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IOWA ARCHITECT

JULY/AUGUST/SEPTEMBER 1974

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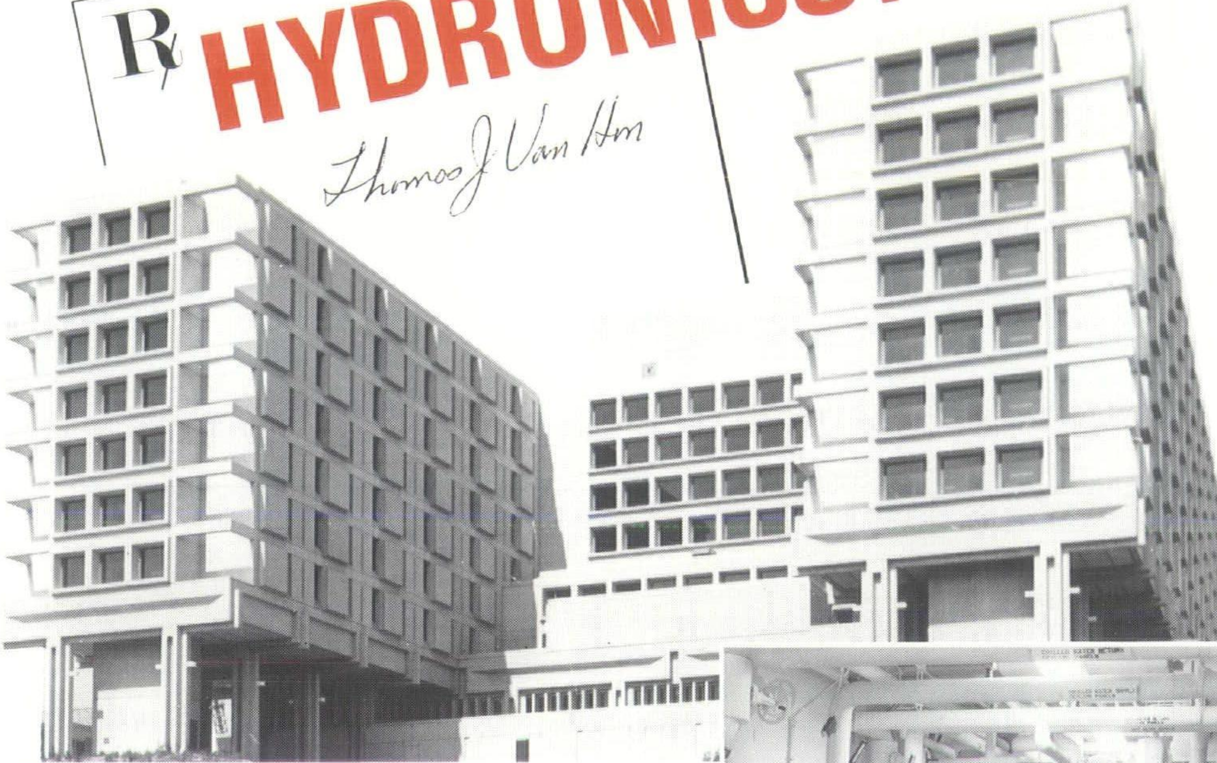
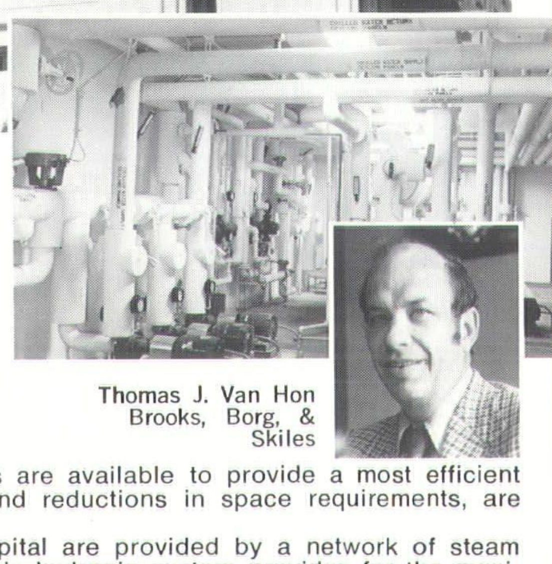
℞ HYDRONICS!

Thomas J Van Hon





Engineer's prescription for the new Mercy Hospital addition

Thomas J. Van Hon
Brooks, Borg, & Skiles

Hydronics, the science of heating and cooling with liquids, was chosen as the primary source of air conditioning for the new Main Towers at Mercy Hospital. A hydronic heating and cooling system for patient rooms gives each occupant the necessary control of climate needed for proper health care. Energy savings are effected by a reduction in required outside air dependence.

Hydronic systems are limited only by the imagination of the designer. A wide variety of simple control elements are available to provide a most efficient heating and cooling system. Versatility in piping layout, and reductions in space requirements, are two great advantages in working with hydronics.

Energy sources for the heating and cooling of Mercy Hospital are provided by a network of steam and chilled water, piped from a central source plant. This hydronic system provides for the maximum efficiency needed in the operation of a central source plant.

Each step of climate design for Mercy Hospital was carefully analyzed and evaluated to yield the most efficient operating conditions and maintenance-free installation and operation. We feel that this hydronic system more than met our basic requirements.

— Thomas J. Van Hon

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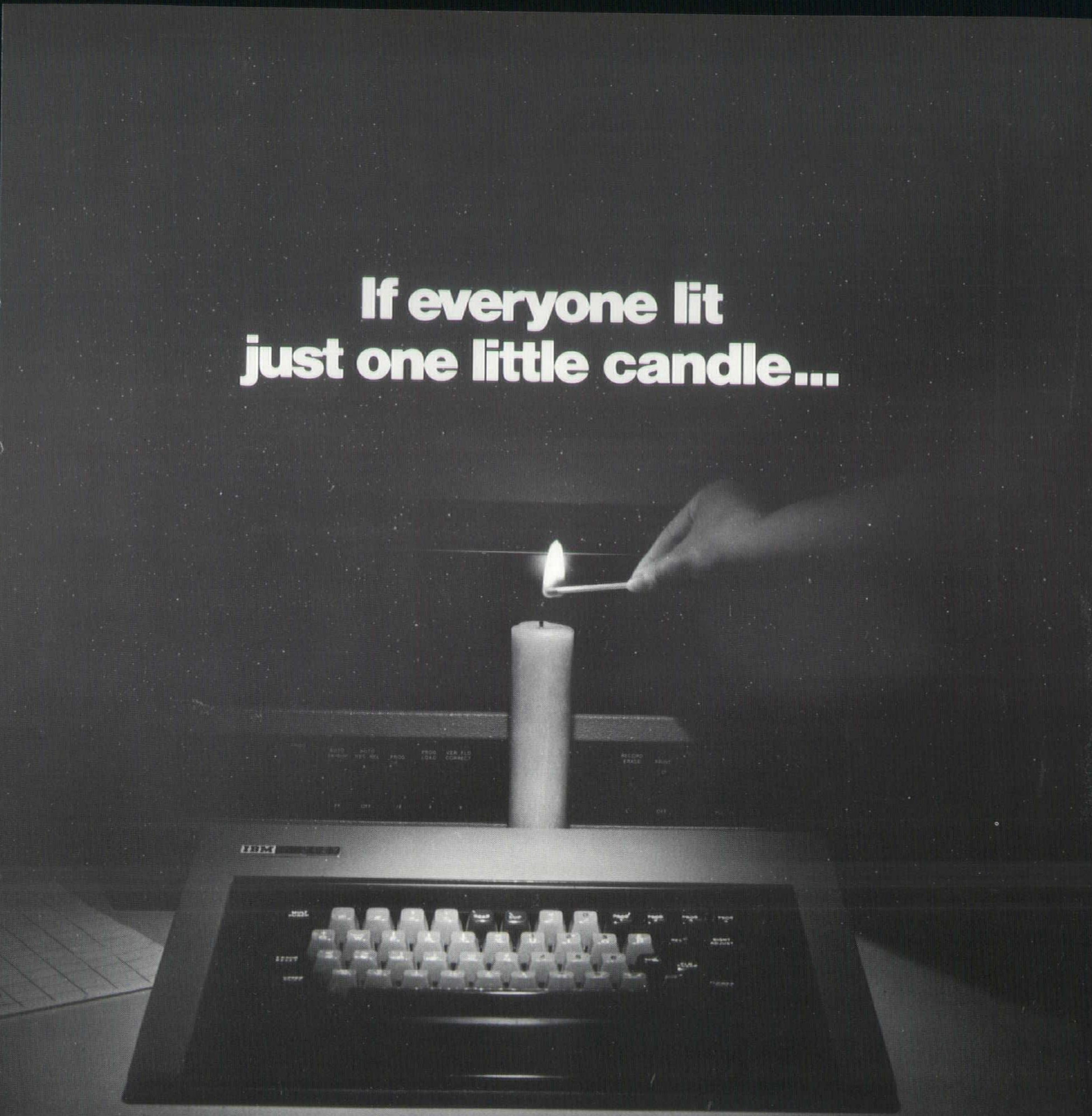
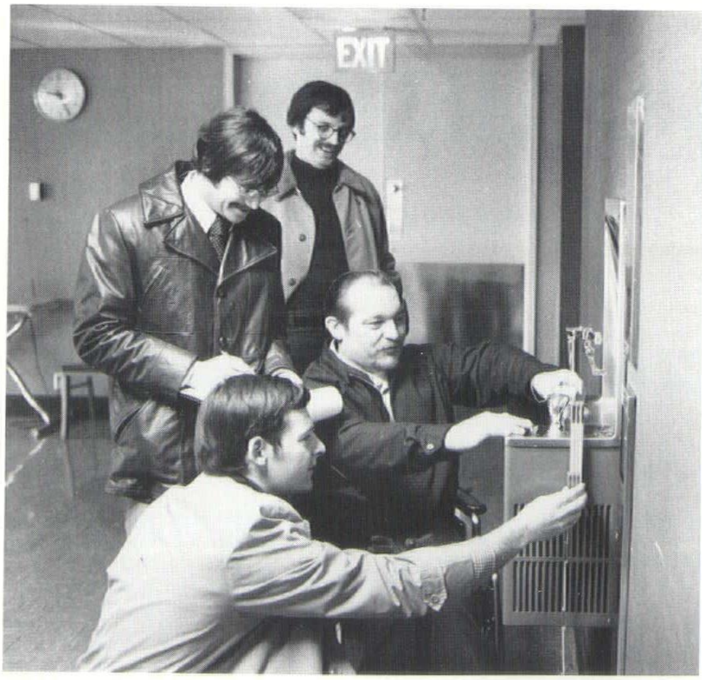

