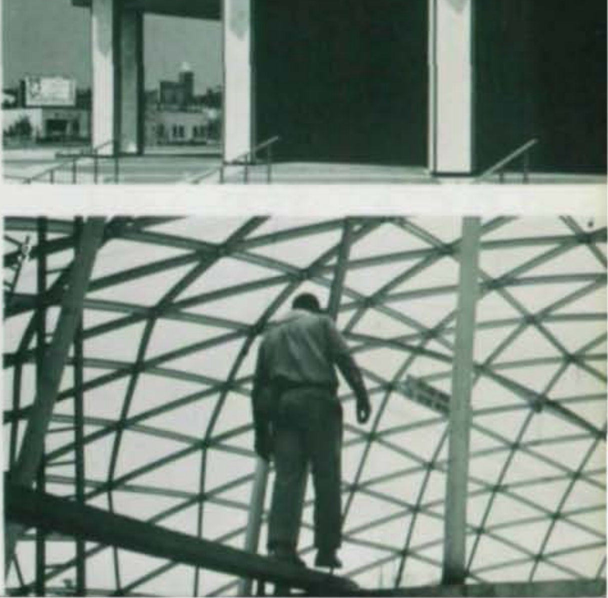
VOLUME V / NUMBER 2 / SECOND QUARTER 1965

MODERN STEEL CONSTRUCTION



MODERN STEEL CONSTRUCTION

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VOLUME V / NUMBER 2 / SECOND QUARTER 1965

CONTENTS

Third Annual Fellowship Awards

Three young men have been named as winners in the AISC Third Annual Fellowship Awards program. The awards, valued at $2,000 each, are made on the basis of choice of research projects, undergraduate performance, and recommendation of college authorities. This program, one of the few offering fellowships in structural research, is intended to encourage research in the field of structural engineering.

David L. Cute of Belmont Hills, Pennsylvania, a senior at Drexel Institute of Technology, Florida, will continue his graduate work there. His research project will entail a study of rigid connections for rectangular and square tubular members fabricated by welding and a combination of welding and bondering.

David M. Harris of Houston, Texas, is a senior at the University of Houston where he will continue his graduate work. Mr. Harris will analyze and test the action of welded tapered beams and columns under combined axial and bending loads.

William C. Russell of Gaston, Oregon, is a senior at Oregon State University, Corvallis, and will continue his research work investigating the effect of unreinforced rectangular holes in the web of welded girders designed by means of a "Vierendeel" type analysis.

The Institute plans to make additional Fellowship Awards annually on a continuing basis.

SIU ARENA on Southern Illinois University campus at Carbondale, which will seat more than 10,000 people for sports and other gatherings. Steel was decided upon by architects for the superstructure because of cost control, bidding competition, and time element factors.

Architects: Perkins & Will

A MULTI-PURPOSE ARENA FOR SIU

Southern Illinois University's gigantic Arena, which will accommodate more than 10,000 persons, did not come too soon for the nearly 14,000 students on its Carbondale campus.

Previously no building was available where more than 2,000 people could gather. The campus had outgrown its facilities for indoor commencement exercises, for programs featuring nationally known artists and personalities, and indoor sports events such as basketball.

So late in 1961 bids were opened for construction of a new physical education and military training building – later officially named the SIU Arena – that would include a domed structure 300 feet in diameter with a roof covering four acres. It could be used for large convocations of any type, for basketball games, and for gymnastic and wrestling meets. And steel did its part to hasten the structure.

When specifications were drawn for the bidders, University architects and the Chicago firm of architects, Perkins and Will, decided that the dome's superstructure should be formed of steel.

"Since the building as conceived was to be half in the ground and half out of it," said John A. Boyce of Perkins and Will, "it was foreseen that grading, ex-

Seating More than 10,000 People, This Arena Is Being Used for a Variety of University Functions.

cavation, foundations and substructures would be extensive and would require an unusual proportion of the building construction time. It was, therefore, especially desirable that the structure be formed of readily available standard elements which lend themselves to speedy erection using familiar methods."

University architects said the eventual decision to base the design of the building on the use of a low ring dome framed of steel was developed from several considerations, including cost control, bidding competition and early completion which was so essential because of spiraling enrollments.

They explained that the cost experience with steel dome structures was readily available while other materials and structures lacked equivalent prototypes which could act as a guide to probable costs.

