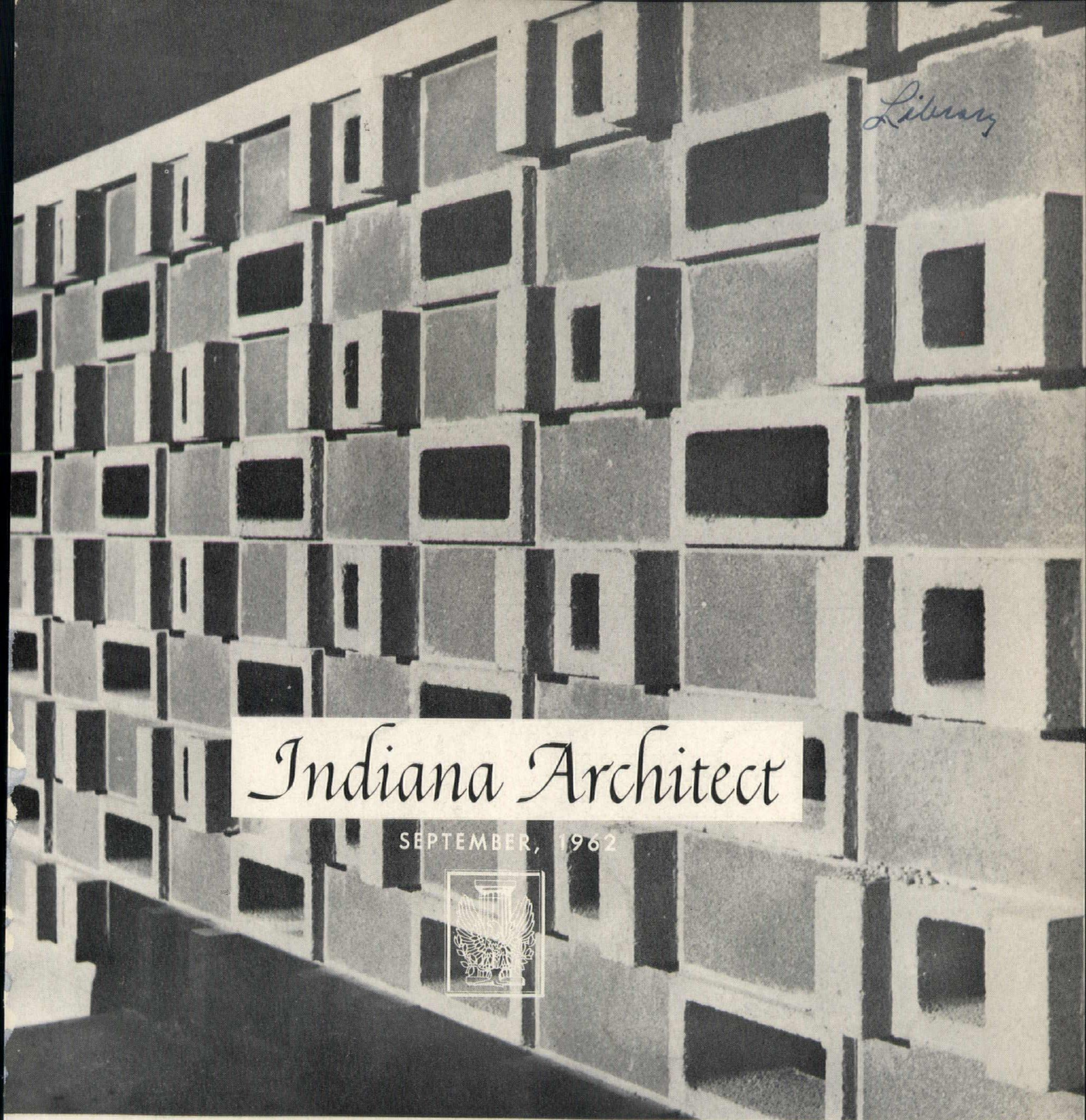
Indiana Architect

SEPTEMBER, 1962



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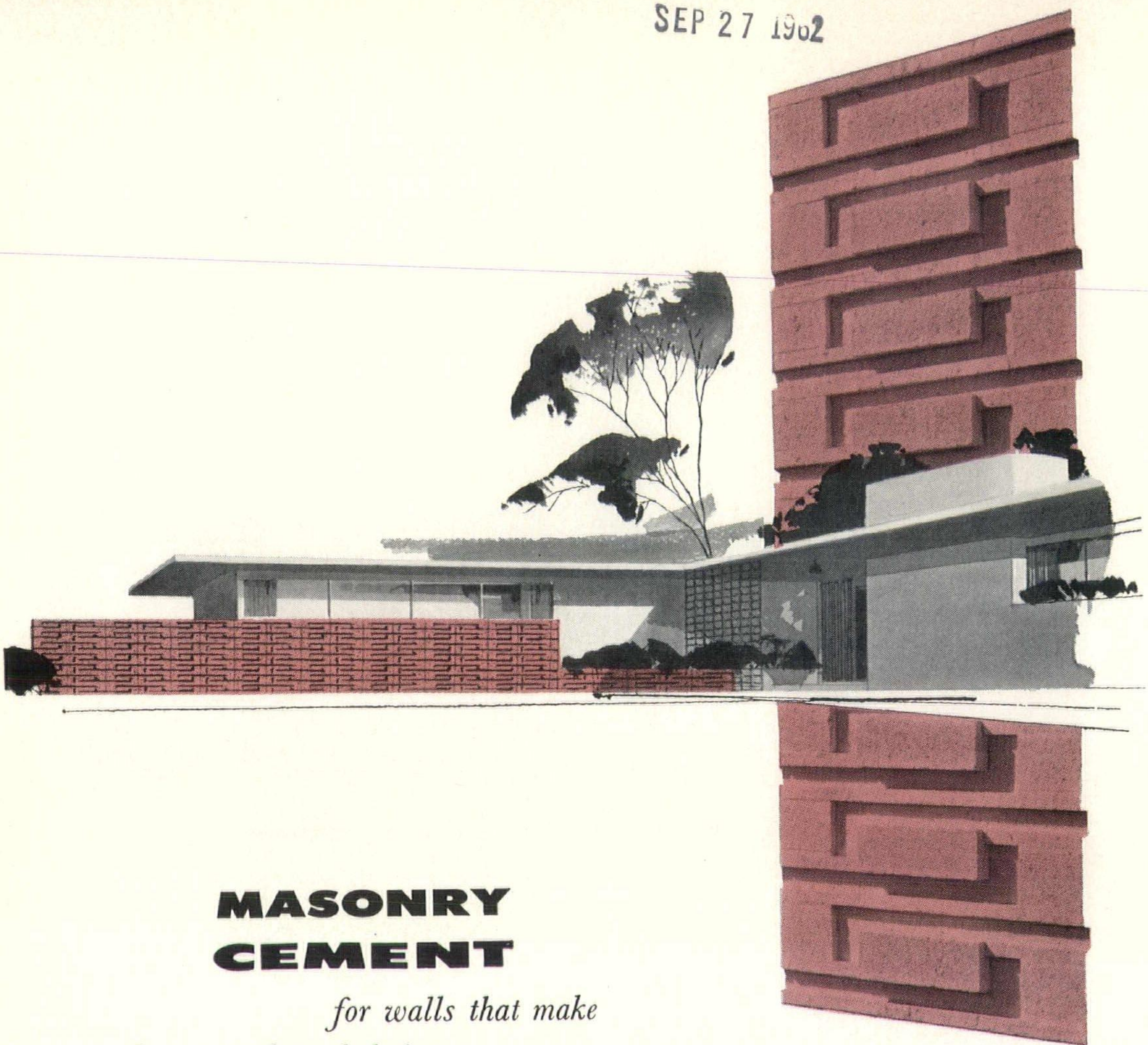