If everyone lit
just one little candle...
IBM

Accessibility– The Law and the Reality

An interesting and eye-catching scenario took place at 34 locations in Iowa during the winter of 1973-74. In each case a team of three persons descended on the institution owning a building completely or partially funded by federal funds. With full cooperation of the owner this team spent several hours in the building checking it against a predesigned checklist for accessibility to the handicapped. On each team there was an architect, a volunteer recorder and a wheelchair consumer — not a fully able bodied individual pretending to be confined to a wheelchair but one actually so confined. Following the survey the three team members completed their report and submitted it to the Steering Committee for tabulation and analysis. All of these were summarized and included in a comprehensive report which has the title of this article and which can be used as a model "why and how" for similar projects in other states and localities.



Public law 90-480 was passed by the 90th Congress in 1968. Its purpose was to insure that federally funded buildings be so designed and so constructed as to be accessible to the physically handicapped.

The President's Committee on Employment of the Handicapped, staffed by Mr. Harold Russell, Executive Director, developed the strong feeling, without having adequate proof, that these buildings designed and constructed since 1968 very considerably in their degree of accessibility.

The project began in Iowa when Ted Noakes AIA of Bethesda, Maryland, a member of the President's Committee on Employment of the Handicapped and Chairman of the subcommittee on Architectural Barriers, came to Iowa and visited with John McKlveen, then President of the Iowa Chapter, about the possibility of the Iowa Chapter of the American Institute of Architects undertaking a pilot study with several objectives in mind. These objectives would include a development of a specific method of surveying a selected group of federally funded buildings, an indepth analysis of the degree to which individual buildings and all buildings on the average meet the requirements of the law and the intent of congress in its passage, and a third objective of providing from this study recommendations for improvement in the law so that the intent would be more fully realized.

The Iowa Chapter officers and the membership received the request with enthusiasm. The next step was a meeting with two other Executives; Mr. Rolfe Karlsson of the Iowa Easter Seal Society, and Mrs. Evelyne Villines of the Governor's Committee on Employment of the Handicapped. At this meeting plans were developed for a Steering Committee chaired by Bob Broshar AIA, a past president of the Iowa Chapter, of Waterloo. In addition to the three staff members and chairman, the Committee included Mrs. Ann Baker of Waterloo, then president-elect of the Iowa Easter Seal Society, Mike Nadler and Don Westergard, on the staff of the Governor's Committee, Joe Powelka and Rod Kruse, architecture students at Iowa State University.

The report has been mailed to owners of the buildings surveyed, with thanks for their cooperation and has been made available on request to many associations and persons active in the field. Any Chapter AIA, with appropriate co-sponsors, can use the report as a specific step-by-step program for a similar survey. The General Services Administration, national and regional offices, provided lists and positive cooperation in the whole project.

The report includes not only conclusions but a full description, with permission of the American National Standards Institute "Specifications for Making Buildings and Facilities Accessible to, and Usable By the Physically Handicapped (ANSI A117.1 — 1961) (reaffirmed 1971). It includes the accessibility checklist, developed by the Steering Committee and refined after an initial inspection of a Des Moines Building, and a tabulation of the results of the checklist after completion of the survey by teams each of which included an architect member of the Iowa Chapter AIA, a wheelchair consumer actually confined to the use of a wheelchair, and a volunteer to provide the recording of the results of the survey. The Steering Committee went one step further and refined for the fourth time the accessibility checklist comprehensive, more accurate and simpler to understand. This is also included in the report.

On July 18th the study and report was noted on the floor of the United States Senate by Senators Church, Randolph, Williams and Clark of Iowa. Senator Clark's remarks, included in the Congressional Record along with the first three sections of the report, are reproduced here for information of those interested in fulfilling their local obligations toward this worthwhile cause.

Mr. President, about one out of every seven Americans has a permanent physical disability. But all of the available statistics, facts and studies show that these individuals can be productive citizens if they are given a full opportunity to participate in our society. To achieve this goal, it is absolutely essential that public facilities and buildings be accessible to the physically handicapped.

In 1968, under the leadership of my friend and colleague Senator Randolph of West Virginia, Congress took an important step with the enactment of the Architectural Barriers Act. This legislation already has had a major impact in opening the doors to new employment, service, and other essential opportunities for handicapped persons.

Recently, a comprehensive study on the provisions of Public Law 90-480 was made by the Iowa Chapter of the American Institute of Architects, in conjunction with the Easter Seal Society for Crippled Children and Adults of Iowa and the Governor's Committee on Employment of the Handicapped. Their conclusion: The spirit of the law still has not been fulfilled.

More than 3,000 buildings have been constructed with some form of Federal support since the Architectural Barriers Act became a law. In Iowa, 34 projects have been federally funded since 1968. And, these 34 buildings were thoroughly investigated to determine whether they met the standards and requirements of the Architectural Barriers Act.

