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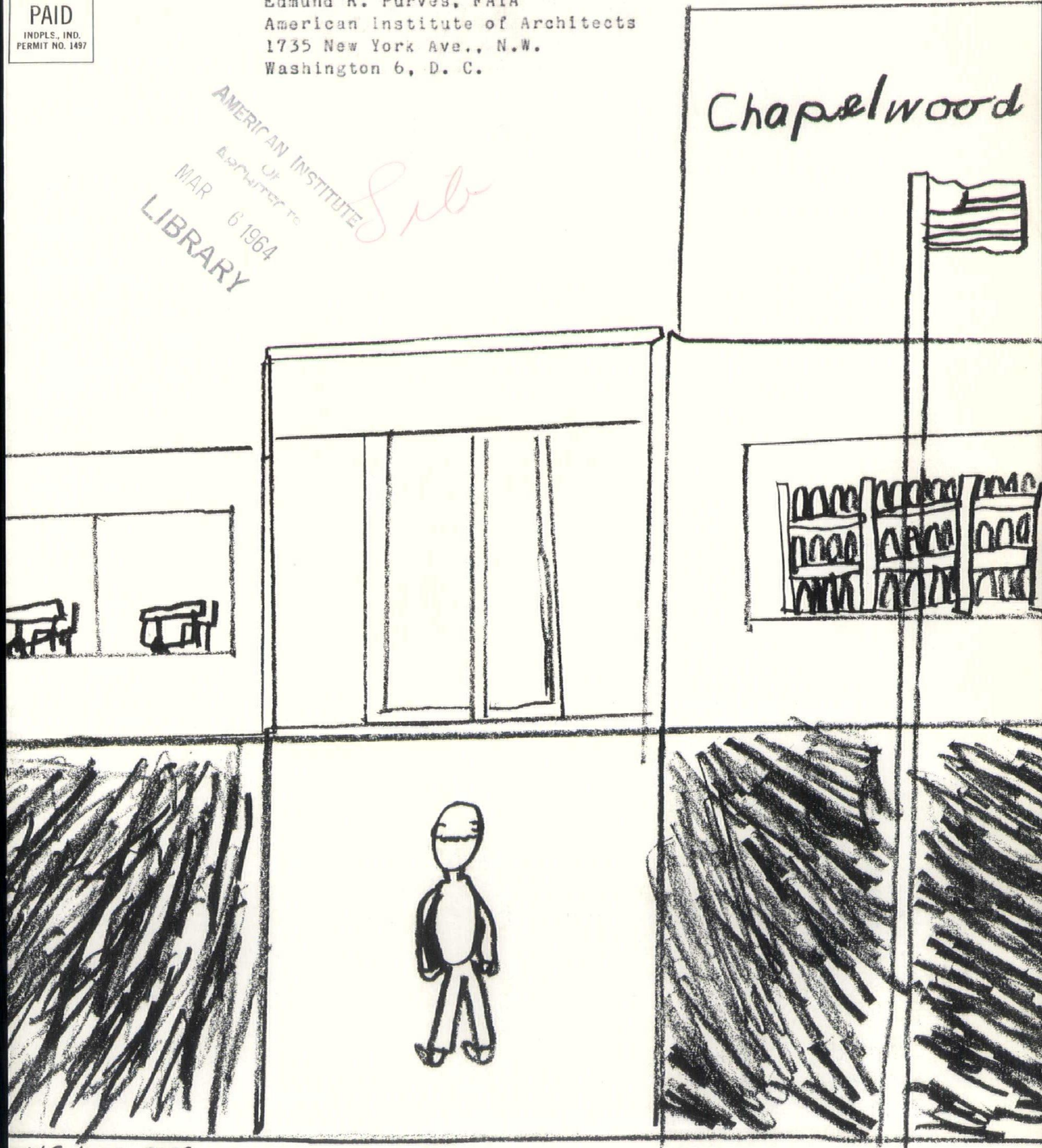


avid Schram age 8

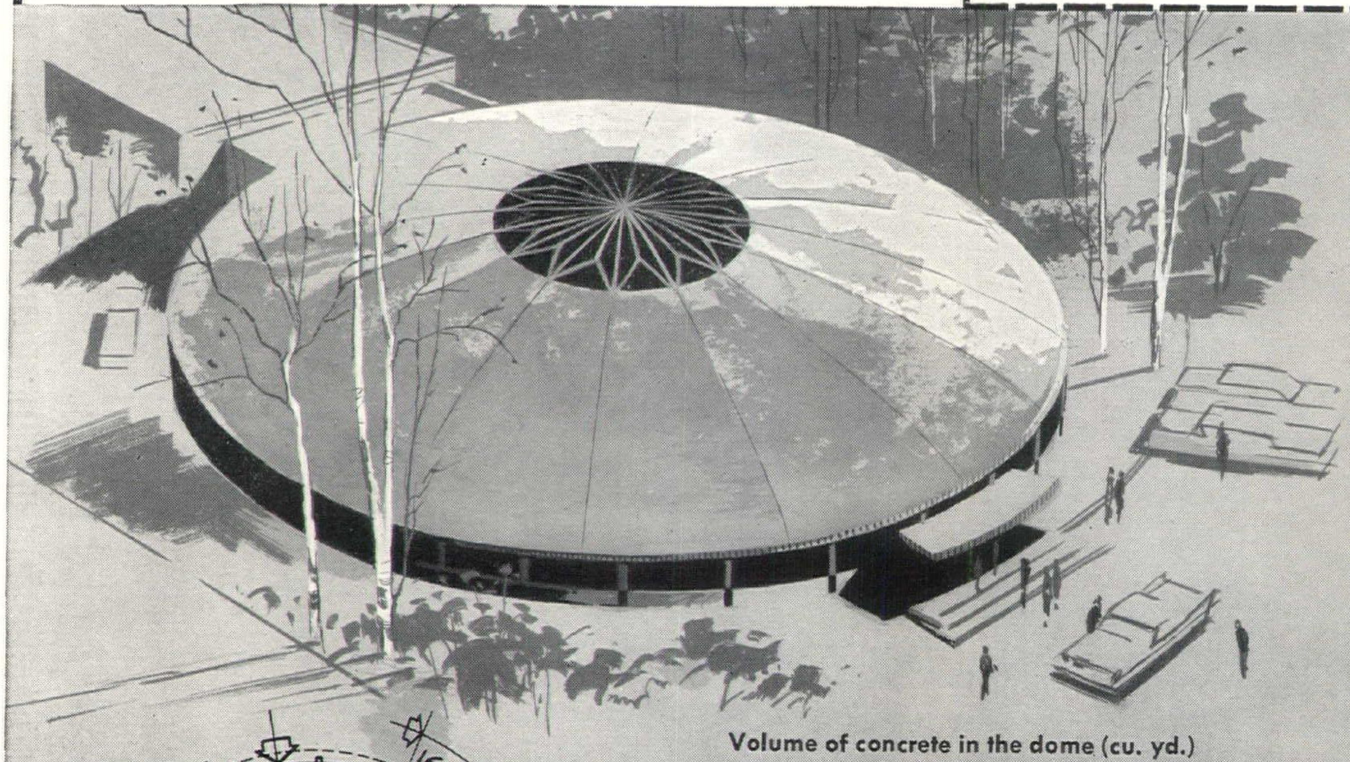
SPECIAL ISSUE: SCHOOLS

dome shell roofs

a.i.a. file: 4-a

Prepared as a service to architects by Portland Cement Association

Clip along dotted line

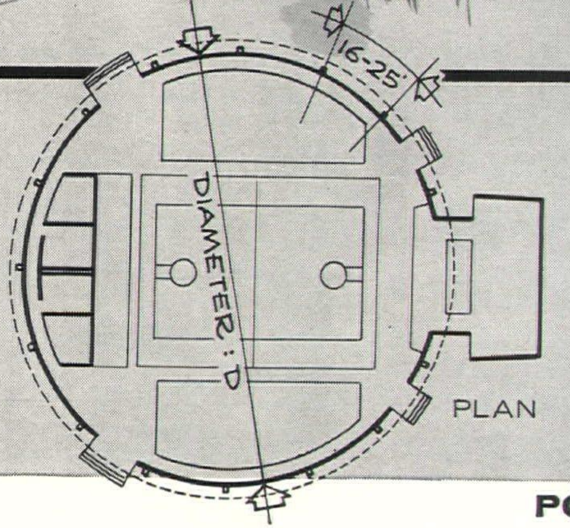


Designing for long spans and column-free space. The basic dome shell of concrete is architecturally important today for both practical and esthetic reasons. Because strength is inherent in the shape, shell roofs in the United States are being designed with thicknesses of as little as 2½ inches.

Dome shells are especially suitable for structures such as gymnasiums where spans are long and column-free space is required. As seen from the table below, shell thickness varies with length of span and curvature of dome.

Domes may be pierced as desired for natural light, or appropriate domed or flat-fixed lights may be used.

Get complete technical literature on additional aspects of concrete dome shell design, as well as other applications of concrete. (U.S. and Canada only.) Send a request on your letterhead.

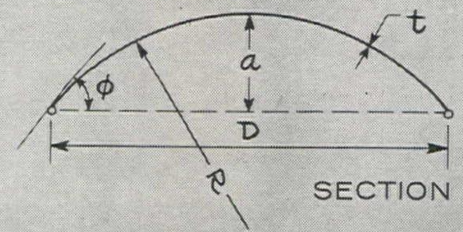


PLAN

Volume of concrete in the dome (cu. yd.)

$$\frac{D^2(t+1)}{360}$$

D in feet, t in inches



SECTION

DOME/SPAN DATA

D	t*	φ	a	R
100'	3"	30 45	13.4' 20.7'	100' 70.7'
125'	3"	30 45	16.8' 25.9'	125' 88.4'
150'	3½" (3")	30 45	20.1' 31.0'	150' 106.0'
175'	4" (3½")	30 45	23.5' 36.2'	175' 123.7'
200'	4½" (4")	30 45	26.8' 41.4'	200' 141.4'

*Note: Shell thickness "t" is usually increased by 50 to 75 per cent near the periphery.

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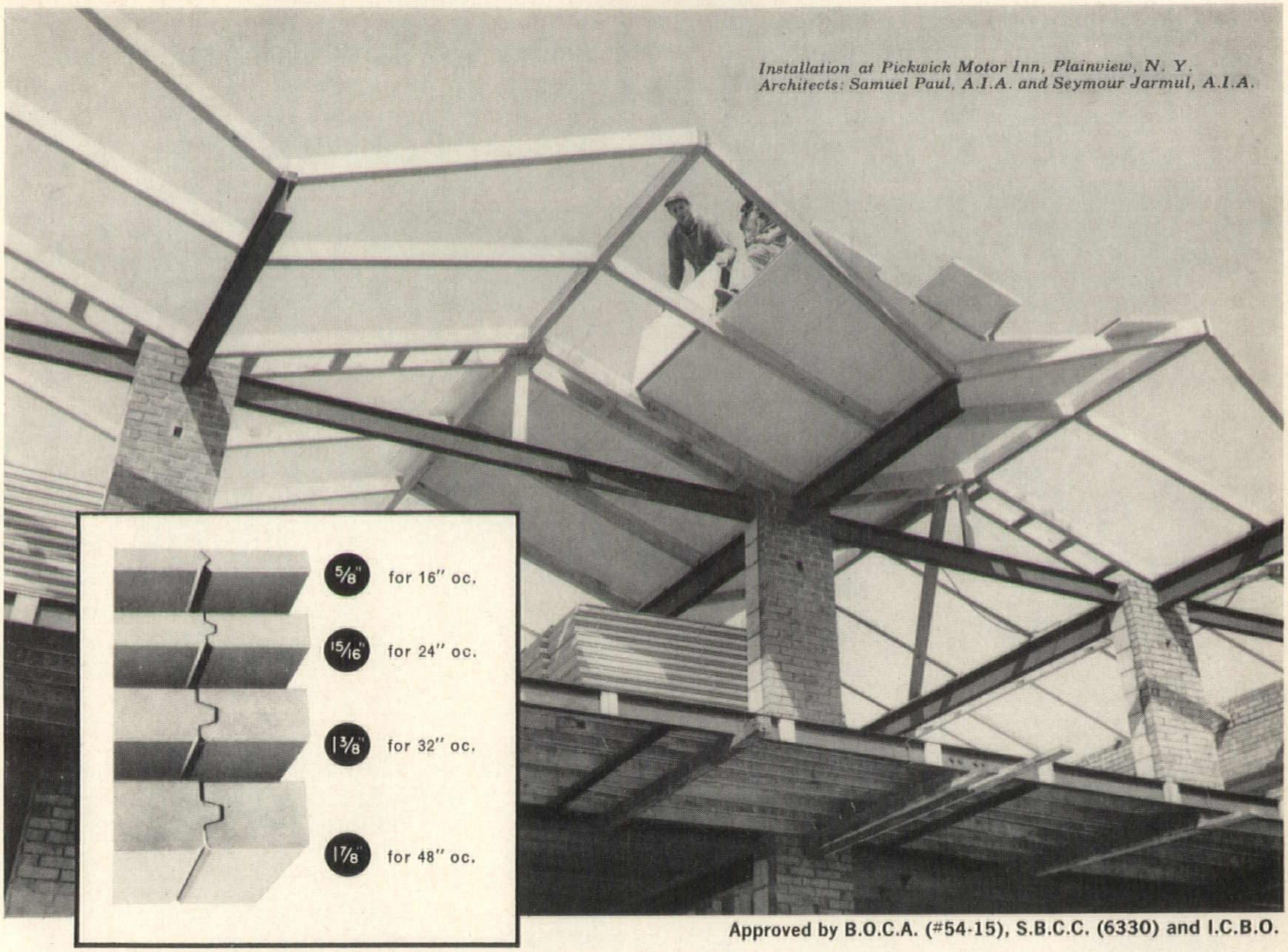

Installation at Pickwick Motor Inn, Plainview, N. Y.
Architects: Samuel Paul, A.I.A. and Seymour Jarmul, A.I.A.