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Indiana Architict

Official Journal, Indiana Society of Architects and the Northern Indiana Chapter, both Chapters of The American Institute of Architects

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Close-up of a masonry screen wall designed by Indianapolis architect Fran E. Schroeder, AIA, for a residence currently under construction; erected by the Robert R. Campbell Co., Inc. (Indiana Architect photograph)

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Why I Want to Be An Architect

By DAVID SWEET, Winner
1962 ISA Scholarship Award

An architect begins his career with the dream or ambition of designing serviceable, well-constructed, and beautiful buildings. This is my future goal.

I am a high school graduate, as of June 1962, but it was early in my freshman year when I became interested in architecture as my life's career. Knowing this made it an easier task in selecting my courses in high school which consisted mainly of math, science, and English. Toward the end of my senior year various colleges came into the spotlight for my consideration, resulting in my choice of the University of Illinois since it offers the best architectural school. Also, through mail correspondence and visits to the college I found Illinois to have a friendly and efficient campus.

Approximately two months before school was dismissed I was able to secure a job with an architectural firm in Gary. Here is where my aspirations began to become a reality. As I sat over a draftsman's table transferring thoughts into realism by the use of lines and measurements, I came to realize the duties and accomplishments of an architect. Knowing this, the most laborious task became easier.

Modeling and woodworking have been two of my most enjoyable hobbies. My interest began with airplane models; then advanced to cabin cruisers and schooners which I designed and constructed. In the past year I have finished a split-level model home as an art project in school. With each project there was a feeling of satisfaction in the accomplishment of planning and then completing the construction of each project. It is this feeling, this pride in a well done project, that wets my thirst for an architectural career.

After sitting over a drawing board for days-on-end, the final fabrication of a dream has a great impact. I know what this is, for on my simple models I would spend hours figuring just how the finished project should look and how I could achieve my ideas in terms of materials.

On a larger, more complex scale an architect with his client figures out how to build, what to use, and a vast variety of other problems that mean so much in developing a perfect building.

I have delved into the functions and training of an architect for this was the subject of my senior year term paper. From the books and phamplets I have read, I secured a knowledge of just who an architect is. My seeking showed he is a businessman dealing in beautiful, serviceable, and well-constructed shelters. An artist who developes dreams, ideas, and imagination into a physical and lasting structure. He is a special person designed to meet the public and to overcome the various needs presented by a community.

The architect's job is much more interesting than a non-professional's. It is not a constant, boring routine; but instead an endeavor to always do better. It is a constant elevating of himself and the community he serves. He is a leader and can take pride in what is accomplished. This is the role I want to perform in my future environment.

AN INTRODUCTION

By GEORGE CALEB WRIGHT, FAIA,
Chairman, ISA Scholarship Jury, 1962

To talk with five outstanding high school students who were looking forward to a life devoted to architecture was a most rewarding experience. It was also one which complicated the difficulty of making a final scholarship award. The Jury would have been pleased to make five awards.

David Sweet impressed the Jury with his dead seriousness. He has no illusions as to the difficult road ahead of him. He has informed himself as to the joys and woes which are a part of the profession, and he likes the challenge they represent. He is determined to succeed. The Jury feels sure that their final selection will be a credit to The Indiana Society of Architects and more particularly, eventually, to the profession of architecture.

PERSONNEL NOTICES

WANTED: Experienced and qualified architectural draftsmen for several central Indiana architectural firms. Also, some openings for qualified architectural drafting trainees. Contact the Indiana Society of Architects, P.O. Box 55594, Indianapolis 5.

JOB OPENING: Metropolitan Planning Department, Indianapolis, Indiana. Title: Associate Planner (Design); Salary Range: $5500-$6500. Degree in Landscape Architecture, Architecture, or combination of technical training and considerable experience in planning or architecture. To perform physical planning work. Excellent opportunity to grow and develop design talent. Apply to Harold K. Gossman, Office Administrator, 2041 City-County Building, Indianapolis 4, Indiana.

ISA Board Notes

Two presentations to retiring ISA President Wayne M. Weber, AIA, highlighted the August 10th meeting of the Indiana Society Board of Directors, held at the Lafayette Country Club, Lafayette, Indiana.

The first presentation was a handsome scroll expressing the architectural profession's appreciation to Mr. Weber for his work on their behalf during his two terms of chapter president.

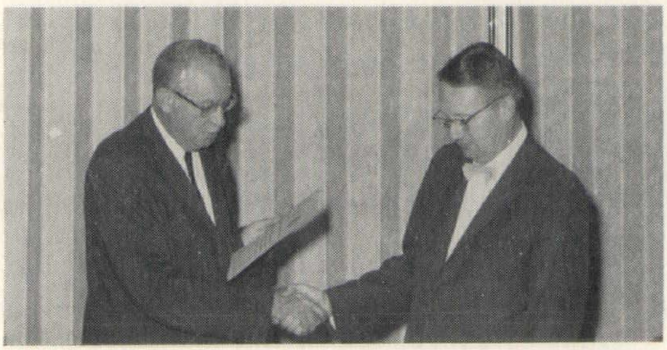
The second presentation was a railroad engineer's cap, in observance of President Weber's interest in model railroading, carrying with it the honorary title of "Retired Chief Engineer."

In other business, the Board approved Corporate Membership applications by William B. Haynes of Bloomington, a former Junior Associate Member, and Kenneth S. Wood of Indianapolis, formerly an Associate Member, and an Associate Membership application by John W. Carmack of Indianapolis, formerly a Junior Associate Member. Approval also was given for the elevation of Merritt Harrison, FAIA, of Indianapolis to Member Emeritus.