The report gave this candid assessment:

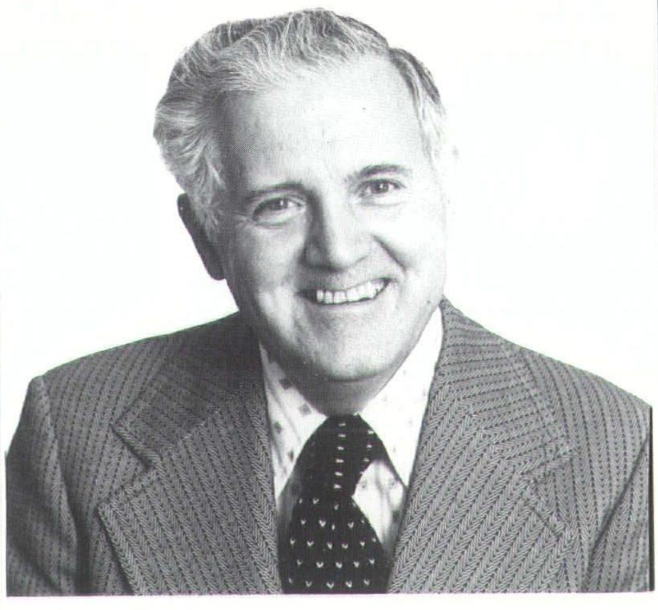
Although there have been great improvements made as a result of the law, too many deficiencies were noted to judge the majority of projects built under the law fully accessible. There is an apparent lack of full understanding of the problems of the physically handicapped on the part of the design professionals, building owners and agencies administering federal funds.

This condition, however, need not persist. This society should not be "off limits" for the disabled. With a clear-cut sense of commitment and sound policies, facilities can be made barrier free for the handicapped, and at a reasonable cost.

Mr. President, in many respects Iowa has been a leader in removing architectural barriers for aged and handicapped persons. The recent study by the Iowa Chapter of the American Institute of Architects on "Accessibility — the Law and the Reality" is an outstanding example of this leadership.

Despite some of the sobering conclusions, it remains optimistic:

> Fortunately, we are in a time when the potential and value of each human life is recognized. It is the fervent hope of the agencies sponsoring this survey that it will serve as an example for similar projects across the country,that as a result there will be an ever increasing circle of awareness of what needs to be and should be done to provide buildings which recognize the independence and dignity of all handicapped persons.



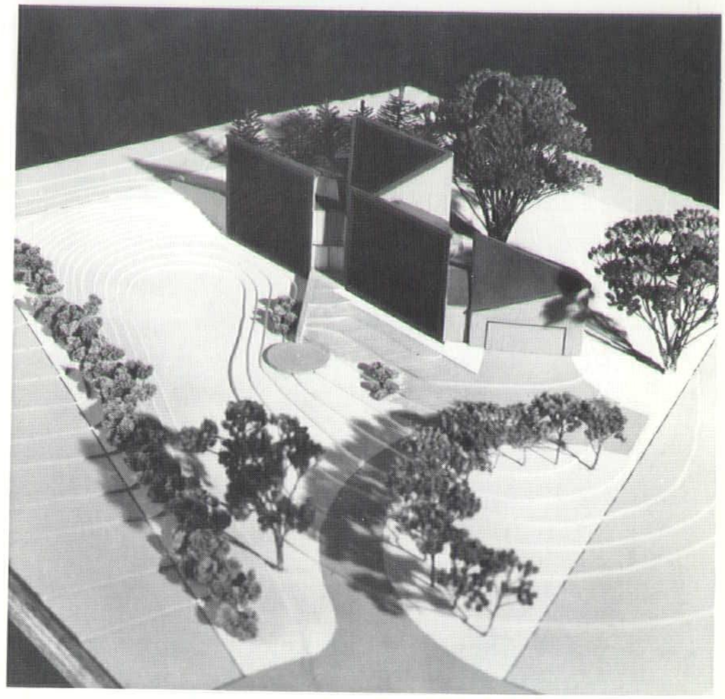
The Omaha Solar House

Hansen Lind Meyer has also been working on a project in Mead, Nebraska on a solar energy office building.

In ten years, it is anticipated that twenty percent of all the new building starts in the United States will incorporate some type of solar heating system. By the year 2000, 23 million square feet of collector will be sold annually. The obvious result will be a major impact on the architecture of this and other countries of the world. Architects will find more and more that clients will ask them to consider solar energy as a heating and cooling method. The architect should, therefore, understand the fundamentals of solar space conditioning and what its implications are to design.

Two categories of solar design are beginning to emerge. These are classified as active and passive solar design. Active solar design is directly related to mechanical systems which convert incoming solar radiation to space conditioning energy. Passive solar design utilizes building technology and spacial organization to indirectly convert exterior climatic conditions to interior comfort. Both active and passive design require careful and extensive micro-climate analysis for successful application.

A structure can be designed solely along the lines of passive concepts. Prominent among these concepts would be natural gravity ventilation, transpiration, and thermalnertia properties. Conversely, a structure can be designed strictly with active solar concepts. A good example of this is the retrofit of solar collectors to the Timonium, Grover Cleveland, Osseo, and Fauquier schools. The best result in solar design would be a combination of both active and passive concepts. The solar house, as well as the solar office, exhibits both active and passive design features which combine to create efficient energy conserving structures.



The principle of solar heating requires collecting and concentrating the radiant heat from the sun; storing this heat and distributing the heat through the conditioned space. This description dramatically oversimplifies the complex architectural and mechanical problems incurred when trying to build and operate a practical, economical solar heated house. The solar heated house being built in Omaha, Nebraska, is expected to be the nation's first demonstration of a commercially practical solar heating system.

Not every building is adaptable to solar heating; in fact, special architectural considerations need to be made to even consider solar heating. The structure must be adequately insulated to lower the overall heat loss by using materials resulting in U values of 0.05 or less. Other design considerations, such as earth berming, minimum window area, insulating panels in lieu of curtains, and windbreaks, are used to lower the heat loss to approximately 20 BTUH per square foot.

One of the unique features of the Omaha house is the use of transparent solar heat collectors. This is the first such installation in the country. This particular collector was designed by James Schoenfelder and is described fully in the Iowa State University Patent Disclosure No. 361, entitled "A Solar Wall System". Still another unique feature is the development of a new type of container for housing the heat storage material, sodium sulfate decahydrate. The new container hopefully will solve the problem of reduced heat storage capacity due to phase change cycling of the eutectic salts.

Data collected from the construction and operation of this house will be a valuable asset to designers of future systems using solar heating and energy conservation.

Two types of solar heat collectors are used. During sunny hours, cool air is pumped through the collectors and is heated. Hot air from the collectors is pumped to the storage room and circulated when required through the house in a conventional duct system. The hot air collectors contain semi-transparent plates which permit

visibility and allow light to enter the structure while collecting heat. The hot air collectors are mounted on the south vertical walls to intercept maximum solar radiation during the cold winter months and to intercept minimum amounts during the hot summer months.

The second type of solar heat collector is the hot water type. The hot water collector will not be installed in the first phase of construction of the Omaha house, but will be added at a later date. This collector will generate hot water for both space conditioning and domestic hot water. The hot water collector is mounted in the roof at a 45 degree angle to optimize collection efficiency for year-round operation.

Both latent and sensible methods of heat storage are being used in the house. The primary heat storage material is sodium sulfate decahydrate. This material undergoes a phase change at about 90 degrees Fahrenheit with a resulting heat storage capacity four times greater than an equal amount of water. The heat storage containers and all mechanical equipment are located in the basement.

Theoretically, enough heat is retained in storage to heat the house for ten cloudy days, however, the practical limit obtained will be approximately five days. Although the house has been designed to obtain all of its heat from solar energy, a backup heat source has been installed. Because weather conditions are unpredictable, a heat pump as well as an electric element, are included. The heat pump, when operating, will draw the storage room temperature down from the normal 100-80 degrees Fahrenheit to 40 degrees Fahrenheit; thereby utilizing the sensible heat storage of the salt as well as the latent heat storage. If additional heat is still required, the electric heating element will operate.

The heat pump will be used during the summer months for cooling. Towards the end of the cooling season, the heat generated by the heat pump will be diverted to the heat storage room. The heat pump then preheats the storage room for winter while cooling the house.

Maintenance of the solar heating system is similar to that of a conventional heating system. Replacing dirty air filters will constitute the major portion of the maintenance program.

At the present time, the inclusion of a solar heating system will increase the construction cost by ten percent. A life cycle cost study shows that this added cost should be made up in seven and one-half to ten years through fuel savings.

The solar heated house near Omaha contains many unique architectural features which help conserve energy. These features are listed below, along with other pertinent statistics.

Owner: John McLaughlin president; Mid-America Industries, Mead, Nebraska.