As to bidding competition, it was important that the number of potential bidders qualified for such work be relatively large, in order to gain the most from the competitive bidding procedure required. Reliance on structural systems using special procedures, experimental techniques, novel materials, or unusual engineering methods was therefore not desirable for this building.

A half-dozen major events were held in the $4.3 million Arena before contractors had finished all phases of the project. Although the huge dome was generally regarded as the site of sports events, all six events were of a nonathletic nature. The Arena was hurriedly pressed into service in June, 1964, when planned outdoor commencement exercises, facing a threat of rain, were moved into the Arena. The August commencement was also held there, and fall enrollment registration was conducted on the vast concourse above the gym floor. Since August, major events included a political rally featuring a national candidate, the fall meeting of the Southern Division of the Illinois Education Association, and the annual Homecoming show.

Main feature of the imposing structure is the 300-foot clear-span dome covering a recessed arena with a free-floor area slightly larger than 200 feet long and 100 feet wide. There is seating for 10,014, including 2,482 chair seats. All bleachers are the foldaway type, located at both ends of the playing floor and completely around the concourse.

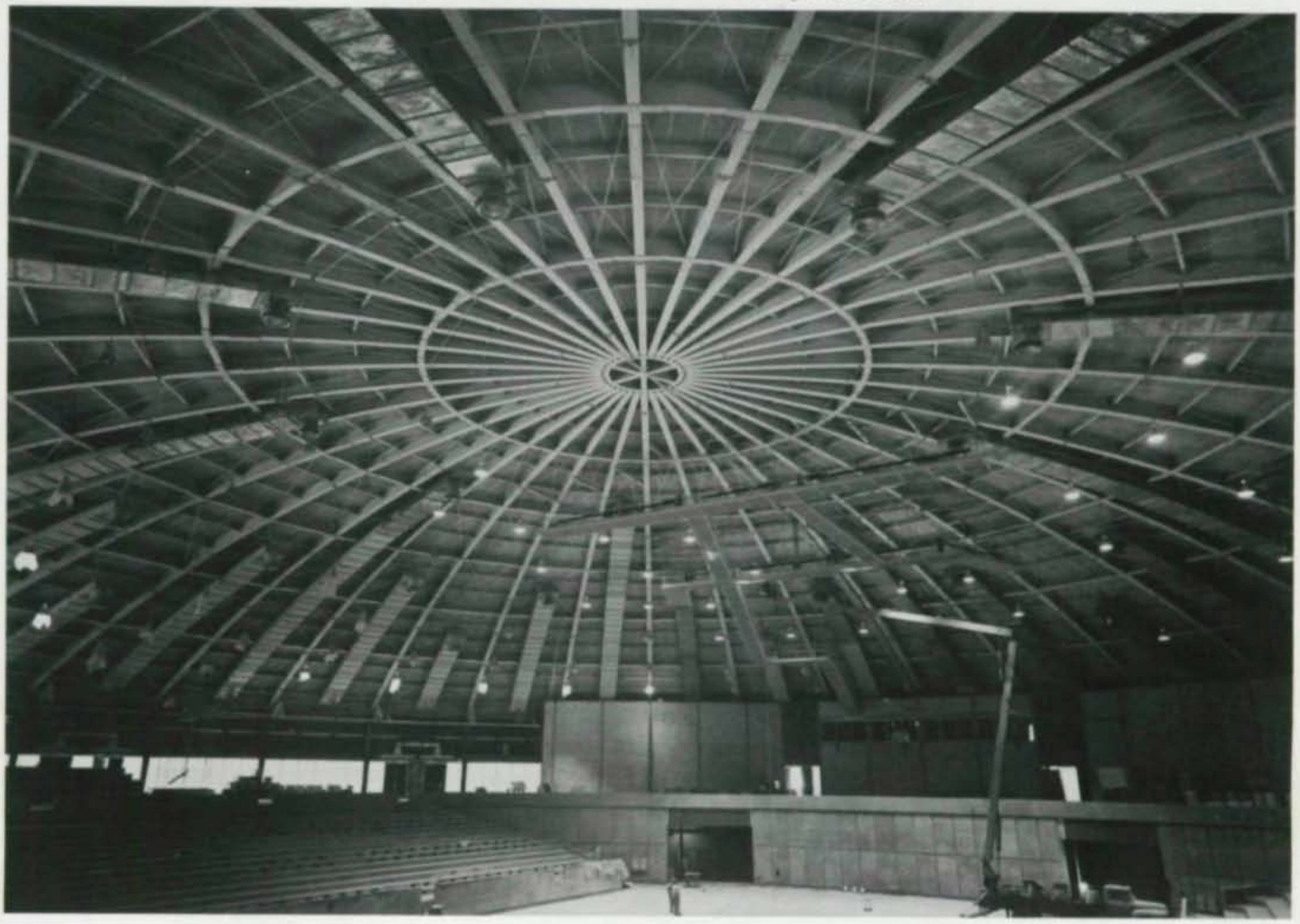
The dome area has a circular framework of 36 main steel ribs with I-beam rings and sway bracing that connect. Ribs are joined at the Crown with an eight-foot compression ring. A steel I-beam tension ring built with the other steel construction forms the outside perimeter of the structure to take the lateral thrusts of the dome ribs.

