THE WISCONSIN ARCHITECT

THE WISCONSIN SOCIETY OF ARCHITECTS

AUGUST 1985

TECHNICAL/ENERGY

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Articles

Introduction — 5
Michael Utzinger

The Growing Role of SARUP in the Professions — 6
Carl V. Patton

Which Way Is Out? Designing for Architectural Liability — 10
Gerald D. Weisman

Limitation of Liability — 19
Bob Greenstreet

SARUP & Community Development — 25
Doug Ryhn & Bob Greenstreet

Air Quality & Building Design — 28
Michael Utzinger

Competitions

Reynolds Aluminum Competition — 9
Mark Klancic

National ACSA Energy & Design Competition — 17
Michael McGuire

National Student Clay Tile Competition — 24
Jihad Hirak & Rob Musgnug

Miami Ninth Street Mall — 27
Kathy Keane & Michael McGuire

News

Society News — 32

Marketplace — 38

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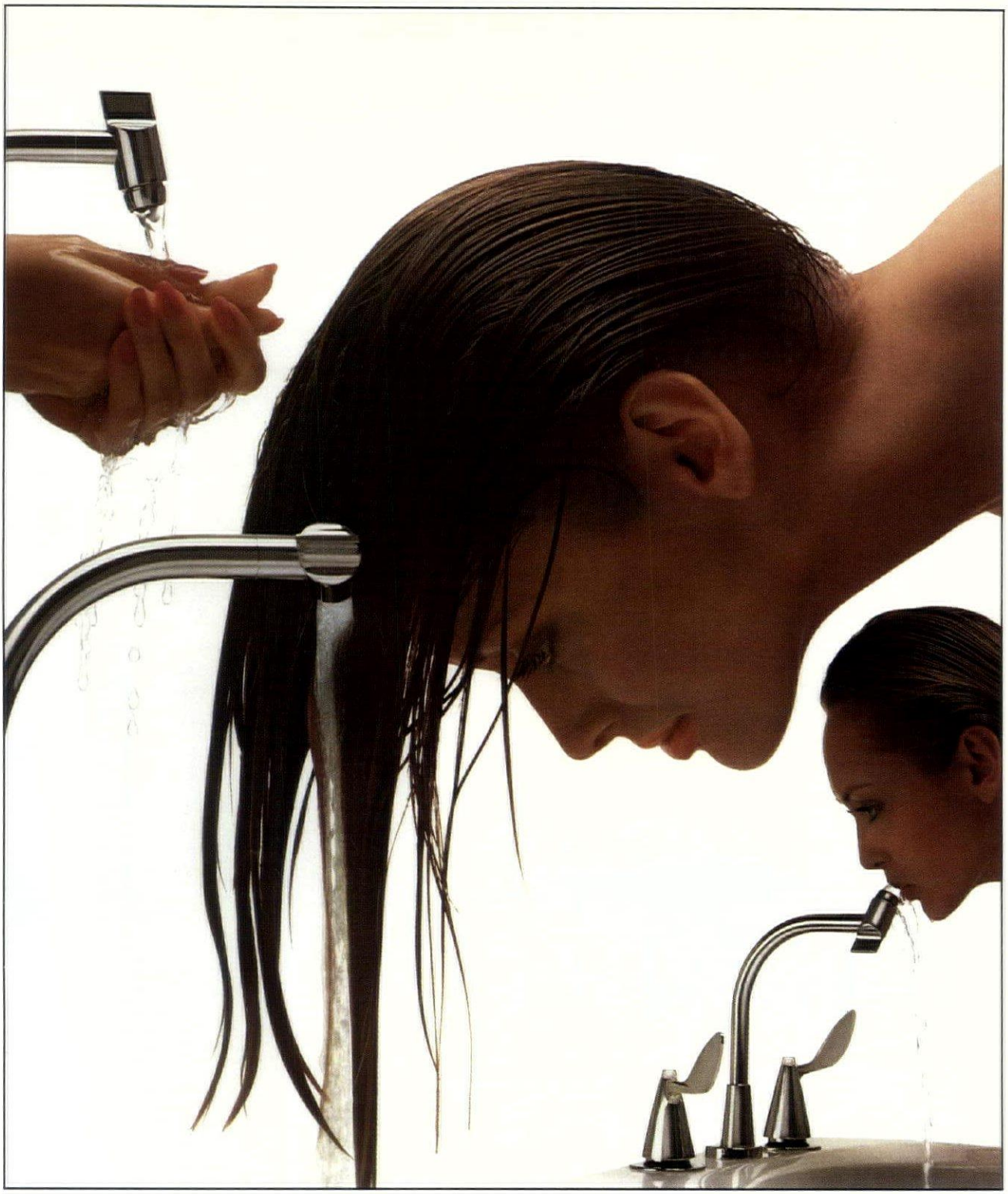

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Introduction

Michael Utzinger, Guest Editor
Assisstant Professor of Architecture

For the past three years the School of Architecture and Urban Planning has editted the August energy issue of THE WISCONSIN ARCHITECT. This year SARUP is again editting the August issue, however, the focus of this issue is the relationship between SARUP and the Profession. It is my privilege to serve as guest editor.

The task of the School of Architecture and Urban Planning is to provide teaching, research and community service at the highest possible level of quality. Articles and work presented in this issue attempt to outline the breadth of that activity. Recent SARUP activities in the professional arena have generated interest from members of the profession. The School's role has evolved over its fifteen year history. Dean Carl Patton begins this issue with a discussion of SARUP's growing role in the Profession.

Through a number of courses and programs, students gain valuable educational experience while providing a community service. Professors Doug Ryhn and Bob Greenstreet discuss two of these programs, the Small Towns Project and the Civic Miniatures Studio. These two projects are an example of how the School can be an ambassador for the Profession to the communities of Wisconsin.

A major activity of any professional school within the university is the act and disemination of research pertinent to the Profession. Professors Gerald Weisman and Michael Utzinger discuss current research results which have an impact on the Profession. Gerald discusses approaches to designing for architectural legibility, an important issue in large, complex buildings. Michael outlines the problem of indoor air pollution and discusses some of the appropriate control strategies available to architects.

Architectural liability is a concern of any practicing architect. Bob Greenstreet, who is now the columnist covering legal issues for Progressive Architecture, discusses the concept of limitation of liability.

Students at SARUP have long been recognized for the excellence of their designs. This past school year four student projects have received awards in national design competitions. Three of the projects were completed in a competition studio under the direction of Professor Miriam Gusevich. With pride we present samples of their competition entries throughout this issue.

Faculty have been increasing their professional activity. In recent years faculty involvement has increased both in the number of projects and the number of practicing faculty. The work has received honors at both state and national level. Some of the recent work attempts to integrate new knowledge gained from research into architectural design. The residence illustrated on the cover was designed by Michael Utzinger to provide a high level of both energy efficiency and air quality. Some of the construction techniques employed in this residence to achieve these objectives are discussed in the air quality article.

It is hoped that this issue will both enhance the practicing architect's understanding of the role played by SARUP and generate a healthy dialog between profession and school as the relationships between the two continue to grow and change in the future. ■

The Growing Role of SARUP in the Professions

Carl V. Patton
Dean, School of Architecture & Urban Planning

The role of a school of architecture and urban planning has grown complex in recent years, with increasing expectations from the university, the professions and the community. The traditional activities of university faculty members have been defined as teaching, research and service. At one time, perhaps, these were separately identifiable areas, but over the years these roles have tended to blend together.

In order to excel at teaching, faculty must keep up to date in the field of architecture in general, as well as in their specialties. An important way in which to do this is through involvement in research and scholarly activities. This permits faculty both to remain abreast of developments in the field and to contribute to further development of our professions. At the same time, however, they must be involved in professional practice, in order to bring current real-world experiences into the classroom. Today's students expect, and have a right to receive, an education which is both academically rigorous as well as professionally relevant.

When the University of Wisconsin-Milwaukee architecture program was created in the late 1960s, the line between professional practice and academic scholarship was also more clearly drawn than it is today. Practitioners were on the "outside" of the School "looking in" while faculty were on the "inside looking out". Today, however, much of that has changed. During a typical year, as many as ten practitioners were hired as members of our design and planning faculty, bringing with them invaluable insights to both students and colleagues. In addition, many of our faculty are involved in professional practice and consulting, the value of which is clearly seen in the local, regional and national awards they have won for their work.

Moreover, as the School has matured, many of our graduates have become well-respected members of the professional community. Our alumni are in many ways the principal test of the School's long-term relationship to the professional community. Alumni are now in positions ranging from new draftspersons to principals in design firms. They are assuming leadership positions in the private and public sectors, and they are contributing to both the mainstream of traditional office practice and the increasingly important specializations of construction management, computer-aided design, facilities management and real estate development.

As the School has grown in size and quality, the links between teaching, research and practice have strengthened, and our relationship to the profession has evolved from a clear-cut division of practice versus scholarship to a creative melding of both viewpoints. This integration of practice and scholarship is evident at many levels.

As noted above, our faculty members have regularly been engaged in professional practice as members of firms, but also a limited number of real-world projects have been brought into the School. As the School's reputation has grown, we have been increasingly called on by numerous groups to provide assistance on a variety of topics ranging from advice about where to obtain a publication, through whether to hire an architect, to assistance with a community design project.

Some inquiries are straightforward, and I or another faculty member can provide an answer. In some cases I refer the inquirer to the WSA office for advice and counsel. In other cases, such as a non-profit organization seeking help with design concepts, we are sometimes able to accommodate them within a design studio when their project meets the educational needs of that studio. Other community services require specialized research talents of particular faculty or staff or require a concerted effort of time and personnel, and these larger-scale projects are undertaken through the School's Center for Architecture and Urban Planning Research (CAUPR).

As a unit in the University of Wisconsin System, the School of Architecture and Urban Planning is charged with the responsibility for research and public service as well as teaching. As such, our School has long been involved in conducting applied research for both public and private entities throughout the State and nationally. CAUPR serves as the vehicle through which we provide such services. Appropriate work has been defined to include that which cannot be provided satisfactorily by others, advances knowledge in the field, might be applicable to other settings, or which could benefit from the perspective that university researchers can bring.

We focus a great deal of our attention on relatively small projects that will spin off larger projects for the private sector. Several notable present efforts include our Indonesia Project through which we hope to open the Indonesian architectural market to Wisconsin firms, the New World City Planning and Design Competition where we will be providing the opportunity

for Wisconsin firms to highlight their accomplishments and potential through a world-wide design competition managed through the School of Architecture and Urban Planning, and our Gerontology Project that is already being used by local service agencies involved with providing housing for older people. We continue to look for other such opportunities to market Wisconsin architecture and to highlight the value of the architectural profession.

CAUPR is essentially a self-supporting unit, and as such we must charge for our services. If no such fees were charged, the School — in fact almost all public universities — would conduct no research. We do not receive state funds for conducting research or service projects and must seek extramural funding to cover this aspect of our mission — just as all academic programs in architecure and in other disciplines seek outside support. It should also be noted that students are not used as free labor in these projects. They are compensated for their services at established University rates. Charging such fees is also good for the profession as it informs both public and private groups about the value and appropriate cost of architectural services.