Architect: Hansen Lind Meyer; Carl D. Meyer, Project Director; Richard Kruse, Project Architect; James Schoenfelder, Designer and Project Engineer.

Location: Lot No. 24, Equestrian Hill Development on Highway 6, South of Ashland, Nebraska.

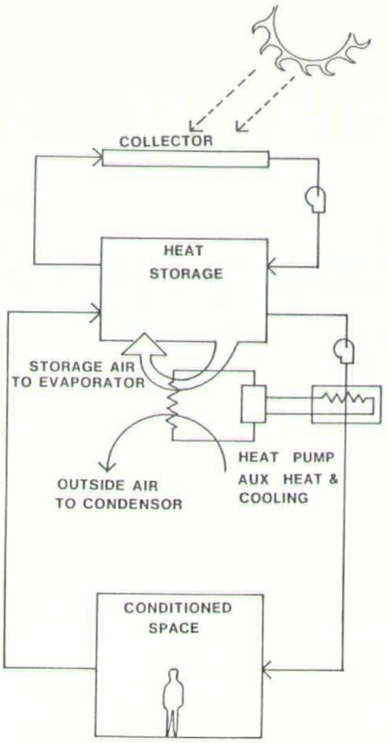
Construction: Wood frame using 4¾″ studs. The stud space is filled with plastic bead board insulation (Dylite). The exterior is textured plywood siding with ½″ sheet rock interior finish. This wall develops an overall "U" value of 0.049.

Floor Area: 2,516 sq. ft. usuable floor area. The estimated construction cost is $67,932 plus $10,000 for the solar equipment. This figure excludes land cost.

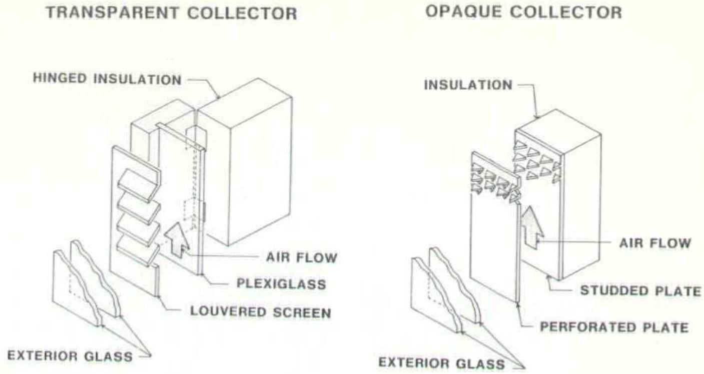
Data Construction: The house will be fully instrumented and continuously monitored for one year. All operating modes will be evaluated to determine the system's overall efficiency.

Design Considerations:

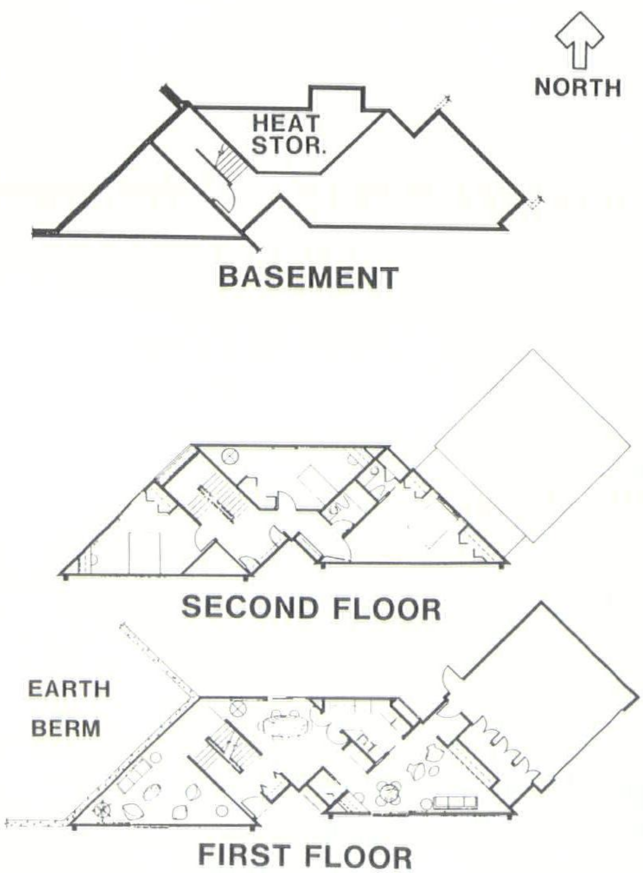
1. No wall faces directly east or west. This reduces the cooling load caused by intense summer solar radiation. Furthermore, the northeast wall on the lower level is shaded and insulated by the adjoining garage.
2. The northwest wall is shaded and insulated by an earth berm, which over a thirty-year period will reduce the heating and cooling cost by an estimated $3,000. Life cycle studies indicate that additional construction costs will be made up by fuel savings in seven and one-half to ten years.



SCHEMATIC: SOLAR HEATING SYSTEM



3. The northwest corner of the site is planted with evergreens to act as a windbreaker.
4. The window area is kept to a minimum; 6% of the actual floor area. Curtains have been replaced by movable insulation panels to reduce heat loss.
5. The structural system consists of triangular modules joined with rectangular connectors. This configuration allows large collector areas on the hypotenuse while limiting the enclosed volume. The collector area to floor area ratio is .67 to 1. This system permits considerable flexibility in floor plan and site orientation. (These modules are designed to be pre-assembled).

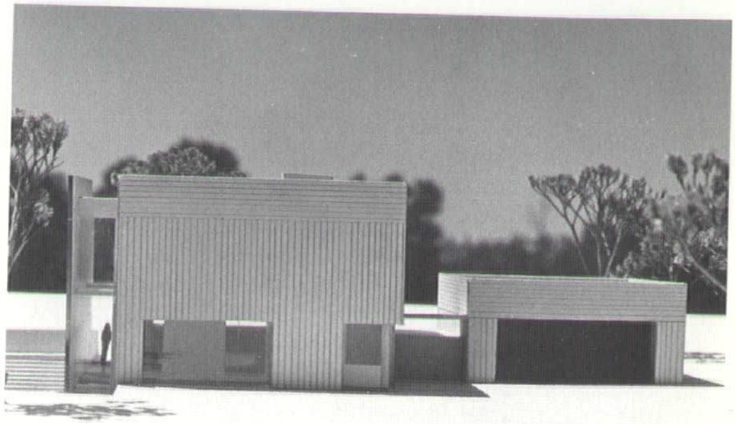


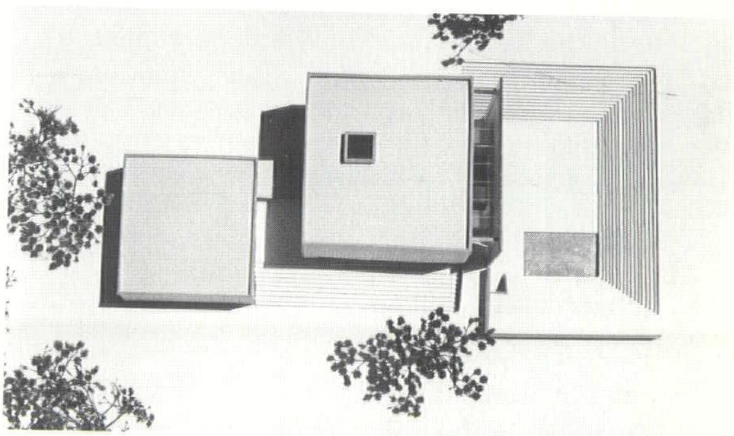
A Solar Electric Habitation

Ray Crites FAIA, Professor of Architecture, David Block, Assistant Professor of Architecture and Paul Sidles, Associate Physicist at Ames Laboratory, Iowa State University have recently been conducting investigations into the feasibility of Solar-Electric Energy use for residential housing.

The following studies were made possible by a grant from Iowa Power and Light Company of Des Moines, Iowa with additional funds from the department of Architecture, Iowa State University.

The recent shortages of fossil fuels dramatically points to the need to find alternate energy sources so that the depleted natural sources may be conserved. A large portion of our nation's energy usage comes from residential housing requirements and therefore it seems reasonable to look for alternate energy sources which could be utilized in this area.