Approved by B.O.C.A. (#54-15), S.B.C.C. (6330) and I.C.B.O.

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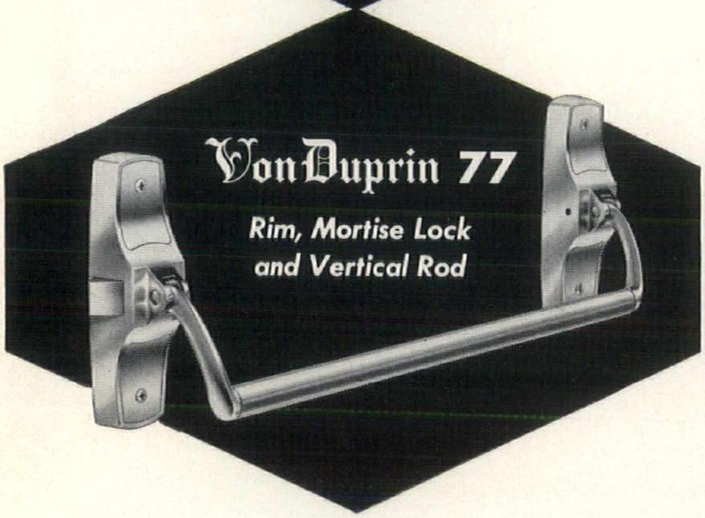

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Indiana Architect

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

VOL. VII FEBRUARY, 1964 No. 11

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Editor and Publisher — Don E. Gibson, Hon. ISA Assoc.

Director of Advertising — Layman Kingsbury

Concerning the Cover:

Ever wonder what students think of the beautiful new schools they attend? We did, so we asked one to draw a picture of his school.

And eight-year-old David Schram, a third grade pupil at Chapelwood Elementary School, drew the cover picture of his school for us. We think the result is delightful.

David is the son of Gene Schram, partner in our consulting art firm of Design Associates of Indianapolis. Incidentally, David informed us that the ground cover in front of the school is not grass—it's straw. The school's too new to have grass, yet.

Chapelwood School, also known as Wayne Township School No. 7, is the newest elementary school in the Metropolitan School District of Wayne Township, Marion County, and was designed by Everett I. Brown Company of Indianapolis. Facilities include 18 classrooms; multi-purpose room with stage, kitchen, dressing and storage facilities; administration area; and activities room and library.

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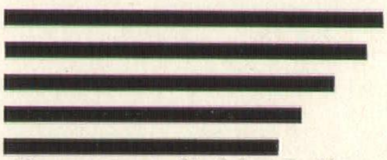
EIGHT STATE REGIONAL SCHOOL CONSTRUCTION COSTS
Cubic Foot Cost Comparison

MICHIGAN	$ 1.03 per cu. ft.
NORTH DAKOTA	1.02 per cu. ft.
ILLINOIS	.99 per cu. ft.
SOUTH DAKOTA	.95 per cu. ft.
MINNESOTA	.88 per cu. ft.
IOWA	.87 per cu. ft.
WISCONSIN	.85 per cu. ft.
INDIANA	**.85 per cu. ft.**

(Based on an 80 school survey in the area reported by F. W. Dodge Company's "Costs and Trends in Current Building Construction," Edition A, 1961 and 1962, for all types of public school construction).

PERCENTAGE OF LOCAL TAX DOLLAR SPENT FOR SCHOOL CONSTRUCTION

1958 (12.35%)
1959 (12.32%)
1960 (12.09%)
1961 (11.78%)
1962 (11.54%)



(Compiled from figures supplied by Indiana Taxpayers' Association)

PERCENTAGE COST INCREASE COMPARISON
1937 - 1957

COMMON LABOR	330%
GENERAL CONSTRUCTION	275%
SKILLED LABOR	220%
STEEL	215%
FACE BRICK	200%
AUTOMOBILES	200%
HIGHWAY CONSTRUCTION	200%
SCHOOL CONSTRUCTION	**150%**

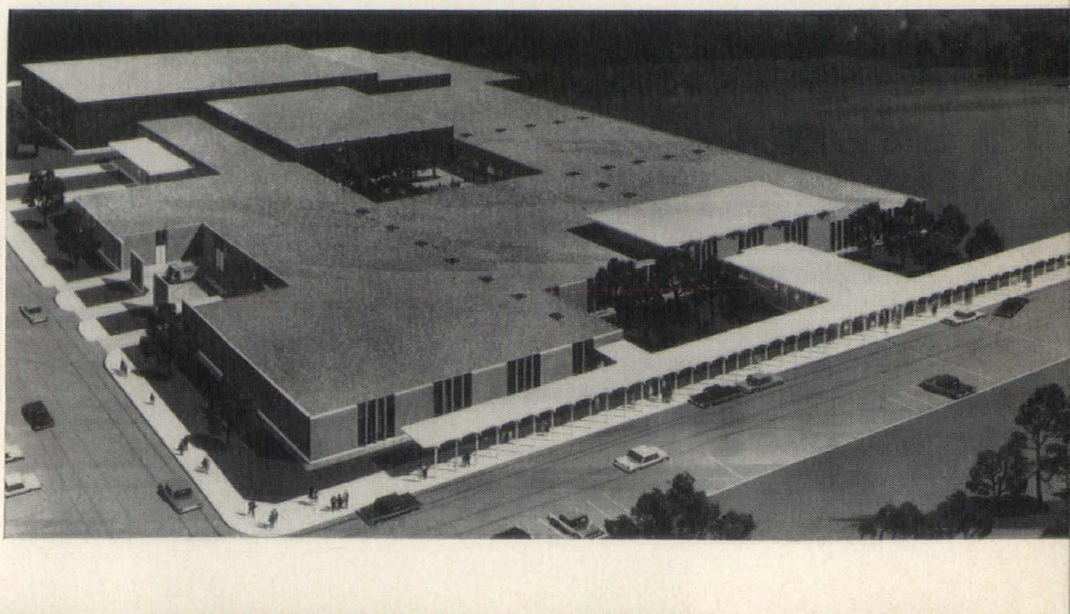
Schools and Public Money

The problem of getting and paying for public education affects the average taxpayer more than almost anything else in civil life. It affects both his pocketbook and the welfare of his children. On a broader scale, it affects the welfare of both his community and his nation.

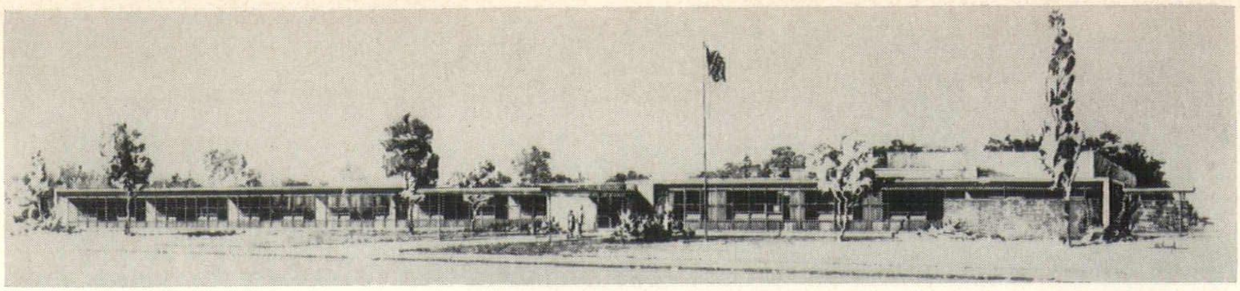
Yet, insofar as the planning of school buildings is concerned, almost nothing is surrounded by so much misunderstanding and confusion — to the detriment of both pocketbook and child.

Each year, the community establishes a budget to pay for all of its public services. Each year, some one-half to two-thirds of that budget is earmarked for **education.** When local taxes are raised, as they have been steadily over the past decade, the property owners who bear the load understandably cast about for some means of relief.

A convenient target for this unrest is often the school building, and this unrest expresses itself in a demand for elimination of **frills.** If this word is equated with **waste,** the community is indeed on solid ground. But often it is not, and the



PIKE HIGH SCHOOL, Pike Township, Marion County
Archts.: Lennox, Matthews, Simmons and Ford, Inc.
Gen. Con.: K. H. Kettlehut, Lafayette



Pleasant Run School

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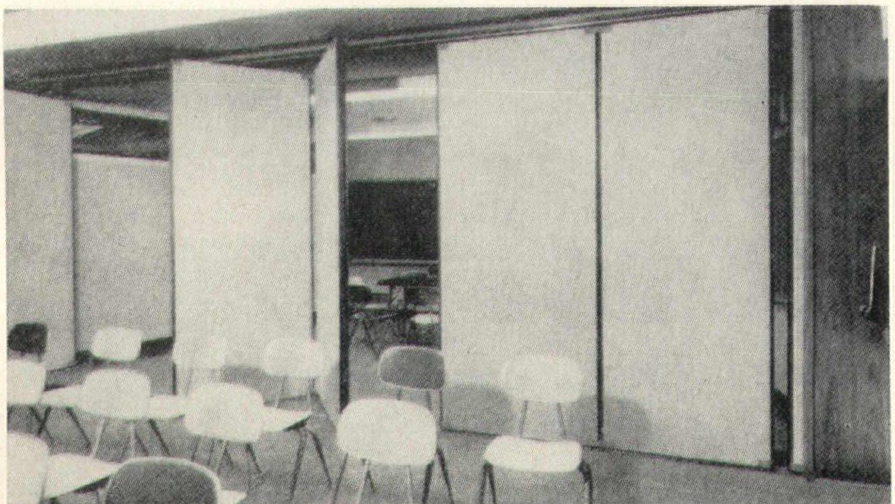

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community suffers from a wave of misplaced and costly "economy."

Here is a fact which comes as something of a shock to the citizen who hears it for the first time:

If we got our new school buildings for nothing, it would make very little difference on our local tax bills. The average new school-building program takes only between 10 and 20 cents from the school tax dollar. (This is not to say that it is an unimportant expenditure, because the way this money is spent affects the whole educational dollar).

Are we spending too much on our new school buildings? To put the answer in perspective, consider what this money will buy — and what we spend it on. If the average home owner pays an annual community tax bill of $200 and education takes half of the budget, he pays $100 for the total school program. Assuming that construction takes 15 per cent of the school tax dollar, he pays $15 for new school buildings during the year. The same man is apt to spend that much taking his wife to a good restaurant for dinner. Or, to establish another analogy, the cost of a modest television set would pay for a 10-year school construction program, or five years at double that building volume.

