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Iowa City Passive Home A new housing project in Iowa

utilizing passive solar features.



Experimenting With Iowa's Mainstreet Learning Laboratories

A close look at the Architects in Schools program.



Committee On Architecture For Justice

Norman Wirkler discusses the committee, its function and purpose.



Editorial A letter from Thomas A.

Baldwin, AIA.

# Iowa City Passive Home

by James L. Schoenfelder

Passive solar heating and cooling is attractive to many sectors of the building industry because of the environmental consciousness it evokes, and because of its apparent natural simplicity of operation. In practice, passive solar applications for residential markets have appealed to a very small segment of the population; specifically to those people willing to participate physically in the maintenance of their micro-environment and to those people who are willing to accept nontraditional forms, materials and spacial functions in their living space. If passive design is, in the short term, to become a significant factor in the overall housing market, passive design must reflect traditional housing values as perceived by the general populace in their marketing area. Passive design must prove suitable to speculative builders and developers if they are to incorporate them in their projects.

The Wehner, Nowysz and Pattschull passive solar house project, to be constructed in Iowa City, Iowa, is designed to reflect current taste in the mass housing market of the middle west. The house appears to be a ranch style with a walkout basement. The master bedroom, full bath, kitchen, dining room and living room are on the first floor. Two bedrooms, utility room and family room are on the lower level. The exterior is stained hardboard siding which blends well with existing styles. Construction completion delayed due to additional HUD funding for instrumentation is scheduled for November, 1978.

Passive features and energy conserving features due to better building techniques, at least to the general public, have become synonymous. Although energy conserving construction techniques are important to passive, as well as any other structure, I feel some distinction must be made between the two. Energy conserving features can be incorporated in structures which allow no solar penetration. Passive features must incorporate solar penetrations, solar thermal conversion and solar thermal storage. Indeed, a passive structure may incorporate no energy conserving features. The Wehner, Nowysz and Pattschull passive solar home includes both energy conserving construction features and passive elements. The energy conserving features are:

- Two inches of exterior basement wall insulation. Exterior insulation will allow the concrete wall mass to help store heat and depress interior temperature fluctuation for more efficient furnace operation.
- 2. Rigid insulation board sheathing over 2" × 6" stud wall construction. One inch polystyrene sheathing will isolate studs from the cold exterior skin. The 2×6 exterior wall will permit a full four inches of rigid polystyrene insulation and maintain an inch and one half space between insulation and foil back sheet rock in which to run electrical wiring and plumbing.



PASSIVE SOLAR RESIDENCE ARCHITECTS: Wehner, Nowysz & Pattschull

- 3. A double entry vestibule will reduce air infiltration.
- Insulating curtains will be used to reduce heat loss at night and control solar heat gain. Floor length drapes with valance will prevent reverse thermosyphoning at night.
- 5. A "heat saver" fireplace will augment the back-up heating unit. The fireplace will draw outside combustion air, has glass doors to prevent room air from escaping, and has integral air vents and forced circulation around the fire box to induce hot air to the conditioned space.
- Operable clearstory windows admit north light and provide additional stack ventilation in the summer months.
- 7. All windows are double glazed. Clearstory windows are triple glazed.
- Hot air from the clothes dryer will be filtered and introduced in to the cold air return during the heating season. In the summer, the dryer air will be exhausted.
- The garage will be located so as to provide a wind break from cold northwest winds.

The passive solar concepts will, according to calculations, provide approximately 40% of the total heating and domestic water heating load and a significant portion (70-90%) of the cooling load. Two separate means of passive solar heating will be used. The first floor incorporates a water wall system. Unlike typical water wall systems which utilize 55 gallon metal drums or blackwall water tubes and appear as static elements to the design, the Wehner, Nowysz and Pattschull water wall becomes a dynamic element of design visually reflecting and demonstrating the solar process. Clear tubular cylinders extending from floor to ceiling filled with colored water and a darker colored slightly negatively buoyant solution are used.

Sunlight striking the colored water will be absorbed and stored as heat in the water. The darker solution will tend to heat more rapidly than the lightly colored water and will slowly migrate via convection currents up the tube leaving behind dark opaque ribbons scattered among translucent flickerings of solar energy. Spatial images and changing hues will, at their leisure, reflect the dynamics of solar passive design. Aside from visual recordings of a solar process, the tubes of changing opacity will provide a means of temperature control. As the darker solution mixes more thoroughly in the tubes, more and more solar radiation is absorbed and stored. In addition, the water tubes have, on either side, retrac-



BASEMENT FLOOR PLAN



FIRST FLOOR PLAN

table insulating curtains which give final control over energy migration.