A Solar-Electric Habitation was selected as a research model because it utilizes a predictable, non-depletable, non-polluting energy source as a primary system coupled with proven mechanical equipment.

Though living patterns may vary as society adapts to diminishing fuel supplies, basic psychological needs for open space, comfort, and convenience will remain. A prototype habitation was designed sympathetic to energy conservation and human needs.

The habitation required a fresh design approach that considered energy source and conservation in the conceptual design phase. The following parameters were considered, many of which are applicable to habitation design regardless of primary energy source.

LOW ASPECT RATIO: Aspect ratio is the length of the structure divided by its width. Since heat transfer is a direct function of surface area, attempts should be made to enclose the maximum useable space within the minimum envelope.

REDUCED TEMPERATURE DIFFERENTIAL: A large reduction in heat transfer is realized by reducing the exterior temperature of the envelope.

A. REDUCED PROFILE: The temperature of the earth a few feet below grade is usually lower than the air in the summer and warmer in the winter.
   Heat loss reductions approaching 85% are obtained on portions of walls below grade. Heat gain for summer cooling is negligible.
B. EARTH BERMS: The placement of earth against the structure above grade has a similar effect as mentioned above but to a lesser degree.
C. EXTERIOR EARTH SCULPTURE: Selected placement of earth will create air foils allowing the passage of wind over and around the structure, reducing exterior skin energy loss.
D. EXTERIOR PLANTINGS: Selected plant species and proper placement thereof will also create air foils resulting in the benefits mentioned above.

REDUCED HEAT TRANSFER: Heat loss and gain is directly proportional to the efficiency of the exterior envelope as a transfer retardent.

A. FEDERAL GUIDELINES: The following federal suggested guidelines based on a Central Iowa location are recommended for opaque walls and roofs.

   $Q/A = 4.8$ BTU's/Hr/Ft² for walls where $Q/A = U$ (ti-to)

   $Q/A = 3.6$ BTU's/Hr/Ft² for roofs where $Q/A = U$ (ti-to)

U = overall coefficient of thermal transmission (air to air)

ti = indoor design temperature in °F

to = outdoor design temperature in °F

The following Federal guidelines for the envelope as a whole are recommended.

$U_oA_o = .20$ where $U_oA_o = U_wA_w + U_fA_f + U_dA_d$

U_oA_o = overall thermal transmission

U_wA_w = U value of opaque surface x the area of opaque surface as a percentage of the total envelope.

U_fA_f U value of fenestration x the area of fenestration as a percentage of the total envelope.

U_dA_d = U value of operable doors x the area of operable doors as a percentage of the total envelope.

These performance specifications allow ample latitude for varied design solutions.

B. INSULATIVE PLANTINGS: The placement of cellular type plants adjacent to the structure may offer additional insulative value.

C. INSULATIVE EARTH BACKFILL: Cellular content backfill placed adjacent to basement walls may also offer additional insulative opportunities.

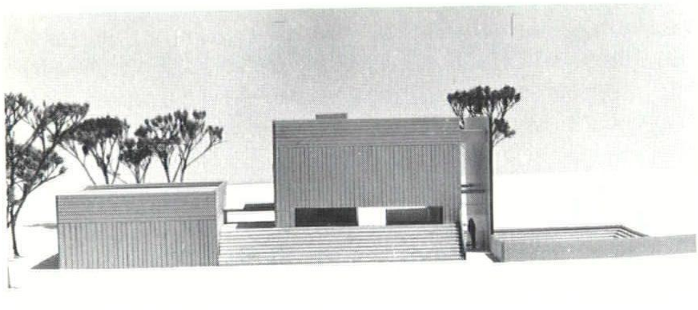
ROOF CONFIGURATION: A flat roof with parapet will retain snow thus adding additional insulation. This surface may also be used for summer cooling by ponding water at night, thus radiating excess heat to the night sky.

COMPASS ORIENTATION: The proper exposure of building components is imperative.

A. SOLAR RADIATION: Solar radiation upon fenestration must be controlled to exclude solar heat gain during the cooling season, but allow some penetration of heat during the winter.

B. WIND EFFECT: A low velocity wind is desirable for natural ventilation. During favorable times of the year, proper placement of operable fenestration will facilitate natural ventilation.

PLANTINGS: The shading of fenestration by the proper placement and selection of trees reduces heat gain in the summer. If broad-leaf deciduous trees are used, the fenestration can receive valuable heat gain in winter. This principle is applicable for opaque surfaces also, but to a lesser degree.

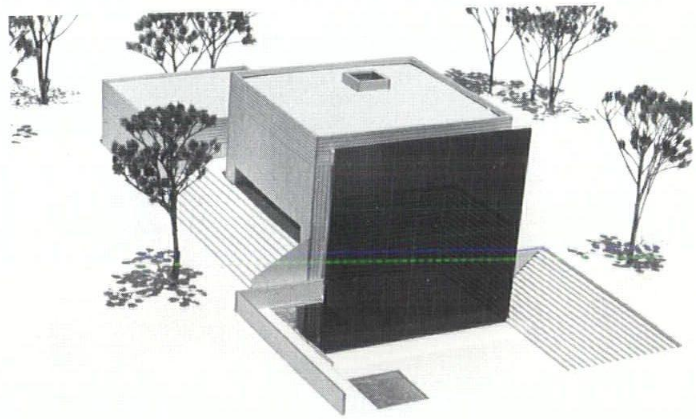


SOLAR ENERGY COLLECTION: Because the collection of solar energy requires the judicious placement of collector panels, proper orientation of the habitation and solar collectors with respect to seasonal sun angles is imperative.

The southern exposure and the roof of the habitation are excellent locations for panels. Maximum heat collection occurs when the panels are arranged normal to the sun's rays; however, panel angle deviations within reasonable limits have minimal effect on the collector efficiency.

A. SOLAR GLARE: Most solar collector surface are highly reflective. Because of the large collector area needed, sensitive placement of panels is necessary.

B. COLLECTOR COST: The cost of available solar collector panels suggests their dual usage as collector and building envelope. These uses are highly compatible.



GREENHOUSE: A greenhouse provides several advantages.

A. TEMPERATURE BUFFER: A greenhouse located between the living environment and the exterior provides insulative qualities.

B. RECYCLING AIR: Plants located within the greenhouse will extract CO² and produce 0², thus reducing the requirement for outside air.

C. PSYCHOLOGICAL: Contact with interior growing plants during seasons when exterior growth is non-existent will enhance the quality of life of the interior spaces.

D. VESTIBULE: The greenhouse functions as a vestibule tempering the unconditioned air entering the habitation when doors are opened. The greenhouse may also be opened in the spring, summer, and fall to allow a free flow of air providing natural ventilation.

MECHANICAL PARAMETERS: The habitation must be planned to receive the collector panels, and the ancillary mechanical equipment.

A. ENERGY STORAGE: Placement of a warm and/or cool storage tank is necessary for the efficient use of the solar electric system. Although several locations for the tank are possible, the most desirable placement is near or within a habitable space.

B. EQUIPMENT PLACEMENT: The heat pump should be placed in close proximity to the energy storage and the conditioned space.

C. ENERGY DISTRIBUTION SYSTEM: Several heating and cooling distribution systems are compatible with the solar-electric equipment allowing maximum design flexibility.

D. DOMESTIC HOT WATER: A separate domestic hot water tank will be needed. Solar energy will provide the primary heat source with additional electric energy available on demand. A location near the main storage tank is desirable.

E. WASTE HEAT COLLECTION: The inclusion of a waste heat collection system is being considered. Collection efficiency is facilitated by the grouping of hot water equipment such as clothes washers, dishwashers, showers, tubs, etc.

THE HABITATION: The desire for widespread application required the design of a prototypical habitation capable of construction on average sites using conventional building techniques.

A typical single family lot of approximately 10,000 sq. ft. was chosen. The residence was designed to facilitate effective placement on sites with varying orientations.

GEOMETRY: A structure 28′ x 26′ x 27′ with a greenhouse was designed. This form closely approximates a cube which gives near maximum useable space within a minimum envelope.