In all honesty, we must conclude that school buildings are not too expensive **so long as they are not inadequately built.** These are not mere opinions; national figures show that the cost of all building has tripled during the past 20 years. The cost of school buildings has only doubled during that period. The fact is that the school building is still the best bargain, dollar for dollar, on the building market.

There is however, a hidden but very real cost in school building and every citizen should be aware of it. It is the cost of **operating** and **maintaining** the school plant each year. This is why a number of authorities state that only the wealthy community can afford a cheap school.

The annual cost of operating and maintaining school buildings in many communities is as much as the community pays each year to build its schools. This means that the better the materials, and the sounder the construction, the more money will be saved in the long run.

Nor does governmental design provide economies. Authoritative studies, involving public works structures on the federal and state levels, throughout the nation, show clearly that the best results in terms of economy and end product have been produced by private practicing architects rather than by municipal architectural bureaus. In this respect, the fees paid to private practitioners have been found to be a very small investment in the best possible planning by professionals who compete on the basis of talent — as do physicians, lawyers, and other professional persons.

The planning and building of good schools is a professional job whose excellence depends on close teamwork by architect and educator. Yet even this, without effective community understanding and support, will produce less than the best result.

PER PUPIL UNIT
COST OF EDUCATION INDEX COMPARISON
1962 - 63

Function	**Indiana**	**Region 3***	**National**
Administration	$ 6.97	$ 13.96	$ 13.50
Instruction	244.66	254.42	261.60
Coordinate Activities	1.64		
Health**		1.11	2.00
Operation	32.42	40.20	33.80
Maintenance	9.82	11.71	11.80
Fixed charges	5.02	6.98	12.00
Other Services**		0.00	.40
Capital Outlay	4.80	9.83	8.90
Debt Service	14.93	42.96	35.90
Transportation	26.35	12.60	14.70
Totals	$346.61	$393.77	$394.60

* Region 3 includes Indiana, Illinois, Michigan, Ohio and Wisconsin.

** Not included in Indiana CEI.

RESEARCH BULLETIN #12, October, 1963, INDIANA SCHOOL BOARDS ASSOCIATION.

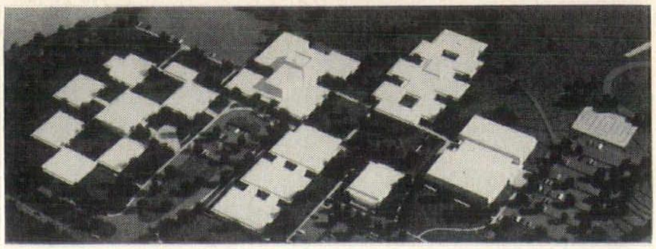
PER PUPIL UNIT
COST OF EDUCATION INDEX COMPARISON
1961 - 1962

Function	**Indiana**	**Region 3***	**National**
Administration	$	$ 14.09	$ 12.90
Instruction	248.32	253.30	245.10
Coordinate Activities	.84		
Health**		.79	1.90
Operation	32.50	38.71	31.90
Maintenance	10.71	12.00	11.10
Fixed charges	4.51	6.01	11.90
Other services**		0.00	.60
Capital outlay	**8.59**	**12.00**	**9.95**
Debt Service	26.37	48.88	37.05
Transportation	23.54	11.77	14.10
Totals	$355.38	$397.65	$394.60

* Region 3 includes Indiana, Illinois, Michigan, Ohio and Wisconsin.

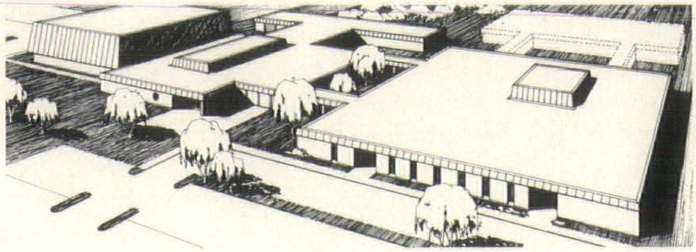
** Not included in Indiana CEI.

RESEARCH BULLETIN #12. October, 1963, INDIANA SCHOOL BOARDS ASSOCIATION.



University School
Bloomington, Indiana

Brownstown Central
Community High School
Brownstown, Indiana



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School administrator, architect and taxpayer, all interested in design for adequate and convenient facilities for the total school program, also seek plans which are not costly in operation and maintenance. Adequate time for architectural study of these factors will prove that practical and esthetic considerations are not mutually exclusive.

In the shared responsibilities of architect and administrator, consideration of maintenance problems should begin in early stages of research and programming and extend thru working drawings and specifications. This will affect selection of materials and equipment, choice of standard or stock elements such as windows, requiring a balance between initial cost, appearance, rate of deterioration, cost of painting and cleaning, etc.

The architect must himself balance his best professional judgment with the administrator's experience and special local conditions. The administrator likewise should avoid rulings which may be based on isolated examples of unsatisfactory experience.

The more nearly the architect may be able to put himself in place of user and the more closely he may be in contact with completed building over long periods of use, the more sympathetic will be his approach to study of effects of maintenance on design.

Design Maintenance Criteria:

- Choice of materials based on:
  Durability or longevity
  Ease of cleaning or renovation
  Facility of replacement
- Choice of apparatus and equipment based on:
  Proven worth and reputation
- Consideration of first cost versus upkeep — "True economy is a complex relationship among original cost, educational utility and operation expense."

PRINCIPLES

Maintenance economy must not be carried to point of educational detriment or embarrassment. Use of cheap materials which cut life span of a structure generally builds up maintenance costs. This is true whether

- Life span of structure is deliberately set low to avoid throttling future educational program with obsolescent physical plant, or
- Structure is a stop-gap to provide temporary housing to meet crowded conditions.

Pumping life blood, in form of dollars, into so-called "temporaries" has proven an expensive operation to many educational agencies in recent years.

Discrimination must be exercised in appraising esthetic and structural values in terms of local conditions such as hurricane hazards in Florida and Gulf States, earthquake hazards and, in general, use of designs or details for one climate not suitable for another region.

Maintenance Considerations in School Design

By HAROLD DWIGHT SMITH, FAIA
EDWARD KROMER, AIA
ALBERT F. GALLISTEL, AIA
PAUL H. ELLEMAN, CE

Planning and construction elements listed below serve to illustrate principle that good design need not be sacrificed by considerations of economy of maintenance and convenience of operation. Such considerations may prove the spur to distinctive architectural achievement.

BASIC PLANNING PROBLEMS

Adaptability:

Most buildings sooner or later are subject to alterations and additions. Original plans should include open-end corridors and provisions for extension of all utilities.

Ceiling Heights:

Reasonably low ceiling heights reduce cubage and costs of construction, cleaning and painting, also heating both in initial equipment and fuel.

Somewhat higher ceilings in semi-tropical areas are justified only if they contribute to natural ventilation thru openings properly proportioned and placed.

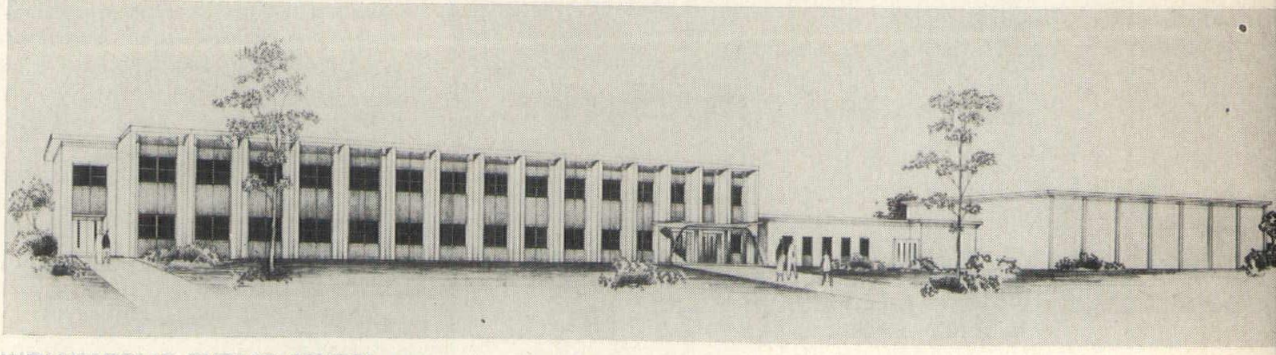
Janitorial And Maintenance Services:

In large buildings plan divisions in service units, vertically or horizontally:

- One office for head custodian
- At least one janitor supply and operation station on each floor.

Extra-Curricular Control:

By proper location of interior gates or doors and stairs with reference to entrances, vestibules and lobbies so that



INDIANAPOLIS PUBLIC SCHOOL 105, Indianapolis
Archt.: Fran E. Schroeder & Associates, Indianapolis
Gen. Con.: Glenroy Construction Co., Inc.

A highly economical but complete elementary school facility for kindergarten through sixth grade pupils. Construction cost ran $10.97 per square feet for the 37,000 square foot project.

portions of structure, when not in use may be fully isolated.

Expansion And Contraction of Materials:

Design must include properly pre-determined expansion joints at major structural division points of large buildings.

EXTERIOR DESIGN

Water:

Source of many serious maintenance problems in nearly all parts of country — design to avoid leaks:

Exterior Walls:

Use non-porous materials or materials with non-porous surface treatment.

Add waterproofing on outside, not inside, of foundation walls.

Window sills, copings and all horizontal masonry surfaces should be water-repellent material and/or placed over thru-wall flashing.

In masonry, use full waterproof and tooled or weather-struck joints, and parge backs of exterior 4" of face-brick walls.

In metals (corrosion-resistant) use fully over-lapped joints, caulked and with full provision for expansion.

In wood or other similar surface materials, use fully over-lapped joints, caulked and surface treated.

Roofs, Parapets And Flashing:

For effective water-shedding on flat roofs, do not depend upon theoretical drainage expected of a flat plane. In practice, no roof surface may be depended upon to be free from irregularities which may cause indefinite retention of water or undetermined or undesirable points.

When properly controlled, spraying of flat roofs is a valuable cooling device at some times of year in certain climates. For this use, roof and its connections and flashings must be constructed as a tight waterproof envelope.

For sloping roofs send water beyond exterior walls by means of eaves and gutters. For metal, seams and joints necessary for expansion and contraction should be located by designer rather than left to devices of roofer.

Parapets safely used only when

- Both sides of parapet wall are treated as fully watertight exterior walls.
- Coping is as fully watertight as any roof should be.
- Intersection with adjoining roof, either flat or sloping, is fully watertight.
- Scuppers or openings thru parapet provided at high points of its intersection with roof, for emergency overflow before water rises above safe flashing levels.

Flashing and counterflashing exposed at exterior intersection of roof and wall often forms a prominent pattern which should be determined by designer and not left to mason and roofer.

Skylights:

Maintenance personnel are generally strongly opposed to skylights because many of them leak. Where needed for light and/or ventilation they can be designed and constructed to be watertight.

Downspouts:

Rainwater drainage, except in southern parts of country, is best provided by interior downspouts or leaders, which should be located away from exterior walls, preferably exposed or accessible in chases or pipe-shafts for ease of maintenance and repair. Exterior downspouts should have leaf-or debris-catchers and a substantial boot or shoe for proper protection at bottom of conductor.

Other Exterior Problems:

Entrances:

Keep dirt and water out of building by proper overhead weather protection and by foot-cleaning devices prominently and conveniently located.

Avoid open exterior entries which require policing.

Use only most durable materials for steps to withstand long, hard usage. For safety, no step should be used at door threshold and steps adjacent to any entrance should be flights of not less than 3 steps.

Refuse Storage:

Will be needed, sooner or later, near service entrance. Provide in original design either by construction or landscape camouflage, do not leave to become an eyesore.

Smoke Stacks, Flues or Chimneys:
(for heating and incinerators)

Designer should recognize their inevitable prominence and inevitable discoloration, and anticipate by selection of materials, texture and colors which will not emphasize discoloration.

Window:

Large areas usually desirable or required by code — select in terms of:

- Readily replaceable stock patterns
- Non-Corrosive material
  For longevity
  Effect on exterior color scheme
- Ease of maintenance
- Weather-tightness
- Interior condensation drainage.

Architectural Concrete:

Architectural concrete is a poured plastic material which reaches its physical and chemical "set" rapidly after placing — which should determine its final form and finish.