The basement floor contains another unique passive system which I call a thermosyphon floor. The floor is a concrete slab poured over a light gauge continuous metal deck with gravel bed beneath. The metal deck is formed in concave strips and is placed on the gravel bed with an inclination from the south glass to the interior center wall. Four inch ABS or PVC piping is placed on the concave metal deck which is then poured full with concrete. Concrete fills the deck cavity and also fills the voids between metal deck strips thereby creating a finned tube effect with metal fins extending downward from the top of the slab under the water filled pipe and resting on the gravel bed. The water tubes which lay on the metal deck turn up at the center insulated double wall and continue upward terminating just below the first floor framing.



UNDER FLOOR HVAC SYSTEMS SCALE: 1/8" = 1'-0"

Another mode of passive cooling is similar to the thermosyphon floor. PVC or ABS water filled tubes are imbedded in rock beneath the basement floor on the north half of the building. These tubes extend forty feet beyond the exterior of the foundation approximately eight feet below grade. The tubes are inclined to help induce convection currents. Warm space air is blown over the water-filled tubes. The water in the tubes will be at ground temperature of approximately 54° F. The warm air will give up its heat to the water. The warmed water will rise through the tube being replaced by the cooler water. The warmer water will migrate below grade to the exterior of the building giving up its heat to the cooler ground temperature.

ASHRAE guidelines suggest heat loss through basement walls is 4 BTUH/S.F., assuming a wall U factor of 0.10. Assuming the heat loss is directly proportional to the U factor, we find the heat dissipation capacity of the tubes with a U factor of 1.17 would be 46.8 BTUH/S.F. The tubes generate approximately 753 S.F. of surface; hence, the heat dissipation capacity of the tubes would be 35,240 BTUH, which is greater than the estimated cooling load. In addition, the water-rock-concrete floor mass could store a cooling effect (assuming CP = .294 & AT - 10 degrees F.) of 209,969 Btu. This represents approximately ten hours of full load cooling. Keep in mind these figures are only of a preliminary nature and do not reflect the recovery time of the cold mass nor high equilibrium ground temperatures resulting from continuous cooling requirements. Further analysis and field testing must be conducted before accurate cooling performance can be predicted.

Sunlight which pentrates the south window wall strikes the dark concrete floor and is absorbed by the concrete mass. Heat is pulled from the upper portion of the slab down through the slab into the water tubes by the metal fins. Convection currents are set up within the water tube which conduct heat from the slab into the water tubes as they continue upward behind the insulated wall. To augment these convection currents and to insure temperature control as spatial temperatures rise above a pre-set limit, the furnace fan comes on, thereby circulating the warm air from the space, down the double insulated wall, over the water tubes, through the rock bed and up to spaces on the upper level north side of the house. In this manner, excessive heat is stored in the water tubes and the gravel bed for future use. At night the furnace fan operates in the same manner to retrieve the heat previously stored in the water and rock. As on the upper level, insulating curtains can be drawn across the glass. This would be done if excessive heat continues to build up within the space or at night to prevent heat loss.

Domestic water preheating is also accomplished through a passive system. One hundred sixty feet of steel pipe is integrated in the concrete floor mass just inside the basement window wall. Cold water must travel through this piping to reach the hot water heater. As the



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### Architects In Schools:

# Experimenting With Iowa's Mainstreet Learning Laboratories

by Elaine Larkin, Iowa Arts Council

There are exciting and valuable lessons to be learned for those who would take a look down mainstreet. At least, that's the message from students and local residents who have worked with lowa's architects-in-schools.

Architects-in-Schools is a component of the Artists-in-Schools (AIS) program of the National Endowment for the Arts (NEA), administered in each of the fifty states by the state arts council. When the Iowa Arts Council first became involved with architecture as an aspect of its Artists-in-Schools program during the 1976/77 school year, Programs Director Nan Stillians was both apprehensive and excited. "The biggest challenge was finding a school system willing to invest \$6,100—the amount required to match funds from the NEA and the state arts council—in an experiment," she said.

"We were eager to add the architecture component to the disciplines offered to the schools," Ms. Stillians said, "because we felt that the opportunity to effect positive, lasting change—in addition to instilling aesthetic principles—is expecially strong in this discipline since it relates to basic curriculum: math, science, and history, as well as literature, art, wood shop, and industrial arts."

The AIS program had established a record of success in the disciplines of writing, dance, visual arts and crafts, folk arts and film and photography, since its inception in lowa in 1971.