With the exception of the South wall, the lowest level is located below normal grade. The North and West walls have earth berms to a height of 5′ above the first floor level. This reduces heat transfer, and creates useful wind foils. Only 40% of the North and West walls are exposed to winter winds.

A flat roof with 12″ parapet is placed on both house and garage for reasons outlined in the design parameters.

A two-car garage (22′ x 26′) with storage is included and located to reduce exposure of the habitation to winter winds.

The exterior skin is cedar, which when allowed to weather, will turn light gray.

The structure is oriented toward true compass directions.

FENESTRATION: Fenestration was held to a minimum without sacrificing view, ventilation, or psychological need for exterior contact.

A 20′ x 20″ horizontal band of glass was placed in the West facade. The glass is recessed 2′ with a sill height of 5′. This allows natural light, view, and cross ventilation, and is well protected from the summer sun.

A small window for the master bedroom was placed in the North facade. A 2′ recess provides shielding from the evening summer sun. Cross ventilation is obtained through the use of floor ducts that extend to the greenhouse.

A 12′ x 6′-8″ sliding glass wall is placed in the East facade protected by a 2′ recess. This allows living room contact with the adjacent patio when desired. A "roll down curtain" located in the soffit above offers additional insulative value to the insulating glass doors when reduced heat transfer is desired.

Fenestration on the northeast corner is used to bring additional light into the stairwell and lower level. The glass is protected by overhangs and plantings.

Light enters the greenhouse through 4′ wide glass walls on the East and West and through a skylight overhead. Operable panels in both walls and skylight will facilitate natural ventilation. The insulating glass panels are protected from the sun by recesses and deciduous trees.

INSULATION: Six inches of batt insulation was placed on all above grade surfaces resulting in a thermal conductance coefficient lower than the suggested Federal Guidelines.

Two inches of rigid insulation is used for all below grade surfaces.

Insulative double plate glass is used for all fenestration.

Because of the geometry, siting, and insulation selected, the calculated heat transfer for this habitation is approximately 40% of a conventional residence with equal useable area.

GREENHOUSE: A greenhouse is located directly behind the collector wall for the reasons stated in the design parameters. Additional value was found in the containment of solar heat passing through the collector panel. This space is used as a return air plenum.

THE COLLECTOR: The solar collector panels were placed vertically and become the South wall of the habitation for ease of construction, to minimize weather damage, and to reduce glare. The surface extends a full 3 stories to obtain the required collector area.

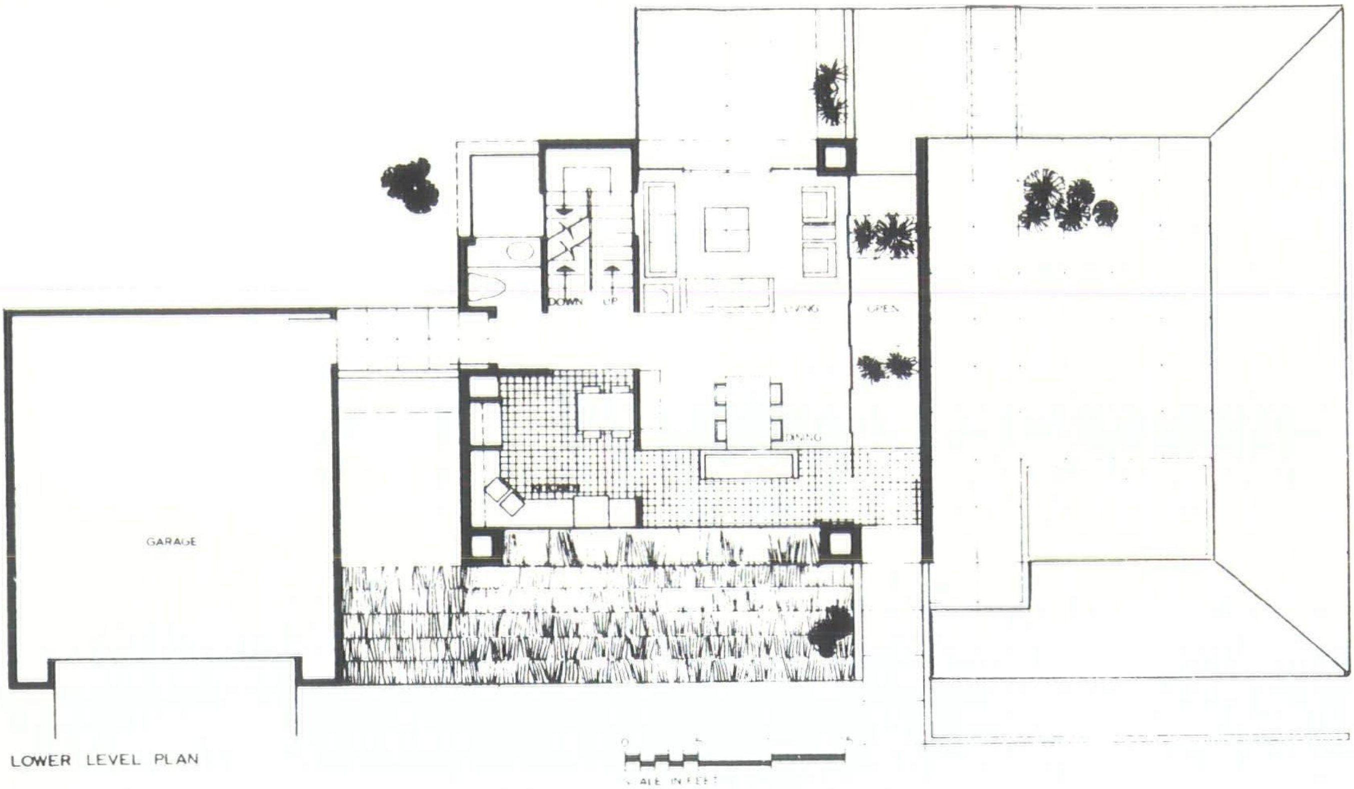
COURTYARD: A depressed courtyard was located south of the collector to reflect sun onto the collector thus increasing its efficiency. This area is ideal for spring and fall useage because of its protected orientation.

PLANTINGS: A dense wind break comprised of evergreens and shrubs is located on the Northwest of the habitation for winter wind protection. Vegetation was greatly reduced on the Southeast and Southwest to allow penetration of summer breezes. Deciduous trees located East and West of the greenhouse glass walls are for summer sun protection, but will allow the desirable winter sun to penetrate. Berms on the North and West will be planted with cellular ground cover suitable for stabilizing the berm and providing additional insulation.

MECHANICAL SYSTEM:

A. HEATING AND COOLING

In the Central Iowa climate the energy required for winter heating is considerably greater than the



LOWER LEVEL PLAN

energy required for summer cooling. Ideally we would obtain our entire heating and cooling energy requirement from the sun. However, there is general agreement that at the present time it is not economic to supply the entire heating requirement from solar sources. In addition, absorption air-conditioning systems which operate from solar energy sources are not yet commercially available. All of the above considerations have lead us to the selection of the heat pump as the basic source of summer and winter comfort with a solar energy supplement to handle the additional winter energy requirement. Domestic hot water will be heated by solar energy with resistance electric heat as an auxiliary energy source. A large cistern is included for rainwater collection. This cistern will be utilized summer and winter as the ultimate base heat sink for heat pump operation.

