within a building, the way in which they are introduced into the design process constitutes an important element in architectural decision making.

An Energy Profile of Texas

Table 1 illustrates the flow of conventional sources of energy through the major consuming sectors of the Texas economy — industrial, electric utilities, transportation, and residential-commercial. Approximately 99 percent of the energy consumed is derived from natural gas and oil. Natural gas supplies 69 percent of the energy demands of the State, while oil accounts for almost 30 percent. The industrial sector has made the greatest claim upon natural gas, followed by electric utilities, transportation, and residential-commercial users. The highest demands for oil come from the transportation and industrial sectors.

Although Texas has long been a major exporter of oil and natural gas (currently supplying the rest of the nation with 63 percent of the oil and natural gas produced in the state), it has been slow to develop its coal reserves and to introduce nuclear power. In large measure, the state's reluctance to pursue alternative sources of energy has been due to the historical abundance and low cost of oil and natural gas. But changing market conditions are now forcing a reconsideration. By 1982 the second largest consuming sector — the electric utilities — plan to generate 14 percent of the state's total electric capacity from lignite and 12 percent from nuclear power.[1]

Marlan Blissett is an associate professor at the Lyndon B. Johnson School of Public Affairs in Austin.

The Energy-Materials System

TABLE 1: How Texas Energy Is Used

	Hydroelectric	Natural Gas	Oil
Electricity Generation	4.4%	17%	1.0%
Residential-Commercial		5%	3%
Industrial		42%	12%
Export (from state)		52.1%	74.3%

TOTAL ENERGY EXPORTED: 63
TOTAL ENERGY CONSUMED: 20
TOTAL ENERGY WASTED: 17

(In 1971, Texas electrical generation, mainly from the burning of natural gas, amounted to the equivalent of 593.2 thousand barrels of oil (BBLS) per day. Of this, 79.4 thousand BBLS went to industry, and 107.4 thousand BBLS to residential and commercial use. **The remaining 406.2 thousand BBLS was wasted through conversion loss. A similar waste factor prevails in the transportation sector.)**

The availability of energy sources within a state or region depends upon a number of factors — demand, rate of production, estimated reserves, price, manufacturing requirements, extraction and processing technologies, economies of scale and public policies. Each factor is part of a complex set of activities that characterize the energy-materials system within which a professional architect must work.

Major changes within this system have occurred since 1900. From 1900 to 1904 non-energy materials for building or manufacturing (forest products and physical minerals) constituted 56 percent of all materials used; energy materials accounted for 44 percent. From 1965 to 1969 non-energy materials had fallen to 42 percent and energy materials had climbed to 58 percent.[2] These percentages suggest that the demand for energy materials tends to rise as a constant, long-term trend, while physical structure materials seem to fluctuate according to business cycles.[3]

In view of such a pattern, increases in the cost of energy will have a continuing effect upon the competitive relations among a number of structural materials. Using 1973 data, Table 2 reveals how changes in the cost of energy would be reflected in the prices of major construction materials. Should energy costs increase, aluminum and cement would suffer the most and lumber and plastics the least.

The Design Process

One of the most innovative architectural responses to the energy-materials system is the concept of an energy budget for both new and existing structures. Buildings can be designed or remodeled to reflect greater efficiencies in operation, illumination, and comfort control.[4] Mechanical and electrical systems can be augmented by taking advantage of sunlight and prevailing wind patterns. Less energy-consumptive equipment can be used throughout a building (e.g. incandescent lighting uses twice as much energy as fluorescent lighting). Construction techniques and materials can be specified so that the total energy investment is reduced.

TABLE 2

	Price Dollars per ton	Energy kwh per ton	Energy kwh per dollar	Energy Price[1] Percent
Steel	$ 184	3,600	20	4
Aluminum, primary	560	64,000	114	23
Glass, container	140	3,500	25	5
Plastics	3,000	25,000	8	2
Cement	17	1,300	76	15
Lumber, incl. logging	100	940	9	2

[1]Obtained by multiplying kwh per dollar by 2 mills (equivalent to 60 cents per million B.t.u.) and expressing as percent.

Source: National Commission on Materials Policy (1973) *Material Needs and the Environment Today and Tomorrow*

Legal and Political Constraints

Although several computer models have been developed for the energy evaluation of buildings,[5] many legal and political obstacles must be overcome before energy budgets can become an integral part of the design process. Originally established to protect the public from faulty erection and construction, local building codes have contributed to the over-design of many structures and to the delay of numerous material or system innovations.

The legal authority to enact building codes is derived from the state's police power. In Texas a portion of this power is delegated to both home-rule and general law cities. Most local jurisdictions enforce a specification code that describes the materials to be used in all types of construction. While this practice is agreeable to local builders and suppliers, it is detrimental to the concept of an energy budget for buildings. Indeed, the test of whether energy budgets are viable planning instruments may depend greatly on the ability of local architects, engineers, politicians and suppliers to replace *specification* codes with *performance* codes.

The one avenue that is open to immediate action is for the state to require an energy budget for both its existing and planned buildings. Insofar as existing state structures are concerned, the Division of Planning and Coordination, Office of the Governor, has already taken action. It has created a "state agency energy budget" which is based on the type of energy used by a particular building. While no formal consumption thresholds have been established, information is being collected that may be used for this purpose. In the area of new state buildings, the State Building Commission has both constitutional and statutory authority[6] to require the use of energy budgets in the design and renovation of state-owned structures.

FOOTNOTES:

1 Electric Reliability Council of Texas, *Supplemental Reports to the Response to Federal Power Commission Order No. 383-2 (Docket R-362)*, 1973.