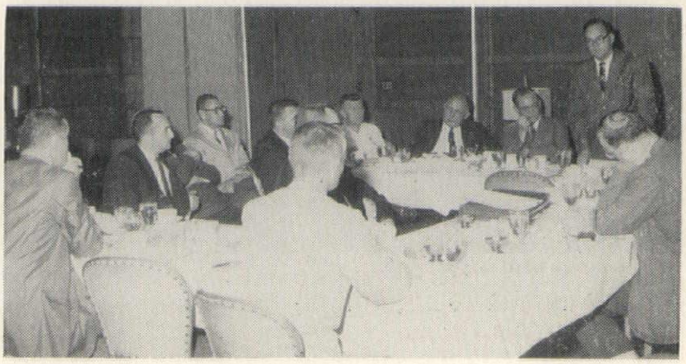
Discussions were held concerning a proposed statewide association of both the Indiana Society of Architects and the Northern Indiana Chapter, AIA, and of the new rulings concerning the displaying of work by architects at conventions.

A large number of Lafayette District members joined with the Board at the noon luncheon for a discussion of professional problems.

A second presentation to Immediate Past President Weber consisted of a railroad engineer's cap, complete with the new title of "Retired Chief Engineer."



ISA President Walter Scholer presented a scroll expressing the chapter's appreciation to retiring President Wayne M. Weber of Terre Haute, at the August 10th Board meeting in Lafayette.



Quite a number of Lafayette District architects joined the ISA Board for luncheon at the Lafayette Country Club. Here, Ernest Schaible, AIA, of Lafayette, reports on the work of the AIA Hospital Committee, of which he is a member.

Architecture in Miniature

Most clients seem to have one or two traits in common: the basic similarity is the desire to end up with more building than their budget permits. The second is an inability to visualize the finished project from the construction drawings.

Architects do their best to solve the first problem, and Mr. Robert R. Bennett does his best to solve the second. For Mr. Bennett is a contractor in miniatures, constructing scale models of Lilliputian houses to airports.

Working in his garage at what started out as a hobby, Mr. Bennett builds most of his models to the scale of one-quarter inch to the foot or even a smaller scale for the larger buildings. He has even made a complete layout of the city of Indianapolis Sanitation Department plant and surrounding facilities.

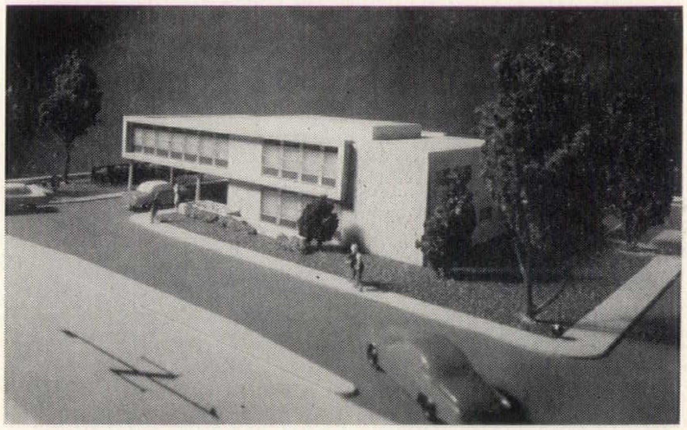
The hobby, dating back some fifteen years in the general field of scale model building, and eight years in the specialized division of architectural models, has now grown into a second vocation for the forty-four year old Indianapolis resident. Although the bulk of his work has been in the creature of models of residences, Mr. Bennett has also completed models of an apartment building for Fleck, Quebe & Reid, several models of office buildings, churches, etc., for Lewis-Shimer Associates, and a model of the Weir Cook airport, designed by James Associates, all Indianapolis architectural firms.

A model of a home usually takes from twenty-five to fifty hours to construct, normally using white pine or balsa wood for the basic model. Roof shingles are plywood and the windows, actually set in frames, are of clear plastic. For decorative wrought iron work, tiny strips of brass are soldered together in intricate patterns and sprayed black. Torn-up cellulose sponges dyed green provide the "landscaping."

The more intricate models are equipped with removable roofs, and the interiors are complete to paint on the walls and kitchen and bathroom fixtures.

The model of the Sanitation plant required more than 1,000 hours to build and measures six feet by eight feet. Built at the rather unusual scale of one inch equals 21.65 feet, the model includes a complicated system of lighting Mr. Bennett designed and installed to illustrate the process of sewage disposal.

Even though he started out with scale model cars and boats, Mr. Bennett (who lives with his wife and two daughters at 4740 Bellingham Drive East, Indianapolis), has never built a model airplane, and today about the only model cars he gets a chance to build are those used with one of his architectural models.



Lewis-Shimer & Associates of Indianapolis, commissioned Mr. Bennett to construct this scale model of a proposed office building.

Designing Safety Into Schools

By RICHARD M. BRAYTON, AIA
Writing in P.C. Bulletin #101

Today, charm and visually stimulating school design are replacing the cold institutional look of thirty years ago. The battle for a psychologically warmer educational environment is largely won. Now attention must be focused on the less glamorous but even more significant factor of school safety.

Safety in school construction is, of course, a positive value from every point of view. It protects the lives of our children; it facilitates the educational process; it is economical in terms of lower insurance premiums and reduced maintenance costs.

Yet, we are far from achieving a satisfactory safety record in our schools. Not enough attention has been paid to the **specific** causes of accidents, for architects have been preoccupied with more global safety considerations.

For example, fire safety has received a necessary but disproportionate amount of attention. Although fire is the most dramatic hazard in schools, comparatively few injuries are due to this cause. In any event, excellent progress has been made in this area and today all new school buildings must meet rigid requirements for fireproof structural materials, electrical connections, exit provisions, etc. It is time to examine other considerations involved in school safety.

ACCIDENT CAUSES VARY WITH AGE OF CHILD

What is often overlooked is that **accidents vary in nature and cause, according to the age of the child.**

Thus, in building safety into a school, an architect must design certain kinds of protection for six-year-old children, other kinds of safety provisions for ten-year-olds, and so on.

Here is an examination of the major types of accidents, based on an analysis of the latest statistics of the National Safety Council, and preventive measures that can be taken in each case:

1. **An average of 10.3 percent of all accidents occurs in the auditoriums and the classrooms.** This ranges from a high of 26.3 percent of kindergarten pupils to 5.5 percent for 12th graders, and is the major area where school injuries occur.

Richard M. Brayton, AIA, is a partner in the New York architectural firm of Urbahn & Brayton, which has had long, award-winning experience in designing schools for all ages, from elementary through college students.

His article reprinted here has been excerpted, by permission, from the September, 1962, issue of P. C. BULLETIN, published by the Producers' Council, Inc.