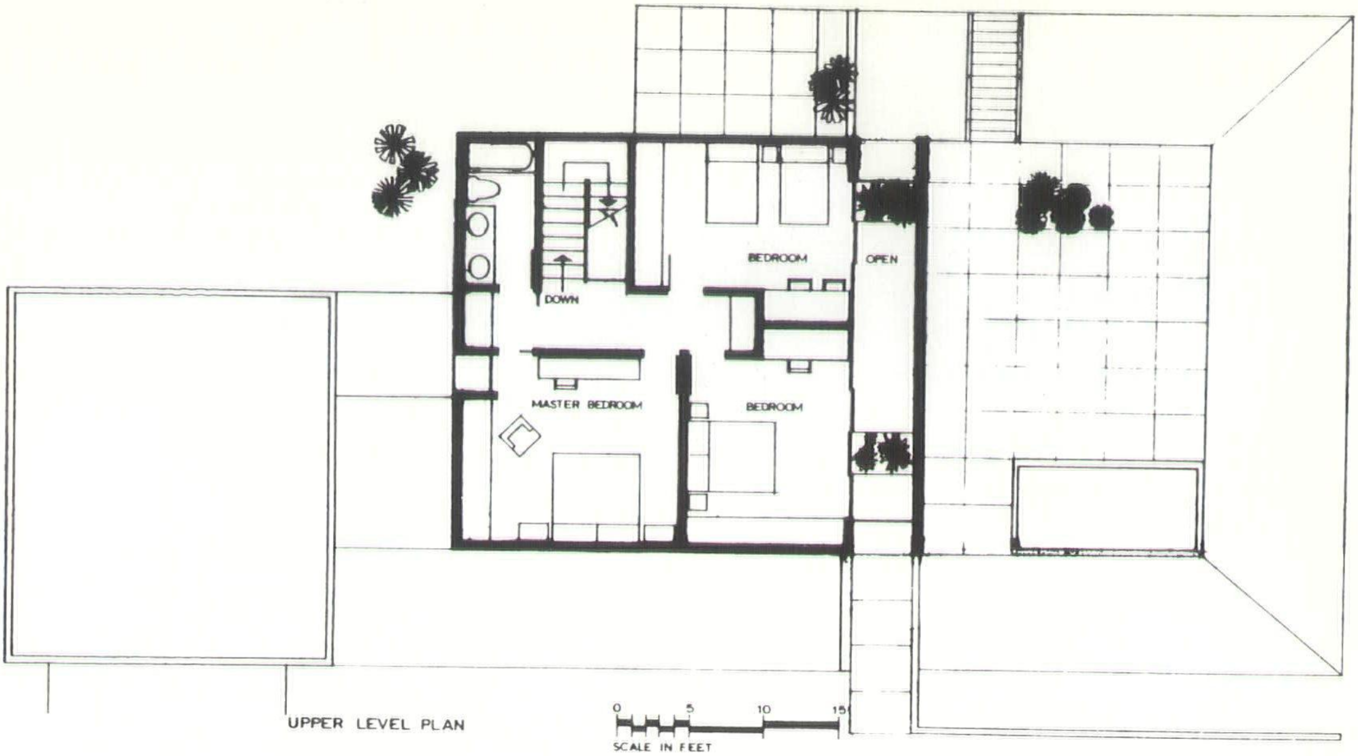
B. SOLAR COLLECTOR

Both design and placement of solar collectors are crucial to the effective utilization of solar energy. Both criteria will be extensively studied prior to the proposed actual construction. State-of-the-art solar collectors will be utilized.

Economic studies will determine whether commercially available collectors will be installed or collectors of our own design will be fabricated on-site. In any case, we expect to install collectors with cover glasses, either dual or single, plate-coil absorbers with selective coatings, and with adequate back-insulation to maintain the energy conservation aspect of our overall building design. Preliminary studies indicate that vertical collector orientation is economically favorable at the present time. Savings in construction costs will overbalance the decreased collection efficiency which results from vertical collector orientation. Collector placement to avoid shading or even partial shading during the crucial 1000-1600 hours for effective solar energy collection appears to be especially important. As soon as a site for actual construction has been selected we will modify our designs to provide collector placements which optimize the utilization of solar energy and, at the same time, take appropriate advantage of any special site features which are present. Our current building design provides for 72 m^2 of collector area. We are prepared to increase or decrease this collector area if final detailed analysis indicates that better overall system performance or greater conversion efficiency would be obtained.

C. THERMAL STORAGE

Some form of energy storage is necessary in all solar collector systems to provide energy during periods when solar energy is not available due to darkness or to overcast weather conditions. In our heating and cooling system, thermal energy storage is placed between the solar collector and the heat pump. Water was selected as the storage media. This same water will be utilized as the circulating fluid through the solar collector and through the heat pump. This scheme reduces temperature drops in the system to a minimum



UPPER LEVEL PLAN

and maximizes the efficiency of utilization of solar energy.

D. HEAT PUMP AND AIR HANDLING SYSTEM

This system will be assembled from commercially available components. Water will be the heat source — sink and water will also be supplied to conditioner coils as the heating and cooling medium. We currently favor a fixed refrigerant circuit with water flow reversal to change from heating to cooling modes. We will consider other modes of operation prior to construction to minimize capital costs. Large heat exchangers will be utilized to maintain high performance with small temperature differences. Comfort zoning can be accomplished either by modulating air flow from a single large conditioner coil or by the installation of several smaller conditioner coils with modulated water flow.

E. EPILOG

The heating and cooling system described above has several possible operating modes and there are several individual components which must be properly sized. We plan to have a computer simulation of such a system available as soon as possible so that we can determine with reasonable certainty the anticipated system performance under central Iowa weather conditions. We plan also to do an economic study of future system performance based upon projected future energy costs. These costs largely determine the optimum sizes for collectors and thermal storage units. In any case, indications are that through energy conserving measures approximately one-half the normal domestic energy consumption can be saved and that solar energy can supply approximately one-half of the remaining domestic energy requirement.

The designers feel that the habitation is consistent with and sensitive to the combined parameters of human needs, conventional construction techniques, and energy conservation and solar-electric application.

Because few residences have been constructed utilizing solar energy with concern for total heat transfer, and because reliable performance data is not yet available, comparative and projected data for this habitation is based on our best estimates. Development and refinement of solar collectors is progressing rapidly indicating a trend toward lowering costs.

Related to a conventional residence of equal useable, area, energy consumption can be reduced by — 80%.

Projected application of this research depends on several factors relating to comparative total operational costs; the current and projected cost of solar-electric equipment and its availability, the future cost and availability of conventional energy sources, the rate of inflation, tax incentives, and the current and projected residence mortgage rate and conditions.

Because several large industries are entering the solar field and predict sizeable reductions in equipment costs once mass production begins, and because cost increases for conventional energy sources are probable, a large increase in the use of solar-electric systems is anticipated.

News

D E P L A G *
ARCHITECTS AND LEGISLATIVE ISSUES . . . an appeal for participation

The architectural profession in Iowa is again directly and positively confronting issues that affect us on a professional basis and also the general public as well. A major commitment is being made to communicate to public policy makers the profession's views on environmental matters, housing, transportation, energy policy, the Arts, growth and planning, building codes, historic preservation and design professional registration.

Spearheading this legislative action is Bob Savage, who is meeting this challenge of architects as a profession becoming a stronger voice in the Iowa Legislature by the drafting of POSITION PAPERS on these topics which concern us all. These POSITION PAPERS will be included in a binder to be distributed to all the legislators this session so that the goals and thrust of the Iowa Chapter, American Institute of Architects is made clear to each of our policy makers.

On such important matters the participation of the entire membership is needed to effectively shape the content of these submittals. To achieve a viable legislative program, architecture must go PUBLIC!: be ready to volunteer when the need arises within the next few months.

Our objective of increased participation will have to be transformed into more than just the typical humdrum communications most legislators are engulfed with daily. Our positions must be stated in an appealing manner with extreme care in the structuring of written indicative of an artistic profession. As each program is formulated and developed, the momentum toward accomplishment must be carried to the goal of effective communications with our legislators.

To this end DEPLAG is dedicated. Those who are interested in helping, please contact the Iowa Chapter.

*DESIGN PROFESSIONALS LEGISLATIVE ACTION GROUP

NEW FIRMS

Wehner, Nowycz and Pattschull
The firms Wehner & Associates, Architects, and William Nowysz & Associates, Architects have merged and will practice under the name Wehner, Nowysz and Pattschull at 201 Dey Building, Iowa City.

Scholtz-Kuehn and Associates
Roman Scholtz and Art Kuehn have joined forces under the name of Scholtz-Kuehn and Associates, and are practicing at 325 Perry Street in Davenport.

Cox/Downing Architects
G. B. Cox and Tim Downing have formed a partnership at 2415 18th Street in Bettendorf and will practice under the firm name of Cox/Downing Architects.