### FIRST RESIDENCY

When it was all over that first year, the Eagle Grove School system and community sponsors had invested nearly \$22,000 in local cash and services, far more than the required matching amount. And there was much to show for it: an award-winning student park for high school students; a mural and a kiosk installed in the middle school; new trees planted on school grounds; and a comDICK CAHALAN, 6th grade science teacher shown here with Damon Ohlerking, acted as in-school coordinator for Ohlerking's residency in Eagle Grove. The model in the foreground is a representation of the high school student park one of many projects resulting from the residency.

munity of people— young and old alike—who were keenly aware of their built environment, how it had been formed, and how they could contribute to changing it to suit their needs.

Fort Dodge landscape architect Damon Ohlerking—who had grown up in Eagle Grove, earned BS and MS degrees from Iowa State University, served as a consultant for Mid-Iowa Development Association (MIDAS), and authored a comprehensive environmental survey of the mid-Iowa region, (A COMMON BEGINNING)—became the first Iowa achitect-in-residence. He had a strong personal commitment to the project in addition to his professional interest.

Throughout the school year, Ohlerking worked with middle school teachers to incorporate environmental studies into the curriculum. The seventh grade mathematics teacher supervised a practical unit on interior design that included scale drawings and models built from cardboard, carpet scraps, and fabrics. The art teacher supervised the design and painting of a mural for the school gymnasium. The industrial arts teacher supervised students in planning, model-building, and construction of a full-size kiosk for a central lounge area of the building.

Sixth grade social studies and history teachers cooperated in teaching units on architecture prior to a "visual scavenger hunt" in which students discovered the local versions of ancient ideas. And the entire school faculty cooperated in planning a school-wide "festival day" in the spring, complete with artists leading workshops, displaying their works and demonstrating crafts—and various other activities, performances, and exhibits.

### AFTERMATH

A year-and-a-half later, the environmental emphasis goes on:

"It certainly had an impact," Middle School Principal Ralph Rolland said of the residency. "We found that our teachers had been doing a lot of the things that Damon was suggesting, but his presence created an awareness. The awareness of our relationship to the things around us would be the key thing that came out of it."

The mural is still on display in the gymnasium, and the art teacher has several more planned. The festival day will be held "every three or four years," according to Principal Rolland.

The community of Eagle Grove received the 1977 "Youth Involvement Award" from the Iowa Development Commission Community Betterment Program for the student park created at the high school. The park was built on a vacant lot that had been slated to become a parking lot before students enlisted Ohlerking's assistance, built a model of their proposal, and made a successful presentation to the local school board. Ohlerking estimated the



ARCHITECT DAMON OHLERKING assisted the Eagle Grove Middle School faculty in organizing a community "festival day" in May of 1977. Here, he speaks with some of those who attended.

cost of the park—without the student labor and locally donated materials and services—would have been at least \$32,000. The actual cost was closer to \$15,000.

In March of 1977, while Ohlerking was designing a park in Eagle Grove, students in Red Oak were getting an introduction to environmental studies from a team of architects with a slightly different approach. Timothy and Genevieve Keller, a landscape architect with a background in anthropology and an architectural historian respectively, spent a month in Red Oak. There they developed an awareness program for a core group of junior high students, and made presentations to local civic and service clubs.

The Kellers, partners in the Virginia-based firm of Land and Community Associates, had become familiar with Iowa in 1976 while cooperating with the Iowa Division on Historic Preservation in compiling an historic inventory and future plan for residents of the Amana Colonies. The Amana project illustrated approaches to ar-



GENEVIEVE AND TIMOTHY KELLER—Architects in Schools. Stratford/Rolfe Schools, 1977/78 Red Oak Schools, 1978/79



STRATFORD STUDENTS participated in painting a mural in the library as a result of the residency of Tim and Genevieve Keller. The mural was designed by Iowa Arts Council CETA apprentice Alan Rohlwing, one of several "visiting artists" who worked with the Kellers.



ONE ASPECT of the long term, major site architecture residency is a program of "visiting artists" selected by the architects to enhance some aspect of the environmental studies. Des Moines fiber artist Priscilla Sage (right) helped students in Rolfe and Stratford schools to explore spacial relaionships by weaving a massive web.



HERE, A ROLFE STUDENT secures the supporting lines for the web.

chitectural studies which impressed Arts Council officials as being in harmony with the AIS architecture component: residence in the community, active participation by local residents in identifying problems and directions, and a commitment to change as a positive, controllable force. "We feel not just that there should be change, or there will be change, but there should be planned change, allowing for the best that can be preserved, and the best that can be added," Timothy Keller stated.