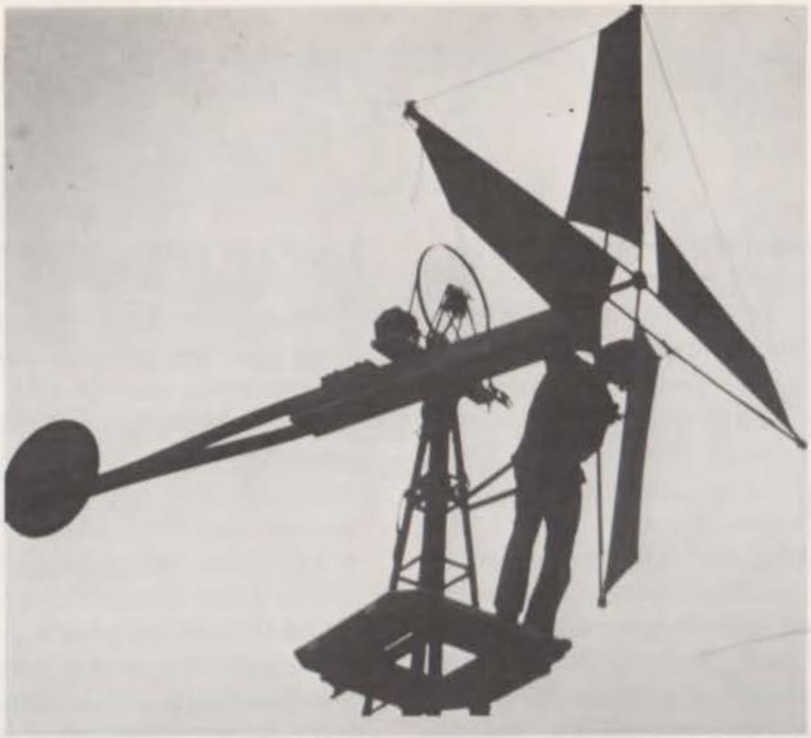
2 National Commission on Materials Policy (1973) *Material Needs and the Environment Today and Tomorrow*, 3-5.

3 *Ibid.*,3-3.

4 Syska and Hennessy Technical Letter, "Energy Shortage — A Constraint or a Challenge", February 1974.

5 For example, the U.S. Post Office and the School of Architecture and Planning, the University of Texas at Austin.

6 Constitution—Article III, Sec. 51-b. (1954) Statute—Article 567m. (1955).



Sun, Wind, Garbage and Survival

For most people genuinely committed to surviving the energy crisis, it has become a truism that, in addition to changing our technology, we are going to have to change our lifestyles. But few of those same people appear to understand the implications of what they say, and fewer still have yet to experiment with it in terms of the actualities of their lives. They issue their statements over the hum of airconditioners, then drive home in airconditioned automobiles.

This is not to condemn. It is only to point out that for most of us there is still a chasm between what we say and what we do. It follows that those rare persons who have attempted to narrow that chasm — who have dared to admit the seriousness of the crisis into their own lives, to experiment both with technology and lifestyle in actual practice — are doing something of extreme value for the rest of us, and we can learn from them.

One such small band of missionaries is working now in a special program at the UT/Austin School of Architecture. Their project is called the Laboratory for Maximum Potential Building Systems, and the people who (more or less) direct it are assistant professors Pliny Fisk III and his wife Daria, graduate student Ken Smith, and a host of other students and sympathizers.

In order to understand what they are doing, it is important to understand the philosophical underpinnings beneath it. One is the assumption that a fundamental cause of the energy crisis in western society is the manner in which that society — its energy flow, its institutions, its economy, its cities, the way its people live and think — is organized. We are a mass society dependent not only on highly complex, energy-intensive technologies, but also on top-down bureaucracies which shape and determine almost every aspect of our lives (our jobs, our food supply, our housing and transportation, our schooling, our health and insurance, our leisure activities and even our deaths). From a pioneering country of free, self-reliant individuals who were able to generate most of their life-support necessities without consulting governments, corporations, or technical specialists, we have evolved into a nation completely dependent on the centralized functions of all three. That's why most of us feel so helpless in the face of the energy crisis — if our customary authorities cannot or will not bring us out of it, what can we mere citizens do?

Pliny and Daria Fisk believe we can do a lot, if only we are willing to make the necessary adjustments in the ways we view and regulate our lives. (They themselves do not restrict their "lab work" to the campus, but have extended it into their own semi-rural home, where they heat their water with the rays of the sun, cook their food on wood fires, and cool their rooms with the wind — no air conditioning.) The key term here is *self-determination*. Pliny and Daria contend that in order to adapt to the menacing times ahead, we, as groups and individuals, must take decisive steps toward a new independence not only of "stagnant bureaucracies and authorities" but of certain technologies that, while baffling and intimidating to the average citizen, gulp down our finite resources like a wolf increasingly maddened with hunger. Most of the work at the UT laboratory is based on this idea of renewed independence and self-reliance, along with the notion of a finely sharpened ecological awareness. The long-term objective is construction of a small "demonstration village" for 20 or so persons living in a state of virtual *self-sufficiency*. They will grow their own food, generate their own electricity and cooking gas, collect and purify their own water — all in a context of sustained balance with their natural environment.

Old bicycle parts being recycled as components in a wind-powered electrical generator. Below: an early prototype is raised at the lab.

The Lab: designing for people and earth

By Pliny and Daria Fisk

The Laboratory for Maximum Potential Building Systems is concerned with the direct connection between people, their life-support systems, and the natural environment. It focuses on procuring energy, food, water, and shelter in ways that bring man into a more direct and mutually supportive relation with his environment — both decreasing his destructive effects on the environment and heightening his understanding and sympathetic use of natural forces, rhythms, and eco-systems.