The School of Architecture and Urban Planning has developed substantially during its brief fifteen year history through support from the WSA, WAF and the profession and through the efforts of a dedicated faculty and a talented student body. Our goal is to strengthen these relationships and to continue to improve the School during coming years as we face yet unknown challenges. We appreciate the opportunity to present selected faculty and student work through the annual editorship of an issue of THE WISCONSIN ARCHITECT. We hope the articles provide insight into the relationship among teaching, research and practice and service activities of the School of Architecture and Urban Planning and into our growing involvement with the professions. ■

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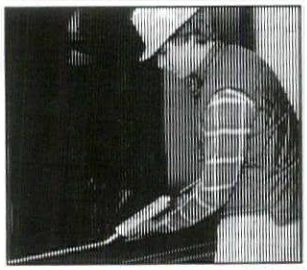

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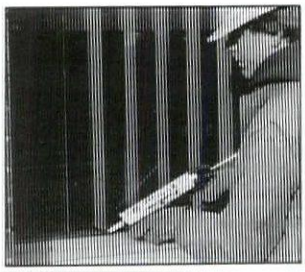

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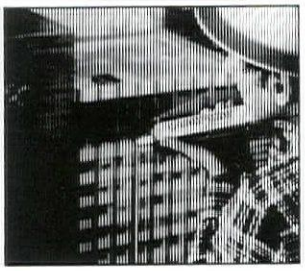

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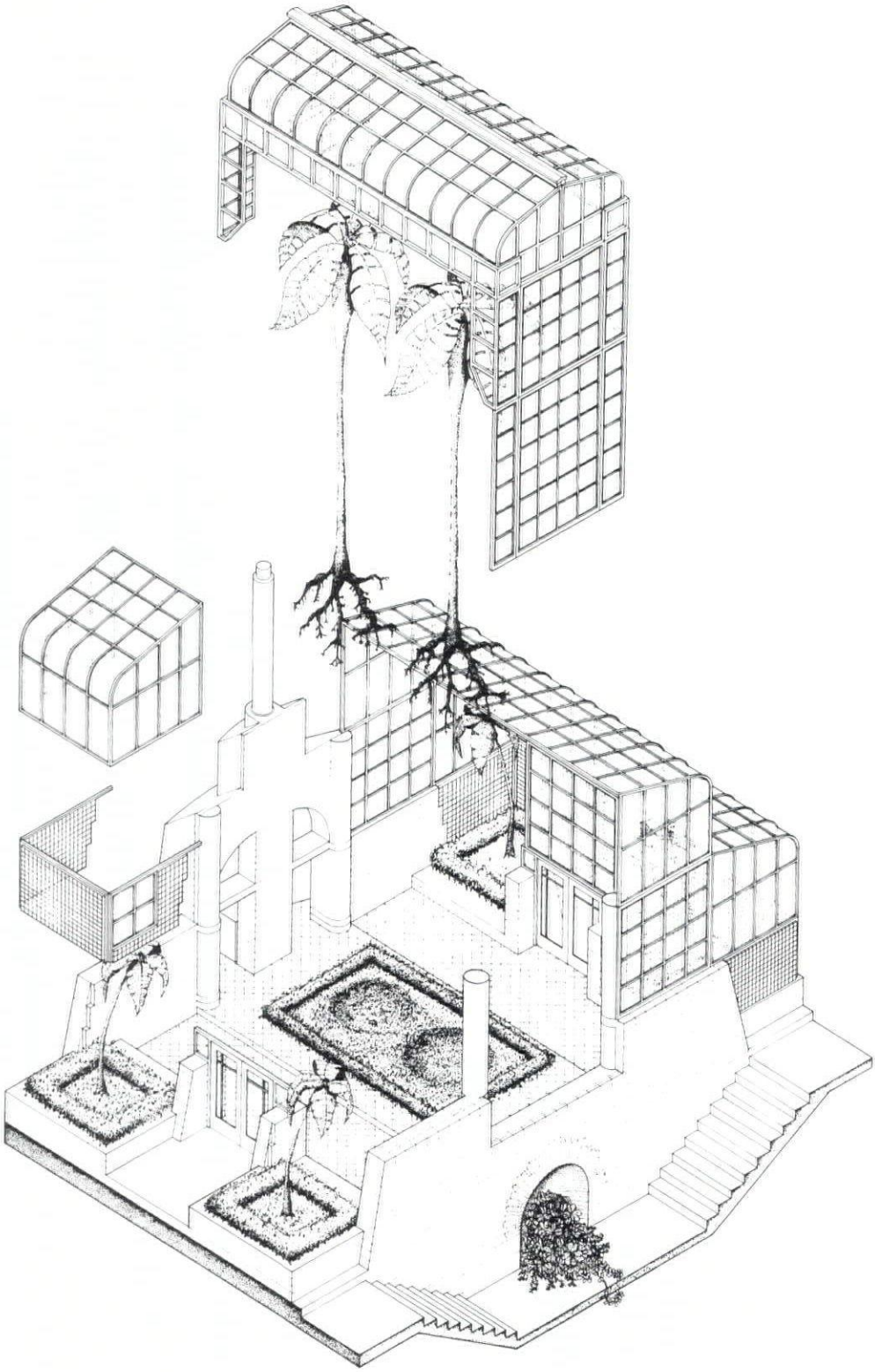

Which Way Is Out?

Designing for Architectural Legibility

Gerald D. Weisman
Assistant Professor, School of Architecture & Urban Planning

Large, complex buildings such as hospitals, transportation facilities, and shopping centers present many challenges to the architects responsible for their design. Perhaps less clearly recognized are the challenges such complex environments present to the people who use them; not the least of these problems is knowing where one is within such buildings, finding one's way to desired destinations, and determining the location of means of egrees

The recent growth in architectural research, particularly that which examines the relationship between the built environment and the behavior of people, has brought an increased awareness of the problem of architectural legibility and the difficulties in spatial orientation and way finding experienced in many buildings. Research data indicate that such way finding problems constitute more than a mere inconvenience. Users' response to, satisfaction with, and even safety within a building may all be influenced by its legibility.

The design of more legible buildings has thus emerged as an important criterion for architectural design and a focus for architectural research. At UWM several current projects are exploring various aspects of this topic; these include the programming of a signage and directional system for a major medical center, design criteria for nursing homes whose residents suffer from problems in spatial orientation as a consequence of Alzheimer's Disease, and the development of a micro-computer based graphic simulation of way finding in buildings.

THE PREVALENCE AND COSTS OF DISORIENTATION

A recent literature review conducted by the author provides some sense of the prevalence and magnitude of problems in orientation and way finding across a range of building types. In the dozen empirical studies identified, sizeable minorities of building users — ranging from 10% to 23%, with a mean of approximately 17% — report way finding difficulties. These percentages may seem relatively modest until one recognizes the numbers of users potentially involved. In a study of the Dallas-Fort Worth Airport 12% of the travellers interviewed by University of Texas researcher Andrew Seidel characterized the terminal as confusing. Given that approximately 75,000 travellers move through this airport daily, upwards of 10,000 people per day may be experiencing problems in way finding. DF-W is also the airport immortalized several years ago in an Associated Press wire service story about a college professor who, upon becoming lost within the terminal building, began gibbering mathematical equations and tearing off his clothes.

As the story of the unfortunate professor suggests, illegible environments can exact significant costs from both building occupants and operators. Staff time may be lost as a consequence of having to direct or even personally escort building users to destinations which they are unable to locate on their own. At one Canadian hospital, almost one third of staff members queried indicated that they were approached at least once per day with way finding questions, and at the Dallas-Fort Worth Airport airlines were forced to hire 34 "passenger service agents" to direct travellers within the terminal. Illegible settings may also influence consumers' attitudes; it has been suggested that one of the factors contributing to the limited patronage and resultant financial reverses of Detroit's riverfront Renaissance Center (Fig. 1) is the difficulty of finding one's way through its highly complex shopping concourse.

Illegibility may exact costs from building users as well as staff and management. As a part of the planning and programming for a major hospital at the University of Michigan, Carpman, Grant and Simmons conducted a series of studies of way finding which won for them a 1985 **Progressive Architecture** applied research award (see Further Reading). Their research indicates that the degree of difficulty visitors experienced in finding their way within the hospital was the single most important predictor of stress, more important

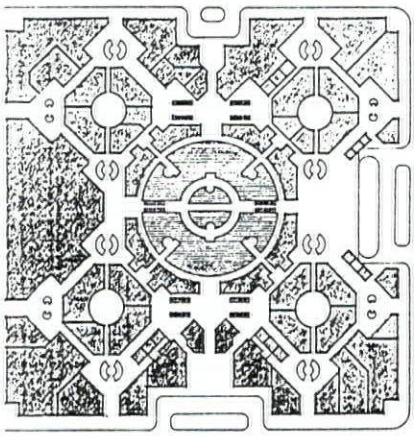

FIG. 1

than such variables as length of stay or desire for privacy.

Finally, in emergency situations which require rapid building evacuation, such as the several recent and widely publicized hotel fires in this country, the ability to effectively find one's way may have life or death consequences. In one fire incident, hotel guests mistakenly tried to gain access to a storage room, the appearance of which was identical to the adjacent exit. In a second hotel, people moved toward a central atrium, and thus toward the heart of the fire, assuming that elevators and fire stairs would be adjacent. Recent data from researchers in both the United State and Great Britain indicates that people in emergencies — rather than becoming panic striken as the popular imagination would have it — behave as adaptively as possible given the information available. Since the architectural environment itself represents one important source of information, it is essential that buildings designed for public use provide guidance for safe and effective way finding.

A MODEL OF WAY FINDING BEHAVIOR

The determination of those forms of environmental information which facilitate way finding is a far from simple task. Because human behavior is exceedingly complex and influenced by so many factors, the architectural environment by itself cannot have totally predictable and unvarying effect. However, to the extent we understand something of the overall principles which govern the interaction of people with their environment — specifically the perceptual and cognitive mechanisms by which they take in and organize sensory and perceptual information — we can begin to model the way finding process and to formulate design guidelines for architectural legibility.

Central to such a model of way finding is the concept of an "environmental image" or "cognitive map" which people develop with time and experience in an environment. The concept of the cognitive map — coding distances and directions between important destinations — is likely most familiar to the design community through Kevin Lynch's classic treatise Image of the City. Because most buildings — like the cities studied by Lynch — cannot be perceived in their entirety from any one location at one time, way finding is facilitated by some form of mental image, allowing the storage in one's mind of that which is not immediately visible in the environment. Thus way finding must be conceptualized as a cognitive as well as a perceptual task, dependent upon what one knows as well as what one sees.

DESIGNING FOR ARCHITECTURAL LEGIBILITY

Thinking of way finding as a cognitive as well as a perceptual task facilitates a broader definition of the kinds of potentially salient environmental information which the designer can provide. The following discussion and guidelines are organized in terms of four such categories of information: (1) signs and numbers; (2) architectural differentiation; (3) perceptual access; and (4) plan configuration.

SIGNS While signs and numbers are clearly the most common and conscious forms of information for way finding in the architectural environment, the available research presents a rather mixed picture regarding their efficacy, particularly in relatively complex buildings. Data gathered by Michael O'Neill, a Doctoral Student in Architecture at UWM, indicate that even with the addition of signage way finding performance remains poorer in the most complex buildings with signage than in the simplest buildings without any such additional orientation information.

Thus in designing for architectural legibility one should view signage, maps, and directories as supplemental and supportive of other forms of way finding information.

The size and visual prominence of sign elements should vary in accordance with the importance of the information being conveyed.

Consider the utilization of "You are here" maps and bird's eye perspective drawings. There should be several points of correspondence between such maps or plans and the surrounding environment; what is at the top of the figure should be what one sees looking straight ahead.

