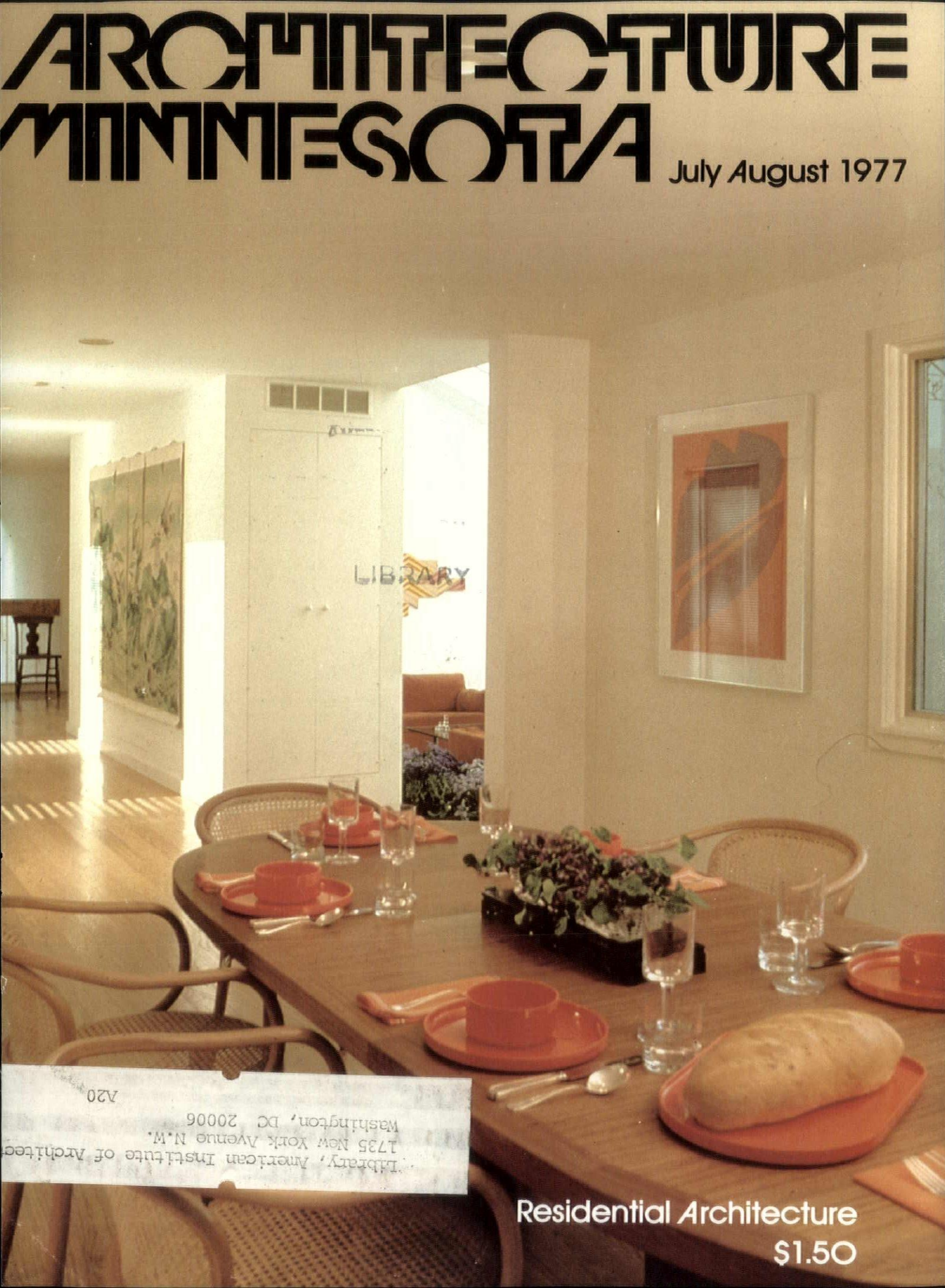
ARCHITECTURE MINNESOTA

July August 1977



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ARCHITECTURE MINNESOTA

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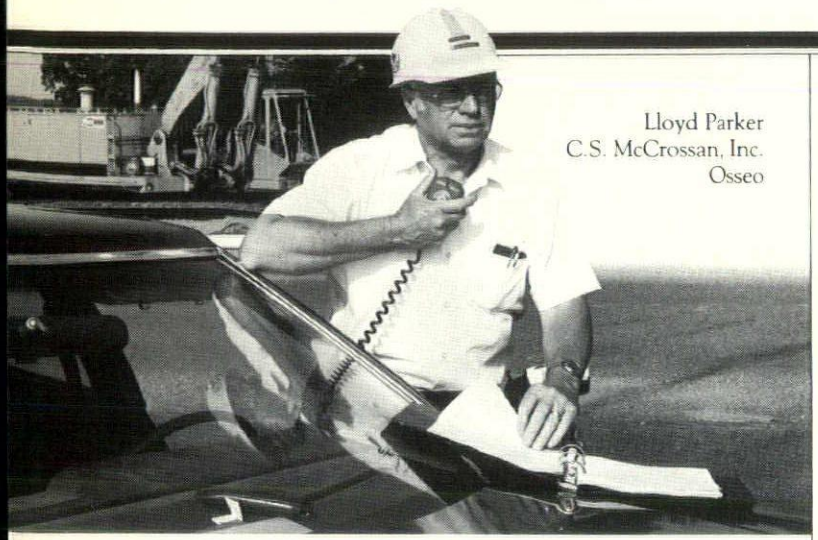
"Our big problem was getting rip rap to the job site. But Shiely barged in with the solution."



Lloyd Parker
C.S. McCrossan, Inc.
Osseo

"I guess I've been using Shiely aggregates about 25 years now. Their products generally aren't that different from everybody else's, but their service is. And that makes a big difference to general contractors, like us.

Here's one example. McCrossan was awarded a contract to build dikes and floodwalls along the Mississippi, to protect the Metropolitan Wastewater Treatment Plant from high waters. It was a big job, with many bid items, including about 20,000 tons of rip rap.

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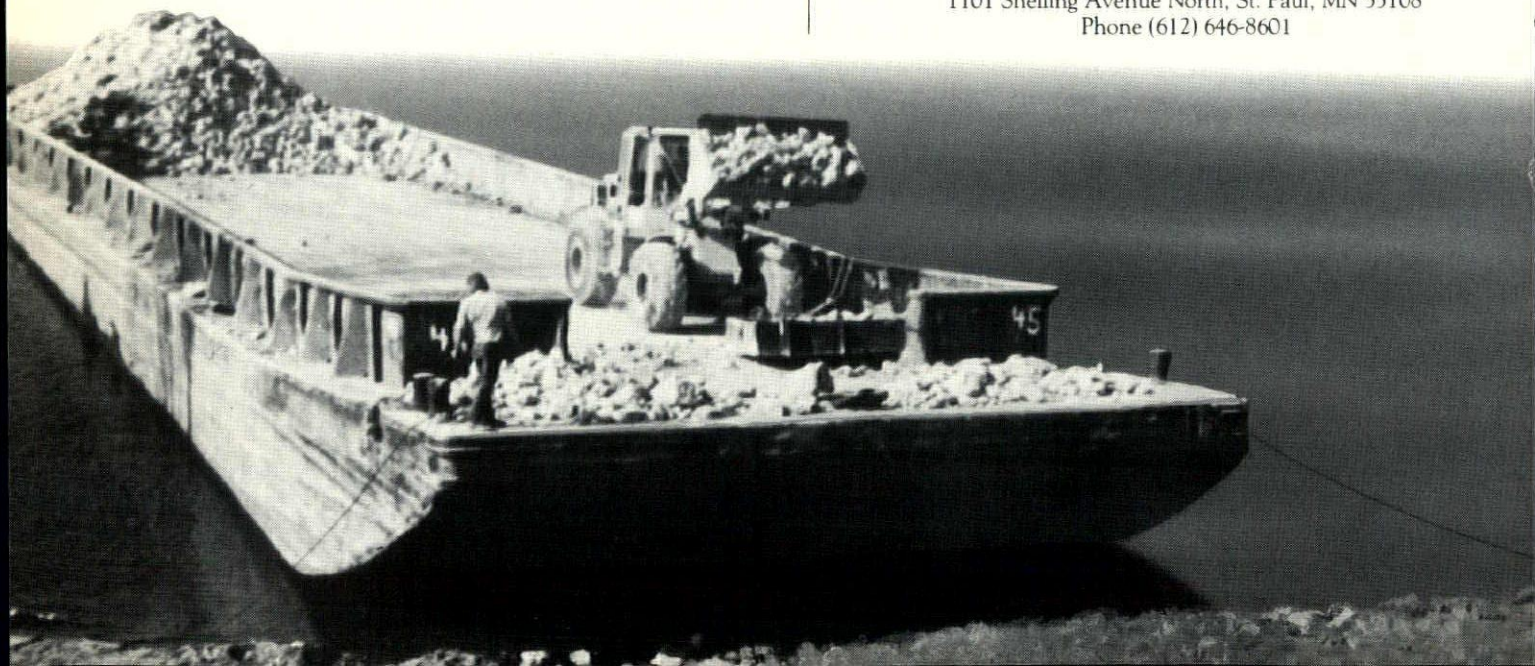
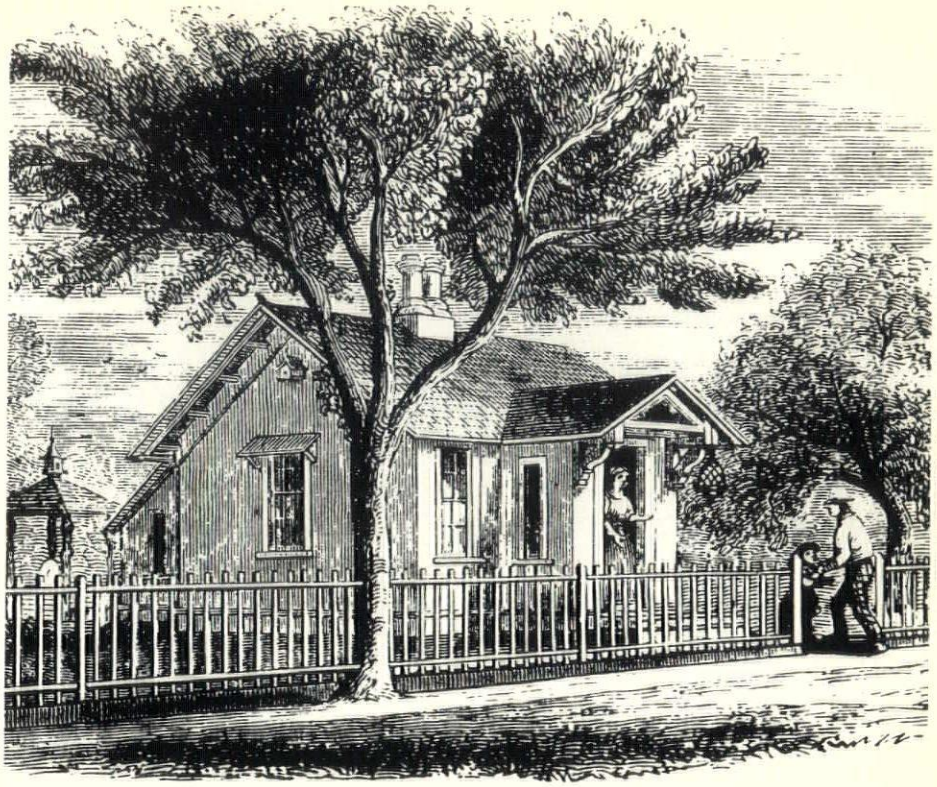


TAKE ME HOME, DADDY...

From the Editor



Take me home, daddy . . . . Take me home where it's safe and familiar and friendly.

Take me home where I can find all my things and all my secret treasures in secret boxes in secret places.

Take me home so I can go to my room and look out the window and watch the street and the alley and the funny catalpa tree.

I want to go home so we can all sit down and have dinner and dessert and listen to sister's funny stories at her job.

I don't ever want to leave home, daddy.

Everything's so neat here: the carpeting and the funny light in the corner and fireplace in the den and the crazy wallpaper upstairs; and the sneak around closets and the weirdo attic.

Let's stay home, daddy . . . .

Allright Michael. Let's go home now. And when we get home, you can wash up and help me make dinner. But after you grow up, Michael, you'll have to leave home. You can't stay home forever. You'll want to leave for real someday and then you'll want to have your own home Michael. At first you may live in an apartment and that will be your home. And you may want to live in an apartment forever and that will be a permanent home. This house will always be your home also—at least for as long as we live in it. Eventually your mother and I may move into an apartment and that will be our home.

As you get older you may want to live in a house again with your own garden and garage and terrace and porch. You'll probably look for a house like this one. It won't look like this one, but you'll want it to feel like this one. You'll want it to be fun and cozy and safe and warm. A house is expensive nowadays. Very expensive and I don't imagine it'll get any cheaper.

On the other hand, a home, whether in an apartment or in a house or in a cave, or in a trailer or in a tree, is neither expensive nor cheap. A home is precious, invaluable, priceless . . . . In your home you will receive your friends, your parents even! You will laugh, you will cry, you will scream sometimes. You will be yourself and you will share with others and you will give to them and they will give to you.

A beautiful home has beautiful rooms and beautiful furniture and fabrics and is warm and natural and sheltering. A beautiful home is also a safe place to be lonely and ecstatic and impatient . . . and also sleepy. Let's go make dinner now, Michael. □

— Bernard Jacob

ARCHITECTURE AT A GLANCE

Armstrong, Torseth, Skold and Rydeen of Minneapolis, are the architects for two new indoor recreation additions now under construction at the **North and West Junior High Schools in the Hopkins school district.** Both structures will house an indoor tennis and volleyball court and will be connected to the gymnasiums of the schools. The $970,000 project is scheduled for use this fall.

Construction has recently been completed on the **Phalen Park Professional Building designed by Centrum Architects, Inc.,** located at Arcade and Wheelock Parkway in Saint Paul. This facility provides 13 dental operatories for two dentists and their assistants plus 5,000 square feet of rental space. The building was designed for maximum energy efficiency using six-inch insulation in exterior walls and an electric heat pump heating, ventilating and air conditioning system.

Korngiegel Architects, Hutchinson, have designed a 24-unit apartment complex to be built this year in the southwestern Minnesota community of Mountain Lake. The project was initiated by a group of area businessmen to appeal to moderate income families with rents ranging from $98 to $194 for single bedroom apartments and from $123 to $219 for two-bedroom units. The complex is composed of two buildings separated by a hard surface courtyard and each building features central air conditioning. Financing of the project will be through the Farmers Home Administration.

McEnary, Krafft, Birch & Kilgore, Inc., Minnetonka, are the architects for a $300,000 public library now under construction in the northern Minnesota community of Crosby. The Jesse Hallett Memorial Library will feature a cement block interior, concrete and brick exterior and a burnished copper roof. The structure will contain children and adult library areas, a work room, a reading room and a community meeting room. Gas hot air furnaces will heat the building with separate units in several areas so that rooms can be kept at minimal heating when not in use.

A $1.5 million expansion and remodeling project is under construction at **The First National Bank of Hopkins, Minnesota. Designed by Rieke Carroll Muller Associates, Inc.,** the addition will expand the present 18,000 square foot building to more than 50,000 square feet and will include a two-story atrium with a fireplace in the center of the reception room.

The Minneapolis firm of **Setter, Leach and Lindstrom, Inc., has been selected by the U.S. Postal Service to design a new dock and parking facility for the downtown Saint Paul Post Office.** The project includes the renovation of the upper level of the Saint Paul Union Depot to provide 444,300 square feet of space for parking and loading storage.

Kenneth Walijarvi and Associates, Saint Paul have been selected as architects for a major school addition for the southern Minnesota community of Morristown. The proposed school addition would replace the 1905-vintage two-story school building which is currently in need of repair, has a heating problem and is considered a fire hazard. The new addition would be an L-shaped structure connecting the old building with the new and would consist primarily of classroom space and a lunchroom for high school and elementary students.

Rockey, Church & Teschner of Mankato are the architects for the new Seminary Building for the Bethany Lutheran Theological Seminary in Mankato.

The Seminary Building will overlook a ravine adjoining the campus of the Bethany Lutheran College. It is organized around its library, which is unusual in having a study carrel for each of the students attending. The library will serve as the students' base of operations each day. The building has classrooms and instructors' offices as well as space for the office of the Evangelical Lutheran Synod.

Twin Cities architect **Ted Butler of Hammel Green and Abrahamson, Inc., Saint Paul, liturgical designer Frank Kacmarcik, and Cambridge, Mass. architect Willoughby Marshall** recently received an Honor Award for distinguished architecture from the American Institute of Architects at the recent annual convention in San Diego. The "team" was cited for the complete interior renovation and re-

How New Jersey Saved $12,000,000

In New Jersey in 1976, contracts were let for 51 public construction projects in the range of $100,000 or more. By law, all publicly financed construction in New Jersey must call for both separate and single bids. In 48 of last year's 51 projects, the separate bids were lower; 9.7% lower than the total amounts submitted on a single contract basis. Because of separate bids, New Jersey taxpayers were saved $12,204,284.* It follows that proportionate savings can be achieved in private construction. That's why architects, engineers, and owners should make the comparison. *Separate* the mechanical, electrical, and general construction bids, and *save.*

*Source: Mechanical Contractors Association of New Jersey. For complete details, write or call the Twin Cities Piping Industry Fund, Suite #304, 2829 University Ave. S.E., Minneapolis, Mn. 55414 (612) 378-7600.