The roof is covered with hundreds of panels made of cement and wood fibre, eight feet long, 32 inches wide and weighing 210 pounds each. These panels, first mortared with gypsum, were covered with asphalt, after which the roof was sprayed with a glass fibre that gives it an earthy color. Crown of the dome rises 72 feet above the gym floor.

Exterior is chiefly aluminum and translucent plastic panels. Some brick has been utilized and Crab Orchard stone decorates entrances.

A wing adjoining the dome contains office and classroom space for physical education, locker and training rooms, storage space, and dressing rooms for athletes.

Thirty Six Steel Ribs Provide Framework for the Dome.



ATLANTIC — ON THE GO

How would you design a service station that is dramatic enough to attract passing motorists; dignified enough to inspire strong customer confidence, and so efficient, a half-dozen cars can be serviced with ease at the same time?

That was the thorny problem tossed onto architect Vincent G. Kling's drawing board by the Atlantic Refining Company, a Philadelphia-based petroleum firm. The answer you see on these pages may prove to be another landmark in design for the award-winning Kling.

The triangular form of the Bala, Pennsylvania, station resulted, said Kling, "from a detailed study of the image which various shapes project to a motorist rolling by at high speed." The three-sided roof and "ATLANTIC" signs are clearly visible from all approaches. And since the pyramidal structure is 36 feet high, it's unlikely a driver could miss it, even from behind a line of cars and trucks jammed up in traffic.

Perhaps the most striking sight is the roof itself. This was designed by angularly stepping down white, porcelain-enamel steel panels over steel framing. Sharp, red letters on white-background signs atop the structure stand out unmistakeably.* But they do so with reserve enough that the concept of a prestige station is unruffled.

Architect Kling and Atlantic considered the dignified approach important for the corporate image, but also because the station has become the southernmost "anchor" for a major, established shopping center. Blending it aesthetically with the community was one of the original design goals.

Continuing, Kling said, "The pyramidal shape proved most effective, and at the same time made it possible to utilize every square foot of interior space. It also allowed optimum use of the driveway around the structure. The triangular plan allowed us to withdraw the massiveness of the building from the intersection, so that only the forward point of the triangle projects, leaving the major portion of the site as an open approach plaza for cars."

Steel framing gave Kling the freedom to face the two forward walls of the triangle with floor-to-ceiling glass. (In today's service station, unlimited visibility **into** the structure is a sales advantage, both for the items displayed inside and for the station as a whole.)

Set on a 150′ x 183′ site at City Line Avenue and Conshohocken State Road, the gleaming white station measures 93′ 9″ on each side of its equilateral sides. It's the largest station ever constructed by Atlantic. At night (and it's open 24 hours each day), concealed fluorescent lights flood the diamond-grid roof and three-sided sign.

There are three gasoline service islands around it. Each is equipped with two multiple pumping units, full-length indirect lighting — also designed by Kling — and illuminated showcases for displaying motor oil and accessory products. A fourth, smaller service island has one pump, and features a long-hosed vacuum cleaner to whisk the interiors of cars.

Because there are considerable power demands, the station has its own electrical substation, behind which is hidden space for trash storage.

*The signs also neatly shield the cooling tower for the air conditioning system serving the sales and rest room areas.

Above the rest rooms and vending machines is a small mezzanine, reached by stairs from the lubrication area. On it are the operator's office, storage space for small parts, and equipment for air conditioning and oil heating.