To students in architecture, community and regional planning, and the university at large, and to members of the Austin community, the laboratory offers the unique opportunity to experience and develop these symbiotic relationships through the design and construction of components for full-scale working life-support systems — employing natural energies and indigenous, renewable or recyclable natural resources.

The laboratory opened in the fall of 1972 with two small shelters at the far edge of Balcones Research Center. We specifically requested that the lab space not include normal facilities to which we have grown accustomed, such as heating, cooling, electricity, and water. The intent was to enable students to confront the first-hand difficulty of supplying sufficient systems to make the environment habitable — not through the use of scarce and irreplaceable natural resources, but through the use of natural forces and resources generally available in the environment.

Natural forces most readily available at the lab were the sun and the wind, while materials were the earth and sulphur (Texas has over half of the world's supply), together with shredded paper, tin cans, scrap insulation, big steel drums, and other by-products of the city of Austin, many of which are generally treated as useless waste.

This emphasis on locally available resources is based on the belief that insofar as man can sustain himself through a judicious use of his immediate environment, he ought to do so — both to decrease the energy and time expenditures involved in transportation, and to increase his on-line ability to observe and confront the circumstances of his interaction with the environment that sustains him. There are few remaining new frontiers. We must learn to live on the turf we have now been allotted, without ravaging it.

The Laboratory took the basic approach, then, that you begin where you are.

As we were to open in November, one of the first priorities was a non-polluting form of heat. Initial excursions to "garbage" dumps revealed a wealth of valuable resources, not the least of which were old discarded radiators. While most of the radiators had broken sections, these could easily be removed and the remaining pieces put together again to form long, continuous radiator banks. Painted with heat-absorbing black paint and put into a well-insulated box covered with a clear sheet to trap the valuable long-wave infra-red (heat-producing) rays of the sun, the radiators make a very low-cost flat plate solar collector — a means of collecting heat without using irreplaceable fossil fuels. To warm our building, we mounted the collectors skyward, where the sun heated the water inside, then pumped the water through a network of radiating pipes attached to our ceiling. We added to the system a well-insulated storage tank full of water which retains the sun's heat even when the sun itself has gone away for a while.

The intention here was not to design and build the most technically advanced or sophisticated solar collectors possible. Rather than technical perfection, the laboratory seeks resourcefulness and ingenuity in applying idle and even ignored resources to useful systems — often turning liabilities into assets. The intent, then, is clearly applied, rather than basic, research.

Efforts were also underway quite early to provide electricity for the lab — especially so that work with small hand power tools could ease the problems and time constraints of building everything rather tediously by hand. (Ever get the feeling you were compressing a large part of man's historic development and doing a re-run for the sake of clarifying where you are and how and why you got there?) Initial research indicated that one of the most non-polluting means both technically and economically — was the power of the wind. Back to the dump for discarded automobile and bicycle parts. Again the idea was to use parts both readily available and generalizable to other areas. Bicycle parts were thus ideal, considering their wide spread use even in developing countries — a matter of growing concern both for us and for many of the foreign students working at the lab.

Work on the wind generator taught us that direct experience is often a more rigorous taskmaster than mere theoretical studies, for the design and actual construction of a reliable and smoothly functioning generator proved extremely difficult. In a year and a half, we designed, built, and tested no less than four different prop designs and a series of generator designs — eventually arriving at a system — made almost exclusively of recycled bicycle parts and becoming simpler, more generally available, less expensive, and more efficient with each successive change.

The wind generator is one example of the contribution which the laboratory is making to significant advancement in the field of alternative sources of energy, both nationally and internationally. To give a sense of perspective, the lab receives inquiries daily for details of this design and others, often from as far afield as Alaska, Haiti, and England. The reasons for this are fairly simple. There are few wind generators commercially available today, and the two produced in the U.S. are low output systems of only 200 to 400 watts, with costs of up to $1,000 for a 400 watt system. Larger systems are available from abroad, but at considerable cost — a 2KW system running as much as $2,800. To build the 3KW system now in use at the laboratory would cost roughly $1,300, which by present standards is dirt cheap. Our design has the further advantage of being relatively straight-forward and understandable, even to the uninitiated, making it easy to duplicate almost anywhere in the world. Again our intent is self-determination — to help people become independent of a remote and complex technology which the average individual can never hope to fully understand or control. Not only the generator, but all our experiments at the lab are being coordinated to provide as integrated and interconnected a life-support system as possible. Critical linkages now being formed include organic gardens, fertilized with compost from the bio-gas plant (which also generates cooking gas for our kitchen); algae pond connected to the bio-gas plant; solar walls both to heat and cool expanded working space, and to provide further heat for the gardens, making it possible for them to be transformed into solar greenhouses in the winter; a system for trapping rain-water and pumping it by wind-power to a solar still, which purifies the water; a low-consumption household water system.

It is this basic approach, coupled with the emphasis on available natural forces and resources, which has made the work at the laboratory so appealing to students from developing countries. One of the most avid examples of this interest is Raphael Montanaro, a graduate student from Mexico, enrolled in the planning program. Besides his work at the lab on low-consumption household water systems, solar heating and distillation, and methane gas production from organic waste, Raphael has written numerous articles in local Mexican newspapers and magazines, has made formal presentations to various government agencies, and is currently proposing a thesis to apply these systems to the extremely impoverished state of Mexico, a suburb of Mexico City.