Stratford and Rolfe were among five north-central lowa schools applying for the 1977/78 program and were selected because of the similarity of their commitment, size, and community involvement. "We were hoping-in accordance with the long-range planning suggested by Damon Ohlerking-to continue the momentum generated by the success of the Eagle Grove program, and to provide opportunities in genuinely rural environments," Ms. Stillians said. The Kellers were selected to conduct the program on the basis of their previous work in Iowa.

Each of the two architects spent 20 hours per week in each school during the spring semester, 1978. They led students in each school through a variety of activities designed to use the town as a "learning laboratory."

Said Genevieve, "In Rolfe, we actually went to the courthouse, and students discovered that what really happened was that the town was developed by a land company. They suddenly knew why their town was there." In the courthouse project, each student in a core group of eighth graders traced the history of one of the town's buildings. Student response was enthusiastic.

The Kellers were also pleased with community involvement. The Rolfe Lions Club was supportive of the architects' activities, and invited them to speak at Club meetings. Rolfe fifth grade students built environments from boxes donated by local merchants and displayed them for the community at a school-wide education fair.

The architects planned individually with teachers whose students participated, in order to integrate activities with ongoing curriculum. Both the architects and the teachers agreed that the variety of projects and exploratory opportunities cut across previous success/failure patterns for students involved. "The supposedly slower students did as well or better in the exercises and maintained a high level of interest," Genevieve said.

The Kellers were selected to present their work in Stratford/Rolfe as one of three case studies on architectural residencies at the national Architects-in-Schools conference in Philadelphia in September.

### FORECAST

The architecture component of the AIS program is progressing from the very rural, with its prairie architecture, toward the urban. The 1978/79 site is in Red Oak schools, with Timothy and Genevieve Keller excited about the prospects for exploring the rich heritage of Victorian architecture in the community.

Residency goals continue to be: orienting teachers to use the town as a learning laboratory, encouraging

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GROUPS OF STUDENTS took a closer look at Rolfe and Stratford business districts. In Rolfe, eighth graders each selected a building and traced its history through courthouse records.



STUDENTS BUILT MODELS to scale as part of an exercise in understanding spaces in Rolfe and Stratford.

students to understand the forces that have shaped their immediate environment, and encouraging townspeople to become involved in the experience. The last point is already in full swing in Red Oak. The local arts council, Touchstone, has taken a leadership role in generating community matching funds to assist the school system and the area education agency.

The Iowa Arts Council would like more Iowa architects

to become involved. "We are pleased with the development of the program," Ms. Stillians said. "Next year we hope to locate our major site in a large metropolitan area and relate to urban planning. As our living spaces become more crowded, we must learn that we can shape these spaces and, thus, improve our lives. This program is a dynamic means of transmitting this civilizing process."



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Dear Mr. Colvig.

### **Iowa City Passive Home**

continued from page 8

cold water travels through the copper pipes surrounded by warm concrete, it is warmed, thereby reducing the heating load to the water heater.

Several passive means of cooling have also been incorporated in this project. Good ventilation is an important factor in producing a cooling effect. Clearstory ventilators at the peak of the ceiling are used to increase the stack effect thereby pulling fresh air through the structure. In addition to these, a specially designed solar ventilator is used to provide maximum air movement when ventilation cooling is effective. The solar ventilation is a chimney type apparatus with a solar aperture facing south. Solar radiation penetrates the transparent membrane striking the dark colored brick walls. A grill at the top of the stack is opened as well as insulated shutters to this space. Hot air rises through the ventilator stack exiting at the top grills thereby drawing air through the structure and subsequently out the stack. Although the primary function of the ventilator is to induce a draft in the summer, it can also be used to supplement space heating in the winter by merely shutting the grill at the top of the stack. This action will trap the solar heat inside the ventilator. Opening two of the three shutters to the space will induce a warm draft from the ventilator to the conditioned space.





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# Committee On Architecture For Justice

by Norman E. Wirkler, AIA

The A.I.A. has several professional interest committees on specific building types and markets. These committees include such areas as health, education, justice, housing, etc. The purpose and charge of these committees is to:

- Provide the means to improve the competency of members of the architectural profession to practice and to serve the profession and society; develp information resources and professional development activities within its specil interest areas.
- Define issues for AIA and generate policy recommendations for the AIA Board of Directors.
- Stimulate communication and information exchange within its special area of interest.
- Provide for the participation of all members of the profession who are concerned and interested—to the degree they wish to participate and are able.
- Provide a meaningful interface with the general public and special interest segments of the public.
- Encourage research and generation of new knowledge.