Surface textures should be modified only by taking away and never by adding material after initial set. Where there is absolutely no danger of frost action, application of color and texture by use of reputable concrete paint is effective. Otherwise, paint should not be applied over architectural concrete. Concrete which requires "cosmetic" curing should be rejected as structurally unacceptable.

INTERIOR PROBLEMS

Greatest area of common concern between architect and administrator. Selection of colors and finishes usually a compromise between ideal colors and surfaces and considerations of initial cost and maintenance costs.

Color:

Of great importance in emotional impact in addition to appearance — select in terms of:

Soil-proofness
Cleaning
Renewal — Matching

Floors:

Minimum of interior angle intersections, coved where possible.

Color by means other than applying paint or pigments.

Entries, Corridors, Shops And Labs:

Hard durable materials:
Terrazzo
Ceramics or masonry, in small renewable units
Hardwood in carpenter shop.

Offices, Classrooms, General Spaces:

Hardwood
Linoleum
Asphalt or mastic tile.

Walls:

Smooth plaster preferable to rough or textured for cleaning and painting ceramic tile — higher initial cost offset by:

Permanence of color
Impervious surfaces
Low maintenance cost.

Porous, unplastered masonry block — lower initial cost and slight acoustical benefit offset by cost of repainting.

Wainscots:

Especially in corridors and stairwells if painted on plaster use tough gloss or semigloss paint.

Color determined in original design, not left to undiscriminating custodian.

Intersections of Wall Surfaces:

Rounded or coved regardless of rigidity of corner beads and other protective measures.

Ceilings:

White or near white for light reflection must be kept clean — therefore easily cleaned surface desirable.

Acoustical Materials:

Selection of porous surface vs perforated-porous vs perforated pan-type, balanced against long-range cleaning or repainting costs.

Woodwork:

Stained and varnished easier to maintain than painted.

Rehabilitation of antiquated golden oak by sprightly colors is effective and popular.

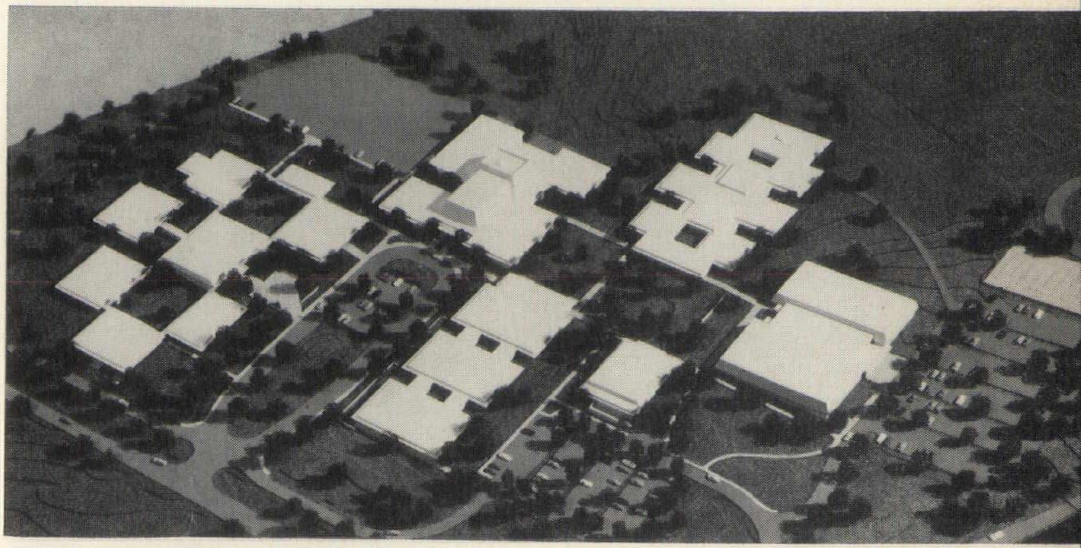
HEATING — PLUMBING — ELECTRICAL

Collaboration between architect and mechanical engineer should begin at preliminary stage. Ever-increasing amount of piping, conduit and fixtures used in modern educational buildings emphasizes desirability of orderly arrangement of such equipment and accessories, exposed, or at least accessible in tunnels or pipe-shafts for ease of maintenance, repair and replacement. A designer cannot ignore such features in large numbers, often in conspicuous places. They become as important in architectural design as are doors, windows, stairs, cabinets, black-boards.

(Continued on Page 17)

UNIVERSITY SCHOOL, Bloomington
Archts.: James Associates, Inc., Indianapolis
Gen. Con.: Repp & Mundt, Inc., Columbus

A unique, self-contained school for nursery through 12th grades, with three main elements arranged as separate schools with shared special facilities (creative arts, physical education and cafeteria-kitchen). Elementary School is a series of little schools (150 students each) around a central service building with library and all-purpose room; included are nursery-kindergarten building and special education building. Planned population is 1950, with 600 elementary, 200 nursery-kindergarten, 50 special education, 550 junior high school and 550 senior high school students. Programmed expansion will facilitate 2,800 students.

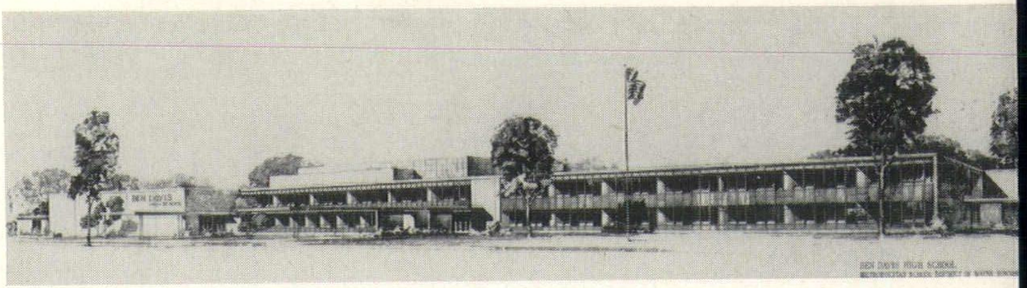


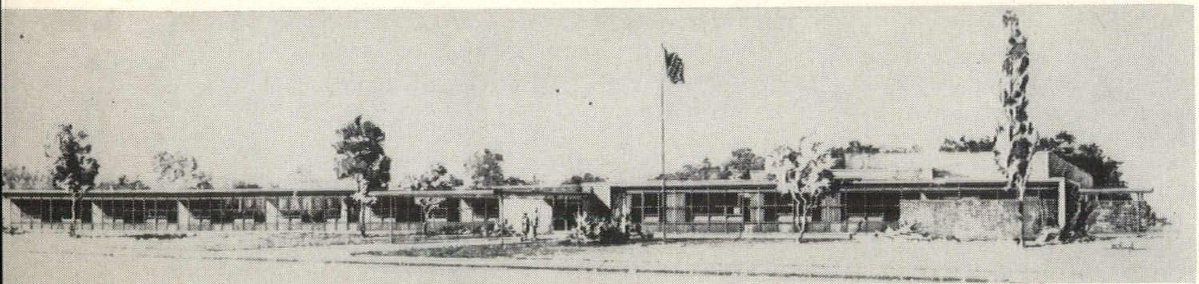
BRUNSWICK ELEMENTARY SCHOOL, Gary
Archts.: Beine, Hall & Curran, Inc., Gary
Gen. Con.: Prosser Howells, Inc., Gary

A basic elementary school composition which can be adapted to the varied classroom total requirements of any Gary school district, including provisions for variation in topography. Providing 30 classrooms, this is the larger of two compositions and represents the initial application of this flexible elementary school plan concept.

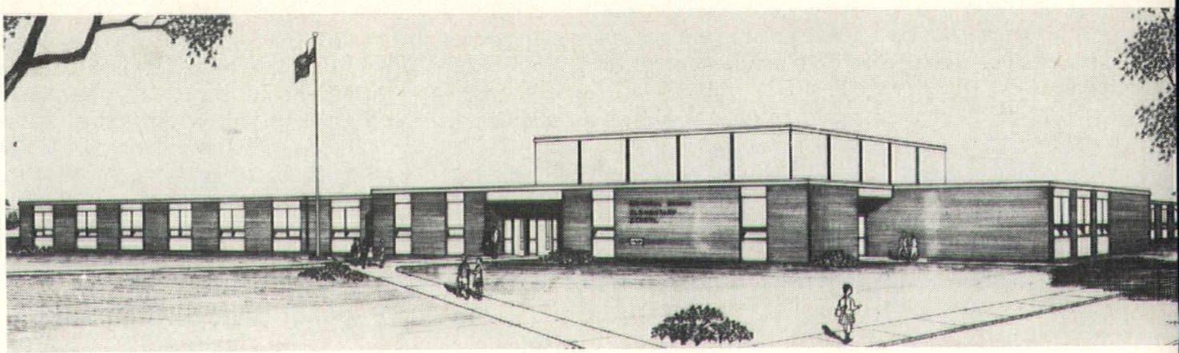
BEN DAVIS HIGH SCHOOL, Wayne Township, Marion County
Archts.: Everett I. Brown Co., Indianapolis
Gen. Con.: F. A. Wilhelm Construction Co., Inc., Indianapolis

Scheduled for completion in 1965, this two-story school adjoining existing junior high and elementary schools and provides facilities for the broad educational curriculum demanded by the educators and patrons. Initial enrollment programmed for 2,000, expandable to 2,500 with addition of classrooms only. Facilities include 1,000 seat auditorium, cafeteria and dining halls, 50,000 sq. ft. industrial arts area, 120 seat lecture hall with rear projection method of visual presentation.



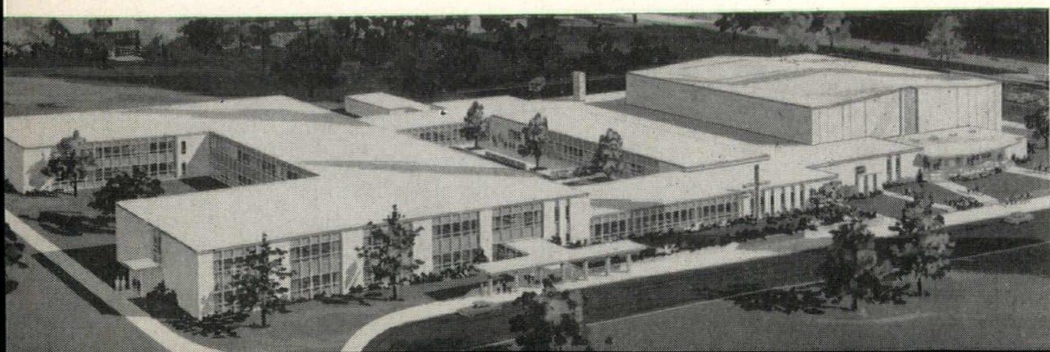


PLEASANT RUN SCHOOL, Warren Township, Marion County
Archts.: Everett I. Brown Co., Indianapolis
Gen. Con.: A. B. Cochran & Son, Inc., Indianapolis



GENERAL SHANKS ELEMENTARY SCHOOL, Greencastle
Archts.: McGuire, Shook, Compton & Richey, Inc., Indianapolis
Gen. Con.: Baystone Construction Co.

A good functional school at moderate cost, this facility provides for kindergarten through sixth grade. Kindergarten and special education rooms (for retarded and handicapped children) are self-contained, and older and younger children are separated in different wings, first three grades in north wing and upper grades in the west wing. Multi-purpose room, kitchen, special education and administrative offices separate the wings.