ARCHITECTURAL DIFFERENTIATION For many building users way finding is supported primarily by elements other than formal signs posted on walls. In a pilot study conducted by the author in a nursing home, 80% of the aids to way finding mentioned by building residents were distinctive elements or features of the setting itself — plants, a grandfather clock, the elevator — which contributed to

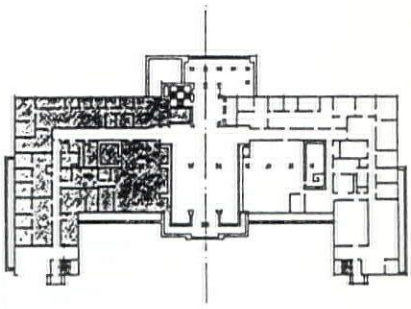

FIG. 2

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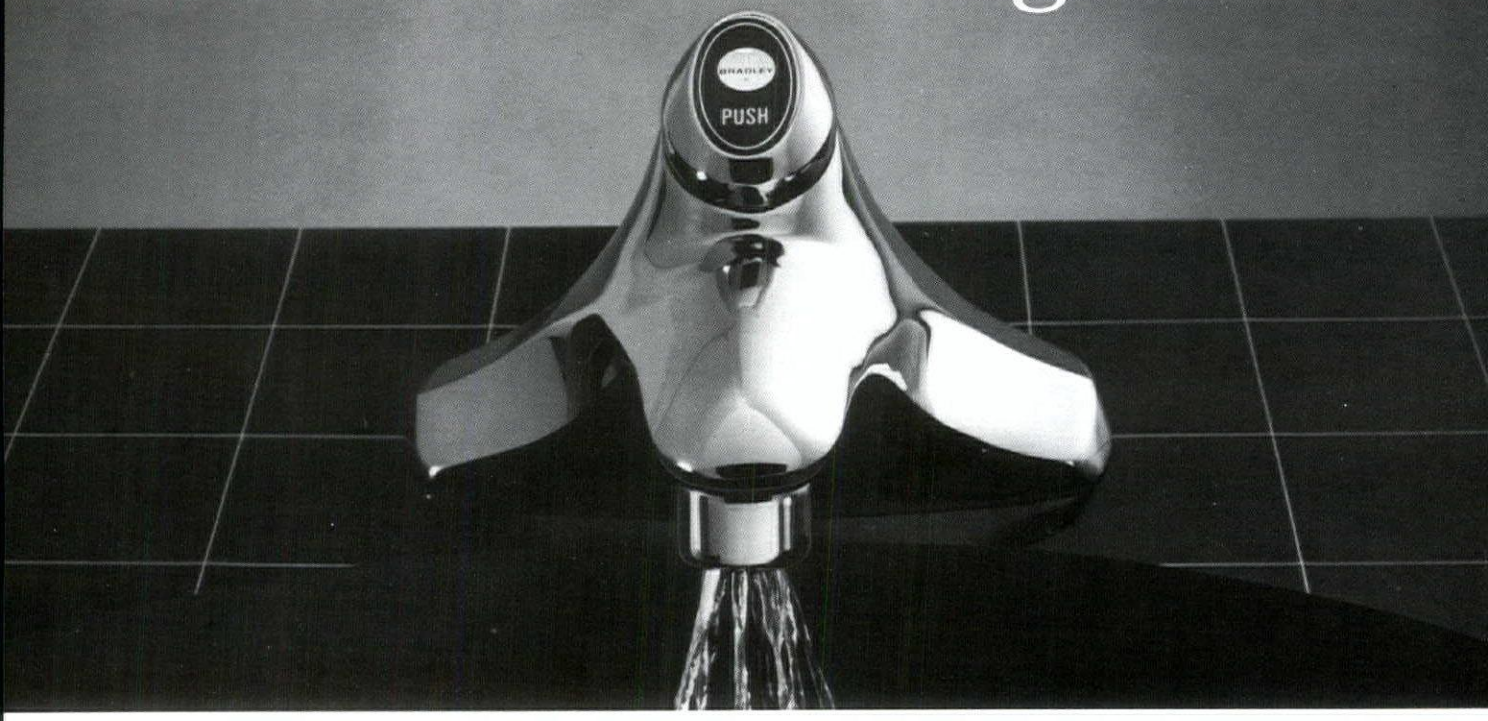

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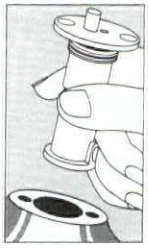

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While color coding can be an effective orientation aid, one must make sure the meaning of the code is clearly communicated to building users.

Along with color, other design variables such as width and height of corridors, treatment of detail and materials can all contribute to architectural differentiation. Such architectural differentiation can occur at the scale of specific rooms or corridors, between wings or "regions" of a building, or between floors (Fig. 2).

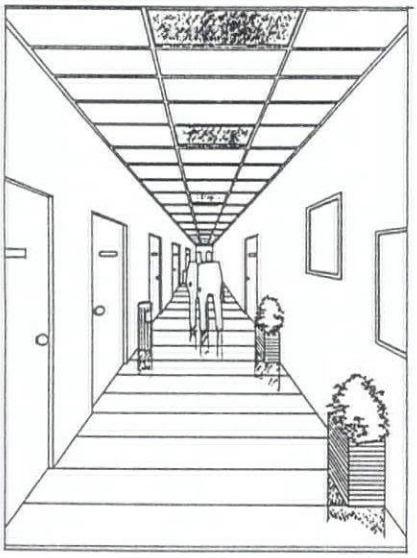

FIG. 3

Long corridors with many doors along them (Fig. 3) are especially confusing. Research suggests no more than 5 to 7 such entries should be located along an unbroken corridor wall.

PERCEPTUAL ACCESS In those circumstances where it is possible to see through or out of a building the way finding task is typically simplified. Thus in Seidel's airport study the terminal is significantly easier to find one's way in by passengers deplaning at gates with direct perceptual access to the baggage claim area.

Views to the exterior at key decision points such as corridor intersections and elevator lobbies (Fig. 4) permit identification of one's present location by relating it to landmarks in the larger environment.

Attria and other forms of light wells can facilitate the way finding task by permitting perceptual access to key locations within the building.

PLAN CONFIGURATION Research indicates that it is easier to build a cognitive map and find one's way in some buildings than in others. A number of characteristics of floor plan configuration — symmetry, number of turns along a corridor system, ease of description — all appear to influence building legibility.

Thus in data gathered by the author in ten university classroom buildings, study participants reported becoming lost significantly less often in those buildings judged to have simpler and more legible floor plan configurations. The following guidelines focus on plan configuration.

The mental images which people construct of buildings consist of major paths or corridors and nodes at which such paths intersect. Such intersections should be designed as distinctive locations within the building.

Legibility is enhanced and way finding is facilitated when building plan configurations can be easily visualized and readily described; examples include "I", "L" or "T" shaped buildings. Right angle corridor intersections can be more readily noticed and remembered than oblique meetings of paths. Clarity of plan configuration is most important when a building provides little else in the way of signage, perceptual access, or architectural differentiation.

The conceptualization of spatial orientation and way finding as cognitive as well as perceptual tasks appears to have important implications for the problem of building evacuation in emergency conditions. The design of buildings in response to life safety requirements has traditionally been viewed as a purely technical task. So long as exit signs were appropriately located, and egress ways were of adequate size, it was assumed buildings could be promptly and safely evacuated.

Recent fire safety research, however, raises serious questions about a number of the assumptions which have governed traditional life safety design. It appears that people in emergency egress situations rely upon many of the same forms of information utilized for way finding under normal conditions. Thus, means of egress which are most visibile, even if not necessarily the closest, are more likely to be utilized as are those routes which are most familiar and most frequently travelled. Exit marking may be far less important than previously assumed. Summary statistics from almost 400 incidents reviewed by University of Maryland fire engineer John Bryan, for example, indicate that in those buildings studied where signs were present, less than 8% of evacuees reported

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seeing these exit markers. Designers cannot assume that "emergency only" egress systems, particularly if they are located in obscure corners of a building, will necessarily be used simply because they are there. Emergency exits are best located where people will see and come to know them as a part of their day to day commerce with a building.

FURTHER READING

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Illustrations by Ahmad M. Hamzah

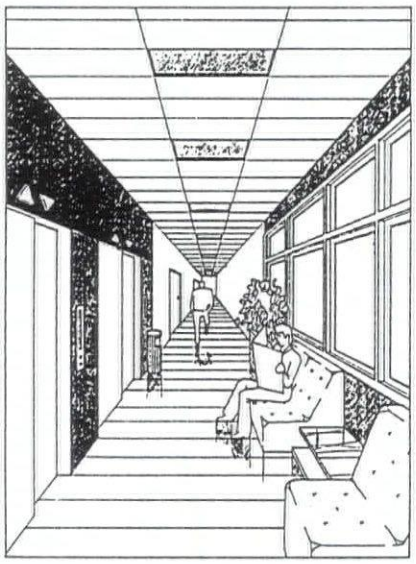
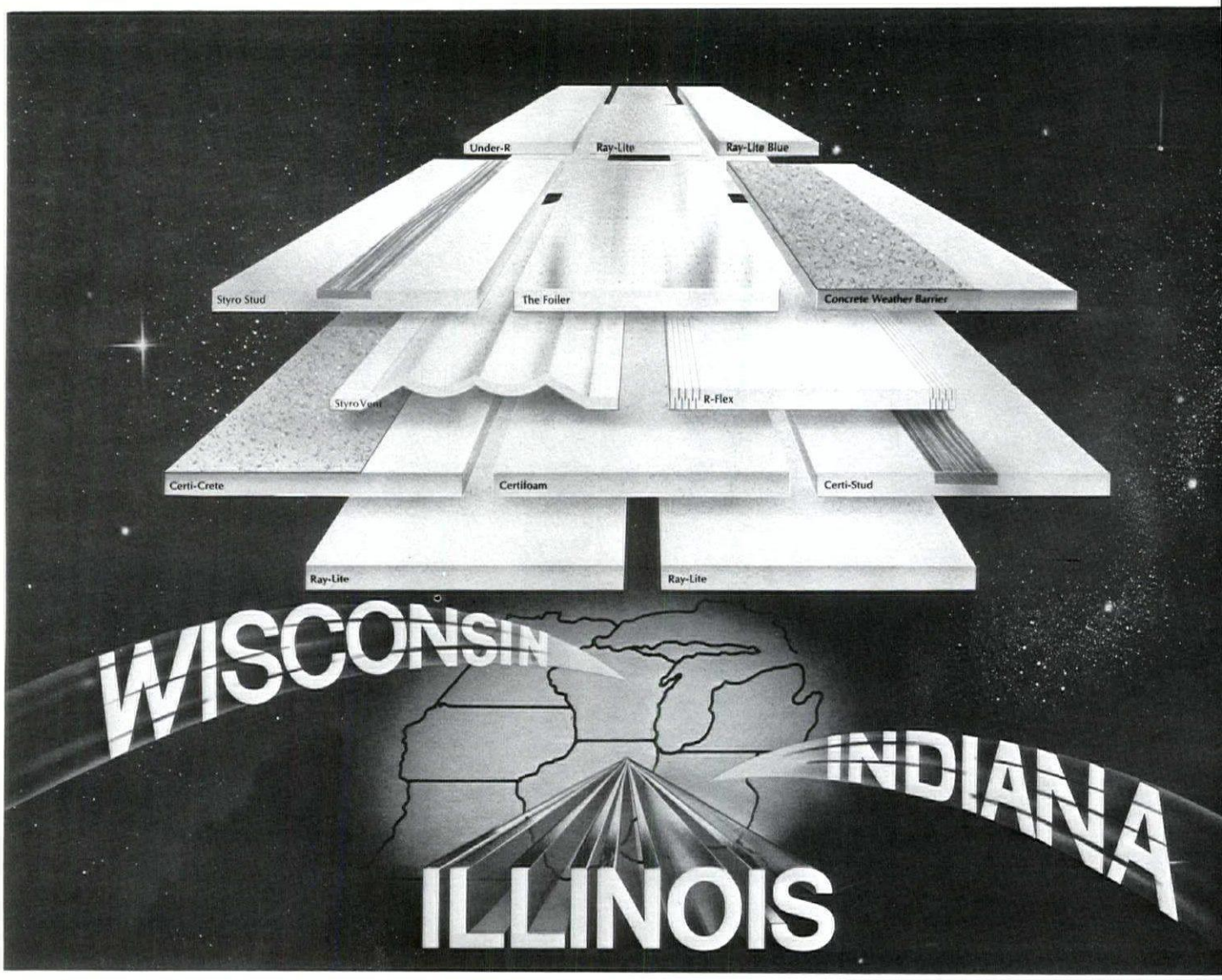