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OF MINNEAPOLIS AND ST. PAUL

design of the **New Melleray Abbey, Dubuque, Iowa**, one of 17 projects out of 500 submissions to receive the AIA's highest honor. The 100-year old grey stone church is part of Trappist monasterial complex and had once housed a library and refectory on the first floor and a dormitory and small church on the second.

As part of the architectural renovation, the original neo-gothic interior was stripped down to its basic form, exposing stone walls and wood trusses to create an open space of simplicity and light. Furnishings of red oak butcher block were designed and built to aid in the creation of a setting especially conducive to meditation and prayer.

The project first received recognition in 1976 as one of 14 Minnesota Society American Institute of Architects Honor Awards.

The Minneapolis firm of **Leonard Parker Associates has won highest honors for its design of the University of Minnesota's law school and library, in the 1977 College & University Architectural Competition** sponsored by "American School and University" magazine. The law school, still under construction, features a multi-level design and a major portion of the roof areas are covered with a 17-inch layer of earth to restrict heat transfer. The design also utilizes deep overhangs which block out the high summer sun but allow in the low winter sun. Overall, the building's cooling load has been reduced to 38 percent below the new state energy code requirements and heating loads are reduced by 20 percent. A "task lighting" system will illuminate only those interior areas in use and the building's mechanical system utilizes high pressure steam absorption water chillers for air conditioning which will create an additional $4,200 in annual steam savings.

Christ Lutheran Church, 3244 34th Ave. So., Minneapolis also received special recognition at the AIA convention. The brick and stone structure designed by **Saarinen, Saarinen and Associates, Inc. and Hills, Gilbertson and Hayes, Inc.,** received the 25-Year Award for structural design of enduring significance. Completed in 1950, the church, complete with bell tower and rectangular nave, both simple masses of modest proportion, is sited in a narrow corner lot and linked to an older parish hall.

James Edgar Stageberg's investiture to the College of Fellows of the American Institute of Architecture.

James Stageberg, right, receiving the medal from John McGinty, FAIA, President of the American Institute of Architects, at the recently held national AIA convention in San Diego, California. Fellowship is a lifetime honor bestowed for outstanding achievement and contribution to the profession. Fellows are recognized by the designation FAIA.

Stageberg, the founding co-partner of the **Hodne/Stageberg Partners, Inc.,** Minneapolis, is past president and director of the Minnesota Society American Institute of Architects. He is a respected and admired leader in the profession and he has been the recipient of numerous international, national and regional awards. Most recently his design for the Southdale Regional Library in Edina received an Honor Award from the Minnesota Society American Institute of Architects. At the National AIA convention this year, his firm also received an Honor Award for the 1199 Plaza Cooperative Housing project in New York City. This project was earlier premeated by the Minnesota Society AIA.

As a teacher, Stageberg's influence is equally important. For 22 years, he has shared his skill, his spirit, and his belief in the importance of architecture with the students of the School of Architecture at the University of Minnesota.

James Stageberg brings a humanity and sense of humor, mixed with an intense desire to accomplish an environment of importance, to his colleagues, clients, associates, and students. □

SO YOU WANT TO BUILD THE TAJ MAHAL

Elizabeth S. Close

People generally don't know about architects—what they do, how they do it, whether their work is really valuable or merely expensive, or if the results of their labors should be classified as Real Estate or as Art. Of course, there are the Masterpieces of Architecture—the Parthenon, Notre Dame, the Palace of Versailles or the Taj Mahal—that impress everyone who sees them, even though most tourists would not recognize the name of the architects responsible. But when it comes to a place to live, not many palaces are being built, and most houses are not designed by architects. Should they be? What can an architect do to help someone searching for a place to live, or trying to improve on the place he has?

Many people call or drop into our office to inquire about our services. Sometimes they have been looking for a house to buy, and not found one they like, so they start looking for a lot, and if the lot is on a hill or difficult of access, they will think about getting help with the design. This is a good idea, because construction is expensive and bad planning can be very costly. So that is one use of an architect: to save money and avoid mistakes.

Prospective clients also want to know whether they can afford an architect's services. The question is, can they afford to be without them? The real value of a house over the years is difficult to gauge; but in terms of convenience, of arrangement, low maintenance cost, asthetic pleasure, and resale value a well-designed house will return to its owner the cost of architectural services many times over. It will last longer, look younger, and be more trouble-free than most homes that are built without benefit of professional advice. The cost of hiring this advice

Right:
Rappaport residence, Fredrick Bentz/Milo Thompson and Associates Inc., Architects, Minneapolis

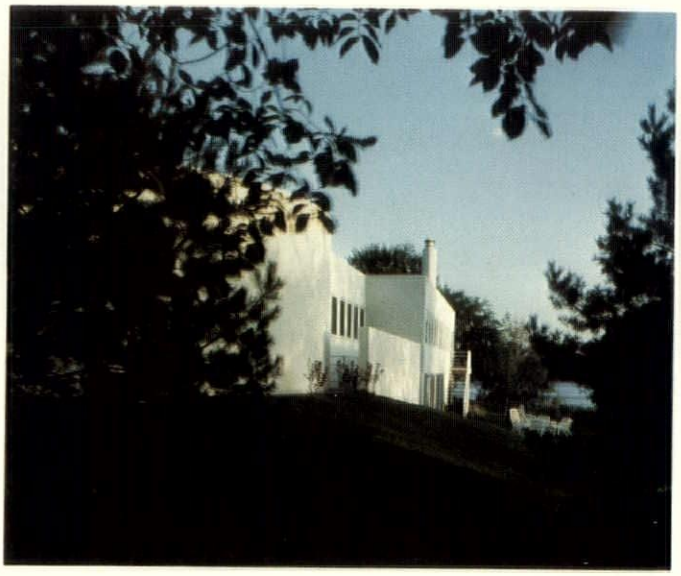
Peterson residence, Close Associates Inc., Architects, Minneapolis

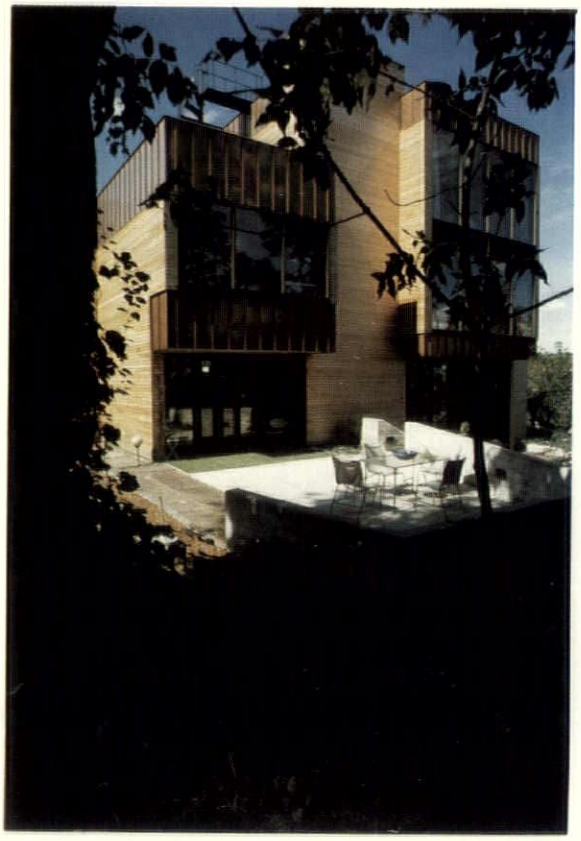
Dr. Malcolm McCannel residence, Horty, Elving and Associates, Inc., Architects, Minneapolis

Daniel French residence, Alfred French and Associates Inc., Architects, Minneapolis

Mullen residence, Cave Creek, Arizona, Hammel Green and Abrahamson Inc., Architects, St. Paul

Ulvestad residence, Close Associates, Inc., Architects, Minneapolis



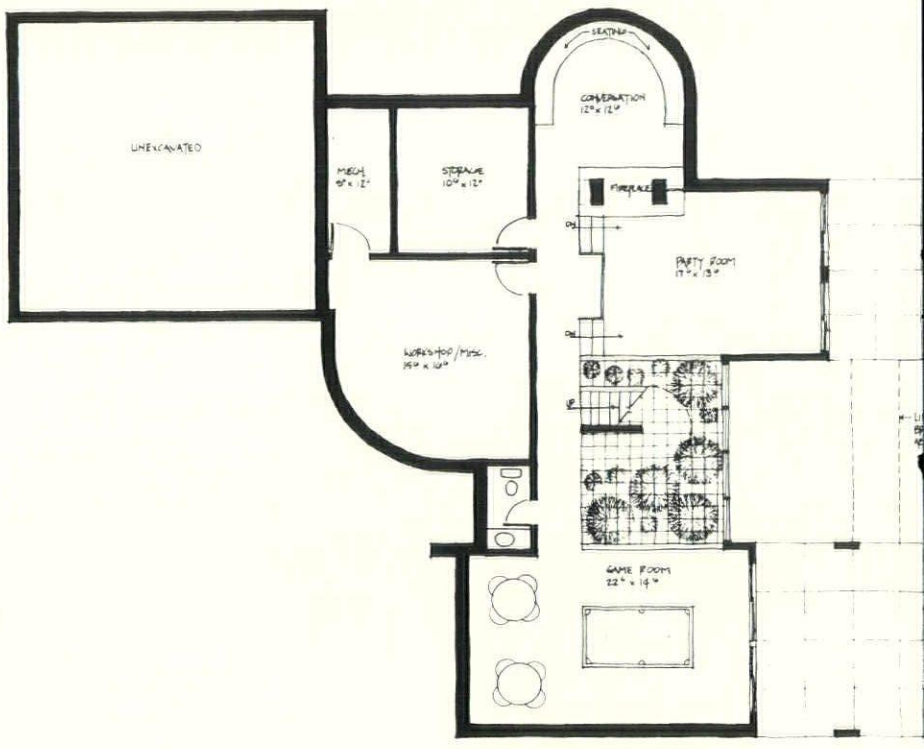


depends on the size of the project, the amount of service provided, and the experience of the architect. In this, as in most other fields, you get what you pay for, and it is not wise to let the size of the fee be the only guide in selecting an architect to design your house. It is at least as important that you are compatible with the person you will be working with; one of our prospective clients recently said that she thought the selection of an architect was as important as the choice of a marriage partner. (She didn't pick us—evidentally we weren't made for each other.)

Well, how do you select one? There are various approaches. First, ask people who have recently gone through the procedure how it worked for them. Go to meet some of the designers who have pleased their clients, and ask for a list of some of their houses that you might visit. If at all possible, see at least one from inside to get an idea of the space. A house can be a dandy piece of sculpture from the outside and be thoroughly unpleasant inside. (It is important to remember, however, that a house designed for someone else will not contain all the elements of your own dream house, and may be full of furniture that makes you cringe.) Find out if the architects you are considering can meet your schedule; and when you have made your decision let all the candidates know about it.

Another way is to keep watching for houses that appeal to you, either because of their setting or interesting shape or materials, and find out who designed them. Then make an appointment for an interview, which provides a look at the office and photographs of some work the office is proud of. Caution: photos can be misleading, and never convey the sense of space that going through a building does.

One of the best uses of an architect is as an idea source. The basic concept can make the difference between a mediocre house and an excellent one. In a remodeling project a slight relocation of functions may accomplish a major improvement. Judgement about the best way to approach a problem requires imagination and experience; a sketch may be all that is needed to illustrate the solution. The actual con-



LOWER FLOOR PLAN

From left to right: Pennock residence, Howard Goltz Architects, Minneapolis; William Atkins residence, Dickey Kodet Architects, Minneapolis; Rapson Glass Cube, Ralph Rapson and Associates, Minneapolis

struction can be turned over to the builder, who will complete the work with only an occasional question to the architect. This kind of work is best paid for on an hourly basis; the owner can decide how much help he would like and how much he will spend.

With the cost of construction and land prices going up each month, many people think about adding to their existing house when they need more space. This approach has the advantage of being less disturbing to families with children—same neighborhood, same school, same shopping areas—even though it means living with the mess of construction around for awhile. But the difficulties of designing a wing or a room that will fit the existing house, both as to plan and exterior treatment, demand a high degree of skill. There are limitations of site, structure, mechanical and electrical systems, roof drainage and window arrangement that an architect can be most helpful with. For such a project a "limited services" arrangement on an hourly basis (as for remodeling) is best.

If you decide to build, and have chosen your architect, there are many ways in which he or she can help you. First, in selecting your lot, if you don't already own it; or if you do, in picking the exact spot to build on. Second, in analyzing your requirements and putting them in writing: what the architects call a "program". Doing this systematically helps to clarify thoughts and establish some priorities. Third, there will be schematic sketches that illustrate different ways of arranging the space on the site, taking advantage of sun, breeze, views, and showing location of driveways and terraces. By this time the size and probable cost of the house can be estimated. As the design is developed you will see sketches or models to help you visualize the house. Many decisions are made by owner and architect working together: what kinds of materials on wall, floors and ceilings; what exterior finishes; what plumbing and lighting fixtures; what wood to use for doors, cabinets and trim; what windows to put in; what sort of system will heat and air-condition the house; colors, planting, and a host of similar items.

After the design decisions are made, the architect will assemble all this information on a set of drawings and schedules that explain to the builder exactly what he is to furnish, and what the result should be. A verbal description of material grades, brand names, and workmanship called "specifications" accompnies the prints that are issued to the builder. If bids are to be taken, the architect assists with the process, answering questions and making sure that everyone is bidding on the same basis. During the construction, the architect will observe the work periodically, resolve difficulties and answer questions; and if an owner has never been involved in a building project before, there usually are many questions in his mind.

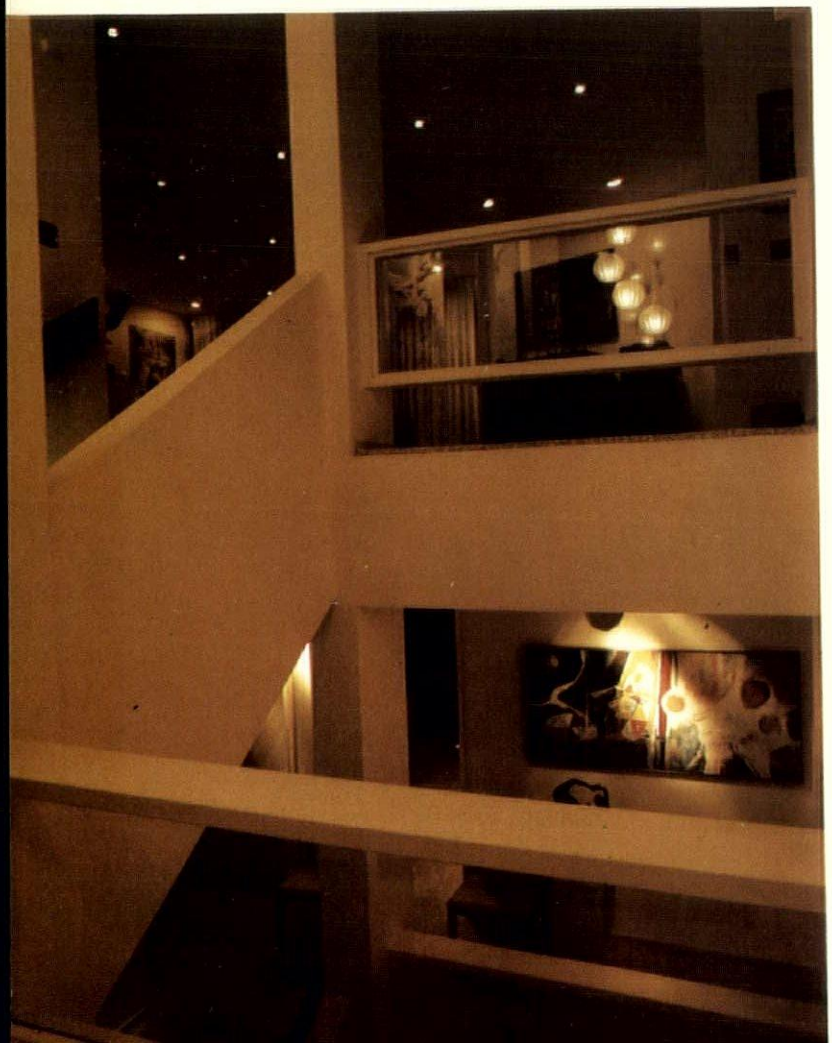
For many people, a house is the largest investment of their life. The cost of architectural services is a small portion of the total cost of a house—but it may well be the best investment of their life. □

Elizabeth Close FAIA, a principal of Close Associates, Architects, Minneapolis, has designed numerous award-winning residences throughout the region.