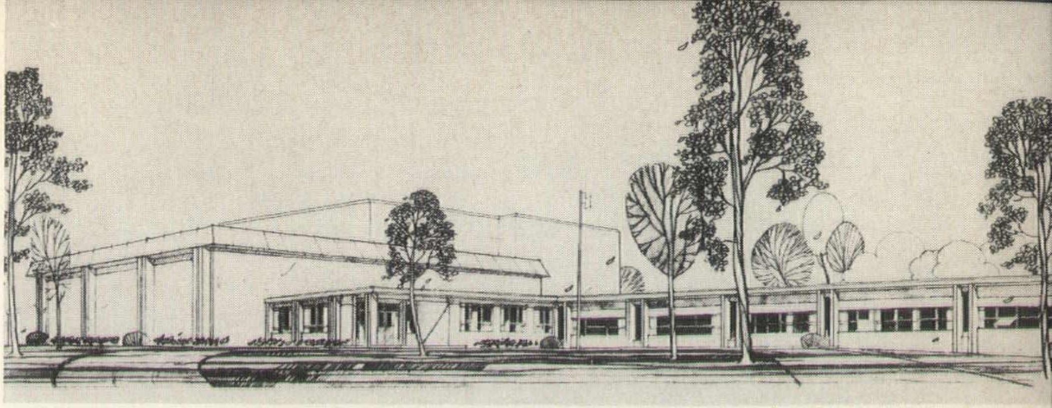


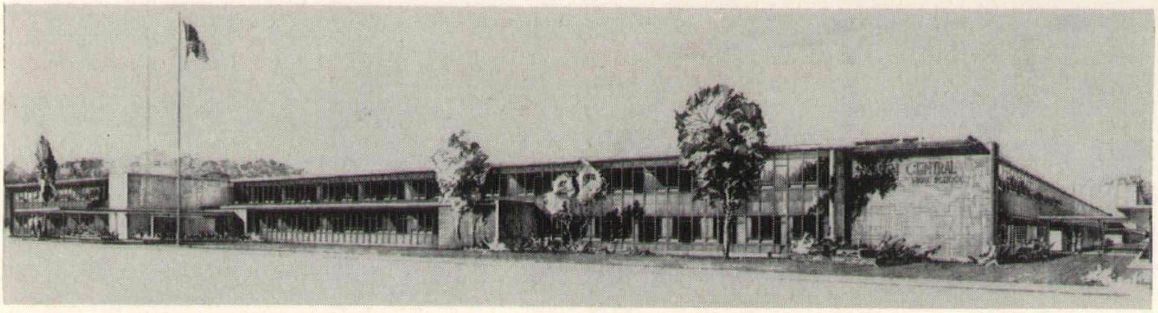
BISHOP DWENGER HIGH SCHOOL, Fort Wayne
Archts.: Mox Pohlmeyer & Associates, Fort Wayne
Gen. Con.: Weigand Construction Co., Fort Wayne

A parochial high school for the Catholic Diocese of Fort Wayne-South Bend, provides separate educational wing for boys and girls, with joint facilities. Facilities include 24 classrooms, 2 biology labs, chemistry lab, physics lab, mechanical drawing room, library, audio-visual room, clothing lab, commercial rooms, language lab, art room, chapel, cafeteria and kitchen, band and choir rooms, administrative offices and living facilities and gymnasium-auditorium with stage.

CROOKED CREEK ELEMENTARY SCHOOL, Washington Twp., Marion Co.
Archts.: Wright, Porteous & Lowe, Inc., Indianapolis
Gen. Con.: Glenroy Construction Co., Indianapolis

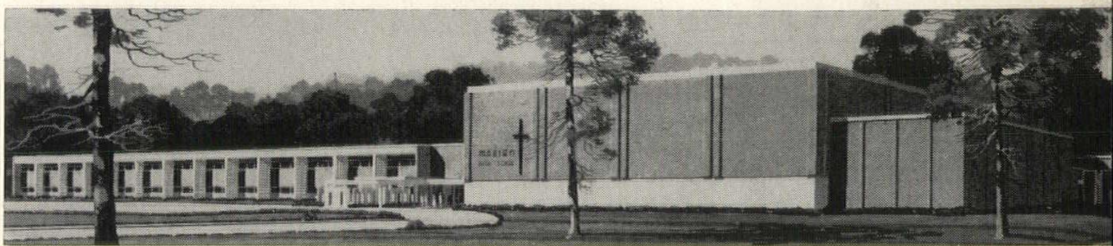
A 42,000 sq. ft. addition to a 50-year-old school with five classrooms on lower level to permit blending of school into finely wooded, hillsite site overlooking Crooked Creek. Facilities include 30 classrooms, gym, cafeteria, library and 3-room special education suite. Oldest portion of school to be replaced with future 12-room unit.





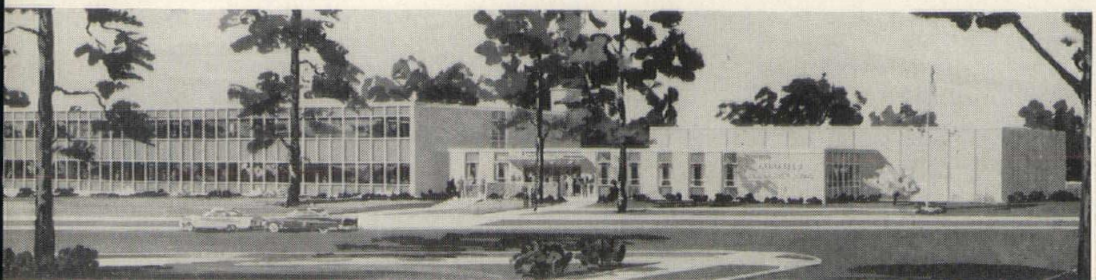
NORTH CENTRAL HIGH SCHOOL, Washington Township, Marion County
Archts.: Everett I. Brown Co., Indianapolis
Gen. Con.: K. H. Kettelhut, Lafayette

Largest, self-contained, single school structure in Indiana is a unique facility to house a quality education program emphasizing the proper environment to instll desire and ambition for excellence in students, desire for superiority in teaching methods, and to expand both summer and winter school programs. Designed for 3,500 student population with 400,509 sq. ft. of usable space in a compact, two-story design.



MARIAN HIGH SCHOOL, Mishawaka
Archts.: Maurer & Maurer, South Bend
Gen. Con.: Fred Black Construction Co., South Bend

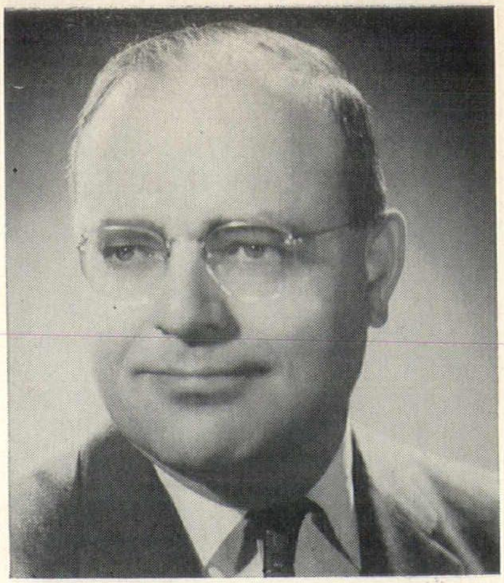
A flexible academic plant contained in an overall parochial complex for the Catholic Diocese of Fort Wayne-South Bend. A compact, two-story building, air conditioned for full-year use, contains 33 academic classrooms, library, home ec department, industrial arts and drafting room, art room, commercial department, 4 science rooms, chapel, kitchen, cafeteria, gymnasium and administrative facilities.



FAIRFIELD JUNIOR HIGH SCHOOL, Fort Wayne
Archts.: Mox Pohlmeyer & Associates
Gen. Con.: Hagerman Construction Co., Fort Wayne

An unusual hillside school with entrances from two street levels. Portions of the building are one, two and three stories, providing 20 classrooms, 2 home arts rooms, homemaking room, art room, TV room, library, vocal music and band rooms, shop, cafeteria and kitchen, gym, lounges and administrative facilities.

WILLIAM G. RAMMEL
AIA



CHARLES J. BETTS
FAIA

Betts, Rammel Appointed to Registration Board

Indiana Governor Matthew E. Welsh has appointed Charles J. Betts, FAIA, and William G. Rammel, AIA, to three-year terms on the Indiana State Board of Registration for Architects. The new appointees replace Indianapolis architect Edward D. James, FAIA, and South Bend architect Roy W. Worden, AIA, whose terms had expired December 31st.

Mr. Betts is national consulting architect for the Board of Church Extension, Disciples of Christ Church in Indianapolis, and is a former president of the Indiana Society of Architects.

Mr. Rammel is a practicing architect in his own firm in Fort Wayne, and is the newly-installed president of the Northern Indiana Chapter, AIA.

Other members of the Board include James L. Walker, AIA, of New Albany, Board chairman; James O. Johnson, AIA, of Anderson, vice-chairman; and Walter Scholer, Sr., FAIA, Lafayette.

200 Attend Lath & Plaster Banquet

Over 200 architects and members of the lathing and plastering industry joined together for a highly enjoyable January 23rd evening at the St. Pious K of C Hall in Indianapolis. The occasion was the ninth (and largest) Annual Dinner Meeting of the Lathing & Plastering Bureau of Indianapolis.

Richard K. Lennox accepts Gold Trowel Award from Robert F. Bowman.

Highlight of the after-dinner program came as Bureau President Robert F. Bowman presented the 1964 Gold Trowel Award to Richard K. Lennox of Lennox, Matthews, Simmons and Ford for their design of the Cadle Chapel in Indianapolis.

The Gold Trowel Award Competition is sponsored annually by the Bureau to salute the most outstanding uses of lath and plaster in this area. With the Award plague goes a check for $300.00.

Honored with Merit Awards were Evans Woollen and Associates, for Clowes Memorial Hall, and McGuire, Shook, Compton & Richey, Inc., for the Indiana State Teachers' retirement residences.

On-site judging was performed this year by Walter Scholer, Jr., AIA, Lafayette, immediate past president of the Indiana Society of Architects, James O. Johnson, AIA, of Anderson, vice-chairman of the Indiana State Board of Registration for Architects, and Robert Georgine, Assistant Business Manager of the Lathing Foundation of Chicago, Illinois.

Maintenance Considerations

(Continued from Page 13)

Heating And Ventilating:

Simplest type of equipment in small buildings to minimize skilled operation and maintenance labor.

Wall-hung radiators or units facilitate floor and wall cleaning, dirt minimized by wall shields.

Exact location of vertical supply and return heating lines, in conspicuous locations, especially where they flank windows, must be predetermined by architect, not left to engineer, contractor or craftsman. Similarly "swing-joint" and other exposed elements.

Modern "packaged" heating and ventilating units require careful pre-planning in terms of both engineering principles and practical considerations of accessibility, cleanability and replacement.

Ventilation registers and exposed duct openings should be designed for cleaning and repair access as well as orderly architectural pattern.

Exterior Coal or Ash-Handling Devices:

Locate and design as definite part of architectural composition.

Locate to produce min need for and to facilitate cleaning of resulting dust and dirt.

Fresh Air Intakes:

Design and location for min or zero dirt intake which is:
Harmful to system
Adds to cleaning and maintenance even with filters
Avoid ground-level intakes.

Underground Utility Lines:

Should be properly founded or flexibly supported at ingress points to avoid damage due to settling fill.

Plumbing:

Toilet Rooms:

Impervious material — floors and walls (at least wainscot).

Wall-hung fixtures — complete floor clearance.

Individual valves.

Piping, valves, accessories, fully accessible if not completely exposed.

"Abuse-proof" fixtures and accessories.

Janitor Slop-Sinks:

Some, if not all, at floor level.

Drinking Fountains:

Surrounding protective floor and wall areas — moisture proof and easily cleaned.

Electrical:

Artificial Lighting:

Standard fixtures and parts (except at points of very special architectural distinction).
Ready supply
Accessible for replacement.

Electrical System:

Safety power sub-stations
All main conduits in tunnels, shafts or closets
All accessories exposed or easily accessible.

SITE PROBLEMS

Surface Drainage:

(Natural or designed topography)

Prevent or Minimize Erosion

Play Area Drainage

Rapid and complete without erosion.

Gutters, Drains, Retaining Walls

In original design, not left to expediency forced by experience.

Seeded Areas — New Projects:

Ample sodded edges (18" to 24") complete sodding on slopes.

Planting Beds — Massed Vegetation:

Simple in form
Located for convenient care.