IOWA BOARD MAKES LICENSING RECOMMENDATIONS

Since our last paper on the above subject, the Iowa board is pleased to report that our concern for this matter has been voiced by many in our profession. As a result, a national committee consisting of representatives from the four major architectural organizations has been formed for studying the professional development of the architect in practice. This committee consists of members from the following organizations:

NCARB—National Council of Architectural Registration Boards
NAAB —National Architectural Accreditation Board
ACSA —Association of Collegiate Schools of Architecture
AIA —American Institute of Architects.

This national scope is vitally necessary since Iowa, along with her sister states, is concerned with architects practicing throughout our entire country. (Of the approximately 1,000 architects registered to practice in Iowa, less than 300 live in our state.) The preliminary findings and recommendations of this committee have been reported and a summary of their work follows:

1. The *general direction of government action* in the safeguarding of the public interest in the architectural field has been not toward the theoretical area of education but toward the practical area of actual construction. This has been accomplished by the adoption of local and state building codes covering general, mechanical, plumbing, electrical and fire safety standards and regulations. This universal protection offered by cities, counties and states is further overlayed by national restrictions and controls imposed by American Society of Testing Material Standards, National Bureau of Standards, National Fire Protection Association and especially by the Occupational Safety Health Act. The general code enforcement of these agencies is further

implemented by restrictions and regulations imposed for specific building types by government agencies such as F.H.A., Hill-Burton, etc. All the named agencies along with the enforcement of building code requirements in the states form an all inclusive umbrella of protection at the construction level of our practice. This is unique to the practice of architecture and means that each project we deliver is examined by a group of outside authorities.

2. The *process of initial registration and licensing* developed by all state boards through the National Council of Architectural Registration Boards has assured a high level of minimum competency through using three guides against which each candidate is measured. These guides are education (85% of certificate holders are graduates of accredited schools of architecture); a mandatory period of internship under the control of a registered architect; and a system of testing consisting of the Equivalency Examination covering History and Theory, Design, Construction Theory/Practice and, the Professional Examination covering Environmental Analysis, Building Programming, Design/Technology, and Construction. All states give the same examination, thus each state is assured that those coming to practice in their jurisdiction have been qualified in a similar manner to those they examine.

3. The *participation in the practice of architecture* is in itself one of the greatest sources of professional training. The learning process of the traditional intern program is carried into practice in an informal but positive manner. The incentive to be informed and to become a master in the field is strongly reinforced by the competitive nature of the profession. The architect who does not perform satisfactorily loses the access to clients. Another factor in the actual practice of architecture is the wide use of qualified consultants in areas where each particular practitioner needs added expertise. The professionalism to seek advice outside his own immediate knowledge is strongly developed in the architectural education process, the licensing testing and the actual day to day practice. This continuous communication with specialists in many fields is a learning process of high intensity.

4. *Continuing education programs* offered in architecture now are from many sources. They are given on a regular basis by Harvard University, University of Wisconsin and University of California. Courses are also offered on a non-regular basis by some of the architectural schools, the A.I.A., and a number of associated and related organizations. The Architectural Department at Iowa State University is currently attempting to establish a system of courses through the extension program and the Iowa Chapter, A.I.A. has, through the years, offered various seminars in architectural related fields. The cost of the programs vary greatly and the quality of education although not documented is generally considered high. Currently there is no system of availability or meaure of content set up for the practitioners' information. Despite this, those courses which are offered have been well attended.

The Iowa Board of Architectural Examiners, in view of the above preliminary report of the national committee which will have continuing input in this field in the next few years and on the basis of our knowledge of the architectural practice in Iowa, today propose the following direction in our work in the continuing education area:

A. The Board encourage quality continuing education for all architects licensed to practice in Iowa on a voluntary basis.
B. The Board provide encouragement and technical support for continuing education programs which could be provided by our accredited school of architecture at Iowa State University and by the local professional societies in Iowa.
C. The Board adopt a form that each license holder must fill out at the time of license renewal indicating his self-evaluation of his participation in continuing education programs and actual practice the past year to give the Board statistical data on current patterns.
D. The Board provide technical support to state officials responsible for updating codes and standards as they relate to the practice of architecture.
E. The Board continue our encouragement of the NCARB national multi-organizational committee now studying continuing education as a part of the entire issue of professional development. We will monitor their efforts to collect data and evaluate the existing continuing education programs toward the development of a national system of accountability.

Respectfully submitted,

Richard H. Brom, President

WOMEN IN CONSTRUCTION INSTALLED NEW OFFICERS

The Greater Des Moines Chapter #80 of National Association of Women In Construction installed new officers for the 1974-1975 year at the regular monthly membership meeting held Monday, August 26, 1974 at Domino's restaurant, 1201 E. Euclid, Des Moines, Iowa.

Officers intalled were:

PRESIDENT — Ruth Norman of Bolton & Hay, Inc.

VICE PRESIDENT — Juanita Kincade of Veenstra & Kimm, Engineers

RECORDING SECRETARY — Fran Leonardi of Iowa Plumbers Supply Company

CORRESPONDING SECRETARY — Bonnie Ford of Foreman & Ford Company

TREASURER — Phyllis Nicholson of Glenn Construction Company

BOARD OF DIRECTORS — Anne R. Baird of Midwest Equipment Company; Donna Ball of Walsh Equipment, Inc.; Karen Carmichael of One Trip Plumbing & Heating Company; Bernetta Clark of Baker Electric Company and

IMMEDIATE PAST PRESIDENT — Mary Coulter of Patzig Laboratories

Installation was by Ruth G. Adams of Vanderlinden & Associates Engineering, a past president of the Organization.

Dinner was at 6:30 P.M. following the social hour which began at 5:30 P.M.

JULIUS SHULMAN TO LECTURE

Julius Shulman will have a public lecture on October 23, at 8:00 PM in the Kildee Hall-Lush Auditorium, Iowa State University. An exhibit of his work will be on display in the Memorial Union Gallery, Iowa State University, from October 20 to December 1. An open reception will be held on October 20 from 2-5:00 PM at the Memorial Union Gallery.

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Book Review

Conversations with Architects
John W. Cook, Heinrich Klotz
Praeger Publishers, New York, 1973.

Architects typically become nationally known through standardized publicity systems. The completion and publication of buildings, speeches, and writings are common methods by which familiarity is spread. In each case, our personal reactions are diluted through intermediation and editorialization inherent in the mass communication process. Freshly enough, John Cook and Heinrich Klotz try to converse openly with their subjects. Even though aware of eventual publication, the casual format produced surprising informality and candor in the architects.

Philip Johnson, Kevin Roche, Paul Rudolph Bertrand Goldberg, Morris Lapidus, Louis Kahn, Charles Moore, Robert Venturi, and Denise Scott Brown all reveal fresh insights into their practices. Differences in attitudes and methods of design underscored by similar questioning proves fascinating. Cook and Klotz, at times, aggressively pry into design rationals and prod the ever present weaknesses of tailor-made philosophy. Yet quite properly the authors, while illustrating differences, did allow the architects to expound on their current directions and projects. This unique combination of controlled questioning and free conversation provides a remarkably candid glimpse into the characters of nine monumental figures.

The choice of architects interviewed was the book's one great weakness. Billed as representing a broad spectrum of American architecture was something that no selection of nine practitioners could live up to. Tunnel visioned away from the rest of the world, it forces the reader with its incontinuity to define American architecture as: Architecture which is produced by architects living within the territorial limits of the United States. Other than the fact that all the individuals are well known, and are American, there is no reason for their grouping. Even allowing for the technical problems in getting a balanced cross-section of architects to speak up, the book's inadequacy leads to an interesting, if not obvious, footnote. One senses, in the authors' frustrated attempt at exemplification, the great loss of direction in the wake of the passing international style. The book's failure at representing architecture as nine people becomes documentation of architecture's internal struggle for an expression of the seventies.

IOWA STATE UNIVERSITY LIBRARY ADDITION

Ames, Iowa

ARCHITECT: Brooks, Borg & Skiles
Des Moines, Iowa

GENERAL CONTRACTOR: Weitz Company Inc.
Des Moines, Iowa

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