The laboratory has become not only a resource for students, but for people in the larger community as well. Numerous people from Austin and the surrounding region have visited the lab, some simply to observe at first hand the systems in action, and others to actually get involved with projects which they themselves are eager to experiment with. To help disseminate this information still further, we are developing a library of resources on alternative sources of energy, methods and materials. This includes large maps forming a climatic and resource inventory for the state of Texas. Another developing resource is a series of explanatory charts and sheets on the design of our natural energy systems, along with the information necessary to make appropriate decisions. Anyone interested in this material is invited to stop by our office in the UT Architecture Annex, 26th and Wichita Streets, Austin, or to drop us a line by mail.

A methane digester (bio-gas plant) in service at the lab. Solar collector heats organic waste material in drum below, producing gas which is piped to the kitchen stove.

Above: alternative building materials include recycled cans for a heat-retaining wall and construction blocks fashioned from low-cost sulfur. Below: lab-director Pliny Fisk.

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Remaking the Specs

Case History of a Design Change for Energy Conservation

By Sara Howze

Northcross Mall Shopping Center, a project which will open this fall in Austin, has been in the active planning stage for more than six years. By the fall of 1972 the preliminary design phase of our project was complete. But like most Austinites, we were not aware of the shortages in Lo-Vaca Gathering Company's natural gas reserves available to the City for electric power generation. We were fortunate, however, that our development and construction timetable allowed us an opportunity to react to Austin's energy shortage and to make some significant changes in our building plans.

We analyzed our plans and made every practical change open to us, given our construction timetable. Most have entailed increased capital expenditures, but in view of sharply rising energy costs, we hope these expenditures will prove money well spent. What follows is a list of design modifications incorporated into Northcross Mall in the interest of energy conservation.

Chilled Water

1. We replaced originally planned roof-top air conditioning units with a more efficient central chilled water plant. This step alone involved an additional capital expenditure of $450,000, not to mention scrapping completed mechanical plans and designing the new central plant within the confines of a building already under construction. The result, however, will be significantly reduced energy demand along with lower cooling and maintenance costs.

2. From the outset we wanted to avoid the use of any significant amount of artificial lighting in our malls and common areas during the daylight hours. At the same time, we knew that to admit very much direct sunlight through skylights or clerestories would increase air conditioning loads in these areas and cancel out power savings gained from the elimination of artificial lights.

Our architects' solution to this problem was an old and traditional one. The long axis of the building, which measures some 900 feet, parallels the east-west direction of Anderson Lane and thus faces a long side north. The clerestory skylights which admit natural light to the mall were accordingly designed to face north only, such that an adequate amount of daylight — but virtually no sunlight — is admitted. This design feature will conserve over 80 tons of airconditioning.

3. The central court of Northcross Mall includes a 14,000 square foot ice skating rink surrounded by a park-like setting of trees, benches, restaurants and entertainment. For the safety of skaters and the health of the trees, additional lighting was needed over this area. In place of tinted glass for the overhead lighting in this central court, which we would have preferred aesthetically, we substituted a product called "Kalwall." This is a translucent, double-wall, fiberglas panel having an insulation value more than 4 times that of tinted glass. While blocking most of the solar heat load, the "Kalwall" panel still admits 30% of the outside light, which our landscape architects determined would suffice for our trees.

Insulation

4. We increased the insulation of the roof of the entire building by 33%, improving the "U" factor — an index by which heat gain or loss through a material is measured — from .15 to .10.

5. On the inside surface of all exterior walls, which are formed of textured concrete panels 7 inches thick, we had formerly allowed tenants the option of whether they wished to insulate or not. We are now *requiring* all tenants to insulate these inside wall surfaces to achieve a "U" factor of less than .20.

To assist them in doing so, we are publishing and distributing lists of insulating methods and materials, together with corresponding insulation values and costs. Our tenants accordingly will benefit from lower air conditioning costs inside their individual stores. More important, the entire mall will have a significantly improved energy consumption profile.

6. As part of a critical review of all lighting inside and outside the mall, we have urged all our tenants to reduce their store lighting. To assist them, we have had a nationally known lighting consultant prepare comprehensive store lighting criteria, together with fixture efficiency evaluations, to help them achieve effective lighting at the lowest energy consumption levels consistent with their merchandising needs.

Some results have been dramatic. One of our larger tenants has achieved a lighting load reduction of 50% — from a range of 7 to 9 watts per square foot to 4 watts per square foot. (A reduction in lighting loads, of course, means reduced air conditioning costs, since interior store lighting normally comprises about 46% of the internal heat load of a store.)

7. Similarly, in our parking lot, we have changed lighting specifications from *four* 1,000-watt metal arc lamps to *two* 1,000-watt high pressure sodium lamps per lighting pole — thus reducing electric consumption for the parking lot by 50%. The high-pressure sodium lamps deliver about 42% more light per watt of power than the formerly specified metal arc lamps. Thus our overall parking lot lighting has been reduced by only about 30% with a power savings of 50%. This level of illumination is still well within recommended safety margins.

8. With center signing, which will be minimal in any case, we have specified, inside and out, opaque sign surfaces with lighted, cut-out letters rather than brightly lighted sign backgrounds with black silhouetted letters.

In sum, the total power requirements of Northcross Mall should easily achieve the 30% overall power reduction that Electric Utility Director R.L. Hancock urged upon all Austinites last summer when Austin's power shortage was most critical. While front-end capital costs have increased, in some cases substantially, operating costs have been significantly lowered. Best of all, we believe that the atmosphere and quality of our center have been very materially improved by these efforts and that people will find it a more pleasant place to visit and shop.

Northcross Mall is a project of the Dunham Company, designed by OMNIPLAN, Architects Harrell & Hamilton.