Vines on Buildings:

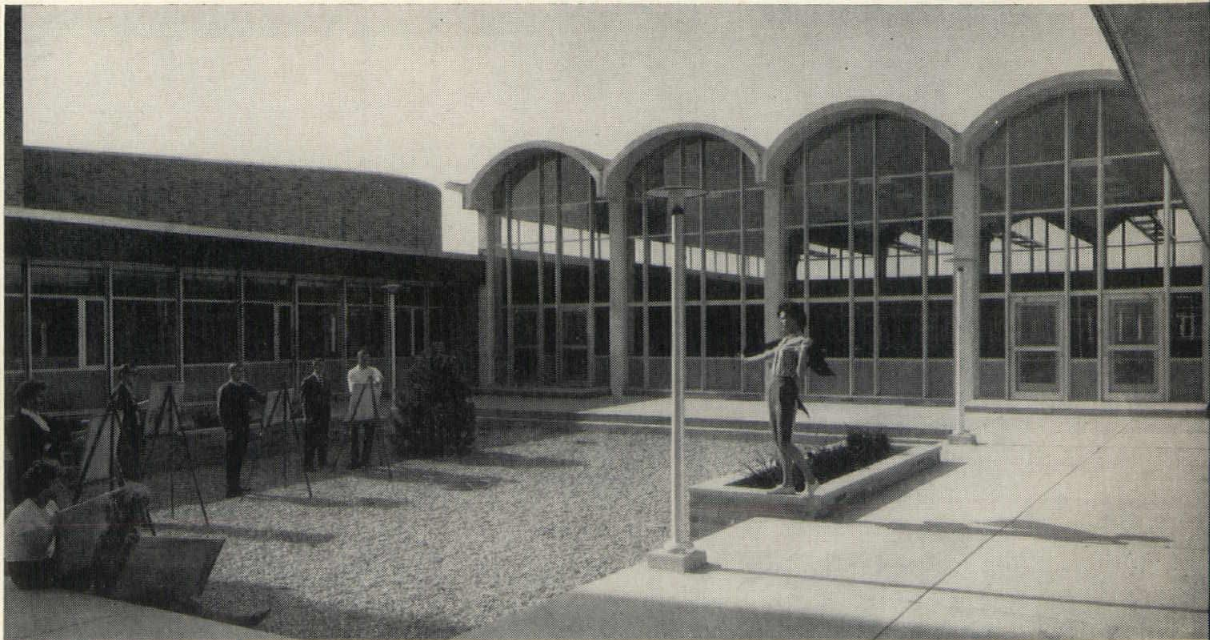
Bronze hooks to support main stems.
Network or trellis for demounting of clinging vegetation.

Flag Poles (on building site):

Located for easy access and maintenance of halyards, etc.

Roads And Walks:

Pattern easily followed by snow-plow traffic signs and painted curbs anticipated by architect and landscape architect with reference to other features and color scheme.



SENIOR HIGH SCHOOL, Frankfort
Archts.: Louis C. Kingscott & Assoc., Inc., Indianapolis
Gen. Con.: Omega Construction Co., Grand Rapids, Michigan

Comprehensive school plant for 1,225 senior high school students with 206,000 sq. ft. Complete educational facilities include 1,000 seat auditorium, recording studios in music suite, swimming pool and 5,500 seat gym.

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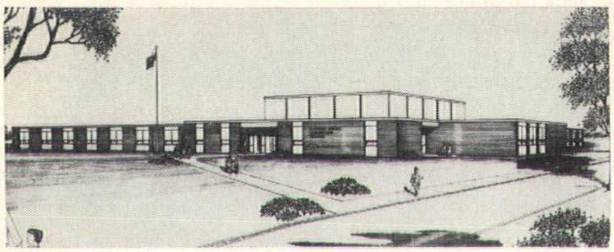

General Shanks Elementary School
Portland, Indiana

ARCHITECTS:
McGUIRE & SHOOK, COMPTON,
RICHEY & ASSOCIATES

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

General Contractors

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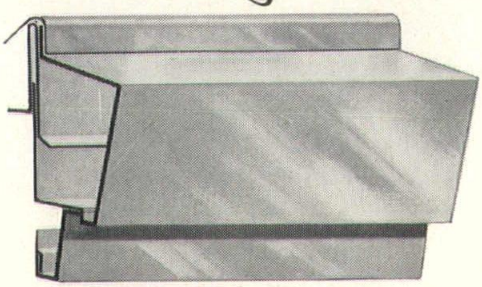

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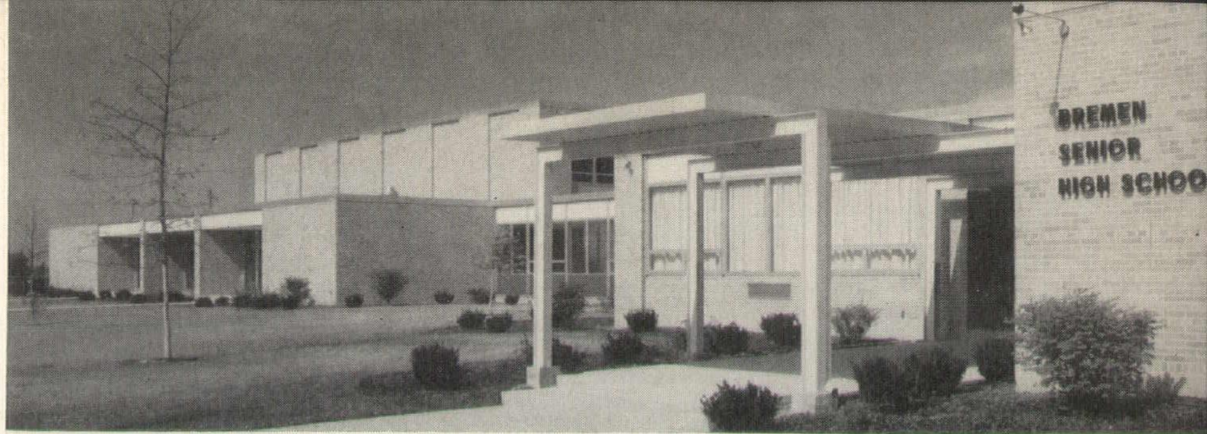
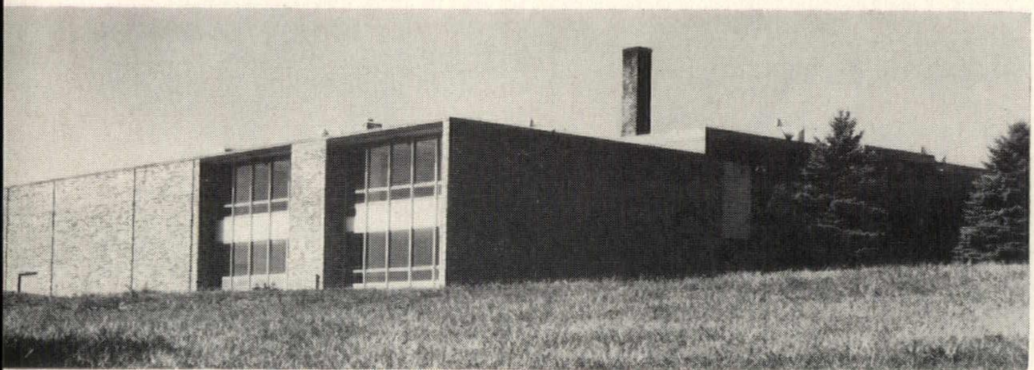


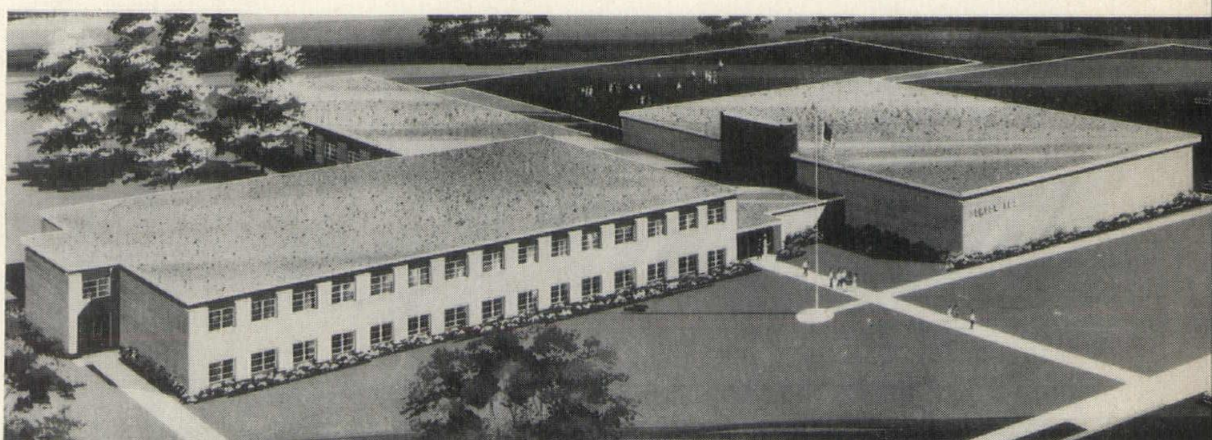
HIGH SCHOOL, Bremen
Archts.: Louis C. Kingscott & Assoc., Inc., Indianapolis
Gen. Con.: H. G. Christman Construction Co., South Bend

Limited budget and site required highly compact plan. 675 students, with 27 teaching stations, are housed in 76,000 sq. ft. Multi-use physical education gym provides large stage and ample seating capacity for both student and community use.



UNION TOWNSHIP GRADE SCHOOL ADDITION, Boone County
Archts.: Pecsok & Jelliffe, Noblesville
Engrs.: Stanley R. Jacobs & William F. Lynch
Gen. Con.: Wayne R. Dunifon

Two story addition to existing elementary school to provide three additional class rooms, all-purpose room and kitchen, of masonry wall-bearing construction (brick exterior) and aluminum framed curtain wall window units. Exposed block interior walls painted.



PUBLIC SCHOOL 107, Indianapolis
Archts.: Lennox, Matthews, Simmons and Ford, Inc.
Gen. Con.: Ernsting Construction Co., Inc., Indianapolis

Conservative estimates by the U.S. Office of Education indicate that during the decade 1959-60 through 1968-69, an additional 607,600 classrooms will be needed to adequately house the public elementary and secondary school children of this country. During the five years 1959-60 through 1963-64, construction of 416,600 classrooms is needed to take care of normal needs and to eliminate the accumulated backlog. These data do not include facilities other than classrooms which are needed to make up a complete school plant. Many communities are finding it difficult to finance their needed school construction. This situation results from five simple facts; namely, growing enrollments, population mobility, aging building, shrinking dollars, and the decreasing importance of land as a portion of the total wealth of the nation.

Ways and Means of Reducing School Construction Costs

By JOHN L. CAMERON, Chief, School Housing Section, Office of Education, U.S. Department of Health, Education & Welfare

School officials and architects generally have had in mind, for a long period of time, not only the child's welfare, but also the taxpayer's purse. During the twenty year period between 1947 and 1957 the cost of school buildings has increased 150%, while the cost of general construction has increased 275%; highway construction, 200%; and the cost of automobiles has increased 200%.

During the twenty year period that the cost of school buildings increased 150%, cost of steel increased 215%, face brick 200%, common labor 330%, and skilled labor 220%.

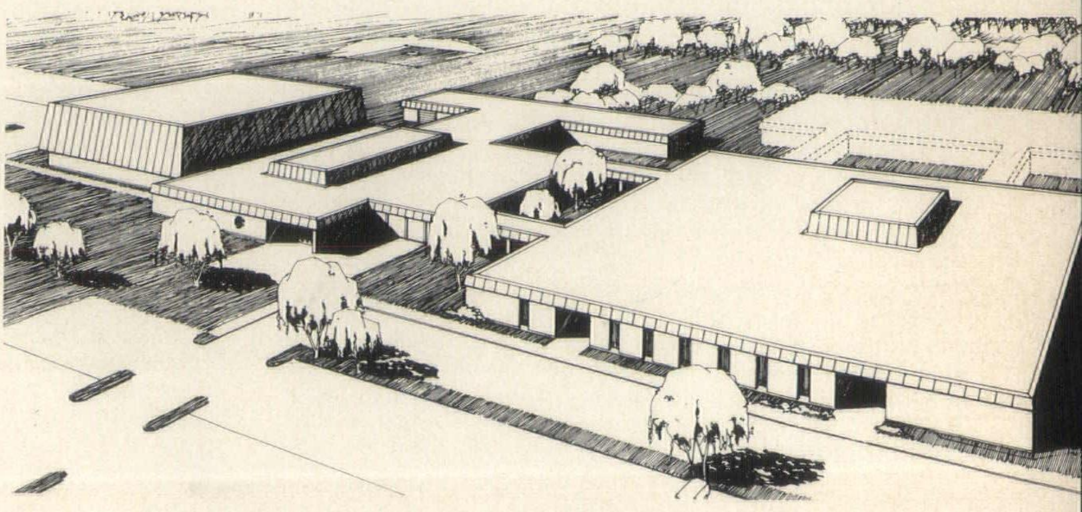
The economy in school buildings can be attributed to the careful planning of school board members, school officials at both the State and local levels, architects, engineers, and in many cases to local fiscal authorities. Realizing that the present and future needs for school buildings are enormous, they have planned together by looking carefully at the kind of space and equipment needed for effective teaching and learning. This cooperative planning has resulted, for the most part, in buildings constructed at reasonable costs which meet the essential needs of the educational program.