The Committee on Architecture for Justice is a very active committee in a field of design that has been and still is quite specialized and has not shown some of the creative architectural solutions that have been evident in the other fields of buildings such as health and education. The Committee on Architecture for Justice relates to three specific areas: law enforcement (police and sheriff's facilities), courts and corrections (prisons, jails, work release facilities, etc.

Some of the reasons for lack of creative solutions in this field in the past are:

- (a) Lack of a consistent public attitude and understanding of the offender and the incarcerated person and a lack of common and widely accepted goal for the treatment, housing and safety of the offender.
- (b) Lack of basic experience and knowledge on the part of architects and planners as to the entire justice process. Very few architects have had any personal experience with the entire system, particularly Corrections. How many architects have actually been in jail or prison? All of us have had exposure to the educational system, lived in differ-

ent types of housing, and most of us have had some close contact with health facilities, giving us a personal experience which we can use in formulating design concepts for designing those types of facilities, whereas almost all of us must learn from the very basics the details of the justice system without the advantage of personal experience.

(c) Until the recent impact of civil rights caused courts and the public to demand certain rights for dignity and humane treatment to apply to individuals in the justice system, very little money was available for construction or renovation of these facilities and consequently very few projects existed to create interest in the architectural profession.

The Omnibus Crime Control and Safe Streets Act of 1968 and 1971 accelerated the funding and research into this field through LEAA and focused attention on the problems of the entire system.

The situation is changing rapidly now nearly every state has an active corrections renovation or construction program in progress. Many states have been forced to do it by the courts; many are voluntarily upgrading their facilities. Local communities are also responding either voluntarily or with court pressure to update jails and law enforcement centers.

Architects are showing an increasing interest in the field as many new commissions become available. The Committee on Architecture for Justice has responded to this interest by providing many projects and programs for educating and informing the membership including:

- State and regional seminars produced by the Committee.
- Preparation of architectural displays of justice projects for seminars and the American Corrections Association conventions.
- 3. Presentation of case studies in cooperation with the L.E.A.A. at the National Clearing House seminars.
- Preparation of an excellent slide show on the history of Corrections.
- Preparation of a Design Resource file for Architecture for Justice including planning guidelines, bibliographies and information sources. (This will be available very soon).
- 6. Publication of a Corrections newsletter describing committee activity and items of interest.

If you are interested in this field of design, a considerable amount of good background information is now available and the A.I.A., the CAJ Committee and the individual committee members are ready to help you find the information and material you may desire to further your knowledge and improve your potential in this rapidly expanding market.

\* \* \* \* \*

Norman Wirkler has been a member of the Committee on Architecture for Justice. He is Vice-Chairman Elect for 1978 and a member of the Steering Committee. Some of the CAJ projects Norm has participated in as a member of the committee are:

· Presentation of a one day seminar for the Michi-

contractors steel

gan Society of Architects on the Muskegon, Michigan, Correctional Facility.

- Member of a Courts Accreditation team and seminar panel member representing the CAJ on Ramsey County Courthouse evaluation project and seminar, St. Paul, Minnesota in cooperation with the Institute of Continuing Legal Education, University of Michigan.
- Case Study and Design Charrette presentation project for CAJ in cooperation with the National Clearinghouse for Criminal Justice Planning and Architect, New Orleans, Louisiana.

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# Letter To The Editor

As a member of the AIA Central States Regional Conference Committee, I have been made aware of and solicited several opinions of the recent speakers to our convention. The reactions are to me guite disturbing.

The intent of those responsible for selecting those who spoke was to bring architects who not only have received highest acclaim for their designs, but who have demonstrated through their teaching and writing an ability to stimulate others to evaluate the design process. The article in The Iowa Architect by Michael Graves, and the presentations made at the conference, as well as the direct observations of award projects demonstrated to me their deep appreciation of the principles and practice of the art of architecture. Their individual expressions in design of course differ and need to be evaluated as such, but the message was clearly a serious search for artistic expression in an art form all too commonly unrecognized as art.

Not to like any artist's work is an understood prerogative, but the know-nothing approach is self defeating to one's own self evaluation and growth. To state that Graves, winner of six P/A awards and a National AIA award ''can't design his way out of a paper bag'' because his work is different than one's own reminds me of the fabled ostrich. Eisenman, Gwathmey and Stern represent equally high national recognition, yet, as they immediately recognized, even architecture students were discouraged by several I.S.U. professors from exposure to their ideas and their work although they spoke intentionally at the Design Center. Why?

I hope that the reactions I found do not represent the rejection of a willingness to look around at ideas, especially unfamiliar ones.

> With all due respect, THOMAS A. BALDWIN, A.I.A.





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