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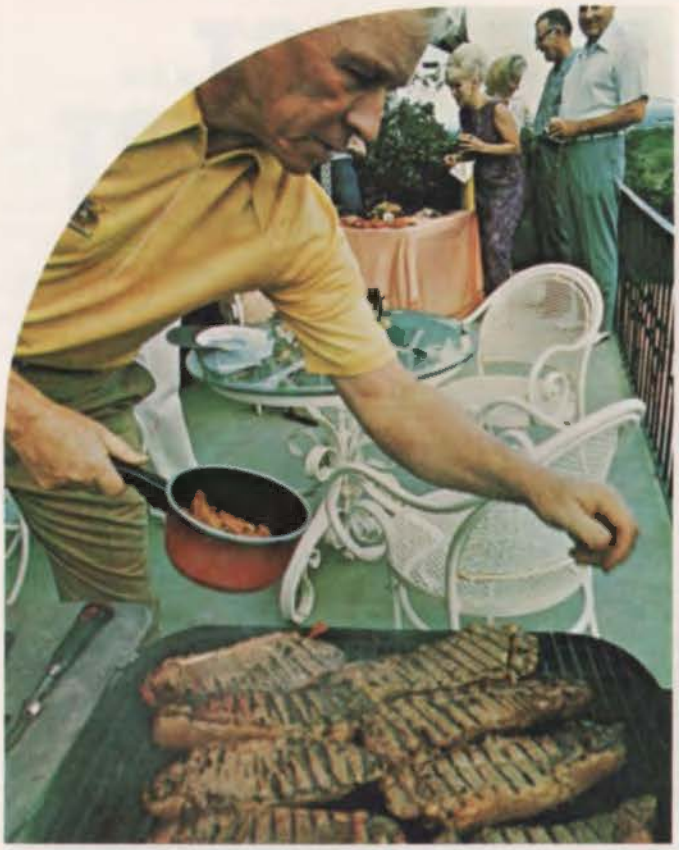

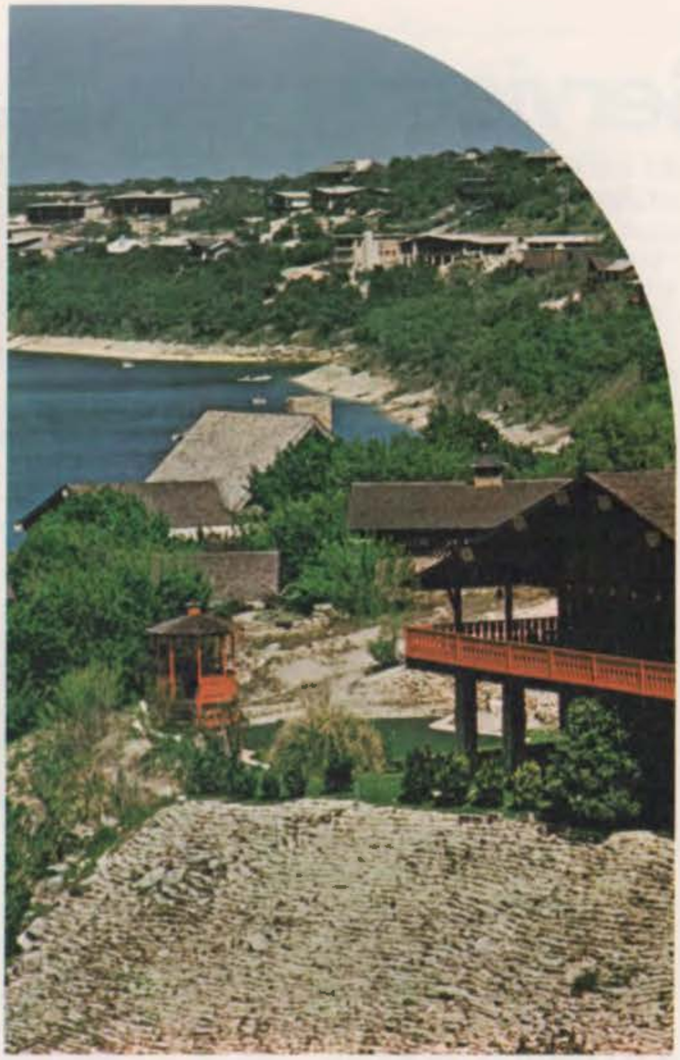

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In the News

Candidate

Houston architect **John M. (Jack) McGinty**, a principal in The McGinty Partnership, is seeking re-election as a Vice President of the American Institute of Architects. The election will take place during AIA's annual convention in Washington, D.C. May 19-23.

McGinty, immediate past president of the Houston Chapter of AIA, has served in various capacities with TSA. In Houston, he founded the Houston Urban Bunch and the city's Community Design Center, and has taught at the University of Houston and Rice University.

In 1972, McGinty was one of four delegates on an architectural tour of the USSR and earlier assisted Secretary of the Interior Stewart Udall as a White House Fellow.

McGinty received a B.S. in Architecture from Rice University and M.F.A. in Architecture from Princeton University.

New Book

A new book by **William Caudill**, **Frank Lawyer**, and **Thomas Bullock**, all of the Houston-based firm of Caudill Rowlett Scott, suggests a variety of ways to design buildings that will conserve on resources, materials and energy and meet human needs at the same time. *A Bucket of Oil: The Humanistic Approach to Building Design for Energy Conservation* is the result of 27 years of exploring ways to achieve "maximum results with minimum means in building design." (Cahners Books, Boston, 90 pp., $10.95)

Environmental Awards

The eighth annual **Environmental Improvement Awards Competition**, sponsored by the Houston Municipal Art Commission and the Houston Chapter, AIA, resulted in top awards to the University of Houston, Gulf Oil Company and a private citizen, Mrs. Edith L. Moore.