Rappaport residence, Fredrick Bentz, Milo Thompson and Associates, Inc., Architects, Minneapolis

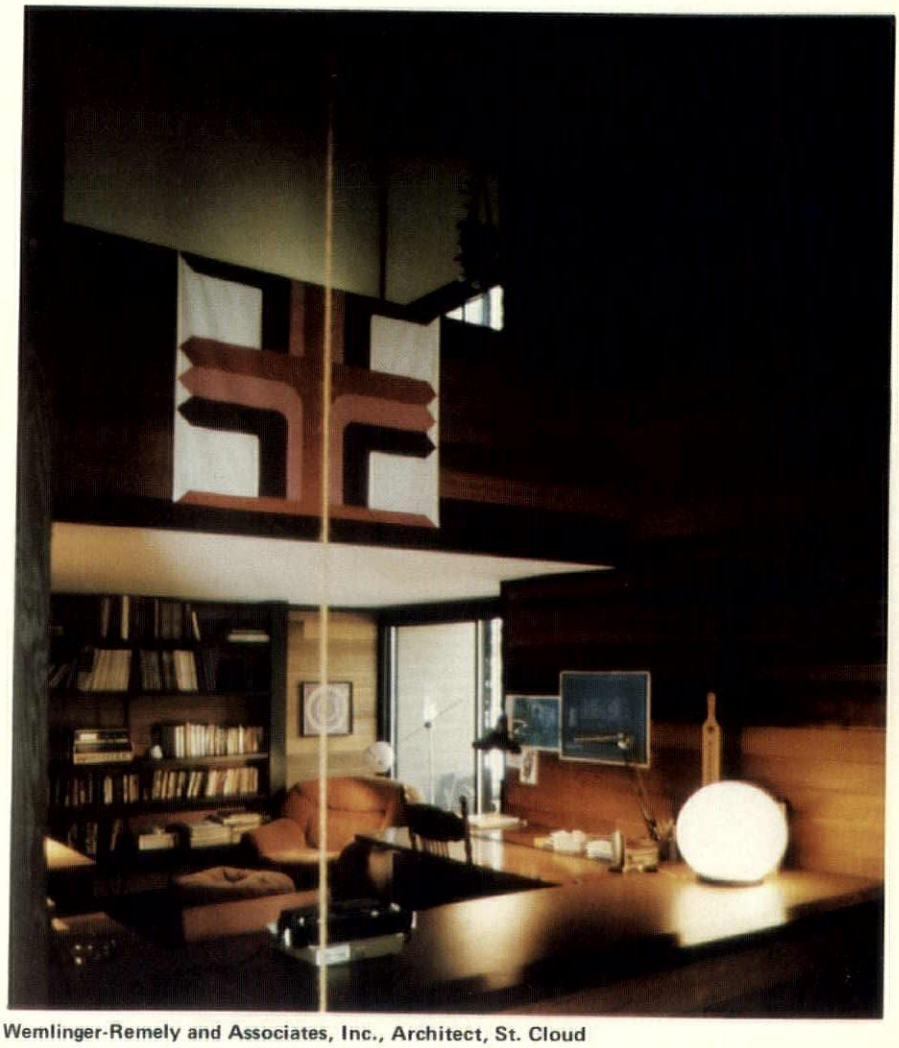
Dr. Malcolm McCannel residence, Horty Elving and Associates, Inc., Architects, Minneapolis

Daniel French residence, Alfred French and Associates, Minneapolis



Parker residence, the Leonard Parker Associates, Architects, Minneapolis

Slade residence, Close Associates, Architects, Minneapolis



Wemlinger-Remely and Associates, Inc., Architect, St. Cloud

MATERIALS AS ELEMENTS OF DESIGN

Edward Kodet Jr.

Materials as elements of design can be crudely divided into two categories: natural and man-made. Natural materials, such as wood, stone and similar products, receive a modest amount of physical change to become building products. Man-made, or synthetic products such as plastic laminates or epoxy coatings are the result of advanced technology. The obvious weakness in this grouping is that so many materials fall in between or are a result of both categories, e.g. steel, glass, and other materials produced in large quantities by large industries with quite modest technologies. The other omitted category is that of combining the best of both such as the varied treatments available for wood products. For example wood has been painted, stained, creosoted, acrylic impregnated, oiled, fire proofed, bleached, and, after all that, left natural. Almost every possible building material has been extensively modified by the ingenuity of man. The final curse is the use of a synthetic material to duplicate the physical appearance of a natural material, or vice-versa.

What should a material do? The obvious answer is accomplish the task for which it is most suited. A simple answer and a purist approach. The truth of the matter is that materials in their pure form very seldom accomplish the demands placed on them by architects. Consequently the next criteria is to preserve as much of that purity as is reasonably possible. An additional criteria in the evaluation of materials is that they should remain in their installed state for the greatest duration of time. When wood siding is used, it is intended that the material remain in its original state, and the same for stone, brick, etc. Consequently, the ultimate in the philosophy of materials is to make the material immortal. Certainly this provides a highly desirable characteristic for fine architectural accomplishments, but the deterioration and collapse of materials is equally desirable for less impressive structures. One would be remiss in the discussion of materials by not including copper, Cor-ten steel, etc., in which natural forces play a very important role in appearance modification and provision of stable surfaces for longevity.

The selection of materials is a most sensitive task in the development of an architectural concept. The initial decisions must relate to the architectural form created. For instance, the juxtaposition of distinct horizontal boards on a vertical concept could ruin that concept. On the other hand, horizontal boards placed on a horizontal concept could establish the final impact needed. One must not follow such rules thoughtlessly, however. Often a contrast is warranted, and thus a horizontal material reinforces a vertical expression.

Economic considerations often dictate the selection of one material over another. A major consideration in material selections should be life cycle costs. The material is inexpensive today but will have to be replaced in 10 years. Or the material is very expensive but will possibly never have to be replaced. Maintenance, the constant tax collector of building performance and appearance, is critical throughout the life of a building. It affects the individuals making use of the facility.

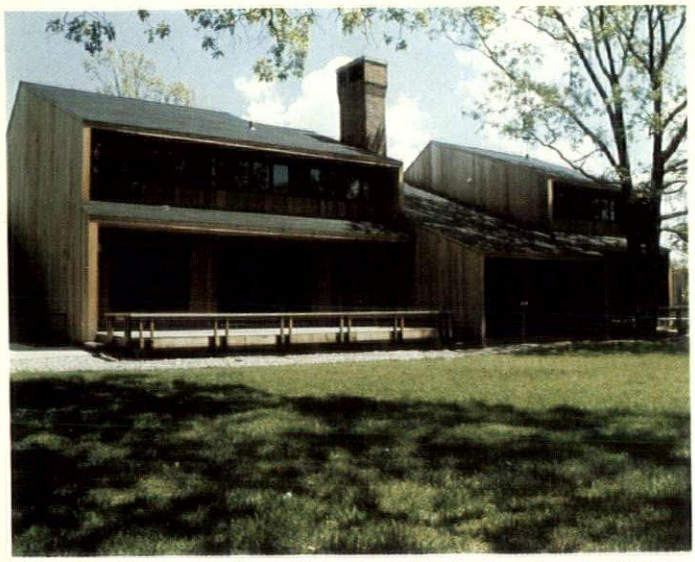
Questions to be considered in the selection of resistant materials are: Will the material stand up against constant wear or the elements that it is subjected to? Can worn surfaces be replaced easily? Many structures should be more like machines, with the ease of replacement of parts as wear takes its toll. Does the surface clean easily and does it conceal or express the maintenance it requires? An additional consideration is the sequence of use of materials. Passing over carpet before stepping on a wood floor certainly extends the life of the sensitive wood. A final element of consideration is: do the surface treatments complement or complicate the maintenance requirement of the material? Paint, when applied as a very

William Atkins residence, Dickey/Kodet, Architects, Minneapolis

smooth coating, may be very easy to wash, but if chipped, leaves a scar difficult to repair with minimal effort. On the other hand, stain may conceal soil to a point and easily hide dents, but the ability to wash the surface is minimal.

The technology of materials is such that manufacturing occurs in predetermined sizes. If one could influence the manufacture of materials to the level of sophistication of tinkertoys, much needless waste of time and materials utilized in the adaptation of materials could be saved. If lumber, for example, could be taken directly from mill to application without modification, a sense of appropriateness to use could be enhanced. Such thoughts should be given to materials prior to selection and become priorities in the design philosophy.

A final and a most important characteristic of material consideration is its structural capacity. High tension steel, wood, concrete, and combinations thereof all contain certain inherent qualities and thus obvious applications. The vast spans accom-

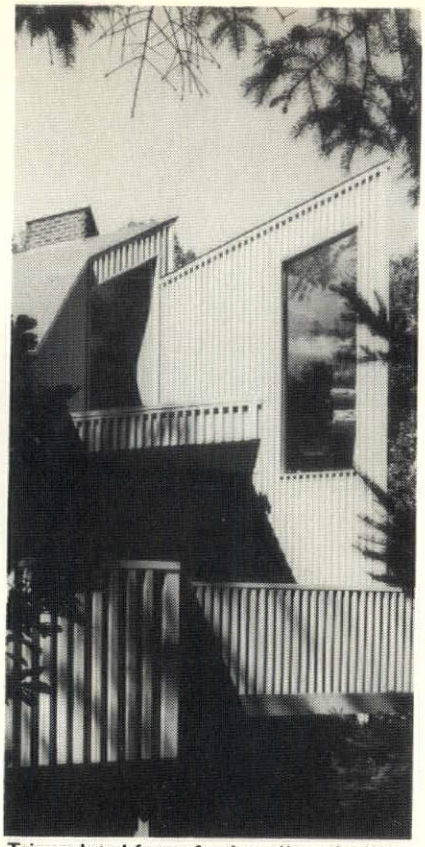


Weitzel residence, Wemlinger-Remely and Associates, Inc., Architects, St. Cloud

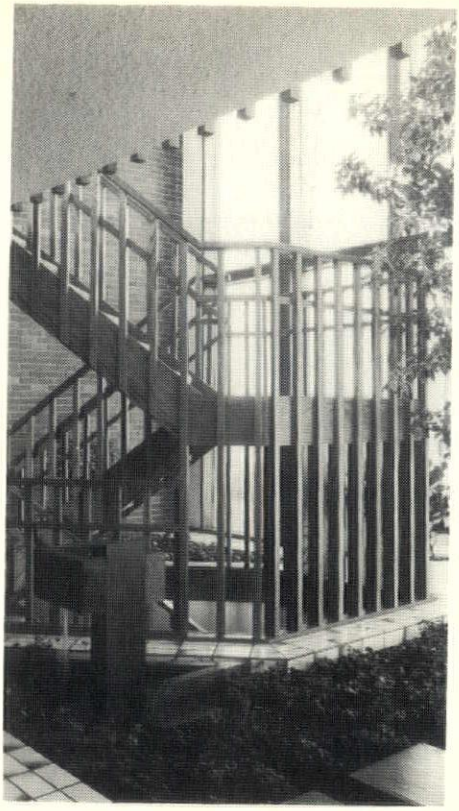
Dr. Goodman residence, the Leonard Parker Associates, Architects, Minneapolis. Photo by Balthazar Korab

Farrell residence, Eldon Morrison Architects, Inc., White Bear Lake

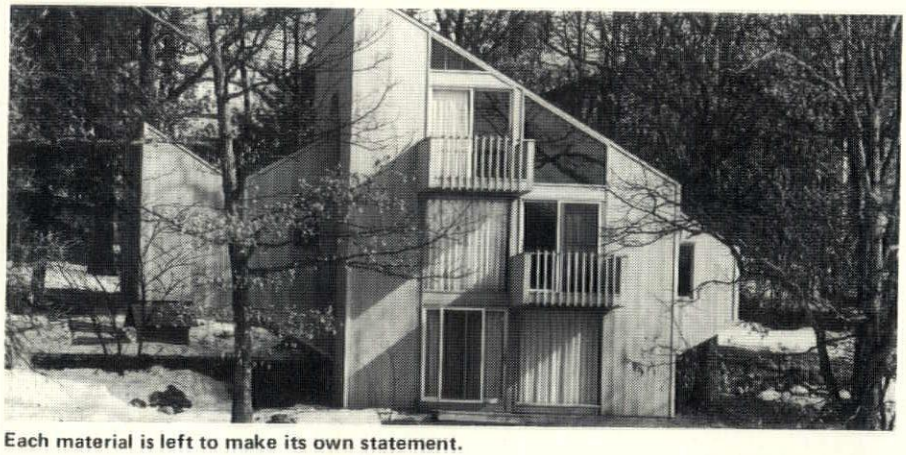
White residence, Cunningham Architects, Minneapolis



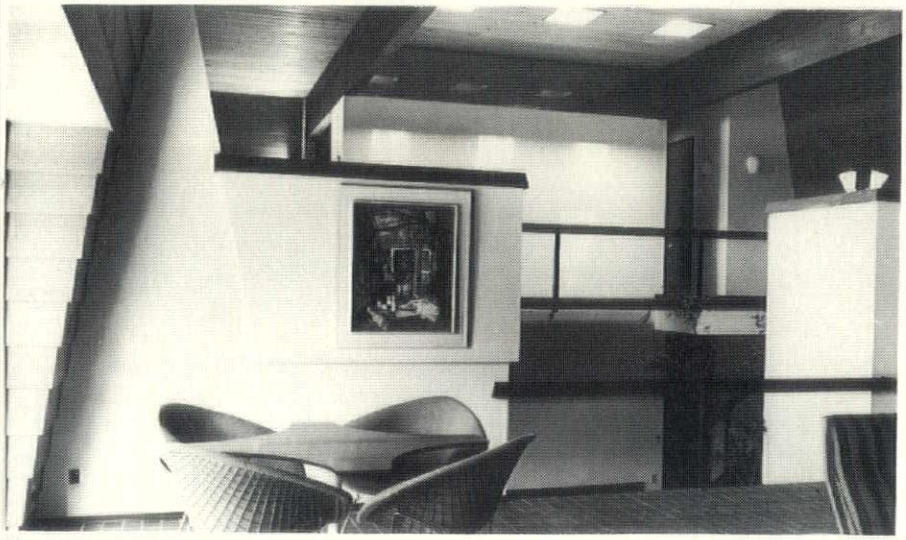
Triangulated forms further allow the light to accomplish its full potential.



Use of texture and the closeness of one material to its neighbor play a most influencing role.



Each material is left to make its own statement.



Material respond to the forces placed upon it.

plished by steel space frames would only be fantasies if conceived in concrete, and modest schemes at best when achieved in wood.

Examples of Specific Applications

The use of texture and the closeness of one material to its neighbor play a most influential role. Materials must complement the fixtures and surfaces they interplay with. The grain, color, direction and all visual and tactile stimuli must be part of the consideration.

The use of light, darkness and shadows further plays a role in the selection, size and shape of the materials. This photograph indicates how a variety of light can reinforce the material shown. The triangulated forms allow the light to accomplish its full potential. One might add that the treatment of the surface with stain not only extends its resistance to the elements, but provides a uniform surface on which the light can perform its tricks. Such a feat would not be possible, or only possible in a limited way, if the material was left in its natural state.

Here each material is left to make its own statement within a certain parameter. The central element of glass is framed on each side by cedar boards. The consequence is that each material retains its identity but the total expression is not lost.

A final example of an attitude to the use of materials relates to their ramifications as structure, carried through in the resulting form. The purity of this usage is that the wood provides not only beauty but is a necessary element for the very existence of the structure. It is gratifying to see a material respond to the forces placed upon it. One certainly can concur with the vast concept created by architects whose entire philosophy develops around this response.

This description of an attitude towards materials certainly is not intended to be conclusive. It is, however, intended to give insight into the physical, pragmatic and artistic considerations for selection. The architect's ingenuity is in the adaptation of manufactured products to suit architectural concepts. □

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CONSERVATION BY DESIGN

Peter Pfister

The use of solar energy in buildings has undergone substantial development in the past several years. Solar space heating is a maturing industry, with proven functioning installations in all parts of the country. Development of solar air conditioning systems is now occurring though it is probably three to five years behind solar space heating. Photovoltaics—the conversion of sunlight directly to electricity—is ten to fifteen years away from being an economically feasible industry.