Younger children have poorer coordination and are much more active in the classroom situation. Thus, it is especially important to take precautions in designing rooms for your children—as examples, slippery floor surfaces must be avoided; fountains, storage cabinets and other equipment should be recessed, so as not to project out from the walls; furniture should be rugged and "tip-proof." These safety precautions should not be confined to rooms for younger children, however—they can be used in all grades.

2. **An average of 5.6 percent of all school accidents occurs on the playground;** the range is from 16.8 percent for kindergarten pupils to 1 percent for 12th graders, with the variation attributable not only to reduced coordination of younger children, but to the fact that younger pupils use the playgrounds more. Injuries in this area **are preventable.** They are largely the result of poor equipment and hard surfacing. For example, most falls off jungle gyms are due to too wide spacing between rungs; most falls from slides are due to falls from the ladder. These are the result of poor equipment design. Today a wider variety of playground equipment is available, and architects should use the new, safer play devices wherever possible. Architects should also specify soft surfacing under equipment. If cost is a factor, the entire playground need not have soft surfacing—the soft surfacing can be restricted to areas under the equipment.

3. **7.8 percent of all school accidents take place off of school grounds.** Many of these accidents which happen while students go to and from schools could have been prevented if the architects had designed their site plan in terms of over-all traffic circulation. In our firm's practice, access roads and driveways are designed so that vehicular traffic is directed away from student traffic. All service deliveries are made to one end of the school site, away from student activities.

Another preventive measure that should be applied is an around-the-site traffic control pattern with very clear directional signs.

Landscaping can be an important consideration. In our practice, we carefully control the design of our landscaping so as to avoid any blind spots that might be caused by trees or bushes at entrances, exits or intersections. This is a safety precaution for both vehicular and pedestrian traffic.

4. **3 percent of all accidents occur in corridors.** There is little variation among age groups here although 7th graders seem more prone to this type of accident, with a high of 4.4 percent. It is likely that these accidents are due largely to slippery floors and dark corridors. Because of

horseplay, there will always be some accidents in corridors, but the number can be reduced greatly by good design principles: corridor width should not be skimpy; floors should have some abrasive quality to prevent slipping; ample lighting is mandatory; and dead-end corridors should be avoided.

5. **Almost 40 percent of all school accidents stem from organized games,** among them football, 9.1 percent; basketball, 6.6 percent; and baseball, 4.6 percent. Architects can aid safety in this area by careful layout of the playing fields. All playing fields should be (1) placed away from traffic; (2) positioned so that two activities, such as football and baseball, don't coincide and thus possibly interfere with one another; and (3) oriented so that the light doesn't get in the eyes of the players.

Of course, careful supervision by teachers is essential, but the architect should do his part in reducing those accidents that occur in the gym. For example, key areas should be designed with resilent padding on the walls, and shower rooms with non-slip floors. In the showers, a single mixing valve giving a mixture of hot and cold water will prevent scalding. Avoiding sharp corners and protruding equipment, and specifying even, nonglare lighting are additional considerations in preventing gym accidents. Also, bleacher seating should be arranged so it can be folded away during regular gym periods and recessed into the walls.

6. **4.1 percent of school accidents occur in shops.** The main factors here are inadequate safety instruction, poorly designed equipment, insufficient lighting, and a high noise level that distracts students from what they are doing.

The quality of the safety instruction is beyond the architect's control but there is no excuse for his not recommending the safest shop tools. He should provide ample nonglare lighting in work areas. Also, he should be aware of the value in preventing disruptive noise; careful selection of ceiling and wall materials with soft surfaces that absorb sound can deaden a good deal of noise originating within the shop, and outside noises can be reduced by a sturdy dense exterior wall or a lightweight exterior wall with an interior air cushion.

SAFETY NEED NOT COST MORE

Safety measures need not raise school costs—good architectural design can provide safety without necessarily increasing costs. Sometimes it is just a matter of intelligent planning of traffic patterns, or the careful selection of competitive products, one of which may be safer than the rest. Sometimes the initial cost may be slightly greater but the over-all eventual costs will be no greater.

For example, many gyms have folding bleachers with protruding seats and hardware which create a hazard for active youngsters; vertical front flush folding bleachers are available at very little additional cost and eliminate the danger from projections. The recessing of classroom doors is another example of safe planning. Fewer accidents will happen because these doors do not swing out into the corridor. This is by no means a new idea but many schools today lack features such as this.

Safety considerations that go beyond code requirements are key factors in all the schools our firm designs. These safety measures are so integrated into the over-all design, the casual visitor may never be aware of them. In all our schools, for example, the flooring material in the auditorium aisles has a highly reflective surface of a very light color; thus, it picks up the side aisle lighting and, in effect, "illuminates" the aisles for safer traffic conditions. The cost, of course, is no more than if a dark color were used.

Recessed drinking fountains, recessed fire extinguishers, recessed exit signs as well as recessed cabinets for folding divider gates are items that may cost a little more, but it is a very small cost compared to over-all costs and to the cost of a single accident.

COLOR FOR SAFETY

The use of accent colors can raise substantially the safety quotient of a school without costing any more. Color can transform a surface into a sign. For example, a door at the end of a long corridor can be painted a bright red to warn oncoming students that a door is ahead of them so that they will not run headlong into it.

The use of color in the mechanical system aids maintenance and helps keep healthy conditions in the school. Painting pipes in accord with the Safety Color Code of the American Standards Association is a safety factor that does not add to over-all costs.

TEXTURE FOR SAFETY

For economy, exposed concrete block has been used extensively in corridors. It is not difficult for students to fall or brush against its rough and abrasive texture and get scraped, sometimes badly. Simply adding a vitreous enamel coating to the rough block will fill up the pores and give the block a smooth, safe surface. This costs more than ordinary painted block, but the cost is less than the cost of a good structural facing tile to which the vitreous coating is equal in terms of safety and upkeep. Thus, maintenance savings may make the enameled surface much more economical in the long run. Similarly, where plaster walls may come in contact with people, a smooth plaster finish should be specified instead of the rough plaster that is often used.

At corners and entrances, architects should specify bullnosed concrete masonry units with roughed edges for the conventional sharp-edged block. Both types are standard, yet the former introduces a definite safety factor, at no extra cost.

TRAFFIC FACTORS

One way in which safety can, and should, be built into a school is to plan for efficient, noncrossing traffic patterns. Sometimes this may involve additional expense, but in terms of the total building costs the increase is negligible. In the schools our firm designs, all prime circulation areas are scaled to maximum traffic load; this usually exceeds the State's minimum standards, yet it enhances safety conditions and also affords a pleasing feeling of spaciousness.

The safety factors discussed are but a few of the many ways in which architects can build safety into a school, generally without increasing costs. Where a moderately higher cost is involved, it is usually offset by reduced long-term maintenance costs, not to mention the increased safety and health of the students and faculty, and the increased efficiency.