The university's award resulted from preservation of open space by going underground with its University Center expansion, designed by Golemon & Rolfe. Gulf was cited for removing its electronic sign from atop its downtown headquarters. And Mrs. Moore was honored for her gift of fifteen acres of land to the Audubon Society.

Energy Guidelines

The General Services Administration has announced the publication of "*Energy Conservation Design Guidelines for Office Buildings.*"

Prepared by AIA Research Corporation, Dubin-Mindell-Bloome Associates, consulting engineers, and Heery and Heery, architects, the guidelines provide the first comprehensive criteria for conserving energy in the design, construction and operation of office buildings.

Order for $2 from GSA Business Service Center 7AB, 819 Taylor St., Ft. Worth 76102. Make check to GSA.

News of Firms

Robert A. Ambrose and **Chalmers G. Long, Jr.** have announced the opening of their firm, Ambrose-Long, Architects, located in the University Medical Center Building at 5620 Greenbriar in Houston.

The Dallas-based firm of Wheeler-Stefoniak, Inc., has announced the opening of a Western Division with offices in Denver, Colorado. **Glen Campbell**, a member of the firm since 1972, will be in charge of the new office.

The Austin firm of **Jessen Associates, Inc.**, as of May 1, has relocated its office to 700 American Bank Tower in Austin.

Joel Carter Howald has announced the opening of an office for general practice of architecture at Suite 1200, the 600 Building, Corpus Christi.

Joe R. Milton, architect, has joined the Houston architecture and investment building firm of William T. Cannady.

The Dallas firm of ICONOPLEX, Inc. has announced the promotion of **Carl H. Rooth, Robert L. Sanford** and **Dan R. Collinsworth** to positions of Vice President.

The Houston firm of Nix, Spencer, Herolz & Durham, Inc., has announced the promotion to Associate of **E. Thomas Anderson**, **Robert C. Emmott, Jr.** and **Michael F. Delamore.**

George J. Mann, a member of the faculty of Texas A & M University's College of Architectural and Environmental Design since 1966, has been appointed to the Board of Directors of RPD—Resource Planning & Development, Architects and Planners, Bryan.

Industry News

Henderson Clay Products, Inc., has added an architectural department to their Houston office. **Henry (Hank) Andresen** has been employed in that office as Assistant Sales Manager.

Two major corporate level promotions at Mosher Steel Co., of Houston, have been announced by R. Trent Campbell, Chairman of the Board. **Oscar W. Stewart**, formerly Vice President and General Manager of Sales, has been named Executive Vice President. **D. Lloyd McGee**, formerly Assistant Secretary and Treasurer, is now Treasurer.

Mosher Steel, a Trinity Industries company, is one of the nation's largest steel fabricators, with Texas plants in Houston, Dallas, San Antonio, Lubbock and Tyler, and in Louisiana at Shreveport.

Deaths

Texas Architect wishes herein to pay tribute to **Louis I. Kahn**, FAIA, noted Philadelphia architect and educator, who died March 17 at the age of 73. Among Kahn's famous works is Fort Worth's Kimbell Museum of Art.

"Everything that an architect does is first of all answerable to an institution of man before it becomes a building. You don't know what the building is really, unless you have a belief behind the building, a belief in its identity in the way of life of man." — Louis Kahn.

Letters

Editor: I am very dismayed by the quote the *Texas Architect* attributes to me on architectural education in "17 Architects on the Profession" (March/April 1974). My alleged statement must be offensive on a very personal level to every individual involved in architectural education.

Your introductory remarks to the article state that all quotations were extracted from written responses to a questionnaire that you provided. In my case, this is not so. I did not fill in a questionnaire. As a matter of fact, none of my opinions came to you in any written form, but from the personal interview you conducted with me in my office. I do not feel any of the statements attributed to me are specifically word for word quotes. I have no serious quarrel with any of the statements except as mentioned above.

During the interview, we discussed architectural education as a sub-topic of the general discussion-i.e., "The State of the Profession," and on balance, I was critical of architectural education. I feel the general posture of architectural schools, and the larger part of our profession, is in many ways irrelevant to the needs of the "real world." Furthermore, I discussed I felt this was partially a result of the fact that many individuals involved in architectural education have not actually practiced architecture in the "real world." In my opinion, this is saying something quite different from the statement in the article.

I hope you can find a way, preferably through some entry in the *Texas Architect*, to express my written opinion that I do not feel qualified to judge who can or can't succeed in any circumstance, and additionally, that I do not feel that those teaching members of our profession are inherently better or worse than any other members of our profession.

Larry, as you know from our conversation, as distressed as I am, I hold no rancor toward you for the publishing of this "statement." I am loudly critical of the lack of relevance (in my opinion) of our profession as a whole. I know you are concerned that these kind of opinions be aired in our magazine and hope the *Texas Architect* can become a forum for constructive criticisms and ideas. For these goals, I applaud you. Now, please assist me in conveying my concern to our teaching colleagues for the offensive nature of this statement.

William J. Scudder, AIA
Austin

Indeed, Mr. Scudder's responses to the questionnaire were obtained during an interview rather than in written form. We apologize for any resulting misquotation or misapplication of his comments.—Editor

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Editor: Certainly anyone who has kept up with *Texas Architect* in the last year has been aware of the magazine's continuing outstanding improvements. With each issue I've been tempted to write offering my congratulations. But after receiving your March/April issue, I can wait no longer.

The line drawings by Norman Baxter were superb. Surely he is to be congratulated for capturing a part of the grassroots of Texas history in a simple and refreshing style.