The question now is — how can we get **even more** for the school building dollar; or, as I would like to rephrase it — how can we get **more per dollar** out of **more** school building dollars? It should be pointed out also that we are not merely concerned with what it costs to construct a school building, but we are also concerned with its life span and what it costs to maintain and operate it throughout its useful life. And, it is not only what we **put into** a building that counts, but it is also what we **get out of it.** No matter how low the cost of a school building, if it does not serve its educational purpose as a functional facility, its cost will be excessive.

School administrators are seeking ways to reduce school plant costs, and some of them feel that substantial savings may be made by reducing the **cost of construction.** It is desirable to build school plants in an economical manner. However, all of the economy cannot come in construction. Many construction economies have been effected, and we may be approaching a minimum construction standard consistent with safety, function, and long-range economy. Studies of construction economies should be continued; but, at the same time, studies should be made of other factors in school plant costs. It is with these other factors that county commissioners, in their official capacities and as leaders in the

BROWNSTOWN CENTRAL COMMUNITY HIGH SCHOOL, Brownstown
Archts.: James Associates, Inc.
Gen. Con.: Repp & Mundt, Inc., Columbus

A junior-senior high school (grades 7-12) with compact academic wing and centrally-located library. In future expansion, junior high grades will be relocated in separate zone. Central court serves home ec and arts and crafts suites and connecting corridors, with cafeteria isolated to reduce sound transmission and to make facility available for community use. 3,000 seat gym designed for future expansion, and industrial and agricultural shops have direct outside entrances. Interior rooms, library, student and faculty lunch rooms, music department and administrative areas air-conditioned.



community, have the greatest opportunities to contribute to substantial savings in the costs of providing school facilities.

The following methods of effecting school building economies are suggested:

1. **Reduce the number of school districts**

Even though we have reduced the number of school districts in this country from approximately 63,000 in 1953-54 to about 40,000 now, we still have many small school districts. The Committee for Economic Development, in its publication **Paying for Better Schools**, recommends a further reduction to approximately 10,000.

During the school year 1956-57 more than 90% of the public school systems in the United States enrolled fewer than 1,200 pupils, and approximately 58% enrolled fewer than fifty students.

In any combining of districts, officials should make sure that all schools are brought up to a level equal to that of the best schools, or even higher. Merger of school districts cannot be justified on the basis of a leveling-out process that improves the quality of education for some children and impairs it for others.

The merging of school districts should result in the following benefits:

- Improved educational opportunities for a large part of the student population
- A broader and more nearly equalized base for financial support
- Reduced administrative costs in many districts. **Note:** very likely, costs will not be reduced by combining large districts as the administrative staff required after merging will probably be as large as the total of the districts before they were merged
- Simplified long-range planning — particularly along the fringe areas of a growing city.
- Improved plant maintenance. Since fewer maintenance men will be needed for a large school than for several small schools, the combining of schools will make money available to employ men skilled in plumbing, heating, electrical, painting, and other trades.
- Simplified and economical transportation of pupils. In numerous districts the school bus passes by a school in one district as it takes pupils to a school in another district, the one in which they live. This is costly not only in money but in time.
- Reduced cost of providing new school facilities.
- Reduced costs of operating school buildings.

2. **Reduce the number of small schools**

All recent significant studies have indicated that large schools can offer better educational programs at a more reasonable cost than small ones. This is particularly true of secondary schools.

The greatest value to be gained from carrying out this suggestion is the improved educational opportunities to boys and girls. Even though the small high school has a greater cost per pupil than the larger one, it is pretty much limited to offering college preparatory work, whereas the large high school has the potential of doing a better job of college preparatory and of preparing the large percentage of the high school graduates who do not go to college. A secondary value, but an important one, is the savings in capital outlay and in operating costs.

In consolidating schools, officials must exercise mature judgment to keep such mergers within practical limits. If geographical or other conditions make it necessary to maintain a small school, district officials should make a determined effort to enable it to offer the best possible opportunities to the pupils who attend it. Such a situation illustrates again the importance of having a broad base for financial support of the schools.

3. **Plan the organization of the schools and the building program to provide for future needs**

An outstanding educational consultant recently said, "The time to do a survey is when you think you don't need it." His statement illustrates the importance of having a definite plan prepared before you are confronted with the necessity of taking action.

Long-range plans should be reviewed frequently and modified to take into account changes in conditions which were not foreseen in the original planning. Buildings should not be constructed that will not be needed when the long-range plans have been realized. More money has probably been spent on buildings that should not have been constructed or were built larger than necessary than on so-called frills.

4. **Secure sites in areas of predicted population growth well in advance of the actual need for the building**

Selection of proper sites will be possible if an adequate job of long-range planning is done. After an area has developed, school sites are expensive and often difficult to secure without going through condemnation proceedings.

5. **Make the school part of a correlated community plan in order to get maximum usage from such facilities as auditoriums, libraries, gymnasiums, playgrounds, and shops**

Careful advance planning should be done by all interested parties in order that the scheduling of non-school activities will not interfere with school functions and in order to determine what portion of the total cost should be charged to the school.

6. **Avoid the use of stock plans**

The planning of each school building project is a different problem. Orientations are different; site topographies and shapes are different; access roads and streets are different; the availability and location of utilities are different. Most important, a school building should be designed to accommodate the educational program a particular community has determined it needs and wants. The building should also be a source of pride to the community.

The use of stock plans makes it next to impossible to properly utilize newly developed building materials and techniques. Adequate inspection of a building while it is under construction is of vital importance, and it should be inspected by the individual or firm who was responsible for its design. This would be impractical if stock plans were used.

7. **Choose professional help with care**

This applies to educational consultants, architects, engineers, and legal counsel. Complete plans and specifications which are easily understood usually result in more favorable bids. Adequate and thorough contract documents will reduce the inevitable change orders and extras.

8. **Seek standardization of component parts**

Savings can be realized from modular designs of recurring units. Avoid the necessity insofar as possible of having special fabrication work done in the field.

9. **Use materials obtainable near the project**

When practical, plan for the use of materials obtainable near the location of the project. The availability of craftsmen experienced in the installation of selected materials will have a bearing on the cost.

10. **Keep mechanical equipment in line with needs**

It appears that this is an area in which more money than necessary has been spent on school buildings during the past several years. Elaborate control systems are costly in the initial stage and expensive to maintain.

11. **Construct buildings of such quality that insurance, maintenance, operation, and replacement costs will be low**

A building of poor quality will be expensive to insure and to maintain, and the useful life of the building will be decreased. If it does not adequately accommodate the instructional program the cost of instruction will be increased, and the quality of the educational program will be diminished.

12. **Develop an adequate maintenance program**

Students can learn better and teachers can do a better job of teaching in an attractive, well-maintained environment. Good maintenance helps keep a healthful and pleasant environment for more productive learning and saves money in extending the time before major repairs or replacements must be made. It is foolish to build a million-dollar building and give it five-and ten-cent care.

A maintenance program, adequately staffed and equipped, should be developed and the jobs to be done regularly scheduled. Ample allowance should be made for emergency maintenance.

13. **Take bids at a favorable time**

The most favorable time to take bids depends upon several things. The location of the school, the number and size of competing projects, seasonal factors, and the general economic conditions all have their effects on costs. Timing of bid requests may be responsible for as great savings as any other economy measure.

14. **Schedule for full utilization of the building**

Colleges and universities in particular have been subject to recent criticism because it has been reported that their facilities were not fully utilized. Perhaps to a lesser extent, the same might be said of some of our secondary plants. Full utilization may mean rescheduling to the end that each teaching space is used throughout the school day. It may mean an extended school year which many of our secondary schools already have in the form of summer sessions. In any event, the extent to which our present facilities and those being planned are and will be utilized should be carefully studied. This is an area in which there could well be some carefully planned experimentation.

15. **Finance, within means, on a pay-as-you-go basis**

A long-range plan of financing needed school facilities should be developed. It may be necessary, particularly to take care of the backlog of school building needs, to receive the funds required through the sale of bonds. It would seem wise to finance school building needs resulting from population growth from annual capital outlay levies.

In counties of low valuation, a capital outlay levy at a reasonable rate would not produce sufficient funds in any one year to construct a building of any size. In such cases, a capital reserve fund, which could not be used for other purposes, should be accumulated until it is of sufficient size to do an adequate job of constructing a needed school facility.

16. **Watch the bond market for a favorable time to sell bonds**

Selling bonds at a reduction in rate of even one-half percent will make a very substantial difference in the total cost over the period of time for which the bonds are issued.

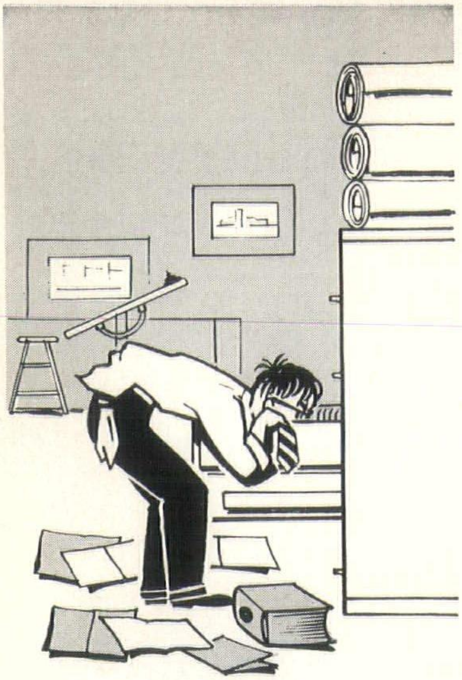
17. **Whenever possible, have school facilities ready when they are needed**

Increase in the cost of construction has averaged from 2 to 3% per year over the past several years.

Conclusion:

Rapid advances in the development of new building materials and techniques and in improved design during the next few years will enable us to get better school plants for the money we invest. It is doubtful, however, that we can make any substantial savings in the cost of constructing a school building. Improvements will be made in teaching techniques and in instructional aids, but it is unlikely that we can reduce the cost of instruction. There is one thing we can do with better facilities and better techniques: We can improve the quality of education.

Charles F Carroll, State Superintendent of Public Instruction in North Carolina, has very appropriately said: "The heaviest and most burdensome tax we can pay is the tax on ignorance." We cannot afford ignorance. We can afford education.



LOT GREEN

Architecture in the News

Lot Green, AIA, engineering vice-president of Eli Lilly and Company, died of a heart attack at his home in Indianapolis, Sunday, January 26. He was sixty years old, and had been with the company twenty-nine years.

Some 800 persons, including more than sixty engineers, were under Mr. Green's direction. He became vice-president in March, 1960. A registered architect, he had been manager of engineering in 1950, director in 1951, and executive director in 1959. He was elected to the Lilly Board of Directors in March, 1961.

Born in Indianapolis January 4, 1904, Lot Green was educated in the city schools, being graduated from Arsenal Technical High School in 1921. He attended Ohio State University, leaving there in 1926 to work full time for Indianapolis architectural firms. Over the next eight years he worked for several firms, including McGuire & Shook, J. Edwin Kopf & Deery, Fred Wallick, and Edward D. James.

In October, 1934, Mr. Green joined Eli Lilly and Company as a draftsman in the plant design and development department. In 1937, he became a registered architect and advanced at the company to architectural engineer and head of the construction department.

Mr. Green is survived by the widow, Mary Stevenson Green, and three daughters: Mrs. M. E. Bridgewater, Zionsville, Indiana; Mrs. Donald LaFollette, New Albany, Indiana; and Mrs. H. W. Baker, Philadelphia, Pennsylvania.