American Standard Specifications for

Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped

1. Scope and Purpose

(Deleted)

2. Definitions

2.1 Non-ambulatory Disabilities. Impairments that, regardless of cause or manifestation, for all practical purposes, confine individuals to wheelchairs.

2.2 Semi-ambulatory Disabilities. Impairments that cause individuals to walk with difficulty or insecurity. Individuals using braces or crutches, amputees, arthritics, spastics, and those with pulmonary and cardiac ills may be semi-ambulatory.

2.3 Sight Disabilities. Total blindness or impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger.

2.4 Hearing Disabilities. Deafness or hearing handicaps that might make an individual insecure in public areas because he is unable to communicate or hear warning signals.

2.5 Disabilities of Incoordination. Faulty coordination or palsy from brain, spinal, or peripheral nerve injury.

2.6 Aging. Those manifestations of the aging processes that significantly reduce mobility, flexibility, coordination, and perceptiveness but are not accounted for in the aforementioned categories.

2.7 Standard. When this term appears in small letters and is not preceded by the word "American," it is descriptive and does not refer to an American Standard approved by ASA; for example, a "standard" wheelchair is one characterized as standard by the manufacturers.

2.8 Fixed Turning Radius, Wheel to Wheel. The tracking of the caster wheels and large wheels of a wheelchair when pivoting on a spot.

2.9 Fixed Turning Radius, Front Structure to Rear Structure. The turning radius of a wheelchair, left front-foot platform to right rear wheel, or right front-foot platform to left rear wheel, when pivoting on a spot.

2.10 Involved (Involvement). A portion or portions of the human anatomy or physiology, or both, that have a loss or impairment of normal function as a result of genesis, trauma, disease, inflammation, or degeneration.

2.11 Ramps, Ramps with Gradients. Because the term "ramp" has a multitude of meanings and uses, its use in this text is clearly defined as ramps with gradients (or ramps with slopes) that deviate from what would otherwise be considered the normal level. An exterior ramp, as distinguished from a "walk," would be considered an appendage to a building leading to a level above or below existing ground level. As such, a ramp shall meet certain requirements similar to those imposed upon stairs.

2.12 Walk, Walks. Because the terms "walk" and "walks" have a multitude of meanings and uses, their use in this text is clearly defined as a predetermined, prepared-surface, exterior pathway leading to or from a building or facility, or from one exterior area to another, placed on the existing ground level and not deviating from the level of the existing ground immediately adjacent.

2.13 Appropriate Number. As used in this text, appropriate number means the number of a specific item that would be necessary, in accord with the purpose and function of a building or facility, to accommodate individuals with specific disabilities in proportion to the anticipated number of individuals with disabilities who would use a particular building or facility.

EXAMPLE: Although these specifications shall apply to all buildings and facilities used by the public, the numerical need for a specific item would differ, for example, between a major transportation terminal, where many individuals with diverse disabilities would be continually coming and going, an office building or factory, where varying numbers of individuals with disabilities of varying manifestations (in many instances, very large numbers) might be employed or have reason for frequent visits, a school or church, where the number of individuals may be fixed and activities more definitive, and the many other buildings and facilities dedicated to specific functions and purposes.

NOTE: Disabilities are specific and where the individual has been properly evaluated and properly oriented and where architectural barriers have been eliminated, a specific disability does not constitute a handicap. It should be emphasized that more and more of those physically disabled are becoming *participants,* rather than spectators, in the fullest meaning of the word.

3. General Principles and Considerations

3.1 Wheelchair Specifications. The collapsible-model wheelchair of tubular metal construction with plastic upholstery for back and seat is most commonly used. The standard model of all manufacturers falls within the following limits, which were used as the basis of consideration:

(1) Length: 42 inches

(2) Width, when open: 25 inches

(3) Height of seat from floor: 19½ inches

(4) Height of armrest from floor: 29 inches

(5) Height of pusher handles (rear) from floor: 36 inches

(6) Width, when collapsed: 11 inches

3.2 The Functioning of a Wheelchair

3.2.1 The fixed turning radius of a standard wheelchair, wheel to wheel, is 18 inches. The fixed turning radius, front structure to rear structure, is 31.5 inches.

3.2.2 The average turning space required (180 and 360 degrees) is 60 x 60 inches.

NOTE: Actually, a turning space that is longer than it is wide, specifically, 63 x 56 inches, is more workable and desirable. In an area with two open ends, such as might be the case in a corridor, a minimum of 54 inches between two walls would permit a 360-degree turn.

3.2.3 A minimum width of 60 inches is required for two individuals in wheelchairs to pass each other.

3.3 The Adult Individual Functioning in a Wheelchair[2]

3.3.1 The average unilateral vertical reach is 60 inches and ranges from 54 inches to 78 inches.

3.3.2 The average horizontal working (table) reach is 30.8 inches and ranges from 28.5 inches to 33.2 inches.

3.3.3 The bilateral horizontal reach, both arms extended to each side, shoulder high, ranges from 54 inches to 71 inches and averages 64.5 inches.

3.3.4 An individual reaching diagonally, as would be required in using a wall-mounted dial telephone or towel dispenser, would make the average reach (on the wall) 48 inches from the floor.

3.4 The Individual Functioning on Crutches[3]

3.4.1 On the average, individuals 5 feet 6 inches tall require an average of 31 inches between crutch tips in the normally accepted gaits.[4]

3.4.2 On the average, individuals 6 feet 0 inches tall require an average of 32.5 inches between crutch tips in the normally accepted gaits.[4]

[2] Extremely small, large, strong, or weak and involved individuals could fall outside the ranges in 3.3.1, 3.3.2, 3.3.3, and their reach could differ from the figure given in 3.3.4. However, these reaches were determined using a large number of individuals who were functionally trained, with a wide range in individual size and involvement.

[3] Most individuals ambulating on braces or crutches, or both, or on canes are able to manipulate within the specifications prescribed for wheelchairs, although doors present quite a problem at times. However, attention is called to the fact that a crutch tip extending laterally from an individual is not obvious to others in heavily trafficked areas, certainly not as obvious or protective as a wheelchair and is, therefore, a source of vulnerability.

[4] Some cerebral palsied individuals, and some severe arthritics, would be extreme exceptions to 3.4.1 and 3.4.2.

4. Site Development[5]

4.1 Grading. The grading of ground, even contrary to existing topography, so that it attains a level with a normal entrance will make a facility accessible to individuals with physical disabilities.

4.2 Walks

4.2.1 Public walks should be at least 48 inches wide and should have a gradient not greater than 5 percent.[6]

4.2.2 Such walks shall be of a continuing common surface, not interrupted by steps or abrupt changes in level.

4.2.3 Wherever walks cross other walks, driveways, or parking lots they should blend to a common level.[7]

NOTE: 4.1 and 4.2, separately or collectively, are greatly aided by terracing, retaining walls, and winding walks allowing for more gradual incline, thereby making almost any building accessible to individuals with permanent physical disabilities, while contributing to its esthetic qualities.