And my congratulations to *Texas Architect* for the wisdom in selecting Mr. Baxter's art to share with all of us who enjoy reading your publications.

Robert Cornell Brown, Editor
Texas Realtor

Editor: I was quite suprised to see the inept so-called sketches by Norman Baxter in your March/April issue. Even to the untrained eye these works are too photographic and perfect to be sketches. They are almost certainly tracings made over a projected slide. If they are indeed tracings, it is a sham to pass them off as sketches.

If, on the other hand, they are actually sketches, then they are a pitifully boring artistic effort-no contrast, no variety of line, no center of interest, no composition. No nothing. Photographs would have been far superior. And more honest.

If you are going to publish sketches, give us something worthwhile.

L. David Godbey, Partner
Golemon & Rolfe Architects
Houston

Mr. Baxter's artistic efforts have been juried by top art directors throughout the country and have garnered awards in New York, Los Angeles, Dallas, Houston, etc. The artist says his drawings "start directly on the board with little or no penciling and end when I feel the picture tells the story." He further maintains that he visits and researches every place he draws and that he "never" has used a slide or tracing technique.—Editor

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Editor: I am beginning to receive junk mail as a result of the article that appeared in the March/April issue of the *Texas Architect* — "Taking Down the Signs". Now at last I have found time to read a six page article with bad cartoons. For the only time in my life I feel just like an Aggie — the one that took the speech course to improve his communication — *FABULOUS.*

To begin with the title is bad — "Taking Down the Signs" — that is *not* what it is all about.

I resent any reference to the Dallas Sign Ordinance.

I resent any reference to the Dallas Sign Ordinance Advisory Committee. "Taking Down the Signs" was not what we were all about. Sign Control, ie. protection of the small business man — safety — better communication, that's what took 15 months.

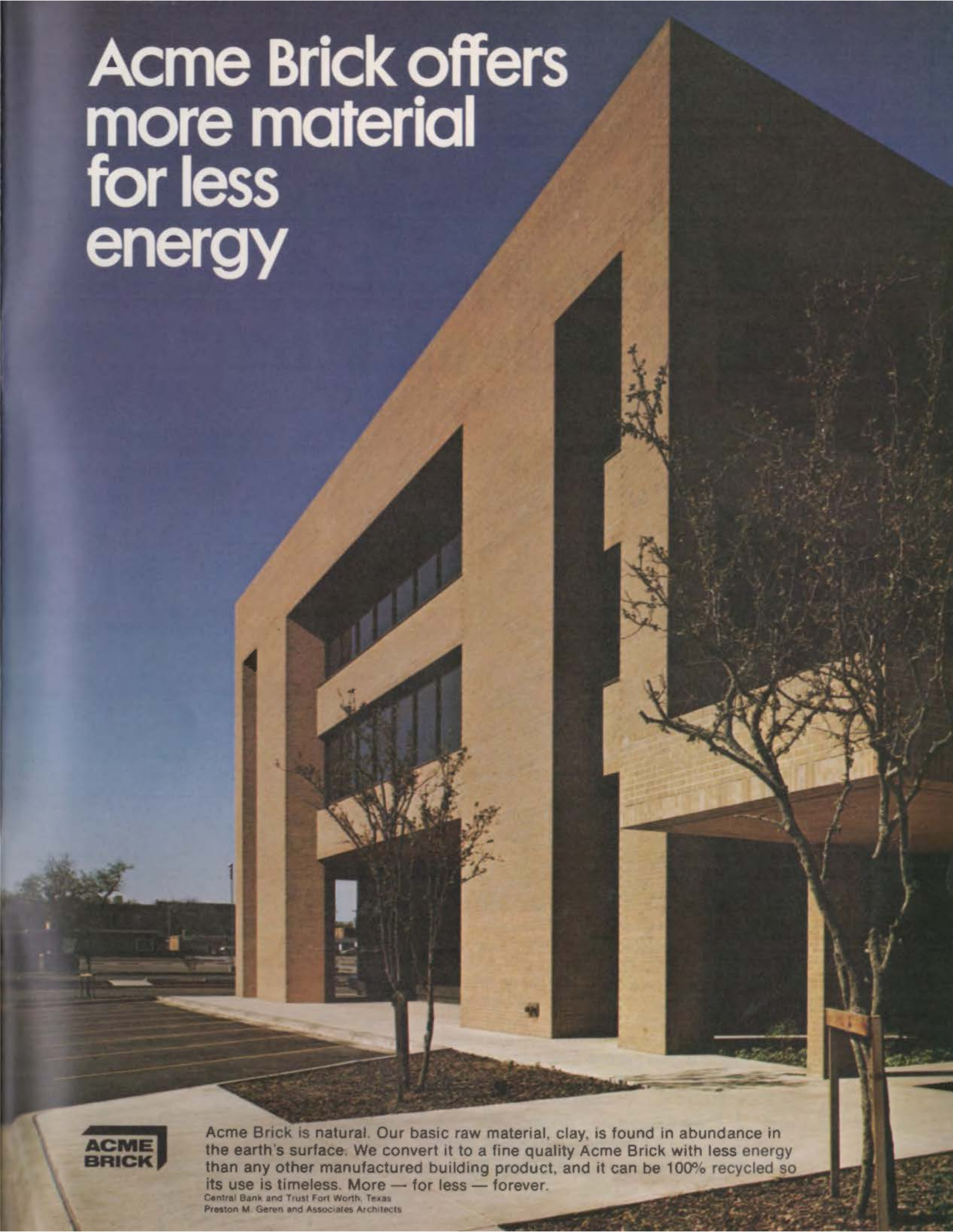
One reason it took 15 months to develop guidelines for the Dallas Sign Ordinance is the very book you selected as your encyclopedia — *Street Graphics.* "Taking Down the Signs" presents *Street Graphics* like it is a point of reference for every community and I tell you it is not — it was not for Dallas. Our basic freedom of expression in this country can not be harnessed by European standards, esthetically or legally.