FIG. 4



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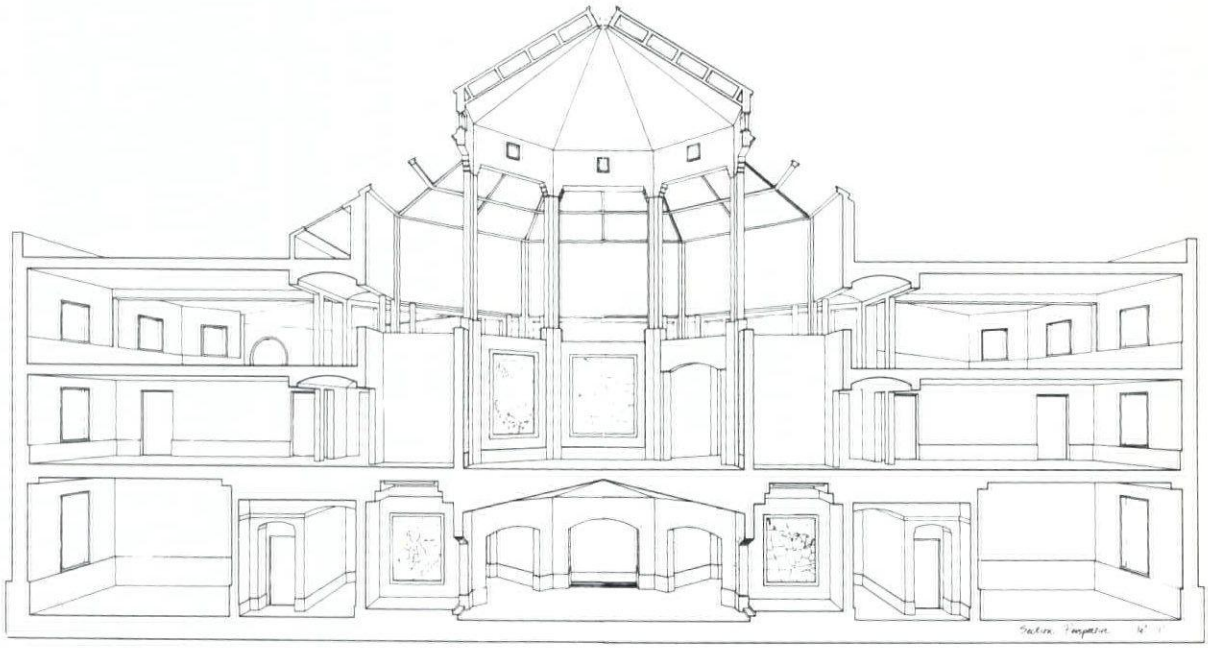

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Limitation of Liability

Bob Greenstreet
Associate Professor, School of Architecture & Urban Planning

"After reading reports of many such cases one is forced to the conclusion that, with few exceptions, those who find themselves at law are the stupid, the negligent, the dishonest and the unreasonable. The average architect, endowed with honesty and a fair degree of skill . . . is not likely to become involved in litigation."

This quotation, taken from the chapter entitled 'The Architect and the Law' in the AIA Handbook of Architectural Practice, was published in 1923 and provides an interesting perspective on the development of liability concerning the design professions.[1] Such confidence in the association of legal action and guilt or incompetence is by no means borne out by legal events within the past few years. Although statistics are hard to come by,[2] the volume of reported cases involving design professionals has increased sufficiently to suggest that it is unlikely that all claims are based on stupidity, negligence or dishonesty. They are more likely a result of Architecture, like other professions, becoming an increasingly dangerous profession to practice with regard to the potential of legal action.

A general survey of prominent cases involving design professionals[3] indicates a broad range of areas within practice where litigation has arisen, some which, a few years ago, would have appeared unlikely areas of vulnerability. However, the increased duty of care expected of design professionals to the level where 'reasonable' behavior has been raised to new heights of expected performance, has given rise to claims in some quite unexpected areas. For example, negligent specification of materials has become an area of concern recently,[4] while approval of shop drawings[5] has also resulted in legal action. In the most extreme cases, there are reports of the engineer who inspected the roof of the Hyatt Regency being enjoined in a law suit for the collapse of the skywalk, despite no inspection on his part of the faulty structure; similarly a firm of architects in Philadelphia are being sued for designing a shopping mall 'conducive to kidnapping' following a crime committed there.[6]

Beyond these incidents, however, there is one area of concern which, when viewed in context, has increased in prominence and magnitude to the point where it may have serious impacts on the future of the design professions. In a study undertaken in Wisconsin over a 20 year period, it transpired that 23% of the cases taken to the Supreme Court concerned the question of limitation of liability.[7] Similarly, a review of current literature and cases indicates nationally a considerable degree of debate and activity within this area, although no clear cut consensus of opinion has yet emerged to clarify the uncertainty that presently exists.

It is the purpose of this article, therefore, to explore the concept of liability limitation on a national basis, to review its development and current variations of interpretation, to assess its impact upon the design profession and to speculate as to further developments in this field.

A limitation period is expressed in statute form in each state, after the expiration of which no legal action can be brought by an aggrieved person. It was developed and expanded largely in the 1950's, as the doctrine of privity of contract was eroded to give the design professions some degree of protection from indefinite legal threat. As the statutes are enacted on a state-by-state basis, they vary considerably both in the time periods they specify and in the allocation of time for specific actions. For example, differing limitation periods may be specified for slander, bodily injury, property damage, etc. (although some actions may fall under two or more categories) and may vary in duration from 2 to 15 years, depending upon the state in which they are enacted.

Some states have enacted statutes of repose as opposed to statutes of limitation specifically for work undertaken by the design professions. The central difference lies in commencement of action; for the latter, an event establishes the date from when the time period for action begins; in a statute of repose, however, a specific date will activate the period, irrespective of any fault or action on the part of the designer. This may, of course, mean that the limitation period could have expired before building failure or damage have occurred, thus depriving the aggrieved party of a remedy. The potential problems of constitutionality here, the deprivation of the plantiff's 'day in court' as opposed to the affording of some degree of legal protection to the design professional has led to a number of challenges to these statutes, and a number of interpretations as to their meaning and purpose. Although these cases have been decided in various states, they collectively provide a broad picture of the variation in interpretation which presently exists in relation to when the statutory period begins. If AIA contract documentation is

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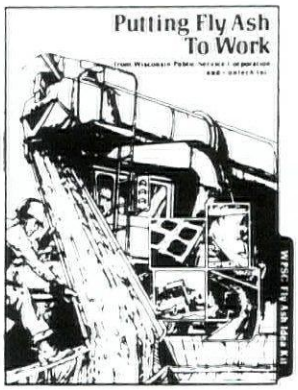

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used, provisions are included to establish the date at the end of the construction of the work[9] upon certification of substantial completion although in some cases, legal action against the architect has been allowed where the limitation period has been conceived as beginning at the end of the professional relationship, which could include a period where the architect gives the client post-completion advice on problems arising from the construction.[10] Architects providing continuing services on a number of projects are particularly ill-served by this ruling. Furthermore, some courts have accepted the Injury Rule as being applicable, establishing the construction of the limitation period as commensurate with the actual failure of the building, as would be the case in any third party injury case.[11]

However, perhaps the most worrying development in this field for design professionals concerns the 'Discovery Rule'. Here the date of commencement is established at the time the plaintiff discovers, or should have discovered, the fault. The rationale for the rule lies in the complexity of building construction, the potential difficulties involved in determining faults which may be covered over or be underground and the potential time lag from completion to discovery. In such cases, by the time the plaintiff has realized the impact of the fault, in the absence of the Discovery Rule, he/she may be statutorily deprived of a remedy. The Discovery Rule allows for both fault and damage to be taken into consideration and has been used successfully in a number of states.[12]

The implications of the Discovery Rule have a dramatic impact upon architectural practice. Buildings completed years previously may suddenly develop signs of failure;[13] from this point, the client will have a statutorily set number of years in which to make a claim, thereby providing the architect with the prospect of virtually unlimited future liability. In the past, architects who insured against potential legal suits could allow coverage to lapse at the expiration of the statutory period related to each project; retiring professionals also could terminate the coverage after this period, confident of no further claims against them. With the emergence of the Discovery Rule, however, such time related protection may no longer exist, and architects may be faced with potential claims long after their retirement. This point is most forcibly brought home in an English case, where an architect is being sued 11 years after his death, and his estate, which supports his wife in old age, is under threat.[14]

Given this gruesome state of affairs, can the future hold any relief for design professionals in regard to future liability? An examination of the situation in England may give some indication of potential new developments. There, architectural liability has tended to develop in tandem with the United States over the past 20 years[15] and, due to the nationally binding nature of major decisions, development in liability can be charted chronologically. The Limitation Acts 1939-80 provide a six year liability period in England during which time claims can be made; in 1972 a landmark case established this period as beginning when the failing foundations were installed and approved.[16] This was overturned in 1976 by the same judge who introduced the concept of the Discovery Rule to the country,[17] a decision which was reinforced and strengthened two years later by the highest court of appeal.[18]

However, last year, a new ruling gave some hope to unrestricted liability by establishing the commencement of the statutory liability at the time when damage comes into existence, and not when it was discovered, much like the 'injury' rule in the United States.[19] This has provided some degree of relief where the architect can establish that the fault occurred at or around the time of construction.[20] It can be seen as something of a compromising decision, allowing a degree of timeliness for plaintiffs to pursue an action, but also providing a basis for defense for the architectural profession. In view of the current ascendency of the Discovery Rule in the United States and its potentially far-reaching impacts on designers, perhaps the limited relief granted by the Pirelli case may be argued successfully in the future in individual states.

However, beyond establishment of the injury rule as a potential means of limiting endless liability, it is possible that a 'long stop' remedy may be introduced. In Scotland, for example, the Prescription of Limitation (Scotland) Act 1973 provides a statutory period of 20 years for claims to be made. The period is lengthened considerably beyond the average six years found elsewhere, giving a generous period of time in which to bring suit, but at least provides the architect with a tangible indication of when that period expires. Similar provisions have recently been proposed by the Law Reform Committee in England, establishing a fifteen year long stop period, and are currently under consideration.

In conclusion, then, the issue of limitation of liability in the United States varies considerably in interpretation concerning commencement of limitation periods, although recent developments suggest that the Discovery Rule is becoming more popular in many states. Curtailment of the Discovery Rule to a less dramatic measure provided under the Injury Rule may provide some relief for design professionals if events in England are anything to go by, although 'long stop' measures may be more effective in ensuring a balance between protection for the architect and consideration of the plaintiff's rights in tort. States which are currently assessing this area of law may wish to consider positions taken both in other states and abroad in resolving this difficult and important issue.

NOTES

1. 'Design Professionals' is a generic term used here to refer to various parties in the construction process including architects, engineers, interior designers, etc. Malpractice cases have occurred in a number of individual cases in various professions, but reflect problems shared by all.

2. New York Times, 2 12 78 estimated that malpractice cases concerning architects had an increase rate of 20% per year. From Berman T, Chapter 1 "Avoiding Liability in Architecture Design & Construction" (edited by R. Cushman) Wiley Interscience, 1983.