He was a member of the Indiana Society of Architects, the American Institute of Architects, Marion Lodge No. 35, F. & A.M., Scottish Rite, the Indianapolis Chamber of Commerce (serving on the Industrial Development Committee), the Wesley Methodist Church, and Alpha Rho Chi, professional architecture fraternity.

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John C. Fleck, AIA, James W. Burkart, and Clyde C. Shropshire, AIA, have announced their establishment in Indianapolis of a partnership for the professional practice of architecture. The firm, Fleck, Burkart & Shropshire, is located at 5255 N. Tacoma Avenue.

All three principals are registered architects in Indiana, and Mr. Burkart is also registered in Ohio. Mr. Fleck is currently chairman of the Indiana Society's Governmental Relations Committee, a chairmanship which he has held for the past four years. Under his guidance, the Indiana State Architectural Registration Act was amended several years ago, as well as several other pieces of important legislation. He serves as one of the ISA's representatives on the Building Congress of Indiana.

Mr. Shropshire is also a member of the Indiana Society and the American Institute of Architects, and Mr. Burkart has a membership application pending.

All three formerly headed the architectural division of Fleck, Quebe & Reid, Indianapolis, where Mr. Fleck was vice-president and principal architect for nine years.

Architectural design contracts executed under their direction at Fleck, Quebe & Reid totaled over $60-million, and included work for Indiana University (University Hospital and the Student Health Center at Bloomington and the Riley Hospital Surgical Addition in Indianapolis), the State of Indiana, Indiana National Guard, Indianapolis School Board (Public Schools 92, 101 and 103, and the music addition to Shortridge High School), high schools for Perry Township and Beech Grove, the Noblesville Methodist Church, Holiday Inn East Motel, the Indianapolis Zoo currently under construction for the Indianapolis Zoological Society, a factory and office building for Dura-Containers, Inc., and several projects for the Chicago District, Corps of Engineers.

The architectural practice of the new partnership will be general in scope, and will not be limited to any specific type of work.

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Wayne M. Weber, AIA, of Terre Haute, has been appointed a full member of the national AIA Committee on Educational Facilities. He formerly served (for the past two years) as a corresponding member. The first committee meeting this year is being held this month in Atlantic City, New Jersey.

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Mr. Edward D. James, FAIA, founder and for many years president of James Associates, Indianapolis architects, relinquished the duties of president of the firm effective January 1st to devote his full attention to duties as chairman of the board of directors.

Extremely active in the profession for many years, Mr. James was honored with Fellowship in The Institute several years ago in recognition of his outstanding service, both to the profession and to the public. He has just completed a three-year appointment on the Indiana State Board of Registration for Architects, serving as chairman of the Board last year.

Under his guidance, James Associates has become one of the major architectural firms in Indiana and the Midwest, creating many outstanding public, religious, and educational buildings, as well as office and commercial buildings and private residences. Mr. James is perhaps best known for his work at Indiana University at Bloomington, where he designed all campus housing projects since the Second World War.

As chairman of the Board, he will be afforded additional time to pursue activities outside the firm yet maintain his interest and responsibilities in the firm's work at Indiana University and other projects requiring his personal attention.

Steve James, ISA Associate, was elected president of the firm; Marion Williams, AIA, is a vice-president and secretary, and H. Roll McLaughlin, AIA, is a vice-president and assistant secretary and treasurer.

Other vice-presidents of the firm include Forrest Camplin, AIA, Thomas C. Dorste, AIA, Norman H. Jeffries, AIA, David O. Meeker, AIA, David F. Snyder, AIA, Raymond S. Thompson, AIA, James D. Woods, AIA, and Howard L. White, AIA.

* * *

David J. Albright, AIA, of Bloomington, has announced the reorganization of his firm from Albright, Stipp and Associates to David J. Albright & Associates, Architects.

The new firm will maintain its offices at 528 North Walnut Street, Bloomington.

* * *

Donald E. Compton, AIA, and Gilbert T. Richey, AIA, senior partners in the architectural firm of McGuire, Shook, Compton, Richey and Associates, announced the incorporation of the firm under the new name of McGuire, Shook, Compton, Richey, Inc.

Mr. Compton is president of the new corporation, and Mr. Richey is secretary-treasurer. Arthur L. Burns, AIA, Donald E. Clark, AIA, Gilbert K. Jacobs, AIA, and George R. West, AIA, are all vice-presidents.

The original firm was established in 1916, and has been responsible for the design of schools, hospitals, churches, institutional and commercial buildings throughout the state. Current contracts include the proposed expansion program at Marion County General Hospital, the Marion County Jail (in collaboration with Bohlen & Burns), and other major projects throughout the state.

* * *

Henry McKinley, AIA, has been named executive director of engineering for Eli Lilly and Company, succeeding Mr. Lot Green.

Mr. McKinley has been director of the engineering staff at Lilly's since 1955 and has been with the company since 1946. He is a graduate of the University of Illinois and served in the U.S. Corps of Engineers for four years during World War II.

* * *

Dudley J. Sennefeld, ISA Junior Associate Member, has joined the Indianapolis architectural firm of Tislow, Hunter & Associates. Mr. Sennefeld formerly was with James Associates for five years, both before and after service in the Navy Seabees and schooling at Purdue University.

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Mr. Ralph W. Walb, president of General Dredging Company at Fort Wayne, was elected president of the National Concrete Masonry Association at NCMA's annual national convention in Atlantic City, January 18-23.

Mr. Walb is past president of the Indiana Concrete Masonry Association, and former NCMA vice-president for Region 6.

New Tracks with Haydite

Long familiar to architects and the construction industry as lightweight aggregate for concrete blocks and lightweight structural concrete, Haydite recently has found an additional and interesting application in the construction of running tracks.

Traditionally running tracks have been constructed, to varying degrees of perfection, with compacted cinders, a hold-over from the days when everyone had cinders to burn. In recent years, however, the percentage of cinder-producing, coal-fired heating systems has been substantially reduced, thereby reducing the supply of cinders.

Also, experiments and tests conducted at Purdue University in Lafayette and elsewhere around the country continued to show that cinders as a track base had several unfortunate features in addition to scarcity. Cinders are basically porous and will break down under the usual use of running and rolling, freezing and thawing. The cinder is in a perpetual state of disintegration.

Haydite, a ground shale fired at very high temperature, was first used at Purdue as a substitute for cinders starting with a track improvement program in 1956. The program was completed in 1958, and in May of that year, the Big 10 Championship Track Meet was held on the track. Sample speeds included the 100-yd. Dash won at :09.6, and the Mile at 4:09.6. And on the day before the meet, the Weather Bureau at Lafayette recorded a 2½-inch rainfall!

Even more importantly, this track was only three inches deep and built directly on a sand-gravel base only four inches deep, without drain tile.

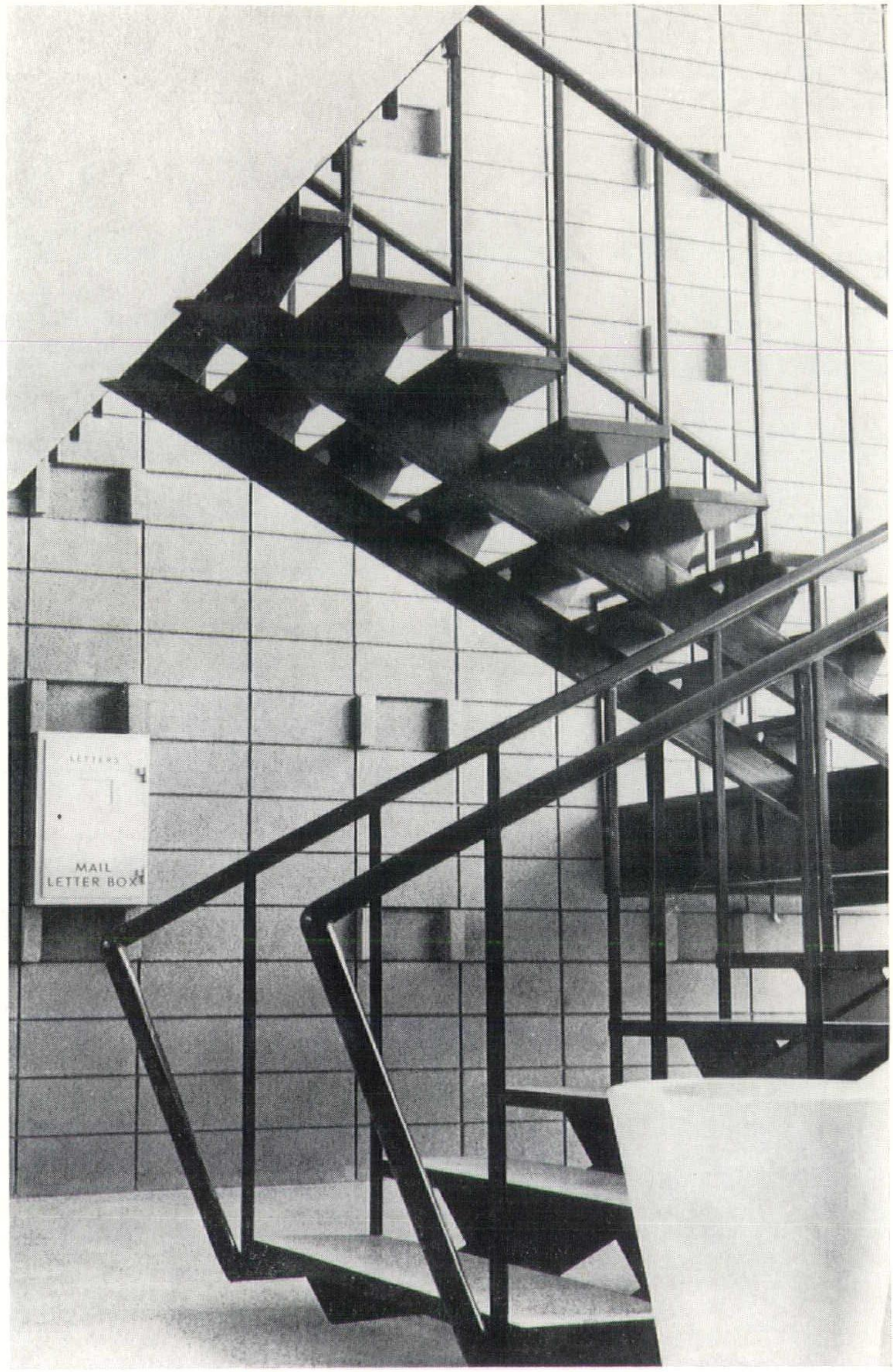
From these experiments, several recommendations were developed for the construction of good Haydite-clay running tracks, such as the one currently under construction at Perry Township High School.

Of prime importance is the curbing, popularly reinforced, air-entrained concrete 4-inches wide and eighteen inches deep, with the outer curbing lower than the inner curbing, directing surface water to the outside of the oval. Outlets every 15 to 20 feet along the outer curbing prevent the water from standing on the track, and the best lanes will be those nearest the inside—the most used lanes. Although no drains are used under this type track, it is wise to drain the infield so that water won't be trapped inside the oval, and drains can be added around the outside if desired.

The base course for the new track may be of sand, or gravel passing a ½ inch sieve. The Haydite for the track surface should be roughly ¼ inch and is mixed with clay in a proportion which will give the best compaction. Incidentally, not all clay makes a good binder, and the proposed clay should be tested as to plasticity and grain size.

The mixture should be placed in layers, the first about two inches in depth, leveled with an ordinary wooden float, and should be placed on consecutive days. The final inch or so should be put on by hand shoveling in a fanning manner, and the surface carefully checked to avoid lows and highs. Brushing and rolling complete the operation.

If properly maintained and used, the track surface can be kept in excellent shape without major renovation. Ideally, the track should be run on daily, as it will keep the surface moderately torn up and well mixed, and the track should be brushed and rolled every morning, thus healing it back into a firm surface.



no

Neither termites, nor pests, nor vermin of any kind can penetrate a wall built of durable concrete block. Its barriers are insurmountable to insect denizens.

Of course, this is simply another of the multitude of advantages offered by this versatile material. In fact, modern architects are freshly discovering and investigating the possibilities of concrete masonry. Their efforts have virtually turned it into a new building medium.

Today's concrete masonry offers structural durability, excellent insulating qualities, and above all, an exciting creative challenge.

When all is said and done, its only disadvantage seems to be its complete indigestibility.

Indiana Concrete Masonry Association, Inc.

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