Please read the information I sent you for an article on sign control. Please read the Dallas Sign Ordinance.

"Taking Down the Signs" did ask a very important question. Can Texas Architects afford the *Texas Architect* without an architect on the staff to review and evaluate the proposed content of every issue? My answer is *NO!*

Last but not least — take my name off your "indebted to several persons for assistance" list. I can honestly be associated with specifying open front toilet seats for a convent, but I have never contributed text or cartoons as bad as the content of "Taking Down the Signs".

Howard C. Parker, AIA
Dallas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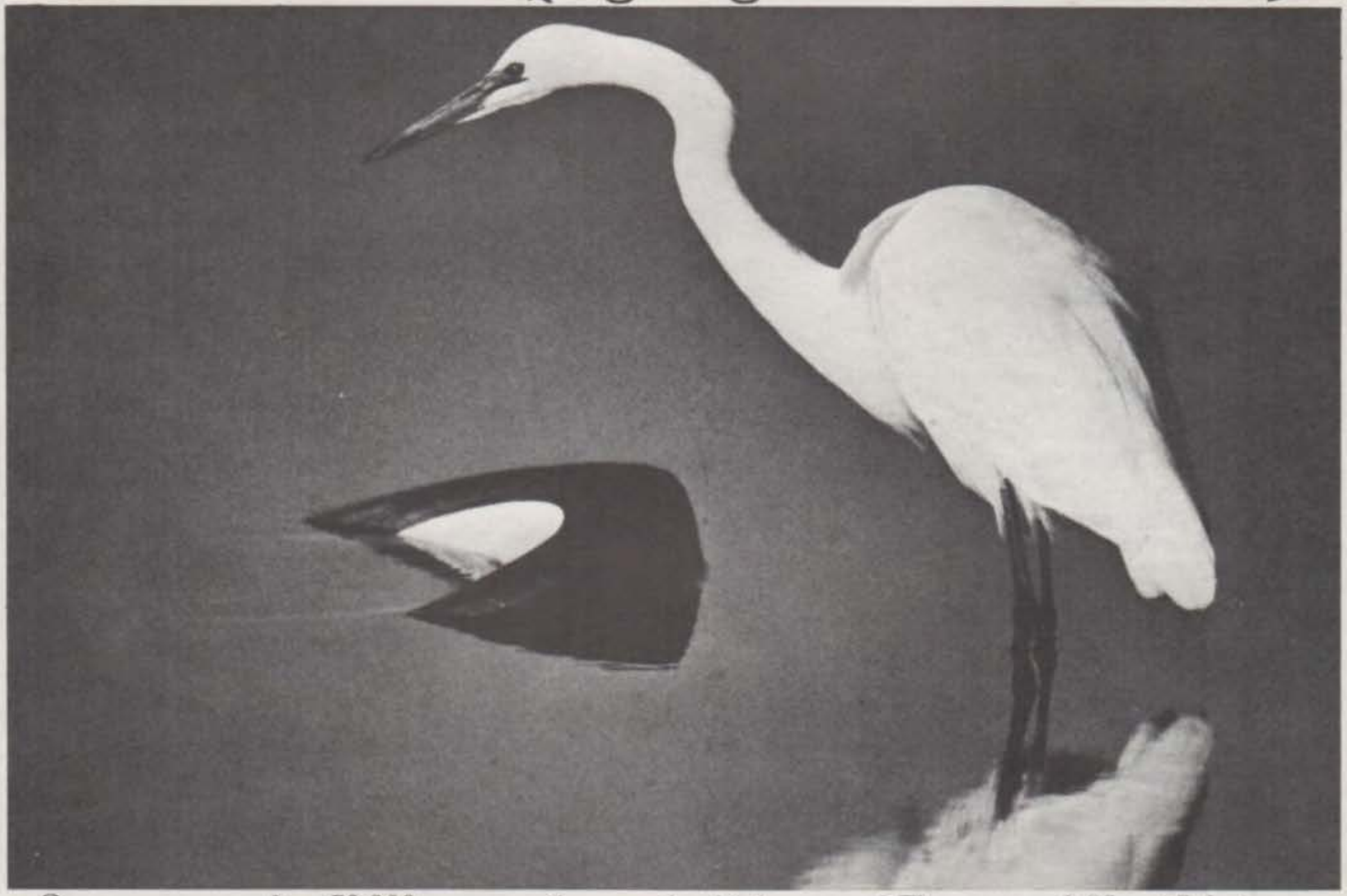
The egret and the 8.55 x 15 4-ply nylon cord fish.



One summer, after 30,000 or so miles on the highways of Texas, an 8.55 x 15 4-ply nylon cord tire went flat. His owner rolled him into a lake.

The tire determined he could begin life anew in the water. He swam about, looking for other abandoned tires who might have adapted to lake living. Alas, not knowing the territory, he swam too close to shore and got lodged in the mud.

An egret happened upon the scene. "What are you doing?" the bird inquired.

"I decided to become a fish," the tire answered. "But I am stuck in the shallows. And now the sun is blistering me. I do not think I was fully prepared for this experience."

The egret thought for a moment. "Neither," he mused, "was I."

MORAL: A worn-out tire cannot hope to start life over as a fish. Take it home and dispose of it properly. And didn't your mother ever tell you it's not nice to confuse egrets?

A fable for our time from the Texas Society of Architects