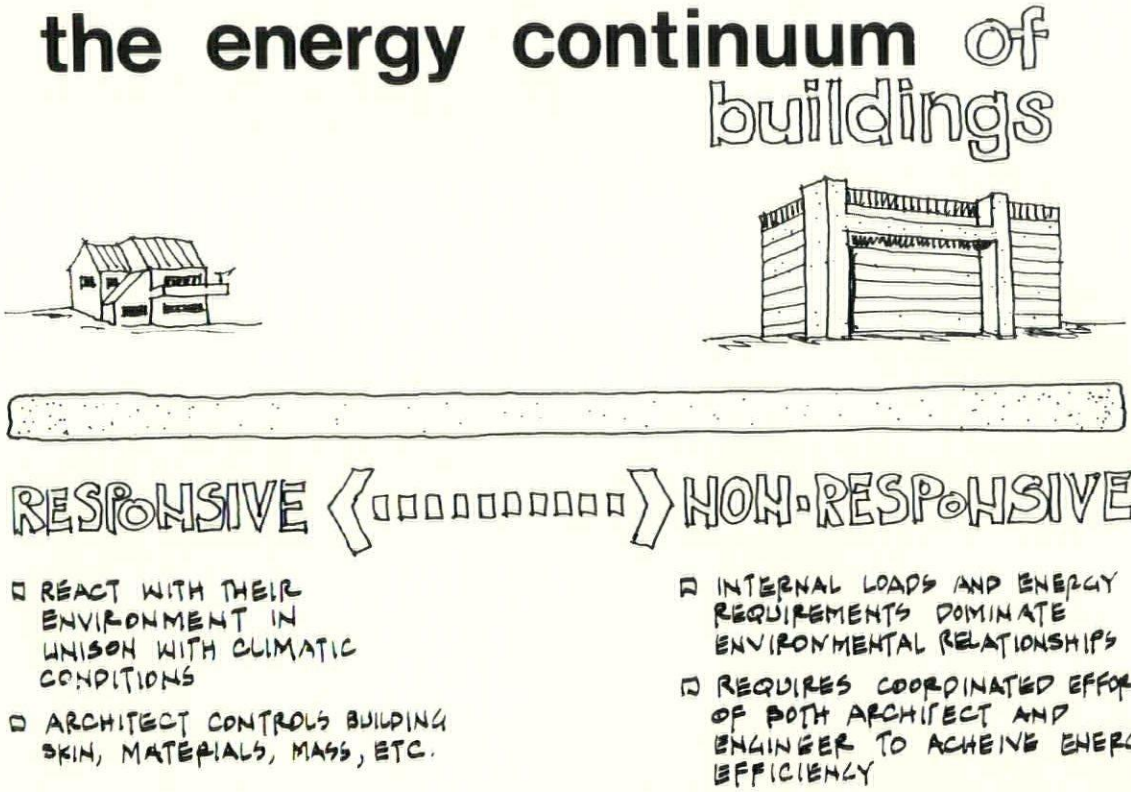
Although solar hot water and space heating systems are mechanically mature, and it can safely be said that solar systems do work, their economic viability has not yet been established. Some reports, such as the widely publicized Mitre* report, say solar hot water heating and space heating are competitive in certain areas of the country when compared to certain conventional fuels. The report then goes on to explain the assumptions made regarding solar system installation and maintenance costs and projected future fuel costs. The industry is getting better at estimating solar costs, but unfortunately, economists are not very good soothsayers, and it is difficult to estimate future fuel costs, an item that is critical in estimating solar payback.

If we want to design a small energy responsive building to be solar heated, we must consider two kinds of solar heating: passive and active. Passive solar heating is achieved by allowing low angle winter sunshine to penetrate through south facing windows to the interior spaces of the building. Mechanical or active solar collection utilize an array of solar panels, a storage system and a distribution system. For either type of solar house, a thermally efficient building envelope is a prerequisite to retain as much of the "free" heat as possible. In terms of investing money to achieve the best payback, the following priority can be established:

1. Design for maximum energy conservation
2. Design for passive solar collection
3. Design for active solar collection

Energy Conservation

The first step in designing for



energy conservation is to optimize the thermal envelope of the house. Additional insulation can easily be accommodated in conventional wood framing in the attic space and under the floors over unheated space. However, increasing the thermal value of a conventional 2 x 4 wood stud wall to a more efficient thermal barrier requires switching to 2 x 6 studs (The Arkansas Plan) or substituting one inch of tongue-and-groove rigid insulation in place of composition or plywood sheating. The use of rigid insulation has two other positive effects: it covers the wood studs with a layer of insulation (an area that is still deficient in the Arkansas house) and it produces a house that is sealed tighter which reduces wind infiltration losses.

As buildings become sealed tighter and better insulated, a larger percentage of thermal losses occur through the windows. Does it pay to install triple glazing on windows to reduce these losses?

Passive Solar

Before answering that question, the role of windows as solar collectors should be established. A single layer of plate glass transmits 90-92 percent of the incident solar energy, and insulating glass (two panes) will transmit 81-85 percent of the energy. On an annual winter heating basis adjusted for cloudiness, a south facing square foot of insulating glass will transmit 160,000 BTU while losing about 100,000 BTU out through the glass. The net energy balance for that square foot of glass will be about 60,000 BTU, and this can be substantially improved by covering the windows during non-daylight hours with an insulating fabric or shutter.

This aspect of passive solar heating has been understood for quite a long time, though it has seldom been utilized as a design feature until the past few years.** It requires that the designer organize and orient activity spaces, such as recreation rooms, play areas, kitchen and eating areas to the south with large amounts of those south walls glass. Other rooms, such as bedrooms, bathrooms, stairs and halls, when organized along the north walls, provide a buffer zone to cold winter winds. The north facing rooms should have minimal window areas, while the south oriented activity space can have substantial window areas and still be energy efficient.

The answer to double versus triple glazing might be this: (1) minimize north, east and west facing glazing and triple glaze these, (2) increase south facing glazing, and double glaze this but protect it at night with a heavy thermal curtain or shutter.

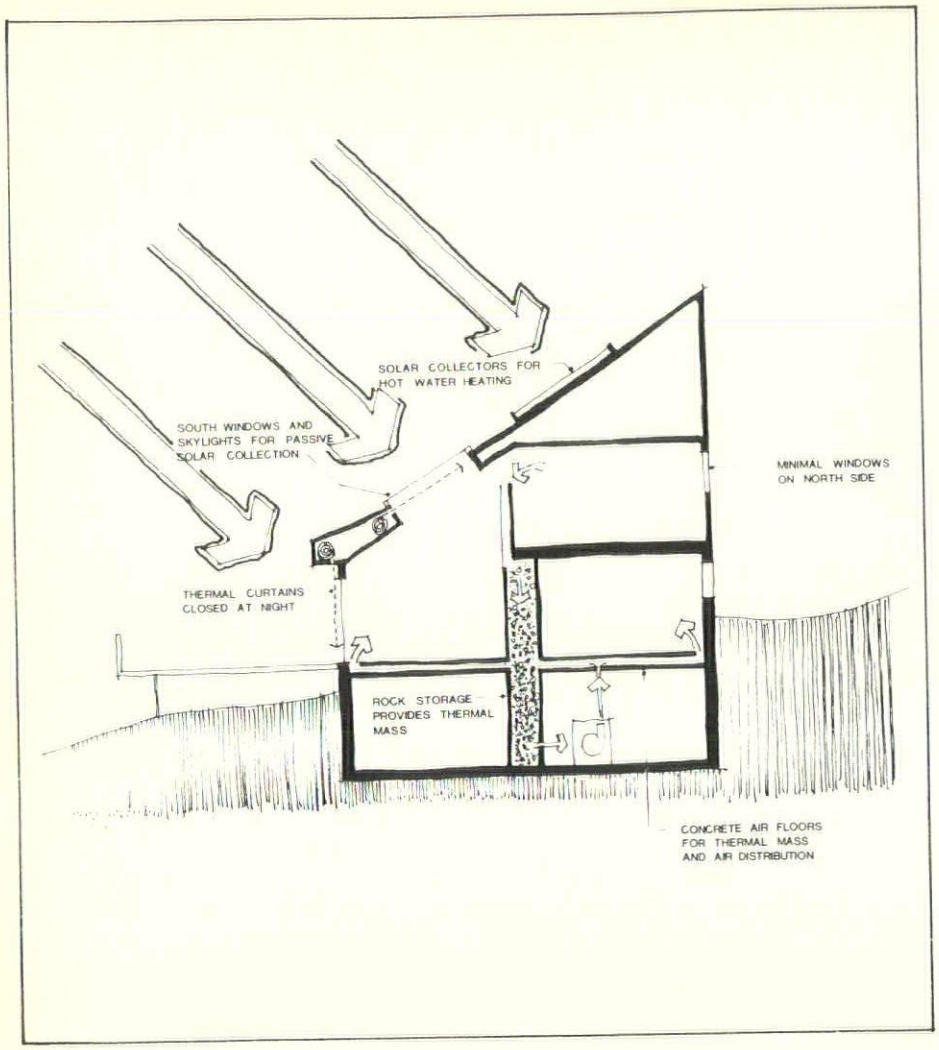
Although it is relatively easy to design a residence or small building to maximize passive solar collection, it is much more difficult to distribute and store the heat once it is captured. Overheating of spaces will occur unless: (1) the heat is distributed throughout the building, either by mechanical means or by natural convection through open spaces, and (2) thermal storage is provided. Mass must be introduced into the building interior that will absorb and retain heat for dissipation after the sun is no longer shining. Substituting concrete floors for wood frame floors, substituting concrete block, tile or brick walls for wood stud walls, or introducing an "artificial" mass such as rock storage bins into the interior of the thermal envelope will provide a thermal flywheel to minimize large temperature fluctuations.

Storing passively collected solar heat is not the same as storing heat from active solar collectors. Passive heat is "low grade" heat, with temperatures only a few degrees above normal indoor temperatures. Thus, the goal in a passive house is to store heat over a small temperature range (say 72-80 degrees F.) by providing a large heat sink (thermal mass). This is quite the opposite in an active solar system, where storage temperatures will range from 110 degrees F. to 180 degrees F.

Active Solar

Before a building is designed to utilize active solar space heating, it should be designed as (1) an energy conserving house, and (2) a passively heated solar house, because it makes the most sense to retain as much heat as possible (whatever the energy source) and utilize passive solar collection since that method is more efficient and less costly than active solar heating.

Traditionally, solar space heating systems have been of two kinds, liquid medium flat plate collectors that generally utilize a water tank for heat storage and air medium flat plate collectors that generally use a rock bin for thermal storage. The pros and cons of each system have long been debated with the choice between systems de-



This figure shows the combination of passive solar heating with solar collectors used for hot water heating. The rock storage bin and precast concrete floor provide mass to store heat, while thermal curtains over large windows and skylights reduce heat losses.

pending largely on personal preference. The costs and performance of both systems are comparable, and the success of either system is more dependent on how the system is designed, manufactured and installed rather than on intrinsic characteristics.

Architecturally, solar collectors can be accommodated on buildings in a variety of ways. In this climate (Minneapolis, 45 degrees North latitude), the optimum collector angle for winter space heating is around 50-55 degrees above horizontal. For a year-around use, such as hot water collection, the optimum angle is around 45 degrees, and for summer air conditioning, a much flatter angle, around 30-35 degrees would be appropriate. Fortunately, deviations from these angles of 15-20 degrees will reduce efficiency by only 5-10 percent. In fact, locating collectors on a south vertical wall may be nearly as effective as the ideal collection angle of 55 degrees for winter space heating if the horizontal surface in front of the collectors is a reflective surface, such as a mirror or snow covered ground.

The location of solar collectors along the south wall or south roof of a residence is in competition with the building acting as a passive solar collector. Locating collectors along a south wall is in conflict with providing large window areas to the south oriented rooms, and if collectors are located on a steeply pitched roof, a two or three story space is generated. The resolution of this conflict is assisted by the fact that the size of the collector array can be substantially reduced, if (1) the house is constructed as an energy conserving house and (2) a substantial amount of the daytime heating can be accomplished through passive collection.

Most solar active systems that have been installed have been either liquid or air medium collectors, with either forced air or hydronic distribution into the living spaces. The working temperature range for these systems is from about 95 degrees F. to 150 degrees F. Distribution of 95-105 degrees air in a space is felt as a cold draft, so this becomes a bottom limit. Flat plate solar collector efficiency drops to 30-50 percent when collecting temperatures are 120 degrees F. above ambient temperature, so the upper limit of 150 degrees is difficult to achieve during winter conditions.

A system that utilizes the best advantages of both conventional fuels and solar systems is the solar assisted heat pump and is especially applicable in areas where natural gas is not available. Heat pumps operate very efficiently—with a coefficient of performance of 3.0 to 5.0—when a heat source in the range of 45-85 degrees F. is available. Solar collectors can supply heat in this temperature range much more efficiently than in the 95-150 degree F. range. If sufficient solar heat is available to obtain storage temperatures above 95 degrees, as should be the case in the spring and fall, the heat pump can be by-passed and the building can be heated directly from the solar system.

The primary benefit of a solar assisted heat pump system is that the solar collector array can be decreased in size and cost, and integrating the array into the building is easier to accomplish. While collector costs decrease, the heat pump costs considerably more than a conventional gas or oil furnace ($1,500-$2,000 versus $300-$500). But the heat pump provides central air conditioning, a feature that many people who are interested

in alternative energy development consider a dubious bonus. What is the advantage, they ask, of having an air conditioning system on a hot summer day when there may be no electricity to operate it?

At this time, solar hot water heating and solar space heating, using flat plate collectors, are technically well developed, but solar air conditioning for residential applications is still in the experimental stages. Flat plate collectors generally cannot achieve high enough temperatures (above 250 degrees F.) to operate conventional absorption air conditioning units. More expensive concentrating collectors can achieve these higher temperatures, and small residential sizes air conditioning units that can operate in the flat plate temperature range of 180-190 degrees are being developed so that this potential market can be met.

The goal of energy conserving design and solar energy utilization is to achieve as much energy independence from conventional fossil fuels as possible. The concept of an Annual Cycle Energy System (ACES) for buildings is being explored. In the ACES concept, a large thermal mass, such as a large water reservoir, rock bin, or even the earth itself, is charged with heat collected during the summer by a solar system for winter use. The reverse of this concept—storing wintertime cold for summer cooling—is also possible and is being explored at the University of Minnesota.

The Solar Market

Many different solar heating systems have been designed and built. Some are crude home-made devices that operate effectively and may cost as little as five dollars per square foot of collector to build. Other systems are exotic technical devices that may cost up to $40 or $50 per square foot of collector.

For residential installation, a $20 to $30 cost is a reasonable average. An old rule of thumb for sizing collectors was that the collector array should be one-third to one-half the size of the building floor area. If the house is designed to be energy conserving and to utilize passive solar energy, the collector area can be reduced to one-quarter to one-third of the floor area, and still provide 50 to 70 percent of annual space heating needs. For a typical residence of 1,600 square feet, a system cost of $7,000-$12,000 can be expected, although it is possible to substantially deviate from these figures.

Is solar space heating economical at these prices? That is a difficult question to answer. An analysis by conventional economics would indicate that investment in a solar system would not produce a reasonable payback. But, as much of the United States found out during last winter's energy shortage, we have developed a lifestyle that is critically dependent on rapidly depleting energy sources. Energy consumption rates are so great that even new petroleum finds have a surprisingly short life time. For instance, if in July 1977, the Alaskan oil fields were used to supply all of the energy needs of the U.S. at the present consumption rate of 17.4 million barrels daily, that field would be depleted by Christmas, 1978. How many more huge energy fields can we expect to find to meet our energy demands, and how long can we continue to depend solely on the merits of economic analysis to insure continued supplies? Now is the time to consider the impact that designing for energy conservation and solar energy utilization can have on our future energy supplies. □

*"An Economic Analysis of Solar Water and Space Heating"; November, 1976 USGPO Stock Number 0060-000-00038-7 Energy Research and Development Administration

**One exception is Architect George Van Keck who designed many passive solar houses in the Chicago and Milwaukee areas in the 1940's.

Peter Pfister is a registered architect with the Architectural Alliance of Minneapolis. As co-chairman of a special task force of the Minnesota Alternative Energy Research and Development Policy Formulation Project he developed a report on the use of passive solar energy.

Annual Energy balance for south facing glazing

	Transmitted	Heat Loss	Net Balance
Single glass	178,000 BTU/S.F.	187,000 BTU/S.F.	– 9,200 BTU/S.F.
Double glass	160,000 BTU/S.F.	100,000 BTU/S.F.	60,000 BTU/S.F.
Triple glass	144,000 BTU/S.F.	65,000 BTU/S.F.	78,500 BTU/S.F.

STYLE-HISTORY OF ARCHITECTURE IN MINNESOTA

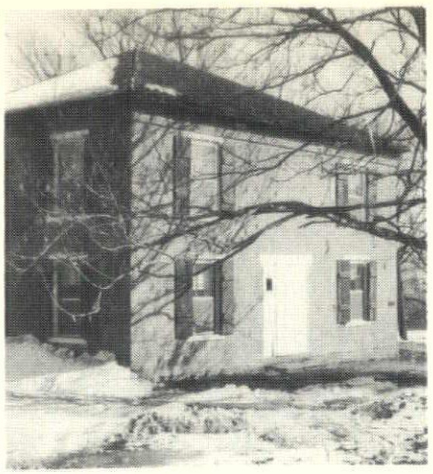
Erickson Log House, Scandia. Photo by Gerald Beale, Washington County Historical Society

Charles W. Nelson

A capsule history of the development of building technology and architectural design in Minnesota covers a period of approximately one hundred and fifty years. Buildings noted prior to the nineteenth century were temporary shelters, used by the Indian and explorer/trader. Such shelters were for the most part made from locally available materials and were easily transportable.

The Woodland Indians fashioned their lodges from a system of bent saplings with bark covering. The Plains Indians, on the other hand, relied on easily transportable pole structures covered with sewn hides and suitable for life in a prairie environment. These building methods continued well into the nineteenth century despite attempts by settlers, missionaires, and agents to lure the Indian away from his "rude dwellings" and into the "cultured" building technology of white civilization.