4.2.4 A walk shall have a level platform at the top which is at least 5 feet by 5 feet, if a door swings out onto the platform or toward the walk. This platform shall extend at least 1 foot beyond each side of the doorway.

4.2.5 A walk shall have a level platform at least 3 feet deep and 5 feet wide, if the door does not swing onto the platform or toward the walk. This platform shall extend at least 1 foot beyond each side of the doorway.

4.3 Parking Lots

4.3.1 Spaces that are accessible and approximate to the facility should be set aside and identified for use by individuals with physical disabilities.

[5] Site development is the most effective means to resolve the problems created by topography, definitive architectural designs or concepts, water table, existing streets, and atypical problems, singularly or collectively, so that aggress, ingress, and egress to buildings by physically disabled can be facilitated while preserving the desired design and effect of the architecture.

[6] It is essential that the gradient of walks and driveways be less than that prescribed for ramps, since walks would be void of handrails and curbs and would be considerably longer and more vulnerable to the elements. Walks of near maximum grade and considerable length should have level areas at intervals for purposes of rest and safety. Walks or driveways should have a nonslip surface.

[7] This specification does not require the elimination of curbs, which, particularly if they occur at regular intersections, are a distinct safety feature for all of the handicapped, particularly the blind. The preferred method of meeting the specification is to have the walk incline to the level of the street. However, at principal intersections, it is vitally important that the curb run parallel to the street, up to the point where the walk is inclined, at which point the curb would turn in and gradually meet the level of the walk at its highest point. A less preferred method would be to gradually bring the surface of the driveway or street to the level of the walk. The disadvantage of this method is that a blind person would not know when he has left the protection of a walk and entered the hazards of a street or driveway.

(Continued)

4.3.2 A parking space open on one side, allowing room for individuals in wheelchairs or individuals on braces and crutches to get in and out of an automobile onto a level surface, suitable for wheeling and walking, is adequate.

4.3.3 Parking spaces for individuals with physical disabilities when placed between two conventional diagonal or head-on parking spaces should be 12 feet wide.

4.3.4 Care in planning should be exercised so that individuals in wheelchairs and individuals using braces and crutches are not compelled to wheel or walk behind parked cars.

4.3.5 Consideration should be given the distribution of spaces for use by the disabled in accordance with the frequency and persistency of parking needs.

4.3.6 Walks shall be in conformity with 4.2.

5. Buildings

5.1 Ramps with Gradients. Where ramps with gradients are necessary or desired, they shall conform to the following specifications:

5.1.1 A ramp shall not have a slope greater than 1 foot rise in 12 feet, or 8.33 percent, or 4 degrees 50 minutes.

5.1.2 A ramp shall have handrails on at least one side, and preferably two sides, that are 32 inches in height, measured from the surface of the ramp, that are smooth, that extend 1 foot beyond the top and bottom of the ramp, and that otherwise conform with American Standard Safety Code for Floor and Wall Openings, Railings, and Toe Boards, A12-1932.

NOTE 1: Where codes specify handrails to be of heights other than 32 inches, it is recommended that two sets of handrails be installed to serve all people. Where major traffic is predominantly children, particularly physically disabled children, extra care should be exercised in the placement of handrails, in accordance with the nature of the facility and the age group or groups being serviced.

NOTE 2: Care should be taken that the extension of the handrail is not in itself a hazard. The extension may be made on the side of a continuing wall.

5.1.3 A ramp shall have a surface that is nonslip.

5.1.4 A ramp shall have a level platform at the top which is at least 5 feet by 5 feet, if a door swings out onto the platform or toward the ramp. This platform shall extend at least 1 foot beyond each side of the doorway.

5.1.5 A ramp shall have a level platform at least 3 feet deep and 5 feet wide, if the door does not swing onto the platform or toward the ramp. This platform shall extend at least 1 foot beyond each side of the doorway.

5.1.6 Each ramp shall have at least 6 feet of straight clearance at the bottom.

5.1.7 Ramps shall have level platforms at 30-foot intervals for purposes of rest and safety and shall have level platforms wherever they turn.

5.2 Entrances

5.2.1 At least one primary entrance to each building shall be usable by individuals in wheelchairs.

NOTE: Because entrances also serve as exits, some being particularly important in case of an emergency, and because the proximity of such exits to all parts of buildings and facilities, in accordance with their design and function, is essential (see 112 and 2000 through 2031 of American Standard Building Exits Code, A9.1-1953) it is preferable that all or most entrances (exits) should be accessible to, and usable by, individuals in wheelchairs and individuals with other forms of physical disability herein applicable.

5.2.2 At least one entrance usable by individuals in wheelchairs shall be on a level that would make the elevators accessible.

5.3 Doors and Doorways

5.3.1 Doors shall have a clear opening of no less than 32 inches when open and shall be operable by a single effort.

NOTE 1: Two-leaf doors are not usable by those with disabilities defined in 2.1, 2.2, and 2.5 unless they operate by a single effort, or unless one of the two leaves meets the requirement of 5.3.1.

NOTE 2: It is recommended that all doors have kick plates extending from the bottom of the door to at least 16 inches from the floor, or be made of a material and finish that would safely withstand the abuse they might receive from canes, crutches, wheelchair foot-platforms, or wheelchair wheels.

5.3.2 The floor on the inside and outside of each doorway shall be level for a distance of 5 feet from the door in the direction the door swings and shall extend 1 foot beyond each side of the door.

5.3.3 Sharp inclines and abrupt changes in level shall be avoided at doorsills. As much as possible, thresholds shall be flush with the floor.

NOTE 1: Care should be taken in the selection, placement, and setting of door closers so that they do not prevent the use of doors by the physically disabled. Time-delay door closers are recommended.

NOTE 2: Automatic doors that otherwise conform to 5.3.1, 5.3.2, and 5.3.3 are very satisfactory.

NOTE 3: These specifications apply both to exterior and interior doors and doorways.

5.4 Stairs. Stairs shall conform to American Standard A9.1-1953, with the following additional considerations:

5.4.1 Steps in stairs that might require use by those with disabilities defined in 2.2 and 2.5 or by the aged shall not have abrupt (square) nosing. (See Fig. 1.)

NOTE: Individuals with restrictions in the knee, ankle, or hip, with artificial legs, long leg braces, or comparable conditions cannot, without great difficulty and hazard, use steps with nosing as illustrated in Fig. 1a, but can safely and with minimum difficulty use steps with nosing as illustrated in Fig. 1b.