3. Greenstreet, R., Greenstreet, K. The Architect's Guide to Law and Practice. (Van Nostrand Reinhold, New York, 1984).

4. Scott & Potomac Ins. Co. of D.C., 2170r323, 341 P2d 1083 (1959).

5. John Grace & Company v State University Construction Fund, 472, N.Y.S. 2d 757 (N.Y. App. Div. 1984).

6. Wall Street Journal, Tuesday, December 6, 1983, p21.

7. Greenstreet, R. "Legal Impacts Upon the Profession of Architecture: The Liability of the Architect in Wisconsin" University of Wisconsin 1984.

8. An informal review of cases reported in the bimonthly newsletter "Legal Briefs for the Construction Industry" (McGraw Hill, Inc.) reveals 13 of their noteworthy cases in the last year have concerned limitation of liability. Similarly, most new texts in the area have addressed the issue at some length.

9. AIA Document B141 Article 11.3 states that the period begins "not later than the relevant Date of Substantial Completion of the Work, and as to any acts or failures to act occurring after the relevant Date of Substantial Completion, not later than the date of issuance of the Joint Certificate for Payment". (Chase Architectural Associates v Moyers Corners Fire Dept. Inc. 427 N.Y.S. 2d 219 (N.Y. App. Div. 1984).

10. County of Milwaukee v Schmidt Garden and Erikson 4 3 Wi 2d 445, 168 NW 2d SS9 (1969).

11. Abramowski v Wm. Kilps Sons Realty, Inc. 80 W.S. 2d 468; 2S9 N.W 2d 306 (1977).

12. E.g., Wisconsin, Illinois, Louisiana, Washington, Oregon, Maryland.

13. Rosenberg v Town of Bergen, 61 NJ 190, 293 A2d 662 (1972).

14. RIBA Journal (Dec.) 1982, Cecil R. 'Writing your Will to Defend your Estate from Eternal Liability'.

15. Supra note 7. A similar pattern of increased liability was established between key cases in England and Wisconsin over approximately the same time period. In other areas of liability (negligent specification, implied warranty of design, etc.) similarities between the two countries is also striking.

16. Dutton v Bognor Regis Urban District Council (1971) 2 ALL ER 1003.

17. Lord Denning MR in Sparham Souter & Others v Town & Country Developments (Essex) Ltd. & Another (1976) 2 ALL ER 65.

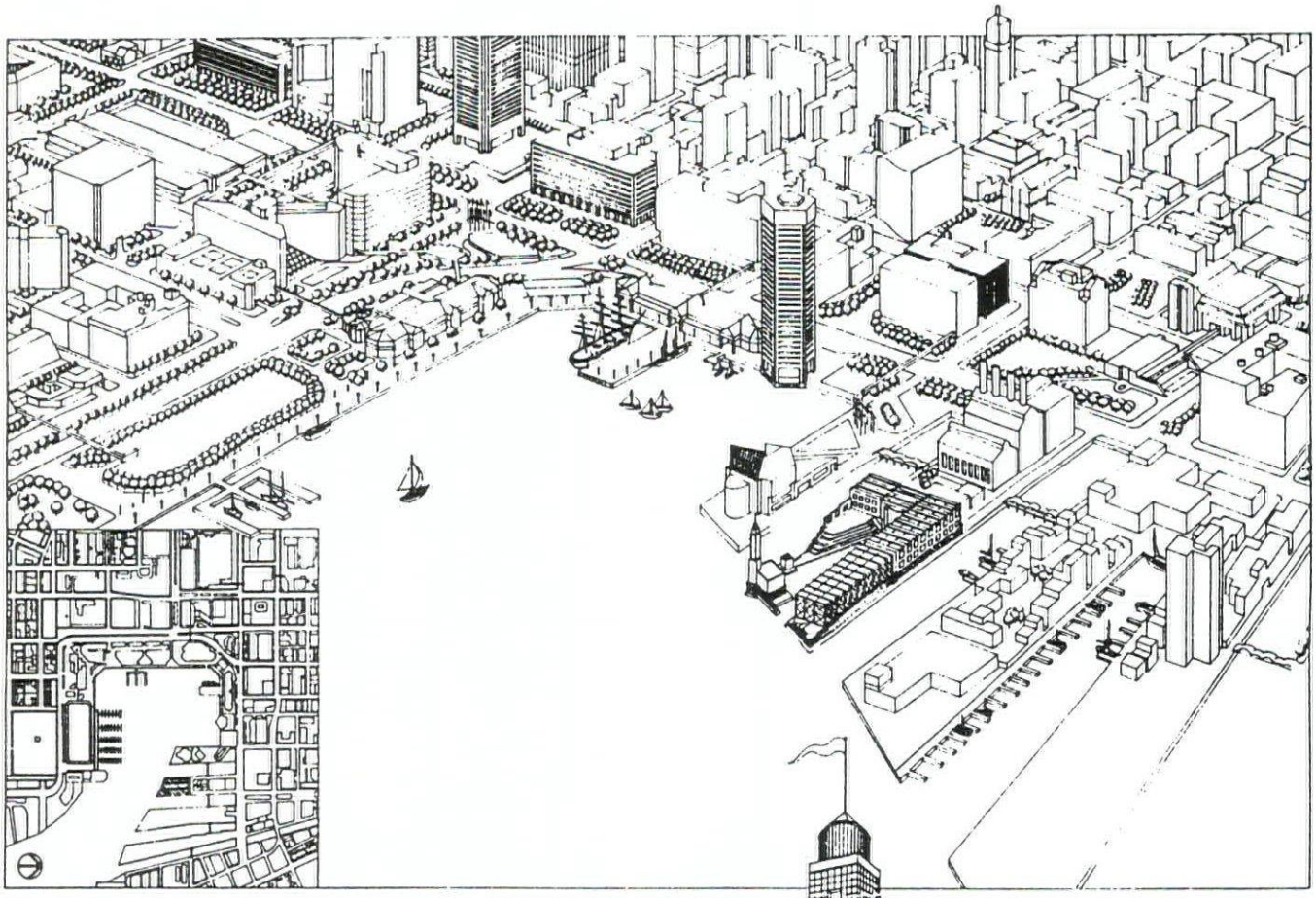
18. Anns & Others v London Borough of Merton (1977) A.C. 728.

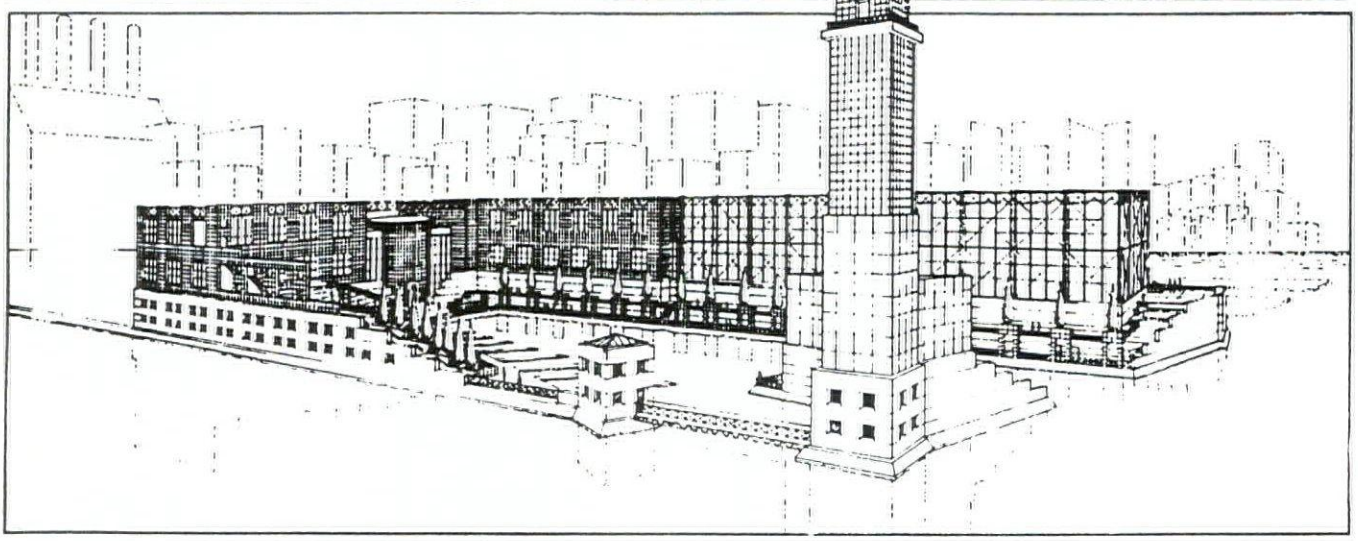
19. Pirelli General Cable Works Ltd. v Oscar Faber & Partners (A firm) (1983) 2 WLR 6.

20. However, the recent ruling in Billam & Ano v Cheltenham Borough Council has stated that the limitation period should not begin to run until the damage constitutes 'a danger to health and safety'. The case is likely to be appealed. ■

Baltimore: Inner Harbor Gateway

National Student Clay Tile Competition — 3rd Place
Jihad Hirak & Rob Musgnug

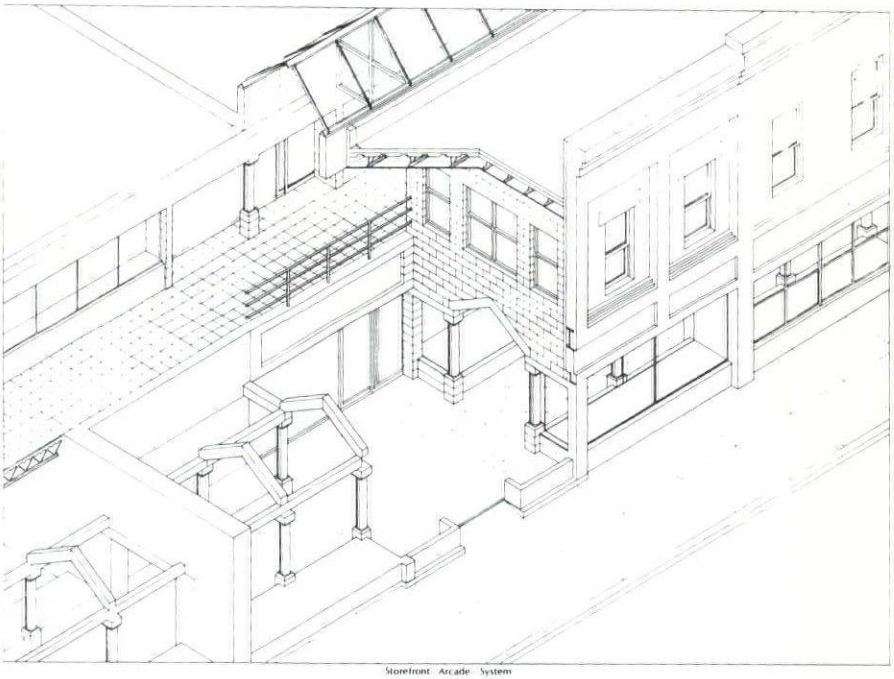




SARUP & Community Development

Doug Ryhn & Bob Greenstreet
Associate Professors, School of Architecture & Urban Planning

Since the inception of the School, the Department or Architecture has attempted to work with communities within Wisconsin on a variety of projects of a design-orientated nature. Whole studios have worked on schemes in Milwaukee and in surrounding towns and villages, and many individuals have completed theses and studies all around Wisconsin. However, two programs that have had longrunning success and are well-established in the curriculum are the Small Towns Project and the Civic Miniatures studio.