During the eighteenth century, Minnesota saw the rapid growth of the fur trade. The traders constructed shelters and wintering posts of a more permanent nature than the aboriginal pole structures. As seen in North West Co. Fur Post (1804), reconstructed on the Snake River near Pine City, this building complex comprised a long, multi-room structure encircled by a log palisade wall. Timbers were placed vertically as posts, and bastions were placed at corners of the palisade. The multi-room structure was executed in a post-and-sill fashion, wall panels being formed by two grooved vertical posts set in the ground and horizontal



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Gideon Pond House, Bloomington

timbers placed one on the other and inserted in the grooves. A simple sod or bark and shake gabled roof covered the whole.

The log house represents a more permanent construction technique than that used in the earlier fur posts. This type of structure usually served as the first dwelling on a homestead, and its use is contemporary with settlement patterns in Minnesota well into the early twentieth century. Often these buildings consisted of only one or two multi-purpose rooms with an attic loft. Joinery ranges from the simple saddle-notch to the complex dove-tail and peg. Preparation of the logs also reflects degrees of craftsmanship. Most of the Scandinavian examples of log houses exhibit a great degree of skill in joinery, chinking and fitting, and adzing or squaring of members. Many of these latter examples survive as cores of houses and have been sheathed by clapboard or plaster.

In areas where stone or clay was plentiful, another vernacular type of building emerged. Many such buildings reflected elements of eastern style while emphasizing functionality. The Minnesota/Mississippi River Valley areas were the settings for the development of a limestone and sandstone architecture, although these same river valleys produced the yellow and red clays for the Chaska, Jordan and New Ulm bricks. The earliest extant examples of limestone construction in Minnesota date from the 1820s and 1830s and are located at the confluence of the Mississippi and Minnesota Rivers. This area was chosen for the site of Fort Snelling as early as 1805 and construction began in the 1820s.

Across the valley from Fort Snelling is the early settlement of Mendota. Two of the earliest limestone residences in the state, both located in Mendota, are the Henry Hastings Sibley House (1835) and the Jean Baptiste Faribault House (1837).

As mentioned above, bricks served as a suitable substitute for stone in areas where clay was plentiful—local kilns were used for firing bricks as well as for conversion of limestone to lime for mortar. Bricks for the Gideon Pond House (1856), a square Federal style two-story residence, were made on site. Until the establishment of industrial clay pits and brickyards, many such buildings were produced of local or on-site materials. With an increased demand for building materials as the state experienced rapid settlement, the reliance on mill-sawn lumber and brick surpassed the more time and labor consuming stone construction. For this reason, most of the buildings dating from the early years of settlement were hastily built and lacked the quality of permanence.

The first distinct architectural style to reach common proportions in Minnesota is the Greek Revival. Buildings in this mode were basically simple frame structures of one to two stories. Their prominence was made possible during the 1840s by the production of sawn lumber at mills in Marine and Saint Anthony. Although very few of these buildings remain in the urban areas such as the Twin Cities, several communities in the Saint Croix River area have retained a significant concentration. These communities include Taylors Falls, Franconia, and Marine. A noteworthy example is the Munch-Roos House (1853) in Taylors Falls. Most Greek Revival designs exemplify the use of simple corner pilaster strips, tripartite entries (door with side-lights), pedimental gables, six-over-six-double hung windows, and clapboard siding. A coat of white lead paint added to the rigid, non-ornamented appearnace of the building.

Within two years after the rise of the Greek Revival style, the Gothic Revival emerged in Minnesota. Some of the earliest residences and churches reflecting Gothic design were recorded in Saint Anthony in 1851. This style was a reaction to the rigidity of the Classic and had roots in the works of A.J. Davis and A.J. Downing as early as 1837-42. Minnesota builders found fascination in producing buildings adorned with board-and-batten siding, foliate and geometric bargeboards, pinnacles and pendants, pointed and trifoil windows, and steeply pitched roofs. Unfortunately, although the Gothic influence was deeply felt, few examples remain which retain original design integrity. Only one "gingerbread" house remains in Miineapolis, the Cutter/Gilfillan House at the corner of Tenth Avenue and Fourth Street Southeast which dates from 1856, and even this has been altered by an addition and a coat of stucco.

Two examples of the Gothic influence on Minnesota architecture deserve special mention. These are the William G. LeDuc House (1862-65) in Hastings and the E. St. Julien Cox House (1871) in Saint Peter. Both buildings represent a meshing of design elements from

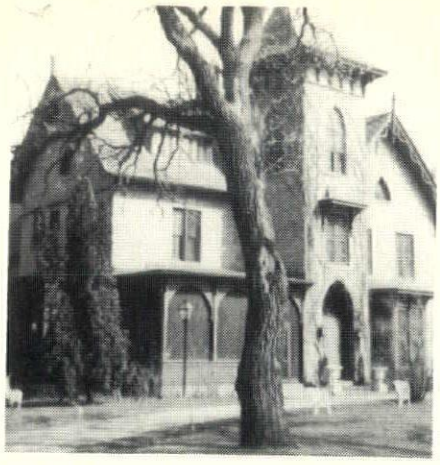
Alexander Ramsey Home, St. Paul

Gothic and a style known as Italian Villa. The latter rose to a position of vogue in Minnesota during the mid 1850s and was retained well into the 1870s. During its peak years the Italian Villa was contemporary to the Gothic.

The LeDuc House is a towered Gothic Villa of stone construction. Of mansion proportion, its design has been traced directly to those found in pattern books by A.J. Downing. In this residence, a three-story stair tower at the inner angle of an "L" plan denotes one of the basic characteristics of Downing's Villa scheme. Further, although obscured by Gothic-arched verandahs, each principle facade exhibits symmetry. Other refined Gothic elements include soaring roofs and gables surmounted by carved pinnacles and trifoil windows in the attic story.

The E. St. Julien Cox House is similar in plan to the LeDuc House; however, the proportions and materials suggest it to be a residence of modest means. Porches lack Gothicized tracery or brackets; supports are squared wooden columns with simple capitals. Construction is frame with board-and-batten siding. However, the principle design elements indicate a mesh of two modes as in the LeDuc House. The tower and "L" plan denote a Villa influence, whereas the steep-pitched roof and barge-boarded gables denote the Gothic. These two residences are the best extant examples of the short-lived Towered Gothic Villa in Minnesota.

The third major style to attain prominence in Minnesota was the Italian Villa style. As with the Gothic cottage and Towered Gothic Villa, credit for the proliferation of the Italian Villa is given to A.J. Davis and A.J. Downing. The Italian influence (although not the Villa fashion per se) continued as an important factor in Minnesota architecture throughout the nineteenth century and into the twentieth. The Villa mode lasted for a period of not more than twenty years. It was a flexible design and was either symmetrical or asymmetrical in plan, usually covered with a low-pitched hipped roof. Eaves extended further than in the Classic or Gothic and were often supported by turned or sawn brackets. A common feature was either the tower or a cupola or belvedere at the apex of the hip. Construction materials varied with the economic means of the build-



LaDuc Mansion, Hastings

er. Most noteworthy of the opulent examples is the Burbank-Livingston-Griggs House at 432 Summit Avenue in Saint Paul, a limestone mansion built in 1862-65 which has retained exterior bracketing and a magnificent cupola.

The Italianate, a derivative of the Villa style, gained popularity in both residential and commercial building design. This style is primarily one of ornamentation applied to an essentially simple mass. The bracket and ornamental cornice are universal elements. Early buildings were constructed of locally available materials (stone, bric, or wood), and ornament supplied by a mill or cabinet-maker. The 1870s witnessed the rise to popularity of the "cast-iron front" for Italianate commercial buildings. Designers employed cast and pressed elements for cornices, roof combs, window hoods, columns, or entire facades. Although many examples of this treatment are found throughout Minnesota, no extant total-metal-front building has been recorded. Examples of Italianate mode are the Lauer Flats (1887) in Saint Paul, Grams Building (ca. 1870s) in Winona, the Nicollet House Hotel (ca. 1873) in Saint Peter, and the Pacific Block (ca. 1870s) in Minneapolis.

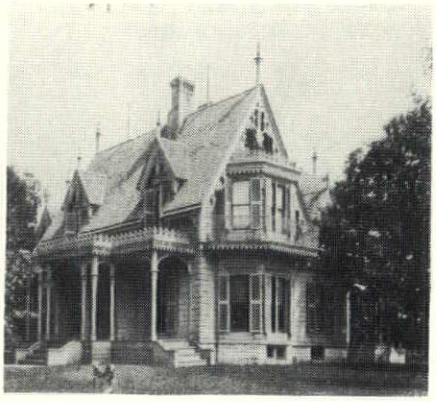
The French Second Empire Style, so named for the mansard, double pitch or curb roof was a distinctive style and one which allowed almost as many variations as the Italianate. The roof was often the only distinguishing feature between the French Second Empire and the Italianate. A publication by Calvert Vaux in 1857 (Villas and Cottages) promoted the popularity of the style in the western areas. Vaux recommended the mansard roof to provide additional space in the attic story as well as for distinctive design. In addition, he recommended variety in heavy window moulding treatment which gained wide favor. The period of popularity for the French Second Empire Style in Minnesota continued from about 1865 through the mid-1880s, although some provincial buildings are found with these style characteristics into the 1890s. The most significant extant example of the French Second Empire style in Minnesota is the Alexander Ramsey House at 265 Exchange Street in Saint Paul. It was constructed in 1872 of limestone with a dormered slate mansard roof.

By the 1870s the rapidity of construction and expansion of settlement in the state encouraged a shoddiness and lack of permanence in the building of all but the most elaborate and expensive structures. The development of the high-speed power saw made possible the rapid production of thin dimension lumber, which, together with the invention of the wire nail, made the balloon frame possible and popular. In many instances the frame, usually sheathed with clapboard, was covered with a thin veneer of brick. In all but the large masonry buildings the balloon frame was used, and the services of skilled craftsmen were less in demand. Much of the ornament was jigsawed or made of sheet metal, cast iron, or cast stone and was applied with nails to the thin-wall structures. The ornament tended to fall off, rot, rust, peel, warp, or curl, furthering the appearance of shoddiness. For the most part, the vernacular building on both small and large scale became easily expendable.

The 1870s experienced a resurgence of the Gothic influence on the architectural design of public buildings, an influence which lasted into the 1880s. These buildings were substantial and often constructed of brick or stone. This resurgence is often called Victorian Gothic and is distinguished by a mixed use of materials and a polychromatic appearance. Sources of influence appear to have been European rather than American.

Examples are Dania Hall (1886) at the corner of Fifth Street and Cedar Avenue and the Chute Building (1881) at Hennepin and University Avenues (both in Minneapolis).

The Romanesque influence, most often associated with the massive "Richardsonian" buildings of the late 1880s and early 1890s, actually began contemporary with the first phase of the Gothic Revival in Minnesota in the mid-1850s. It was characterized by stone construction and semi circular arches over windows and doors and by structural vault and arch systems. This fashion appears never to have had a strong influence on Minnesota architecture although several examples have been noted. An excellent remaining example of the early Romanesque mode in Minnesota is the Church of the Assumption at 51 West Ninth Street in Saint Paul, which was completed in 1873. This church design originated directly from Germany; architect Joseph Reidl from Bavaria patterned it after the famous



B.O. Cutler House, Minneapolis

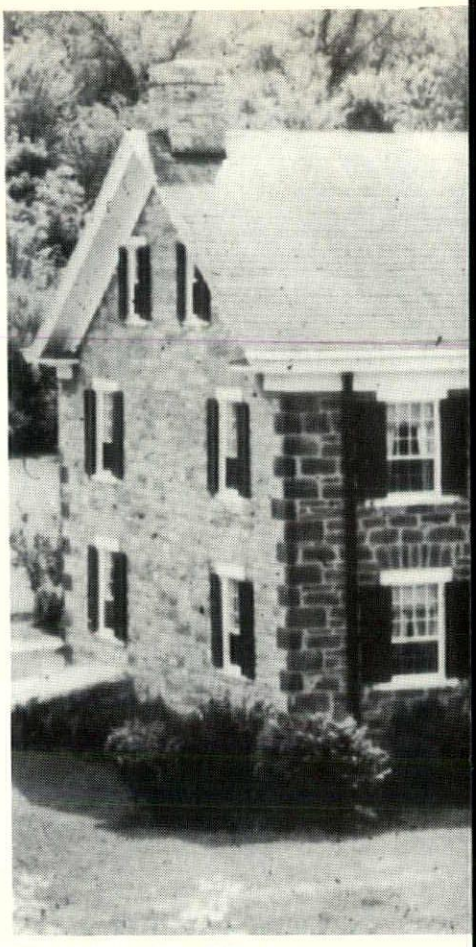
Ludwigskirche in Munich by Friedrich von Gaertner.

By the end of the 1870s the Romanesque fashion received new inspiration through the designs of Henry Hobson Richardson. The massive carved stone structures with round-headed arches and squat columns became known throughout the country as "Richardsonian Romanesque." The intense but short-lived popularity of the Richardsonian influence far surpassed the earlier Romanesque. The peak of Richardsonian influence in Minnesota lasted from about 1885 to 1892. A style requiring great amounts of time and money, skilled craftsmanship, and hand-worked materials, the Richardsonian Romanesque did not survive the years of depression subsequent to 1893 or the increased interest in academic and Classic architecture popularized by the Chicago Columbian Exposition of 1893.

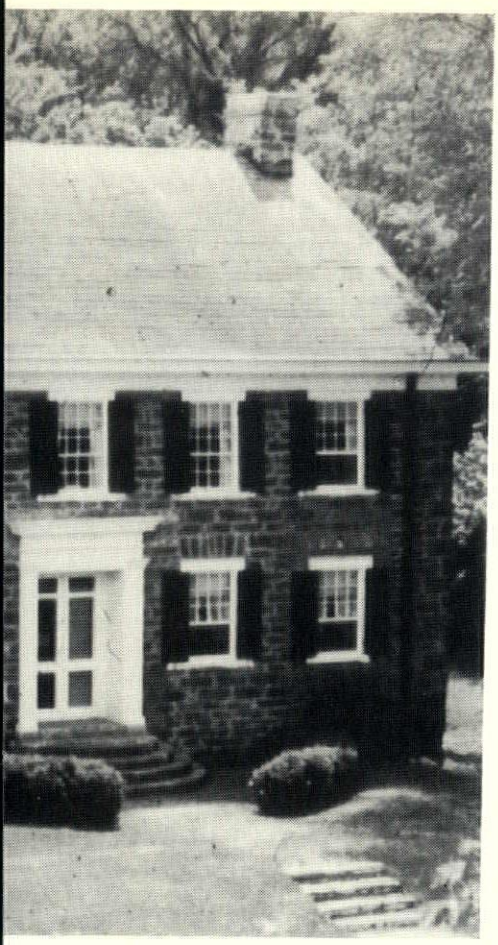
The massiveness and materials inherent in the Richardsonian style made it extremely conducive to use for large buildings, such as multi-story commercial buildings, churches, institutional buildings, and public buildings. Minnesota boasts its share of notable examples of each of these types.

A prime example of a Richardsonian Romanesque public building is the Minneapolis City Hall/Hennepin County Courthouse (1889). This building is constructed of rock-faced stone masonry, employs the round arch, prominent dormers and gables, and a tower. This courthouse exemplifies the epitome of design, skill, and taste in public buildings during the 1880s and is recognized as a local lankmark. The Minneapolis structure (Long & Kees, Architects) carries out the Richardsonian influence to the greatest degree, occupying a full city block and being derived from Richardson's own Allegheny County Courthouse in Pittsburgh (1883-87).

Mansion-type residences and churches also reflected the tastes of the Richardsonian designers. The style was not readily adaptable to small scale, and therefore became a statement of power, affluence, and social elitism. James J. Hill chose this style for his enourmous stone mansion at 240 Summit Avenue in Saint Paul when he hired the eastern firm of Peabody and Stearns in 1889. Many such mansions, unadaptable and in areas growing less fashionable, were razed prior to World War II—their owners and builders abandoned them in their constant social drive for more



Faribault House, Mendota



fashionable architectural styles such as the Renaissance Revival, Georgian, or Neo-Classic.

Fashionable row houses, many fronting on a half or entire block, also employed elements of the Richardsonian Romanesque style. Contrary to the total exterior design treatment of the mansions, row houses were usually "street facade architecture" with little or no attention given to ornamentation or materials in side and rear facades. The street facade, however, was lavishly adorned with arches, carvings, towers, and either polychrome stone or stone-brick combinations.

Contemporaneous with the Richardsonian Romanesque was a brief period of interest in what became known as French Renaissance or "Chateauesque" styling. Primarily encouraged by the work of Richard Morris Hunt in his design of the Vanderbilt mansion in New York in 1878, inspiration was taken from the fortress-like chateaux of the Loire Valley in France. Like the Romanesque, this style was not suitable to small-scale adaptation and was used exclusively in mansions for the extravagant display of wealth. Further, the style was not adaptable to wood construction and depended on rich carved details, stone massiveness, turrets, stair towers, tournels, and soaring roofs.

Few Minnesota examples of the "Chateauesque" style approach the grandiose scale of Hunt's eastern designs.

Duluth's Union Depot (1892) at Fifth Avenue West and Michigan Avenue is the product of the office of Peabody and Stearns of Boston (also architects of James J. Hill's Richardsonian Romanesque mansion in Saint Paul). The depot incorporates a steep roof with centrally placed wall dormer over a facade of brick and cut stone. A cast iron filigree portico shields the entry while allowing vehicular access. Conical roofs surmount symmetrical towers. The interior of the passengers' waiting room is graced by a wooden-trussed ceiling which rises over three stories to the roof ridge.