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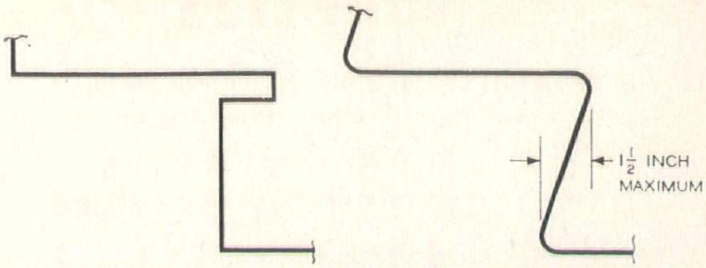


Fig. 1
Steps

5.4.2 Stairs shall have handrails 32 inches high as measured from the tread at the face of the riser.

NOTE: Where codes specify handrails to be at heights other than 32 inches, it is recommended that two sets of handrails be installed to serve all people. Where traffic is predominantly children, particularly physically disabled children, extra care should be exercised in the placement of handrails in accordance with the nature of the facility and the age group or groups being serviced. Dual handrails may be necessary.

5.4.3 Stairs shall have at least one handrail that extends at least 18 inches beyond the top step and beyond the bottom step.

NOTE: Care should be taken that the extension of the handrails is not in itself a hazard. The extension may be made on the side of a continuing wall.

5.4.4 Steps should, wherever possible, and in conformation with existing step formulas, have risers that do not exceed 7 inches.

5.5 Floors

5.5.1 Floors shall have a surface that is nonslip.

5.5.2 Floors on a given story shall be of a common level throughout or be connected by a ramp in accord with 5.1.1 through 5.1.6, inclusive.

EXAMPLE 1: There shall not be a difference between the level of the floor of a corridor and the level of the floor of the toilet rooms.

EXAMPLE 2: There should not be a difference between the level of the floor of a corridor and the level of a meeting room, dining room, or any other room, unless proper ramps are provided.

5.6 Toilet Rooms. It is essential that an appropriate number[8] of toilet rooms, in accordance with the nature and use of a specific building or facility, be made accessible to, and usable by, the physically handicapped.

5.6.1 Toilet rooms shall have space to allow traffic of individuals in wheelchairs, in accordance with 3.1, 3.2, and 3.3.

5.6.2 Toilet rooms shall have at least one toilet stall that—

(1) Is 3 feet wide

(2) Is at least 4 feet 8 inches, preferably 5 feet, deep

(3) Has a door (where doors are used) that is 32 inches wide and swings out

(4) Has handrails on each side, 33 inches high and parallel to the floor, 1½ inches in outside diameter, with 1½ inches clearance between rail and wall, and fastened securely at ends and center

(5) Has a water closet with the seat 20 inches from the floor

NOTE: The design and mounting of the water closet is of considerable importance. A wall-mounted water closet with a narrow understructure that recedes sharply is most desirable. If a floor-mounted water closet must be used, it should not have a front that is wide and perpendicular to the floor at the front of the seat. The bowl should be shallow at the front of the seat and turn backward more than downward to allow the individual in a wheelchair to get close to the water closet with the seat of the wheelchair.

5.6.3 Toilet rooms shall have lavatories with narrow aprons, which when mounted at standard height are usable by individuals in wheelchairs; or shall have lavatories mounted higher, when particular designs demand, so that they are usable by individuals in wheelchairs.

NOTE: It is important that drain pipes and hot-water pipes under a lavatory be covered or insulated so that a wheelchair individual without sensation will not burn himself.

5.6.4 Some mirrors and shelves shall be provided above lavatories at a height as low as possible and no higher than 40 inches above the floor, measured from the top of the shelf and the bottom of the mirror.

5.6.5 Toilet rooms for men shall have wall-mounted urinals with the opening of the basin 19 inches from the floor, or shall have floor-mounted urinals that are on level with the main floor of the toilet room.

5.6.6 Toilet rooms shall have an appropriate number[8] of towel racks, towel dispensers, and other dispensers and disposal units mounted no higher than 40 inches from the floor.

5.7 Water Fountains. An appropriate number[8] of water fountains or other water-dispensing means shall be accessible to, and usable by, the physically disabled.

5.7.1 Water fountains or coolers shall have up-front spouts and controls.

5.7.2 Water fountains or coolers shall be hand-operated or hand- and foot-operated. (See also American Standard Specifications for Drinking Fountains, Z4.2-1942.)

NOTE 1: Conventional floor-mounted water coolers can be serviceable to individuals in wheelchairs if a small fountain is mounted on the side of the cooler 30 inches above the floor.

NOTE 2: Wall-mounted, hand-operated coolers of the latest design, manufactured by many companies, can serve the able-bodied and the physically disabled equally well when the cooler is mounted with the basin 36 inches from the floor.

NOTE 3: Fully recessed water fountains are not recommended.

(Continued)

NOTE 4: Water fountains should not be set into an alcove unless the alcove is wider than a wheelchair. (See 3.1)

5.8 Public Telephones. An appropriate number[8] of public telephones should be made accessible to, and usable by, the physically disabled.

NOTE: The conventional public telephone booth is not usable by most physically disabled individuals. There are many ways in which public telephones can be made accessible and usable. It is recommended that architects and builders confer with the telephone company in the planning of the building or facility.

5.8.1 Such telephones should be placed so that the dial and the handset can be reached by individuals in wheelchairs, in accordance with 3.3.

5.8.2 An appropriate number[8] of public telephones should be equipped for those with hearing disabilities and so identified with instructions for use.

NOTE: Such telephones can be used by everyone.

5.9 Elevators. In a multiple-story building, elevators are essential to the successful functioning of physically disabled individuals. They shall conform to the following requirements:

5.9.1 Elevators shall be accessible to, and usable by, the physically disabled on the level that they use to enter the building, and at all levels normally used by the general public.

5.9.2 Elevators shall allow for traffic by wheelchairs, in accordance with 3.1, 3.2, 3.3 and 5.3.

5.10 Controls. Switches and controls for light, heat, ventilation, windows, draperies, fire alarms, and all similar controls of frequent or essential use, shall be placed within the reach of individuals in wheelchairs. (See 3.3.)

5.11 Identification. Appropriate identification of specific facilities within a building used by the public is particularly essential to the blind.

5.11.1 Raised letters or numbers shall be used to identify rooms or offices.

5.11.2 Such identification should be placed on the wall, to the right or left of the door, at a height between 4 feet 6 inches and 5 feet 6 inches, measured from the floor, and preferably at 5 feet.

5.11.3 Doors that are not intended for normal use, and that might prove dangerous if a blind person were to exit or enter by them, should be made quickly identifiable to the touch by knurling the door handle or knob. (See Fig. 2.)

EXAMPLE: Such doors might lead to loading platforms, boiler rooms, stages, fire escapes, etc.