Storefront Arcade System

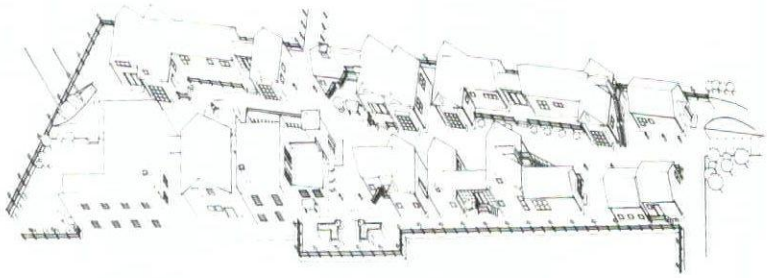
An Arcade Design Proposal for Main Street, Medford, WI.
Ron Bercovitz
Fall 1983

SMALL TOWNS PROJECT

The small towns project began in 1975 as a means of providing revitalization assistance to downtown businesses. Graduate architecture and urban planning students are selected for the project each year based upon their design abilities, maturity and personality and are paired with communities seeking assistance. The nature of the effort is generally to create alternative storefront sketches which are presented to merchants and eventually implemented, often by local student help and contractors.

Since the program began, over fifty students have spent summers living and working in twenty-five small towns in sixteen counties throughout Wisconsin. The first contacts in the community are usually with the county extension agent and some type of coordinating committee consisting of persons representing the business sector, the lcoal government and various citizen groups. This is followed by meetings with individual merchants where details such as schedules and budgets are discussed as well as general design directions. Based upon these discussions as well as research into local history, the students are able to produce several alternative sketch designs which are presented for consideration.

Typical of these are suggestions for the repair or replacement of pressed metal or wooden cornices, removal of inappropriate



Commercial Development, Port Washington - Kyle Edwards and Scott Blank

modernizing materials and signs and occasionally the substitution of a window or door more in keeping with the character of the building. The most frequent solution however is cleaning and painting to bring to the building and the street the desired effect through the careful use of color. Often ideas from several sketches are combined and at some point the store owner feels the design has reached the implementation stage.

The local bank often provides loan assistance, hardware stores and lumber yards supply most of the materials and contractors in the area provide the necessary skills.

Both the students and the small towns benefit through this field laboratory. The students, operating in a totally different environment from school, meet new people, are confronted with new problems that must be addressed in short periods of time and with very restricted budgets. In addition, most often the projects are implemented while the students are still in residence and very often a new and improved attitude about themselves that is reflected in a generally healthier economy.

CIVIC MINIATURES STUDIO

The studio, which is offered to both graduate and undergraduate students, concentrates on working with small Wisconsin towns and villages on a series of proposed or potential public projects. Typically, contact will be made with the Village Manager of a likely settlement to see if there is mutual interest in working together. If this proves positive, the Village Manager and other key members of the community - bank manager, planning official, police chief, for example — act as clients with whom the students work and to whom they ultimately present their schemes. The students derive enormous benefit from dealing with potentially 'real' client personalities, often with widely divergent demands and agendas than those of the design faculty. At the conclusion of the semester, the work is presented to the town residents in the form of an exhibition and, if possible, a booklet containing the work with the intention of providing a stimulus for discussion and decision-making with regard to future building plans that will hopefully affect and motivate further development within the community.

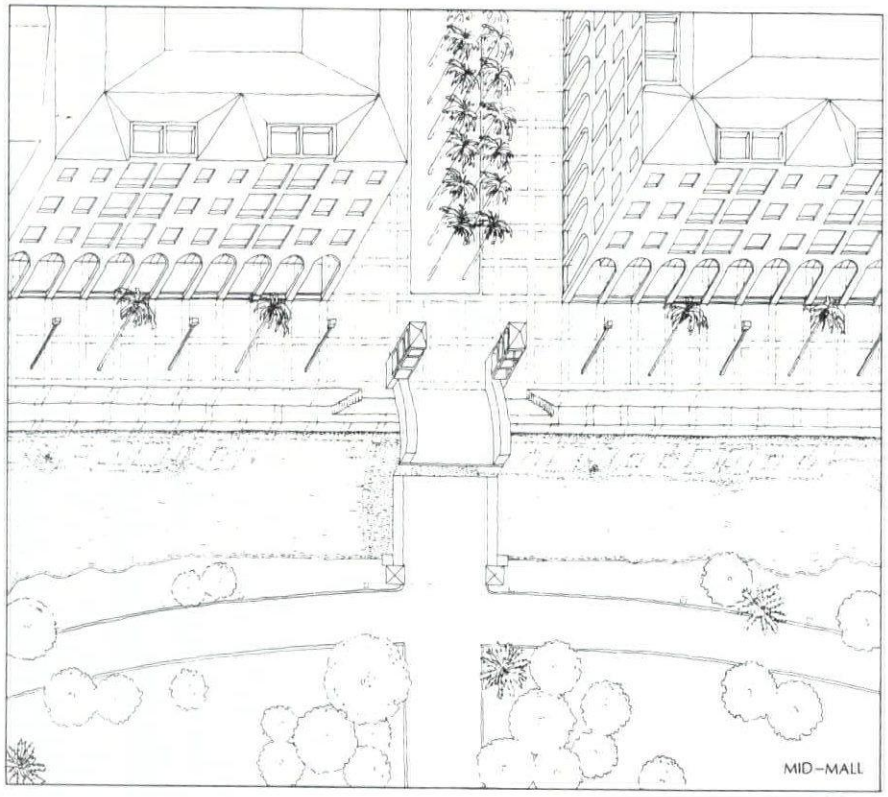
Last year, the studio worked with the Village of Saukville, where the students produced designs for gas stations, war memorials, libraries and banks. This year, we were approached by the Village Manager of Port Washington who heard of our involvement, and have just completed a semester of design work concentrating upon the lakefront area of the City. Each student was responsible for analysing the future needs of Port Washington in terms of potential building and designing three projects for consideration. Schemes submitted included hotels, condominiums, parks, health clubs and even an aquarium.

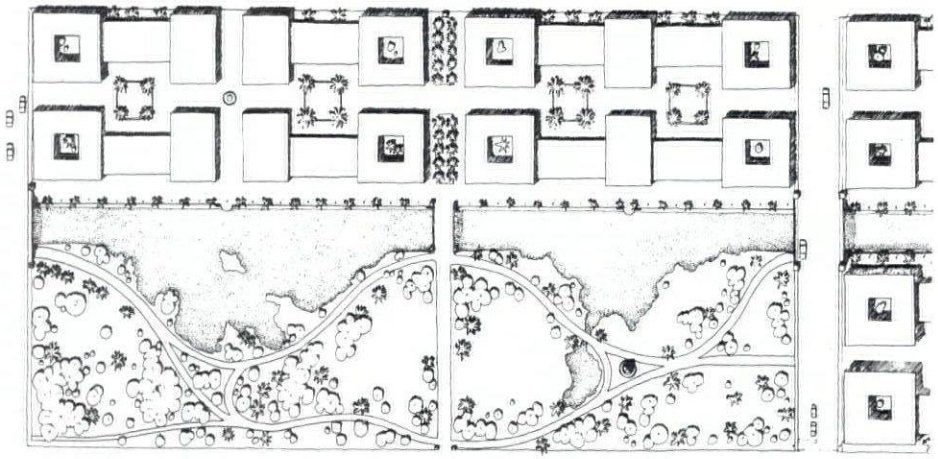
The student's work has been presented formally to the Planning Commission and the Rotary Club (who are actively pursuing one of the park projects, and hope to bring some of the ideas to fruition later this year) and will form the focus for a major exhibition later this year entitled 'Port Washington - Visions of the Future'.

The studio has been remarkably successful in the past in providing both a valuable opportunity for the students to develop skills of client management and realworld design on one hand, and generating numerous ideas for future development for small towns on the other. We hope to continue this work in the future (the studio runs in the Spring semester of each year), and would be happy to work with any small town or village who would like to participate in the experience. ■

Miami Ninth Street Mall

National Professional Competition — 2nd Place
Kathy Keane & Michael McGuire





Air Quality & Building Design

Michael Utzinger
Assistant Professor, School of Architecture & Urban Planning

Ask an architect to describe the most cost effective method to conserve energy in an existing residence and the response will likely be to reduce heat loss via infiltration by caulking and weatherstripping. An engineer in Naperville, Illinois did just that. He so successfully reduced infiltration that carbon monoxide from his kitchen stove and furnace killed him. Effects of indoor air pollution typically are not as immediate. However, many recent studies of both commercial and residential buildings indicate pollution levels which exceed acceptable outdoor minimums. The study of indoor air quality is relatively new, and consensus on acceptable pollution exposure levels has not been reached. With an understanding of the problem, an architect can design buildings which minimize or avoid some problems of indoor air pollution.

To solve the problem, one must understand both air pollution sources in buildings and methods used to control pollution levels. Pollution sources can be divided into two groups: those generated within a building and those occurring outside which enter as 'fresh air'. Pollutants generated within buildings include: formaldehyde, commonly contained in many building products; radon, round in construction materials, the ground and water; biological aerosals; combustion products including carbon monoxide, aromatic hydrocarbons (wood fuels) and nitrogen oxides; asbestos; and cigarette smoke. Pollutants entering the building from outside include: sulfer oxides from combustion; industrial emissions including cadmium, calaium, chlorine and silicon; automobile emissions including carbon monoxide, lead and manganese; pollens; and ozone. Any or all of these pollutants as well as others not mentioned may be present in a building. Richard Wadden and Peter Scheff provide an excellent review of the sources of pollutants and studies of health risks due to exposure in their book, Indoor Air Pollution. Pollution control methods depend on the source of the pollutant.

Pollutants are measured by their concentration, defined as the amount of pollutant per unit volume of air. Indoor concentration levels of pollutants entering the building from outside depend on the outdoor concentrations and filtration. Outdoor concentrations can be a function of microclimatic conditions and location of intake vents. These issues are discussed later. If outdoor pollutant levels are unsafe, filtration of the incoming air is required.

Indoor pollution sources enter the air as products of combustion, respiration, or outgassing from materials. The rate of addition to the air may be constant (emission of radon) or intermittant (operation of a gas stove). Concentration levels depend on the rate of addition to the air and rate of removal via ventilation or recirculation through filters. Pollutants can be controlled at their source by behavioral adjustment, source removal, specification and detailing. Behavioral adjustment is achieved through regulations such as non-smoking zones. Source removal would include modifications to existing buildings such as the removal of asbestos. Nonpulluting building materials or equipment can be specified (eg. use of electric rather than gas stove). Detailing can reduce pollutant generation. For example, plastic vapor barriers placed between the earth and building restrict radon emission from the ground into the building. Once pollutants are in the air, control is through air filtration or dilution. If pollution concentrations are high, recirculated air must be filtered. The most common method used to control indoor air pollution is dilution via ventilation with fresh or filtered air. Doubling the ventilation rate halves the concentration of indoor pollutants. A major conflict arises between reducing ventilation to save energy and increasing ventilation to achieve a healthy building.

What is a minimum acceptable ventilation rate? Most code ventilation requirements are based on building type, occupant levels or specific industrial exposure standards. Many of the pollution sources presently being studied, such as acceptable radon concentrations, are not addressed by codes. While many occupancy types require minimum ventilation rates, the requirements for residences in most codes are an operable window in each habitable room. Who opens their windows during winter? Ventilation rates can be specified according to the number of occupants, volume of the space, or use of the space. There is wide variation of opinion as to the appropriate minimum ventilation rate per occupant. Values range from 5 to 35 cfm per person. All researchers agree that higher ventilation rates are required when smoking is permitted. This author has used recommendations of the Nordic Standards which require 10 cfm per person if smoking is not permitted and 20 cfm per person if smoking is permitted. To reduce concentrations of building generated toxins, such as formaldehyde, most researchers recommend a minimum ventilation rate of ½ air change per hour during building occupancy. These

recommendations are tentative, as experimental data is limited and health risks are not well known. However, if either method would require a higher minimum ventilation rate than required by the code, the architect should seriously consider using those values rather than smaller values specified by code.