By far the most popular style of architecture and the most adaptable to all economic classes during the last years of the Victorian period was the Queen Anne. A truly eclectic style, flexible enough to satisfy all tastes, the Queen Anne in America differed greatly from the Queen Anne conceived in England by Norman Shaw and

Philip Webb. The English versions often combined Medieval elements such as half-timbering and bays with low-relief carving and classic motifs. By the time the Queen Anne reached the United States (ca. 1880), the style was far from simple or restrained. Along with its Eastlake, Stick, and Shingle derivations, the Queen Anne became synonymous with such descriptive terms as "bric-a-brac," "free-classic," and "anything-goes."

The Queen Anne, Eastlake, Stick, and Shingle styles combined irregularity of plan and massing with a variety of colors, textures, and materials. Also characteristic were ornate wrap-around spindled porches adorned with carved brackets or dentils, projecting gables, a variety of roof lines and heights, stained glass windows, corner towers, second story balconies or porches, filigree iron-work, patterned shingled roofs, and tall, decorated chimneys. Many different treatments and motifs were present in one building.

The Queen Anne and the Eastlake were the more ornate of the four related modes. These relied heavily upon ornamental facade treatment for visual effect. Exterior design features were often carried through the interiors in design of mantels, spindle or ball-and-stick work archways, break-fronts, staircases, and stencilling. As in the exterior, most decorative treatment was in the form of applied ornament. Design of furnishings further promoted the complexity of ornament and material/texture combinations. Significant extant examples are primarily residential. The George W. Taylor House (1890) in LeSueur is one of the more elaborate and complex Eastlake-influenced designs. This frame residence combines virtually every previously mentioned motif, earning the descriptive title of "Bric-a-Brac."

Most heavily ornamented urban examples have been razed or altered almost beyond recognition by removal of bric-a-brac. The "bric-a-brac" influence was not confined to residential architecture but also found expression in store-fronts, small public buildings, and railway depots. Often a building of earlier vintage would be "dressed up" by addition of fret-work or gable decoration or porches. The Minnehaha Depot (ca 1880) is a small frame structure with Eastlake and stick style detailing. Texture is given to the exterior walls by combinations of vertical, horizontal, and diagonal clapboard-

ing and paneling. Applied ornament consists primarily of simple jig-sawn brackets, fans, and gable trim.

As a result of the economic crises in the early 1890s and the increased interest in academicism and classicism promoted by the Columbian Exposition, the styles associated with the Victorian Era ceased to exist except in simplified and toned-down versions in provincial, non-urban areas. However, before the Victorian fashions passed from favor, designers expressed interest in both the classic and medieval foundations of architectural design. Although these foundations had contributed to earlier versions of the Greek Revival, Gothic, and Italianate, the new focus was upon academic correctness and reproduction of historic design motifs. The Columbian Exposition awakened an awareness of the roots of architectural expression traceable directly to Colonial and Georgian America, Roman and Renaissance Italy, and Tudor England.

The span of academic influence on Minnesota architectural style covered a period of roughly 40 years from 1893 into the 1930s. This was a good deal longer than any one earlier style had endured. The academic styles existed concurrently, making an evaluation of which had greatest impact purely a matter of conjecture.

Many of the Georgian/Colonial and Renaissance designs were introduced in the eastern states by the firm of McKim, Mead and White as early as 1883. By 1888 this influence had reached Minnesota, although on no major scale. At this time manufacturers began to produce decorative embellishments such as Palladian window units, Georgian/Colonial dormers, porch columns in the three classic orders, fan and side-lighted entrances, and Classic and Georgian mantels, dadoes, newell posts, and balusters. The majority of Georgian/Colonial buildings also became "stock items;" a number of standardized plans called for nothing more than a square, white building with an applique of stock trim.

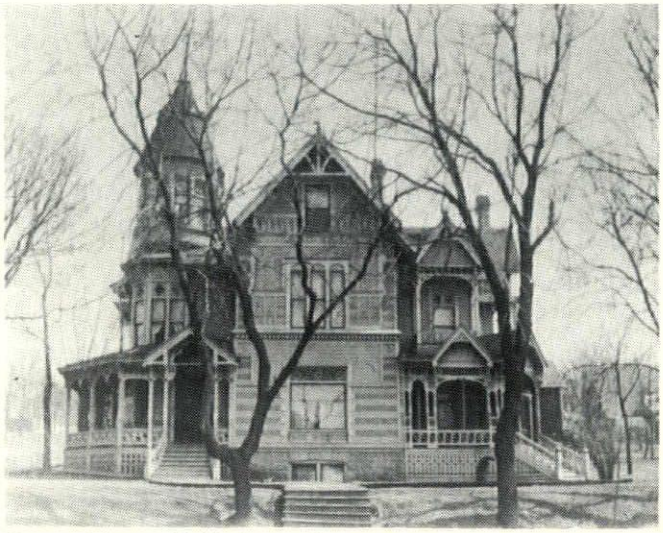
The Georgian/Colonial building is essentially rectangular in plan and generally lacks bays or projections popular in the earlier Queen Anne. Facade treatment is usually symmetrical. Cornices exhibit classical detailing such as simple brackets and dentils. Three roof types are commonly used—the hipped roof, the gambrel roof, and the double pitched roof. Some examples

have a projecting central entrance bay, and some may have a colonaded portico. Most Minnesota Georgian/Colonial buildings are either frame or brick.

Minnesota has several noteworthy examples of the Georgian/Colonial style.

The Albert L. Ordean House at 2307 East Superior Street in Duluth was built in 1905 according to designs by Palmer and Hunt. It is a red brick residence of mansion scale which combines a balustraded double pitched roof with symmetrical double end chimneys and a slightly projecting central entrance bay with two-story ionic pilasters. Directly across the block to the rear of the Ordean House stands the William J. Olcott House (2316 East First Street) which dates from 1904-5. This massive brick residence employs an "overwhelming gembrel roof" and a central two-story semicircular doric portico.

The Georgian/Colonial style was enthusiastically adopted for residential architecture, whereas the Neo-Classical style found favor in public buildings and institutions. However, neither style was confined to any one type of building or function. The Goergian/Colonial was primarily an architecture of frame or brick; the Neo-Classic designs were suitable for expression in stone. Buildings in the Neo-Classic mode were often larger than those of the earlier Classic or Greek Revival. Broad expanses of plain, uncarved, or polished wall surface were common. Roofs were usually gabled with full pediments or of low pitch hidden behind a balustraded cornice. Lofty colonnaded porticoes added to a sense of monumentality. The central section of the Minneapolis Institute of Arts (1913-15) with its monumental ionic portico and sym-



Home of George W. Taylor, Le Sueur

metrical massing is a product of the office of McKim, Mead and White, the major practitioners of the academic movement. Lesser examples include many early twentieth century banks, libraries, and even religious edifices which continued to be built throughout the state until the Depression of the 1930s curtailed the lavish standards of the building trades.

The Renaissance Revival style sprang from a reaction against the overly detailed and "unordered" fashions of the High Victorian period. Promoted by McKim, Mead and White, the style turned to two major sources for inspiration. Most important was the academic study of the Italian Renaissance palazzo, but another source was the earlier Italian influence in United States pre-Civil War architecture. Renaissance Revival buildings are often storiated, with rusticated ground story and smooth surfaced upper stories. Ornamental elements are confined to the windows, cornices, balustraded balconies, recessed loggias and porticos. Characteristics often duplicated earlier designs; however, stone was preferred over stucco or wood as a building material, and cast metal ornament was abandoned in favor of cast or carved stone. A major change in the Renaissance-inspired buildings of the 1890s to 1930s from those of the pre-Civil War years is grandiose scale.

Although the Renaissance Revival is usually associated with large public buildings such as libraries, city halls, and museums, the more affluent members of society chose it for their "city palaces." It also became an accepted mode for hotels and office buildings. These urban mansions, although smaller in scale than public buildings, often surpassed the public buildings in elaboration, interior finishing, and quality of materials. Because of location, cost of maintenance and size, few of these mansions still serve their original residential function. Prominent examples have been adapted for institutional, commercial, or multi-purpose functions. The Frank B. Semple Mansion (1899), a "palace" at 100 W. Franklin Avenue in Minneapolis, is now the Franklin National Bank.

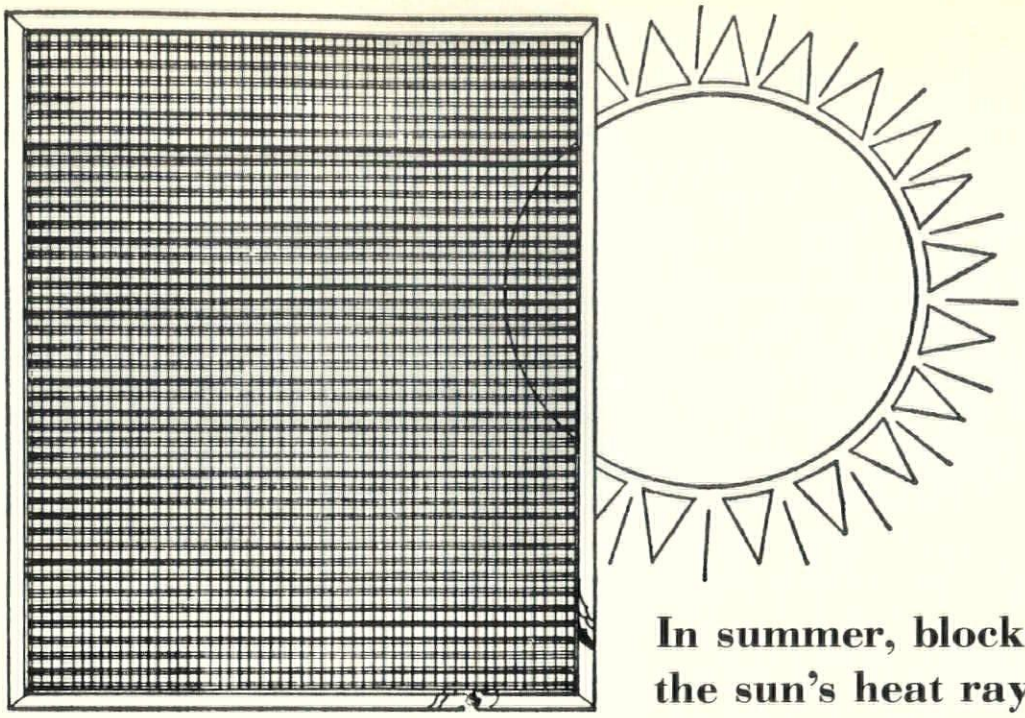
The third major academic stylistic movement affecting the architecture of early twentieth century Minnesota had its roots in medieval England. Designs were taken directly from the English late Gothic, Jacobean and Elizabethan periods. Functions of buildings in the styles ran the gamut

from monumental churches and cathedrals to pseudo-manor houses and cottages. This influence made a strong impact during the "building boom" of the 1920s and, although thwarted by the Depression of the 1930s and the war years of the early 1940s, has continued to survive in some forms up to the present day.

The "Gothic" buildings of this period exhibit a greater sense of massiveness and are decidedly simpler in design and ornamentation than those of the "Victorian" Gothic. The primary construction material for walls (and often window tracery) was stone or other forms of masonry rather than wood as in the earlier Gothic revival. Terra cotta ornament is often employed rather than carved stone. The overall effect of the Late Gothic is one of non-cluttered refinement. The Late Gothic was well received as a representative "church architecture."

In 1908 and 1914 respectively the congregations of the Cathedral Church of Saint Mark and the Hennepin Avenue Methodist Church commissioned Minneapolis architect and medievalist Edwin H. Hewitt to design and engineer new houses of worship. These buildings near Loring Park in Minneapolis are important not only as excellent examples of the architect's extensive training as a Gothicist and engineer but also as vital elements in an overall landscape scheme.

The Tudor, Jacobean, and Elizabethan variants on the medieval revival were most popular in residential and institutional architecture. Dominant features of these styles were windows, gables, and chimneys of distinctive forms. Windows, and often bay windows, are rectangular and are set in cut stone frames with stone mullions. Gables on roofs and dormers are either steep and angular or composed of combinations of segmental curves and straight lines. Doorways are seldom trabeated, being either round-arched or low-spring pointed Tudor. Brick or stone or combinations thereof are primary materials. The Elizabethan and Jacobean styles often employ brick for walls and stone for window frames, parapets, quoins, and ornament. Leaded casement windows are common. Another variant design feature is the introduction of mockhalf-timbering as decorative treatment in gables and walls. Noted examples of these architectural treatments are found throughout the state; however, concentrations are the rule in



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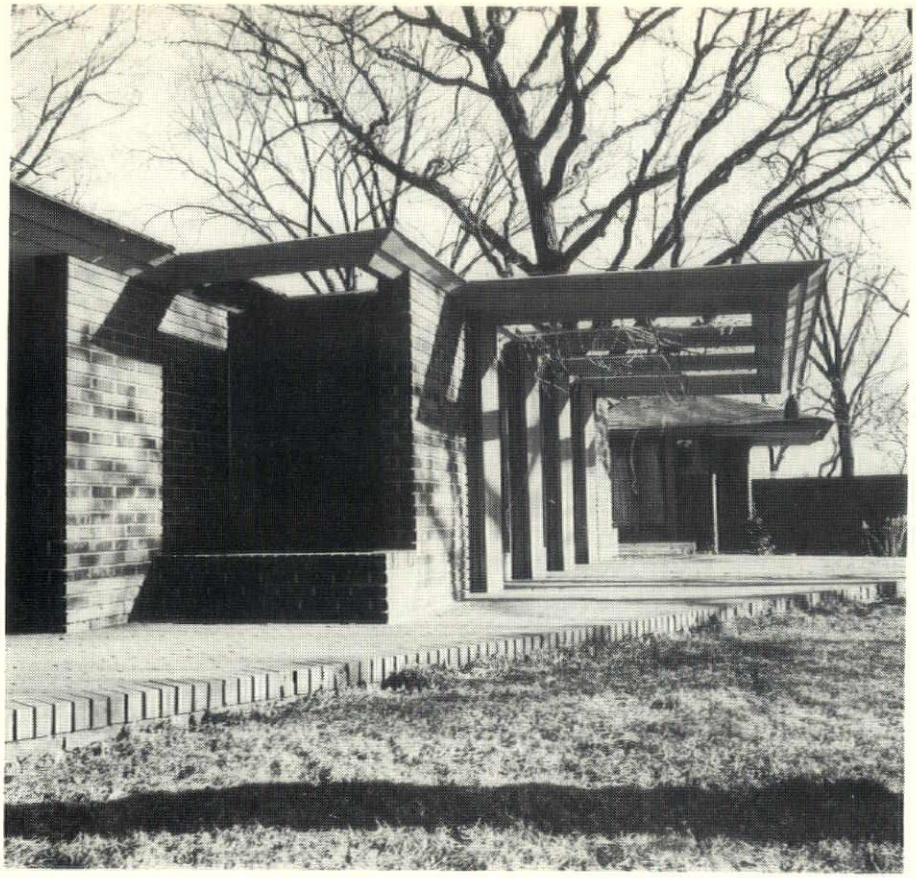
Directly akin to the Neo-Classic was a more lavish and monumental tendency toward the dynamic Baroque forms. The design impetus for these forms often called the "Neo-Baroque," came out of the Ecole des Beaux Arts in France. Although the Neo-Baroque style drew upon classic motifs, it surpassed the rectangularity of classic by a dependency on domes, rounded and curved elements, arches or vaults on clustered columns or piers, and a flamboyancy of sculptural, painted, cast, or gilt features. Due to reliance on rich materials, and detailed and time-consuming craftsmanship, the extremely costly Neo-Baroque style is rare in Minnesota.

In 1896 Cass Gilbert combined Classic, Renaissance, and Baroque features in his much-praised design of Minnesota's State Capitol. A decade later Emmanuel L. Masqueray, who, like Cass Gilbert, received formal architectural training at the Ecole des Beaux Arts, chose the Neo-Baroque for his designs of Minnesota's two largest religious edifices, the Cathedral

C.P. Noyes Cottage, White Bear Lake



Malcolm Willey House, Minneapolis

of Saint Paul (1906-15) and the Basilica of Saint Mary (1907-25). All of these architectural masterpieces are considered irreplaceable and have gained the esteem of Minnesotans.

Although only one major building design by Louis Sullivan, the Northwestern National Bank at Owatonna, exists in Minnesota, the Sullivan influence had a great effect on the development of commercial architecture at the turn of the century. Ironically, the concepts used in the Owatonna bank buildings are exceptions rather than the rule. Built in 1908 as the National Farmers Bank, it was one of a series of banks designed by Sullivan during the later years of his career. It is an exquisite cubiform "jewel-box" of brick, stone, and terra cotta. The round Syrian arch is a dominant design feature carried to full expression through expanses of green and gold stained glass. As in other Sullivan designs, the terra cotta ornament is integral and composed of rich organic and geometric forms in polychrome.