5.12 Warning Signals

5.12.1 Audible warning signals shall be accompanied by simultaneous visual signals for the benefit of those with hearing disabilities.

[8] See 2.13.

5.12.2 Visual signals shall be accompanied by simultaneous audible signals for the benefit of the blind.

5.13 Hazards. Every effort shall be exercised to obviate hazards to individuals with physical disabilities.

5.13.1 Access panels or manholes in floors, walks, and walls can be extremely hazardous, particularly when in use, and should be avoided.

5.13.2 When manholes or access panels are open and in use, or when an open excavation exists on a site, particularly when it is approximate to normal pedestrian traffic, barricades shall be placed on all open sides, at least 8 feet from the hazard, and warning devices shall be installed in accord with 5.12.2.

5.13.3 Low-hanging door closers that remain within the opening of a doorway when the door is open, or that protrude hazardously into regular corridors or traffic ways when the door is closed, shall be avoided.

5.13.4 Low-hanging signs, ceiling lights, and similar objects or signs and fixtures that protrude into regular corridors or traffic ways shall be avoided. A minimum height of 7 feet, measured from the floor, is recommended.

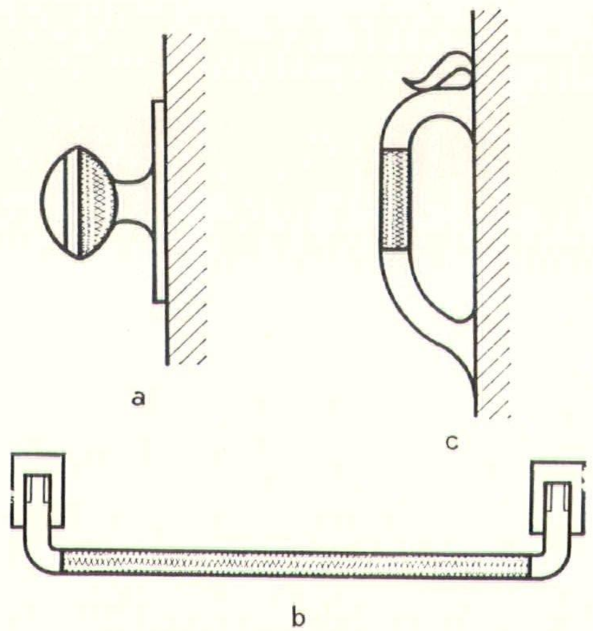
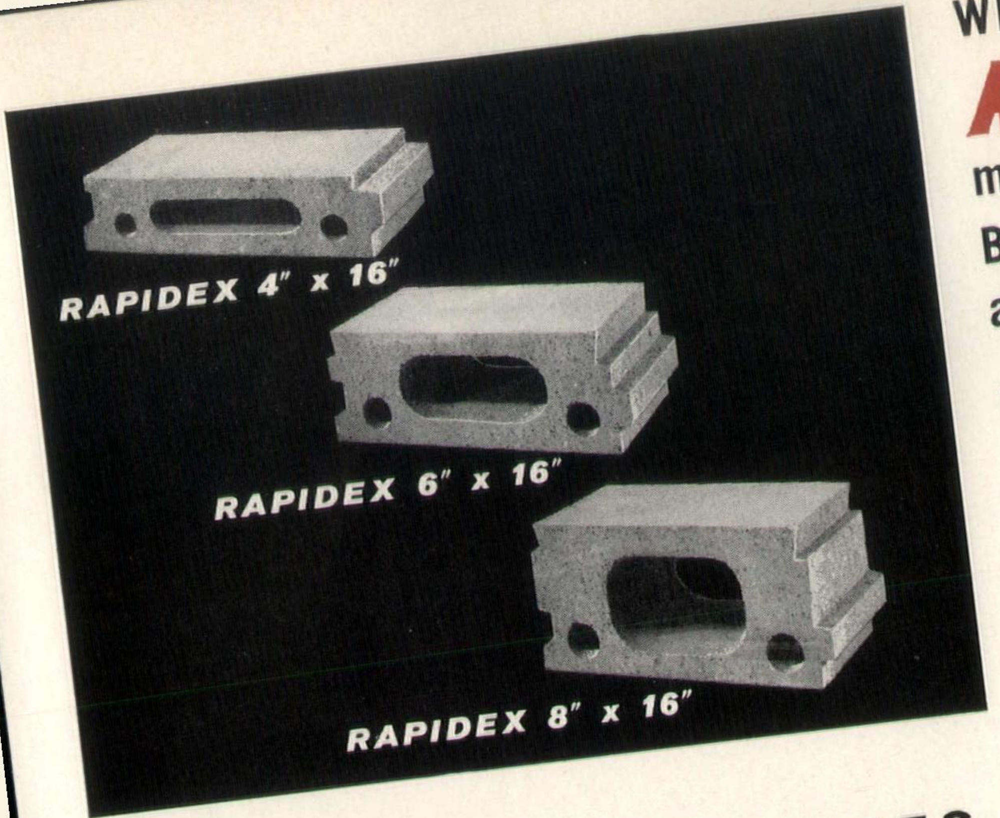


Fig. 2

Knurled Door Handles and Knobs

5.13.5 Lighting on ramps shall be in accord with 1201, 1202, 1203, and 1204 of American Standard A9.1-1953.

5.13.6 Exit signs shall be in accord with 1205 of American Standard A9.1-1953, except as modified by 5.11 of this standard.



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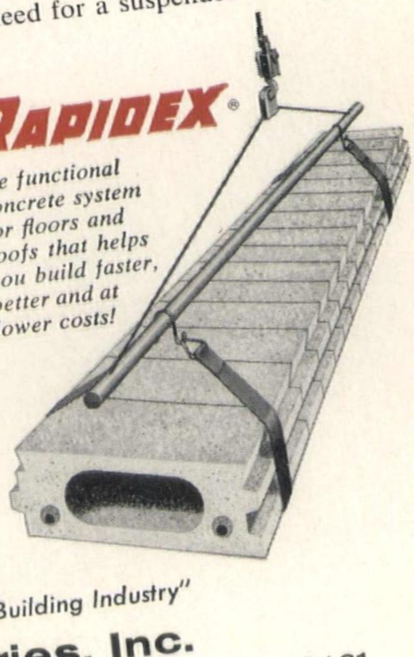

CONSTRUCTION DATA

	Weight of Section per sq. ft.	Load Carrying Characteristics	
		Floor Spans	Roof Spans
4" x 16" RAPIDEX	22 lbs.	Up to 14'	Up to 14'
6" x 16" RAPIDEX	30 lbs.	Up to 20'	Up to 22'
8" x 16" RAPIDEX	42 lbs.	Up to 29'*	Up to 29'

* topping included in L/D of 40 A.C.I. 711-58.

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