New energy efficient residences present specific problems. Buildings designed to be energy efficient will have very low infiltration rates. Typical construction might result in infiltration rates of ¼ air change per hour. Some construction techniques will result in much lower infiltration rates. Mechanical ventilation is required to maintain health. Why, one might ask, should houses be tightened only to require mechanical ventilation? Infiltration rates in residential buildings will be approximately proportional to the square of the wind speed. Thus a house designed to have an infiltration rate of ½ air changes per hour in a 5 mph wind would have an infiltration rate of 2 air changes per hour in a 10 mph wind. The infiltration rate might be dangerously low during calm weather. To achieve a high infiltration rate, the architect would forgo all sealants around windows and doors and specify windows with higher infiltrations rates. One might be moved to ask why a house with large infiltration rate is insulated, especially since the risk of condensation damage is greatly increased. The point here is that if you want energy efficiency and a healthy residence, a mechanical ventilation system with heat recovery is required. As the codes do not require mechanical ventilation, the architect should educate the client to the issues of indoor air quality and ventilation.

Figure 1 illustrates a construction process used by this author to limit both infiltration and condensation in a new residence. By constructing the entire exterior shell before constructing interior partitions and finishes, all openings in the skin could be sealed and inspected. This construction method also permitted inspection of the vapor barrier prior to interior construction. Maintaining all electric wiring, plumbing and ductwork inside the vapor barrier reduces the risk of both condensation and infiltration. The calculated infiltration rate of this residence is ⅛ air change per hour in a 15 mph wind, and 1/80 air change per hour in a 5 mph wind. To insure a healthy indoor environment, a ventilation system including an air-to-air heat exchanger was installed in the residence. The fans were sized to provide a ventilation rate of ½ air change per hour. The heat exchanger can recover roughly 75% of the potential heat loss due to ventilation. The annual heating load is estimated to be 20 million Btu (equivalent to 200 therms or 6000 kwhr). The resi-

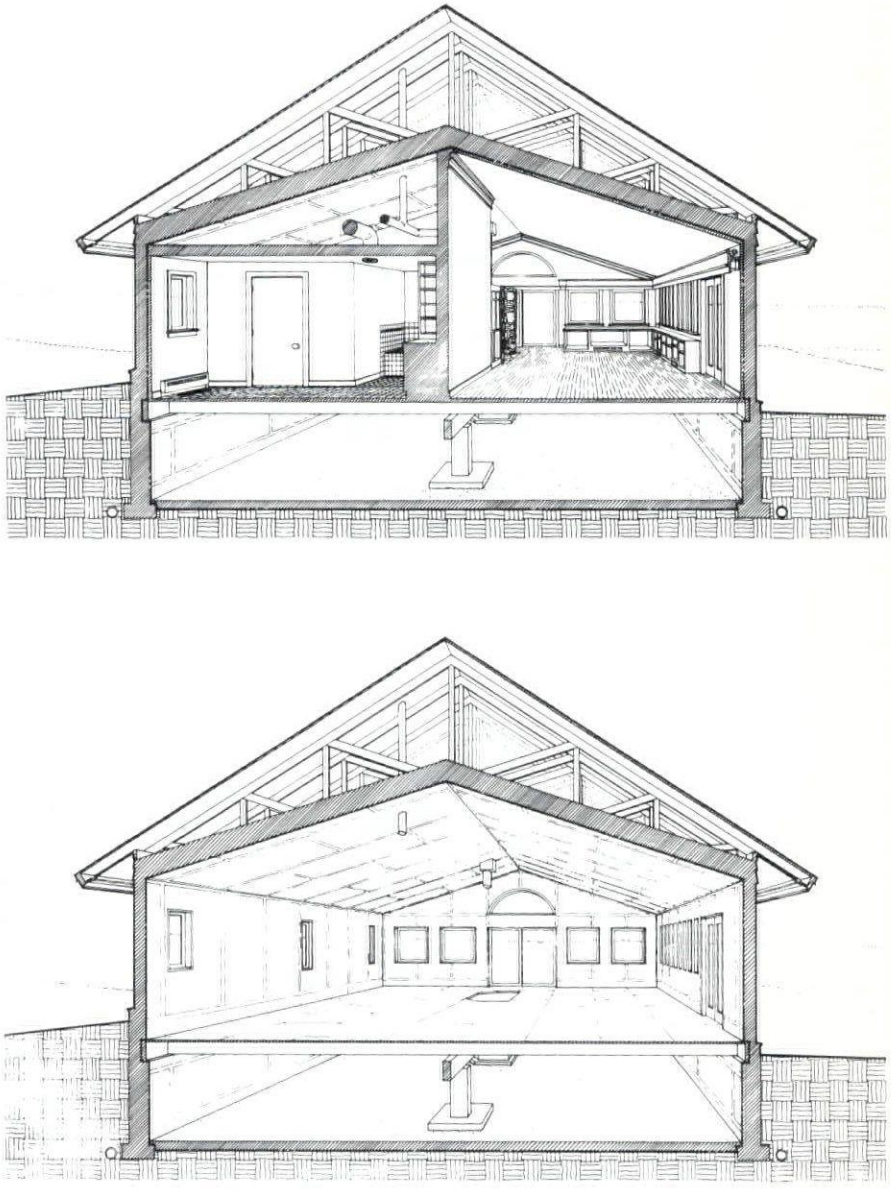


Figure 1. Shell & Interior Construction

dence is presently being monitored to determine whether it really is a healthy, energy efficient building.

The problems of indoor air pollution extend beyond the requirements of removal of indoor based sources via ventilation or recirculation through filters. The architect would be wise to consider the outdoor air quality of a proposed building site; the appropriate location of fresh air supply and spent air exhaust; and the potential for unplanned transport of air within the building. Reyner Banham, in his book The Architecture of the Well Tempered Environment, notes that early building ventilation systems were designed to filter polluted outdoor air before distribution throughout the building.

Location of supply and exhaust grilles can have a major influence on air quality within a building. In urban settings, air quality near the street or alley is often poor, due to higher concentrations of pollutants from automobiles. Locating a supply duct near ground level adjacent to an alley will insure the use of polluted air to ventilate the building. Improper exhaust or smokestack locations can lead to the development of polluted eddies of air located near the building. If air intakes are located next to polluted eddies, the supply air will contain higher levels of pollution. Most codes provide little more than a minimum perscribed distance between inlet and exhaust grilles. Distance alone is not enough to insure exhaust air will not be readmitted into the ventilation system. For an introduction to microclimate pollution problems, the reader is referred to T.R. Oke's book, Boundry Layer Climates.

Air can move through buildings in a variety of ways: through the HVAC ducts; driven by wind through cracks and openings in the skin; and from lower floors to upper floors through stairwells, elevator shafts and other vertical shafts, driven by the stack effect. Any or all of these effects can combine to move air through a building in ways never envisaged by the architect or mechanical engineer. One must understand that a room is a duct enlargement, complicated by the many openings by which air may enter or leave. A sad example of reduction of air quality due to unintentional air flow in a building is the case of the John Hancock Building in Chicago, reported in the June 1984 issue of Chicago Lawyer.

The John Hancock building was conceived as a mini city, with a shopping mall at the entry levels, offices in the lower half of the tower, and apartments in the upper half. The apartments are constructed with kitchen and bath exhaust fans. Fresh air is supplied through the hall and enters apartments under the door, a decision made during construction. A parking garage which serves the apartments occupies the floors between the shopping area and the offices. Due to the great height of the tower (nearly 100 stories), the stack effect exerts a tremendous pressure up the elevator shaft. Thus air from the parking garage enters the apartments via the elevator shaft and hall. To make matters worse, ventilating fans supplying air to the apartments were routinely shut off at night to save money. Thus much of the 'fresh' air supplied to the apartments first ventilates the parking garage, picking up carbon monoxide, lead, and other toxic gases. The problem should be viewed as a design flaw exacerbated by building mismanagement. The inclusion of a parking garage within any building requires great care and forthought to insure that fouled air from the garage will not enter the building. This is not an easy task considering that the path people take from a parking garage into their office or home is a very large duct with randomly opening and closing dampers.

Although a definition of indoor air quality has not been reached, the conscientious architect, with adequate forthought and common sense should be able to design buildings will be viewed as 'healthy' rather than 'sick'. ■

From left: (front row) Marines, Hackl, Busby, Hallenbeck, (back row) Alford, Brewer, Dinsmore, Lawson.

LAWSON ELECTED AIA VICE PRESIDENT

Dave Lawson, FAIA, of Madison, has been elected one of three national Vice Presidents of the American Institute of Architects. Lawson, currently serving on the AIA Board of Directors representing the North Central Region, will serve as a national Vice President with A. Notley Alford, FAIA, Dayton, Ohio; and Ben Brewer, Jr., FAIA, of Houston, Texas, for 1986.

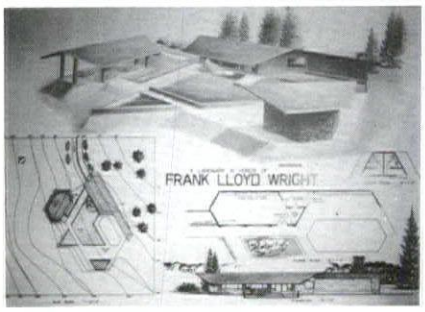
All three national Vice Presidents were elected at the 1985 AIA National Convention. Don Hackl, FAIA, of Chicago was elected the new First Vice President/President Elect of the AIA. Don will become AIA President in 1987. John Busby, FAIA, of Atlanta, the current First Vice President of the AIA will assume the office of presidency of the AIA in December of 1985.

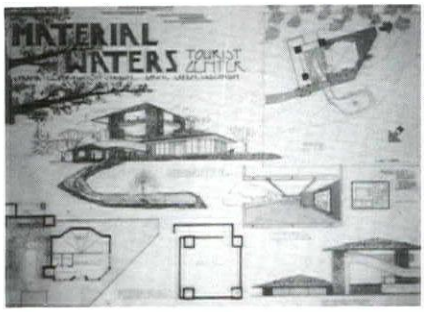
Harry Hallenbeck, FAIA, San Diego, was elected to a two year term as Treasurer and Phil Dinsmore, Tucson, Arizona continues in his two year term as Secretary of the AIA.

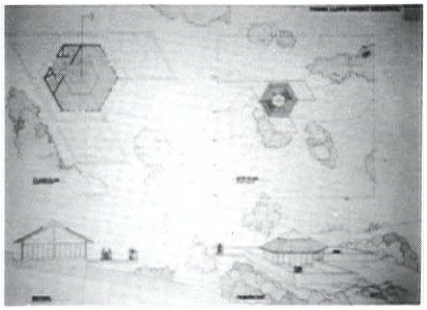
WISCONSIN ARCHITECTS FOUNDATION AWARDS GRANTS

$3,500 in scholarship funding was awarded to students at UW-M School of Architecture and Urban Planning by the Wisconsin Architects Foundation this past year. The Wisconsin Architects Foundation has awarded in excess of $80,000 in scholarships to students during the last 30 years. The Board of Directors of the Wisconsin Architects Foundation publically thanks its many supporters and looks forward to continuing to provide scholarship support to students pursuing careers in architecture.

Pictured with this article are three of the six scholarship recipients from this past year. The young guy pictured with the silly smile on his face is WSA Executive Director, Eric Englund.







SOUTHWEST CHAPTER'S 1985 HIGH SCHOOL DESIGN COMPETITION

The WSA Southwest Chapter has once again sponsored its annual High School Design Competition. Participating in the 1985 program were 31 students from 9 southwest Wisconsin high schools. The design program, written by Solner and Associates of Madison, entitled "A Tribute To Frank Lloyd Wright" encouraged the design of a landmark for a hypothetical park in the Spring Green, Wisconsin area. Students had the opportunity to work with architectural advisors throughout the 6 week competition.