In design of commercial buildings

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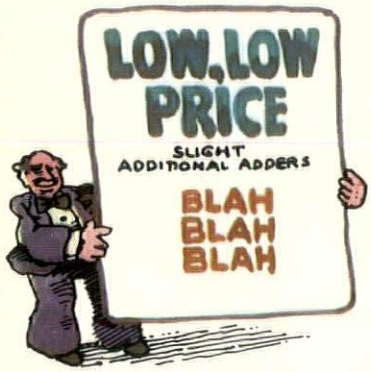

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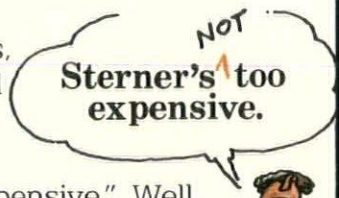

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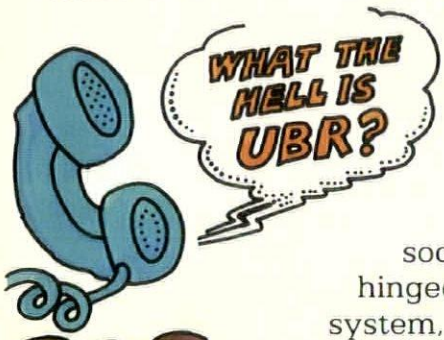

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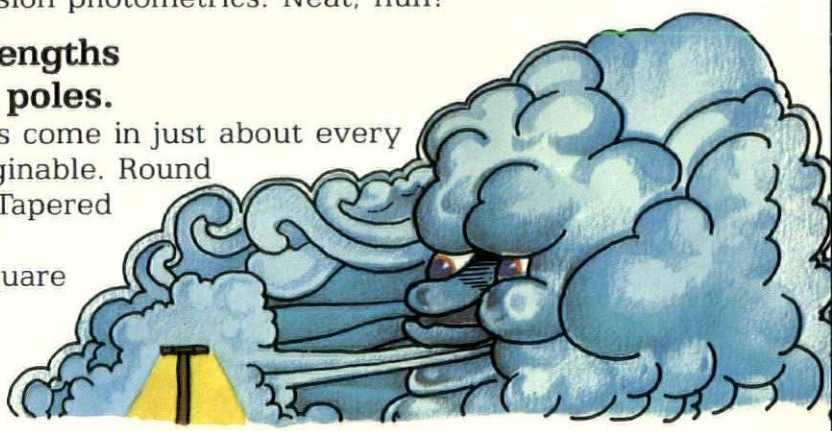

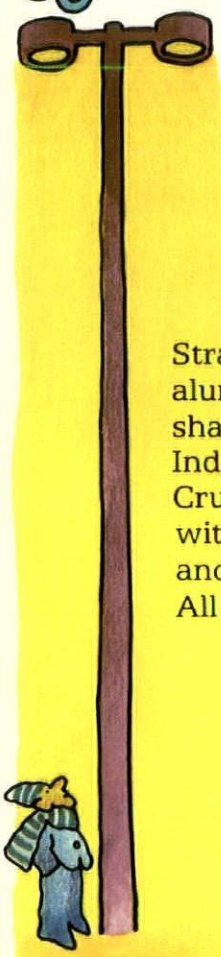

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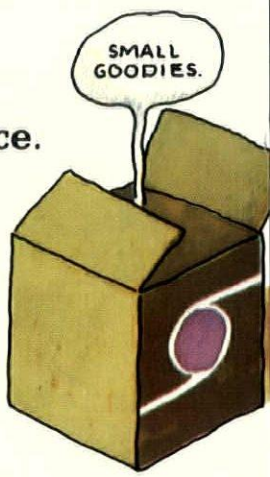

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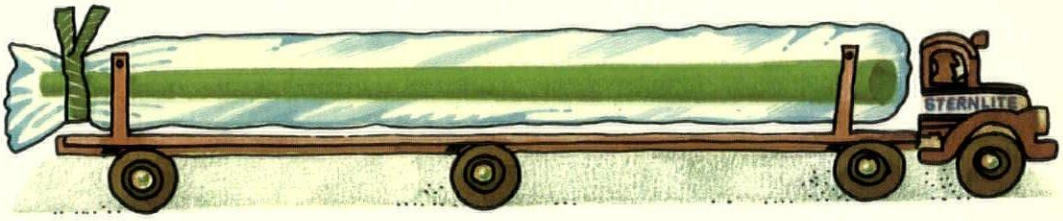

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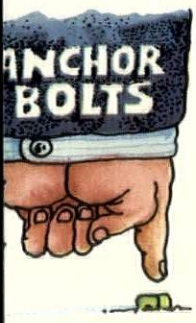

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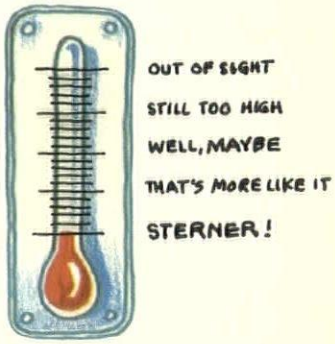

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of major scale, the Sullivan influence appeared in Minnesota as early as 1892 in the design of the now-altered Flour Exchange Building in Minneapolis by Long and Kees. Many Sullivanesque features such as the terra-cotta ornamental entry, the verticality through separation of windows by unbroken piers, and the flaring cornice (now removed) were employed. Similar features attained wide acceptance in commercial design shortly after the turn of the century and are noted in the Grain Exchange (1900-02) and the Advance Thresher and Emerson-Newton Plow Company Buildings of 1900 and 1904 (both Minneapolis).

Greater building heights were made possible through development of the skeletal frame of iron and steel, and elimination of the exterior bearing wall and reliance on interior system of posts and girders allowed the facades of tall buildings to be opened for windows. Such broad use of windows, vertical piers, and panels is a characteristic of twentieth century "curtain-wall" construction. Contemporary development of "fireproof" construction methods also encouraged greater height and scale of commercial and industrial structures. In such buildings terra cotta or other types of masonry were used to encase steel or wooden structural members to retard combustion.

From the turn of the century through World War I, a style called the Prairie Style, which derived inspiration from the works of Sullivan and Frank Lloyd Wright, found favor in residential architecture. Most of the buildings in this style were no more than two stories in height with single story projecting wings, low hipped roofs with dormers, horizontal bands of casement-type leaded windows, and wood banding on a plaster or stucco facing applied over a wood frame structure. Brick was often used in conjunction with the wood and stucco or plaster. Little or no applied ornament is used, and great emphasis is placed on integrity of materials, integration of building and site, and strong horizontality.

The chief components of the Prairie style in Minnesota were the partners William G. Purcell and George G. Elmslie. This partnership, combined Elmslie's wealth of ornamental design experience from Sullivan and Wright with Purcell's knowledge of structure and building technology. A large number of Purcell and Elmslie-designed

Prairie Style residences remain in several locations, although the greatest concentration is in the Twin Cities. Two noteworthy examples are Purcell's own residence (1913) at 2328 Lake Place in Minneapolis and the E.S. Hoyt House at 300 Hill Street in Red Wing.

Carrying on the tradition of the small bank building which developed from Sullivan and Elmslie's work in Owatonna, Purcell and Elmslie also produced several banks in addition to their numerous residences. Relying heavily upon Elmslie's designs for glass and terra cotta facade composition and use of materials, the firm designed banks for Grand Meadow, Adams, Hector, and Winona. The Merchants' National Bank (1911-12) at the corner of Third and Lafayette Streets in Winona epitomizes Elmslie's experienced handling of integral ornament and spatial relationships stressed in the earlier work of Sullivan.

Interest in the historic prototype Gothic cathedrals, Medieval manors and cottages, Renaissance palaces and villas, and Colonial-Georgian plantations continued to supply designs for Minnesota architects during the interim period between the two World Wars. In addition, architects drew from the adobe or pueblo in the southwestern United States. Mock-adobe stucco and "Spanish" tile roofs adorned churches, residences, schools, and public buildings. Most common use, however, was for design of residences as miniature haciendas. Although popular stylistically, such construction was ill-suited to the harsh Minnesota climate and required careful maintenance. Many variations on the Spanish theme continue to find favor in present-day residential deigns.

The Exposition des Arts Decoratifs, held in Paris in 1925, supplied the impetus for the rise of Modernistic (Art Deco) architecture in the late 1920s. This stylistic treatment lasted through the 1930s and into the early 1940s. It was primarily a style of rectilinear ornament and mass. Fluting in pilasters, rectilinear projections, metal, concrete or stone panels, piers devoid of ornament, and zig-zag geometric forms are dominant features. Above all, in larger buildings as well as in small buildings, stress is placed on verticality. Buildings either incorporate towers or are totally confined as towers. The Art Deco influence was concentrated primarily in urban areas and can be seen in commercial buildings, theatres, garages, restaurants, and residences. One of the earliest intact examples of the first or zig-zag phase of the Art Deco style is the interior of the Forum Cafeteria (1929) in Minneapolis. Unfortunately, many interiors executed in this mode have been extensively altered or destroyed. Of the later streamlined phase, which employed extensive use of polished stone, gold leaf, back lighting, and curvilinear elements, the interior concourse of the Saint Paul City Hall/ Ramsey County Courthouse deserves special consideration for preservation.

From the 1930s through the years of post-World War II and on into the present, construction of sizeable buildings in urban areas tended to be in the so-called International style. These are essentially steel or reinforced concrete structural frameworks sheathed in glass, metal, or polished stone panels. This type of architecture is closely associated with urban core renewal and brought about the demise of the earlier Richardsonian, Second Empire or what-not low-profile bearing wall structures. The International style building offered a flexibility, dimension, and facility of construction previously unavailable and therefore gained popularity with city planners and urban architects.

The 1930s also marked the beginning of large scale urban and sururban sprawl. The automobile made possible development of separate communities within reasonable commuting distance from the urban centers. To accommodate the increased demand for housing in these areas prefabrication and mass production of necessity produced small residences of non-descript quality. Such residences include the bungalow, the ranch-style rambler, the split level, and the apartment complex. All are machine produced with little dependence upon skilled craftsmen for fabrication. The result is a building constructed with a minimum of materials and a minimum of labor—contributing to a stereotype design of a non-permanent, throwaway economy product. However, the construction of the late nineteenth century which was also thought to lack permanence has deserved historical record, so must the designs of the present be recorded for the future. □

Charles W. Nelson is Architectural Historian at the Minnesota Historical Society. He was Secretary of the State Review Committee for the National Register and has lectured extensively on the History of Twin Cities Architecture, Nineteenth Century Architecture and Historic Preservation.

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4-year Course	4	*6	10
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More than 200 Minnesota residents entered the contest when it was announced last December. The purpose of the contest, according to coordinator Huldah Curl, was to get everyone thinking about new ways to "make do with what is available in natural resources."

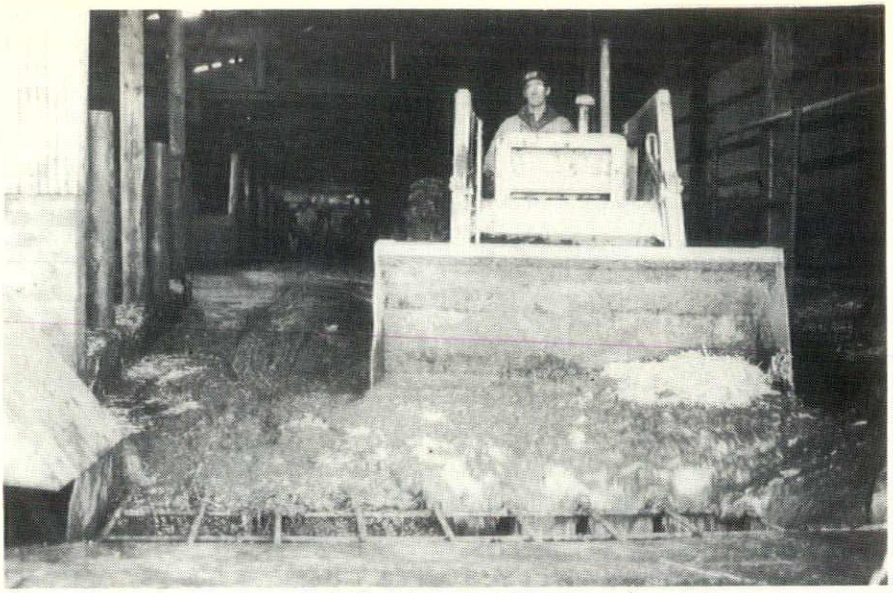
The contest was open to everyone—not just scientists, engineers and architects—and, as a matter of fact, was meant to stimulate the thinking juices of Mr. and Ms. Average Person. Ideas did not even have to be original—just simple, economical and buildable.

This month, six $1,000 cash prizes were awarded and 21 entries received merit awards for ideas from using refuse for energy to building with salvaged materials, applications of solar and wind energy, ways to revive failing cities and year-round planting ideas. And except where inventors have patented or copyrighted their entries, the ideas are up for grabs.

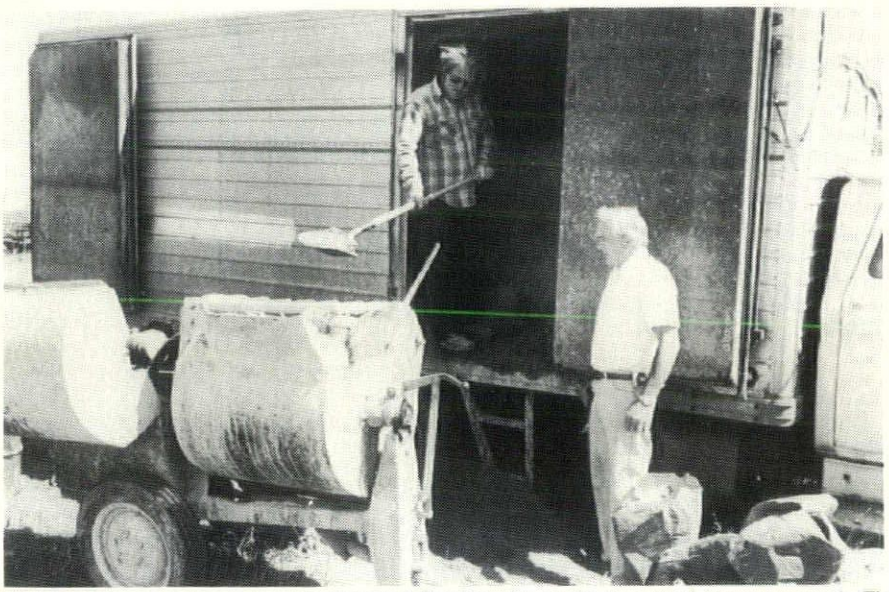
Bruce Hilde, a construction worker from Moorhead, Minn., won $1,000 with his homemade solar collector constructed entirely of scavenged beverage cans. Using cans he had collected from ditches along the highway after an outdoor concert, Hilde built his low-cost collector.

He painted his cans black, punched holes in the tops and bottoms, stacked them in vertical columns between boards and covered them with double glazing—windows of a sort.

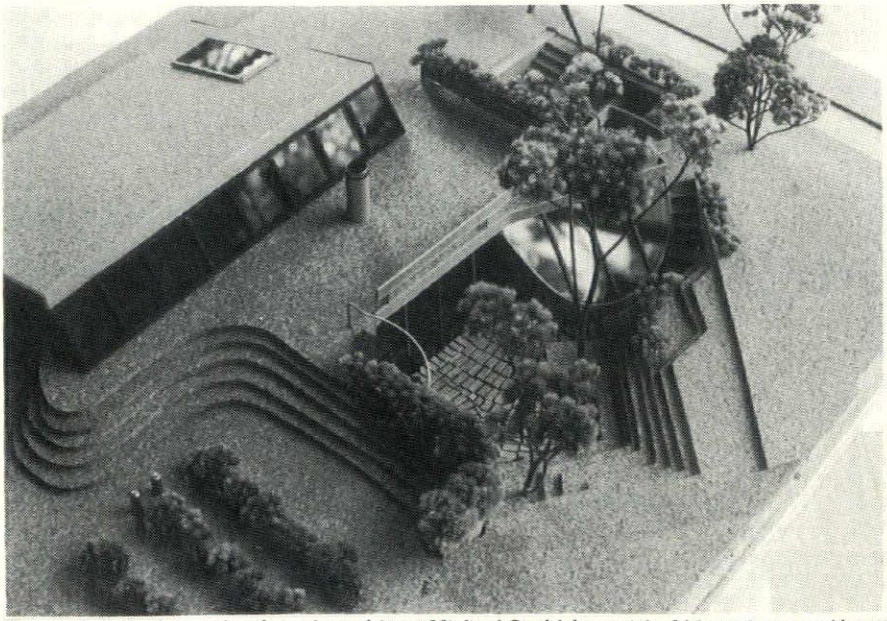
As the sun hits the cans, it is ab-



This manure slurry cuts Eugene Schaffer's waste handling chores from an hour and a half each day to 20 minutes and can hold manure up to six months.



Richard O'Connel shown next to the modifications he made on a used ice-cream truck. The changes save labor, materials and energy in his masonry operation.



The earth is used as an insulator in architect Michael Saphir's model of his underground house.

sorbed and heats the cold air traveling through the cans. The hot air flows into Hilde's attic, and a fan pushes the air into ducts that move it through the house.