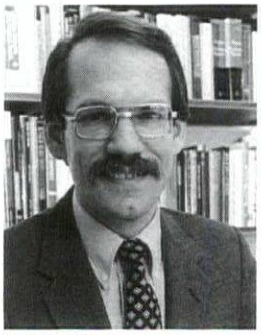
The 31 entries were judged on the basis of design concept, creativity and presentation technique by three distinguished judges: Robert Groves, Jack Klund, and E. Edward Linville. The awards ceremony was held at the First Unitarian Society, designed by Frank Lloyd Wright where Reverend Max Gaebler welcomed the group. Guest speaker Gordon Orr, FAIA gave a special presentation entitled "The Frank Lloyd Wright Legacy." Awards for the winning entries were presented by Joan Bouril, chairperson of the event. Contributors for the awards included The Wisconsin Architects Foundation, Master Blue Print of Madison, and The Spring Green Restaurant.

GUIDANCE IN PLANNING NEW PUBLIC LIBRARY BUILDINGS

The enormous investment of time and human and financial resources involved in building a new public library demands that the leaders of the project plan carefully to make the best use of their resources. PLANNING THE SMALL PUBLIC LIBRARY BUILDING introduces librarians and library trustees to the complex process of planning, designing, and constructing a new library facility. It includes an excellent discussion on selecting architects on the basis of competence and qualification . . . not fee. This booklet is authored by Anders C. Dahlgren, the consultant for Public Library Construction and Planning at the Wisconsin Division for Library Services. A copy of this fine publication is available through the WSA office or can be ordered from the American Library Association in Chicago.

PEOPLE AND PLACES

WIDEN ASSOCIATES LTD., a new architecture and planning firm in the Milwaukee area recently opened their offices at 7124 West Center Street. Heading the firm as president is Leonard A. Widen, AIA who has been a registered architect in Wisconsin for the past 29 years.



Carl Patton

Doug Ryhn

INDONESIA HERE THEY COME

The University of Wisconsin — Milwaukee School of Architecture and Urban Planning (UWM-SARUP) has been selected to participate in an innovative cooperative architectural program in Indonesia. Seven UWM-SARUP professors will serve as consultants on a rotating basis for 2½ years. In exchange, several master's and doctoral candidates will attend UWM-SARUP during the same time.

Congratulations to UWM-SARUP Dean Carl Patton for his outstanding efforts in obtaining the award of this project. The program is supported through funds from the World Bank and total contributions to the program will be in the range of $250,000 - $300,000.

Doug Ryhn, of WISCONSIN ARCHITECT Editorial Board fame, will be the first UWM-SARUP member to leave for Indonesia.

MEMBERSHIP ACTION

CLARKE, RONALD A., was approved for AIA Membership in the Northeast Wisconsin Chapter.
GROFF, JAMES J., was approved for AIA Membership in the Northeast Wisconsin Chapter.
KEGLER, GARY D., was approved for AIA Membership in the Northeast Wisconsin Chapter.
KRETCHMER, GARY A., was approved for AIA Membership in the Southeast Wisconsin Chapter.
SCHMIDT, PHILIP A., was approved for AIA Membership in the Southwest Wisconsin Chapter.
LUCE, RICHARD, was approved for Associate Membership in the Northeast Wisconsin Chapter.
MCMASTERS, DONALD W., was approved for AIA Membership in the Southeast Wisconsin Chapter.
WELLS, EUGENE, was approved for AIA Membership in the Southwest Wisconsin Chapter.
He is upgrading from Associate Membership.
BECKER, DANIEL, was approved for AIA Membership in the Southeast Wisconsin Chapter.
RISLEY, BRUCE, was approved for Student Membership in the Southeast Wisconsin Chapter.
ROTHERMEL, CECIL J., was approved for AIA Membership in the Southeast Wisconsin Chapter.
He has transferred in from Illinois.

ON THE HOOK?

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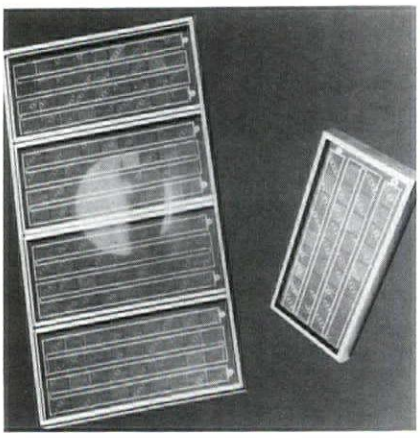
If you are looking for a new position or seeking an associate, the WSA Job Bank can help you. There is no charge for using the service.

If you have any questions or need more information about the service, call Sandra at the WSA office (Madison - 257-8477; Wisconsin - 1-800-362-3912.

Marketplace



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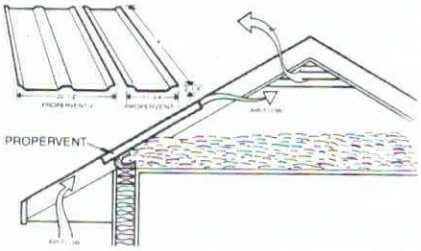
Five new product line catalogs are available from Bradley Corp. that detail the firm's broad family of Washfountains, showers, metering faucets, modular wash center, security fixtures and accessories, emergency fixtures and washroom accessories. To obtain free copies of the catalogs, contact Bradley Corp., P.O. Box 309, 9101 Fountain Blvd., Menomonee Falls, WI 53051 414-251-6000.



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Advertisers Index

A & A Distributors 31
Acoustical Floors of Wisconsin, Inc. 33
American Surveying Company, Inc. ... 39
Arnold & O'Sheridan, Inc. 39
Automatic Temperature Supplies ... Insert
Bachmann Construction Co., Inc. ..... Back Cover
Baker Manufacturing Co. ..... Insert
Bend Industries, Inc. 37
Bradley Corp. 12
John Buhler Co., Inc. 23
Karl E. Buschmann Co. 39
C & R Model Co. 39
CAD Systems of Wisconsin 23
Desert Aire Corp. 29
Dolan & Dustin, Inc. 39
Geis Building Products 35
General Electric Silicone 8
Graef, Anhalt, Schloemer & Associates 39
International Market Square 4
Jacobus Security Systems, Inc. 37
Thomas H. Jaeschke & Associates 39
J. J. Koepell Co. ..... Insert
Kohler Co. ..... Insert
Milwaukee Glass Block 31
Milwaukee Plumbing & Heating Supply ..... Insert
Minnesota Diversified Products 14
Murphy Supply Co. ..... Insert
Orlandini Studios, Ltd. 39
PBBS Equipment Corp. 37
W.S. Patterson Co. ..... Insert
Pella Window Co., Inc. 29
Photocopy, Inc. 39
Radford Co. 18
STS Consultants 39
Sheet Metal Contractors of Milwaukee 33
Stickler & Associates 12
Unific Systems Incorporated 35
United Brick and Block 39
United Plumbing and Heating Supply ..... Insert
Ver Halen, Inc. 23
WECK Glass Blocks 31
Wisconsin Brick and Block 33
Wisconsin Gas Co. 2
Wisconsin Power & Light Co. 14
Wisconsin Public Service 20
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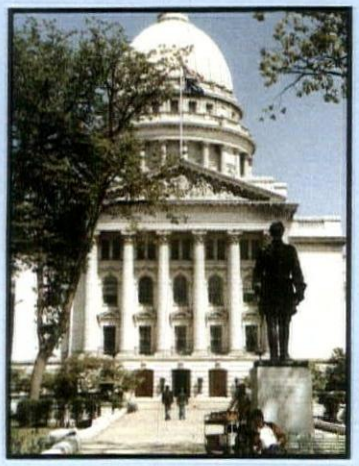

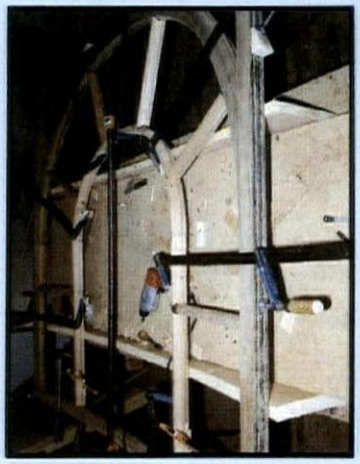
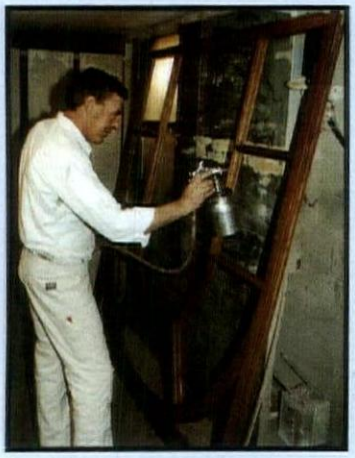

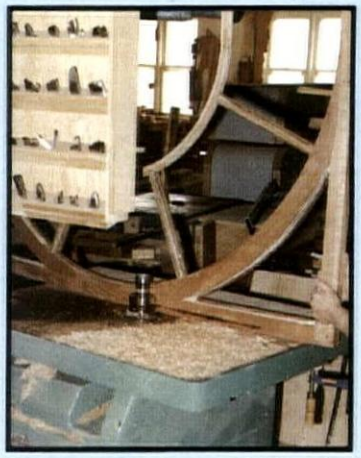
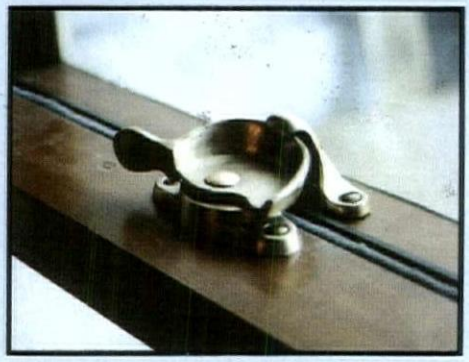
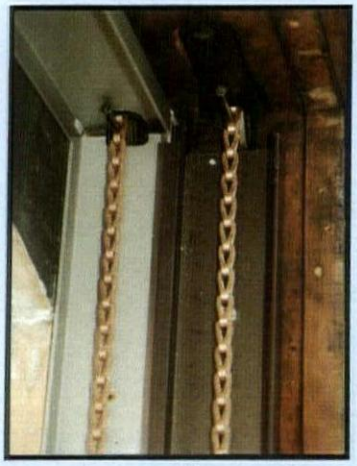
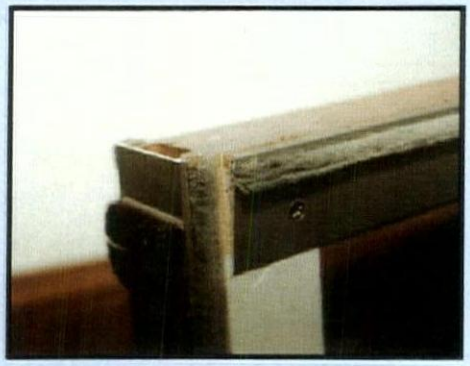
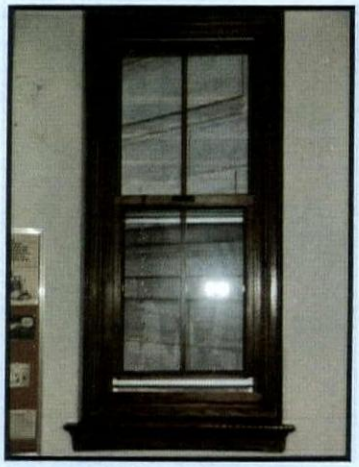

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