Hilde saves $150 a year on his heating bills and is now building solar collectors for other people. He has published a pamphlet with detailed information for building empty-can solar collectors.

Eugene A. Schaffer, a Cannon Falls, Minn., farmer, has been hauling manure from barn to field twice a day for 30 years. Sick of the chore, he invented his winning, time-saving manure slurry and cut his waste-handling chores from an hour and a half each day to about 20 minutes.

Now Schaffer scrapes the waste from his barn into a pit with a tractor. The waste is pumped underground to the slurry, which can hold the waste for up to six months. Constructed from a concrete above-ground silo tank, the slurry was built with plans Schaffer obtained from a silo company.

Minneapolis architect Michael Saphir won $1,000 for his design for an underground house. Using standard techniques for heat conservation and heat exhaust, the design is "an attempt to make underground living an appealing and convenient option for an energy-conscious life style," Saphir said.

His plan can be used on a typical urban lot and uses the best and cheapest insulator available—the earth. In winter, a solar collector heats the structure with the help of a fireplace. Absorbent-radiant floor tiles, facing south, absorb and emit the sun's heat. In summer, the southern exposure is blocked by leaves on trees adjacent to the windows.

After several years of leaking roofs, damaged ceilings and collapsed walls, "Grandmother" Marie K. Goff discovered that asphalt caulking applied to the overlap gaps and to roof hips and valleys solved leakage problems.

Now Goff is working on changing the state building code to make roof caulking mandatory in new homes. Her simple solution netted her one of the top awards in the competition.

Richard O'Connel, owner of the O'Connel Masonry Company in Rochester, Minn., found a way to use an old ice cream truck to solve some of his occupational problems.

O'Connel placed a six-inch pipe with a torch at one end of the truck a few inches off the floor. Along with the existing insulating capabilities of the truck, his modifications made it possible to warm 10 yards of sand, 2,000 pounds of mortar, 300 gallons of water and two pallets of brick during the winter at a cost of $1 per day.

Before making his changes, O'Connel was paying up to $20 a day to heat only four yards of sand, using the conventional torch and culvert system.

Two students at the University of Minnesota, Bob Close and Mike Dunn, developed a plan to revitalize a small, stagnant town nestled in the hills of southeastern Minnesota. One of the key concepts used by the students in their design is the rehabilitation and maintenance of older areas.

In their plan, an old building erected by a local historical figure is turned into a soup shop and trailways headquarters. New trails for walking and biking are constructed on abandoned railroad beds. Unused alleys and "marginal space" are turned into courtyards, gardens or private homes, and an old house is made into a museum.

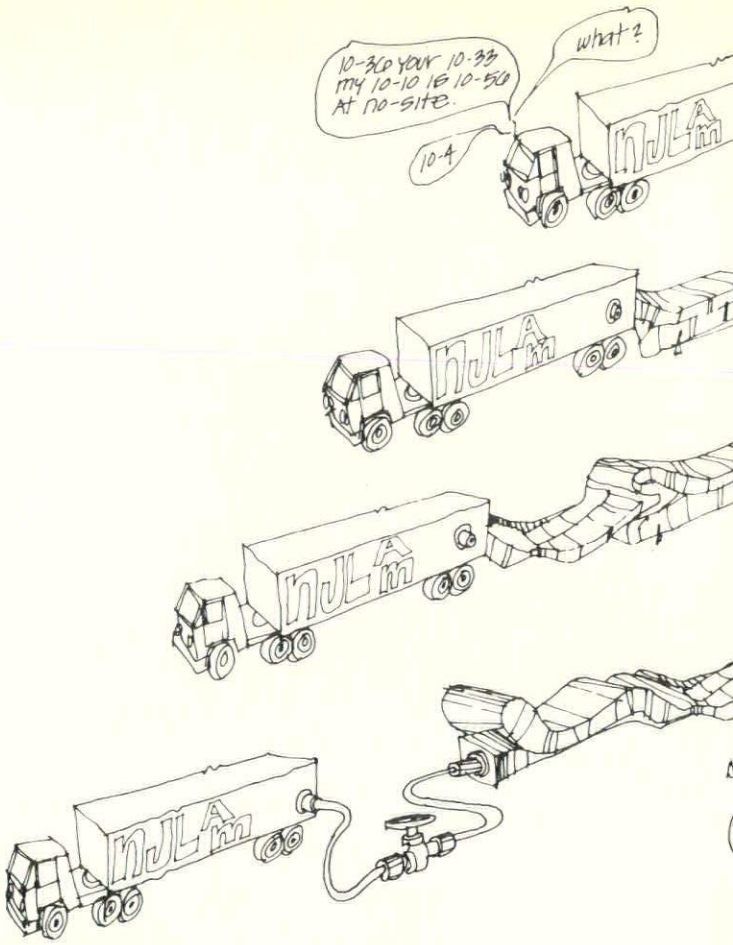
Close and Dunn have combined living and working areas in the same structures and say their plans show residents how to live "in tune with the natural environment."

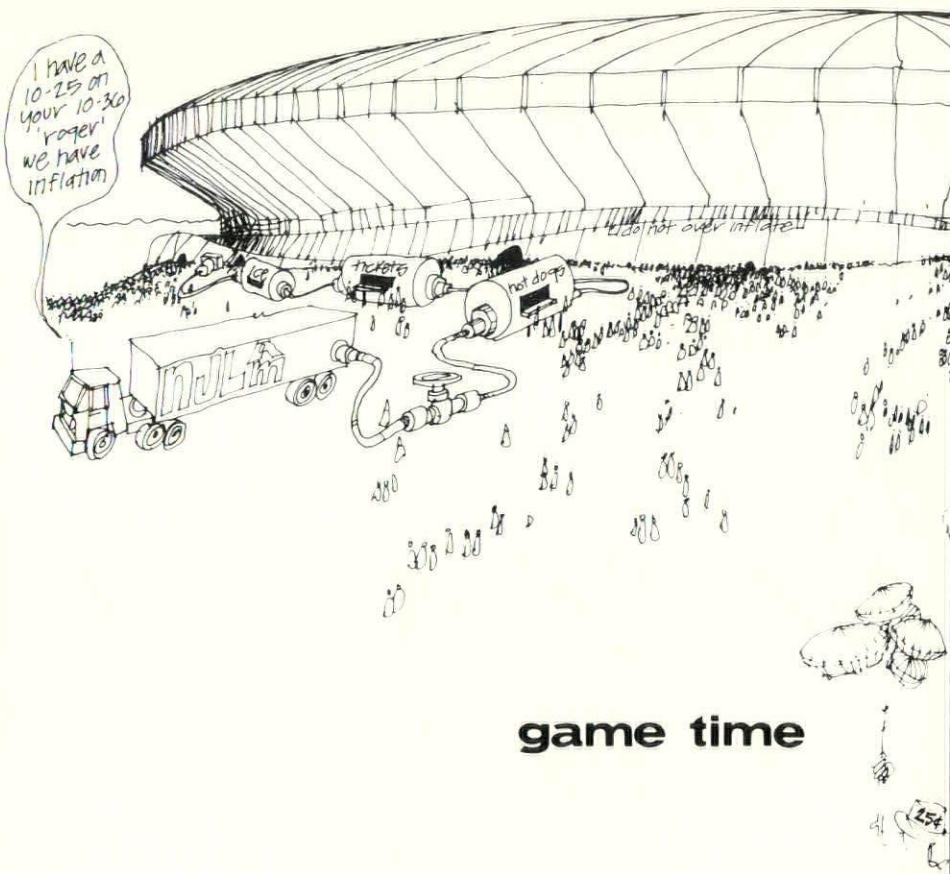
"We feel that the forces that caused the town to happen have been diluted by time, but are still present and are indeed the keys to its renewal," their statement reads.

Merit-award-winner Paul Hannon, Bloomington, Minn., designed a bus that can transport people and their bicycles from suburban and urban areas to recreation areas and back again. Onamia resident Clyde Bye built a wind-powered electrical generator out of old parts and miscellaneous junk. Peter Carlson's nonmechanical air conditioner resembles a greenhouse, with an awning that lets in ventilation in the summer and a little heat in the winter. And the list goes on.

Plans for the cash-winning and merit-award-winning designs will tour the Upper Midwest this summer in an open exhibit. Contest sponsors have prepared a catalog of entries in the exhibit to give viewers more information, should they wish to use some of the ideas themselves.

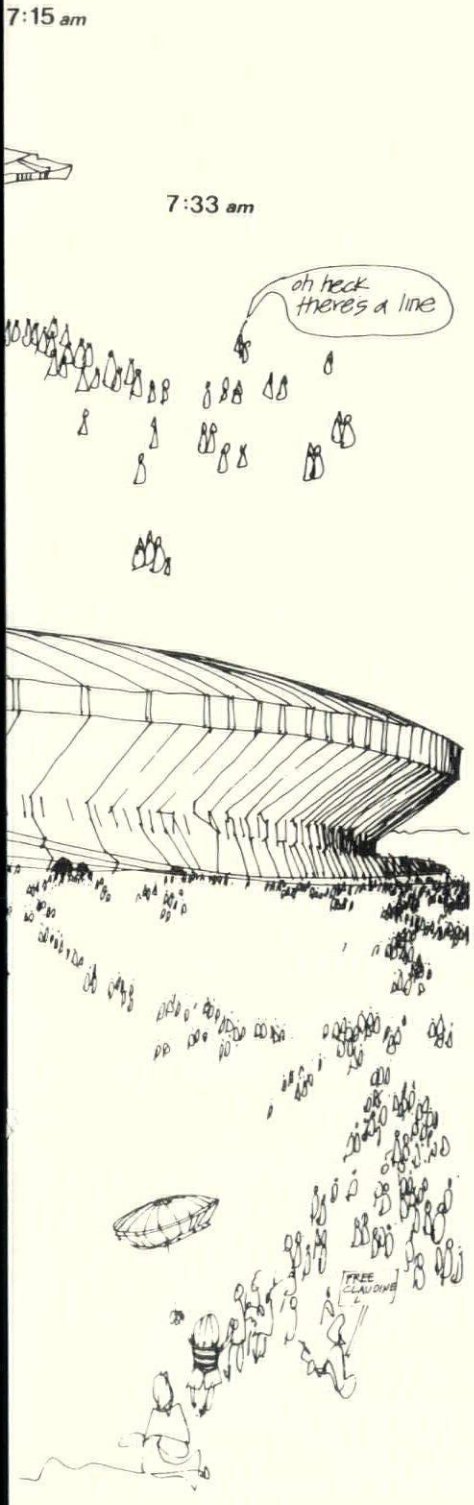
The catalog, which will be published this summer, can be obtained by writing to Huldah Curl, Associate Director, Continuing Education in the Arts, 320 Westbrook Hall, Minneapolis, Minn. 55455 or by calling (612) 373-4947.





game time

ONE MORE STADIUM



The New Jerusalem Life Style and Air Mattress Company (NJLSAMC) will request the Metropolitan Sports Facilities Commission to grant immediate approval to NJLSAMC's stadium plan, featuring a portable, expandable, truck-encased stadium, which, claims NJLSAMC officials, is the only stadium proposal which meets state law, as the Minnesota State Legislature enacted a "No-Site" stadium bill.

Industry Square, Bloomington, Midway, Coon Rapids, Hilltop, Hibbing, Northwest Angle—all can be accommodated by the trucked stadium which can bring the joy of sport to all Minnesota residents.

"Today's problems must meet tomorrow's answers", states trucked stadium spokespersons. "Our stadium can be expanded to any size, so each game can be played to a full-house, standing room only crowd, whether it be as colossal as this year's Superbowl or as modest as Mayslack's annual arm wrestling tournament."

The stadium's shell material—urban fabric—won't rust like steel or crack like concrete—just a little tire patching here and there will keep it in shape. However, some city planners who also extensively use urban fabric fear that its use here may overpopularize it and create a run on the material.

The trucked stadium will save money on grounds maintenance as there's no grounds to maintain, no property taxes, just keeping up the truck trailer license tabs.

The stadium is also ecological—the air used to expand the stadium will be recycled from state legislature sessions.

"We're going all the way," says NJLAMC, "and we aren't going to run out of gas."

Architects for this stadium proposal are the Design Collective of Minneapolis. □

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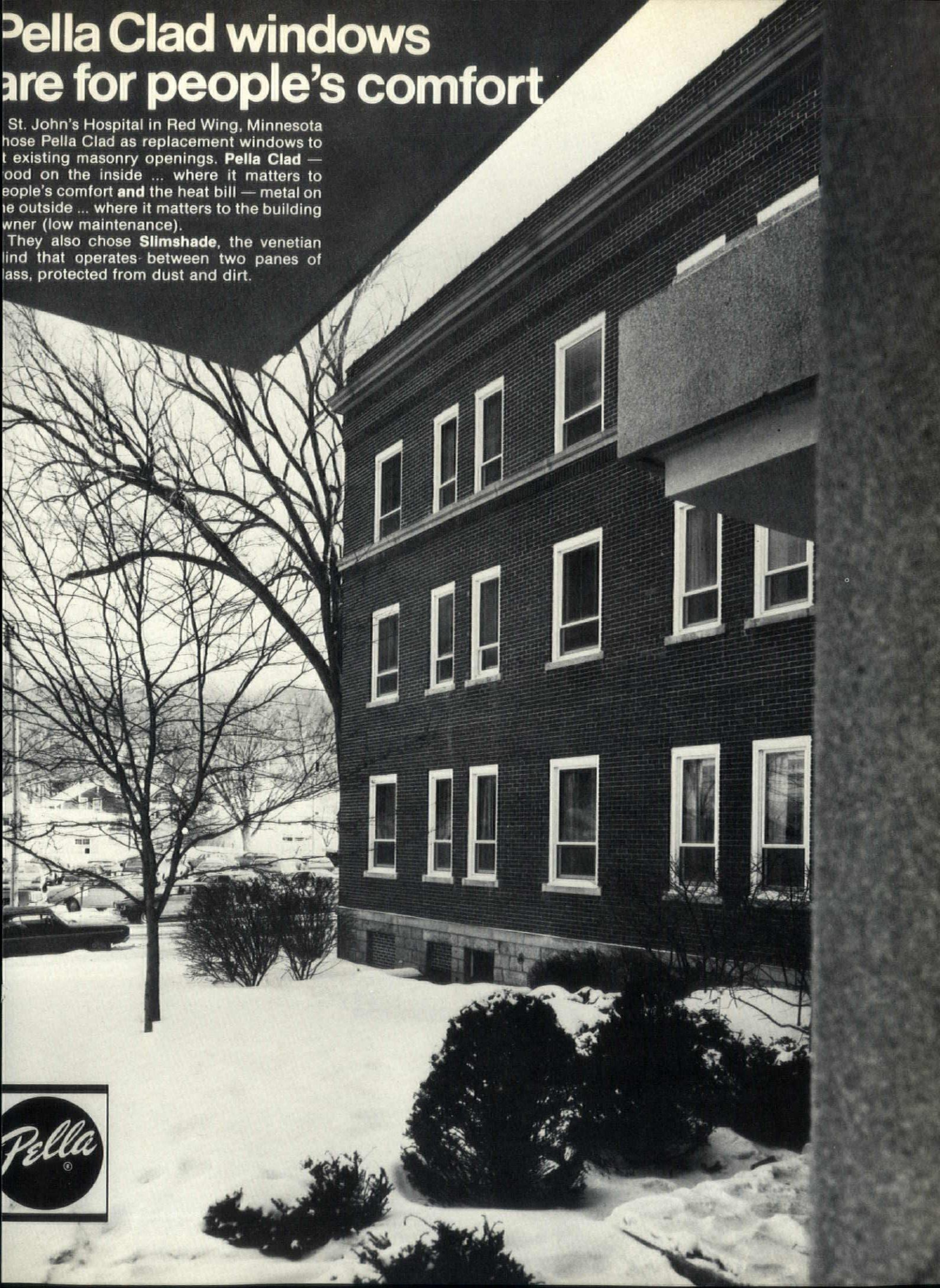

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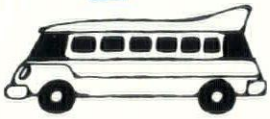
WOMEN IN AMERICAN ARCHITECTURE

Though not widely recognized, the role of women in architecture has been a significant influence on American lifestyles. The success of women in this field is revealed in a retrospective exhibition currently showing across the country.

"Why yes, I am a little homemaker–I'm in the construction business and I build small homes!"

To define the case of women as master builders, the exhibition, "Women in American Architecture: A Historic and Contemporary Perspective," documents 200 years of achievements by women architects and designers. The exhibition is organized by The Architectural League of New York thorugh its Archive of Women in Architecture.

"Women in American Architecture" was on display at the Brooklyn Museum and at the Massachusetts Institute of Technology Hayden Gallery. It will be shown at the Colorado Springs Fine Arts Center from August 15 through September 30; the Houston Public Library from October 20 through December 4; and the ArchiCenter of Chicago School of Architect Foundation from January 10 through February 28, 1978. Additional locations will be added to this schedule at a later date. □

What does Kentucky  Fried Chicken, A County Jail,   A Fire Station, A Telephone  Building, A  Bus Garage, all have in common?

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