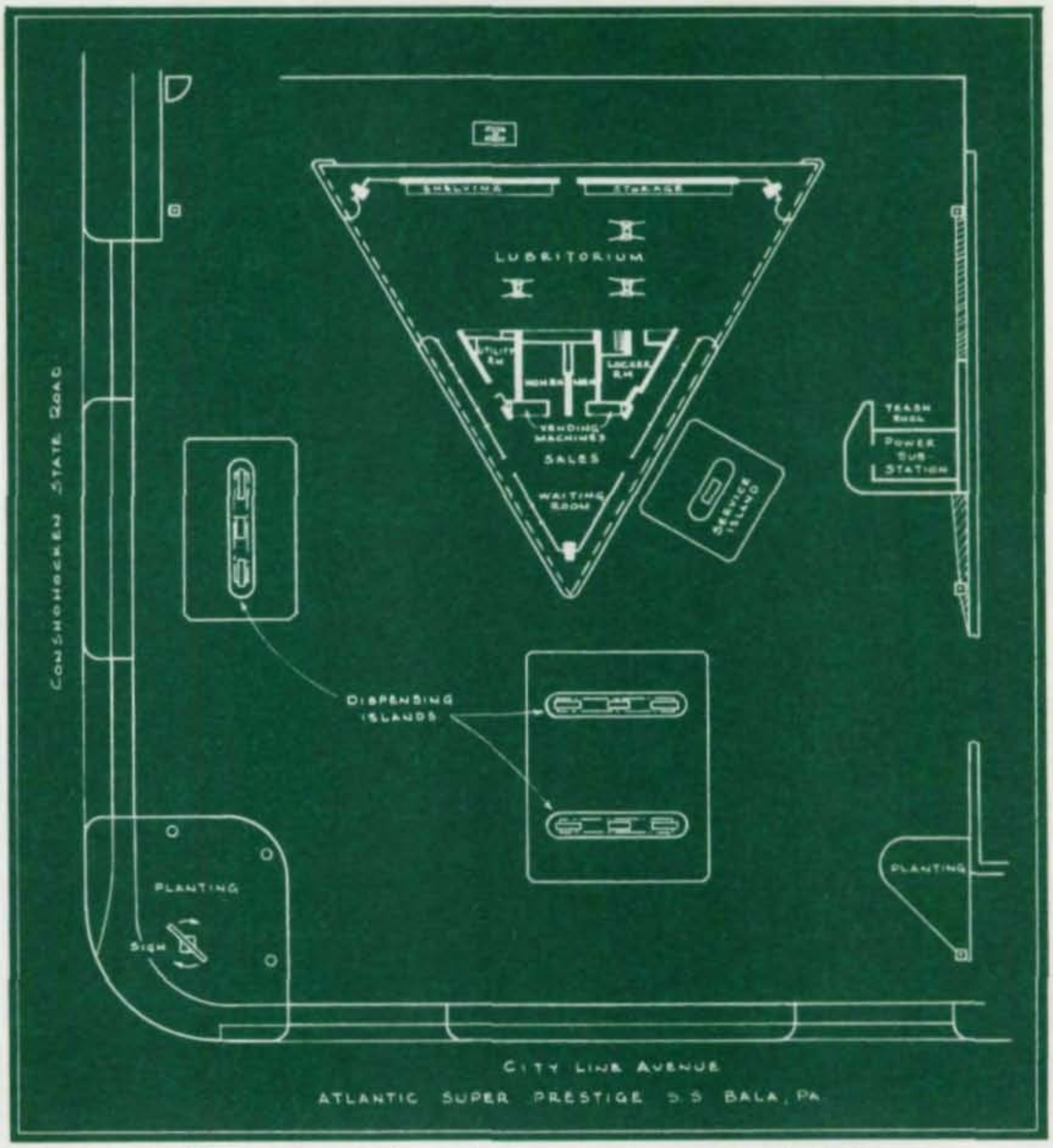
The lubritorium, so-called, has three auto lifts. A fourth is behind the building.

Kling points out that the design of all accessory facilities – gasoline islands, substation, signs, lights – "were coordinated to carry out and complement the visual impact of the pyramid form. The station and island were located to conserve as much space as possible for movement and parking of autos, and to accommodate natural patterns of traffic flow so that motorists can enter and leave with ease."

The lubritorium has storage racks and cabinets for tires and other accessories along two sides. The end (entry) walls are made up of banks of sliding glass doors which telescope horizontally into the walls.

In addition to the three-sided sign on top of the building, there is only one other major sign: a 25'-high, internally illuminated, rotating Atlantic sign. The sign itself is approximately 6' high and 10' wide. Beneath it, and in several other perimeter areas are landscaped plantings. The station was built by Wallace Engineering & Construction Company, Bryn Mawr, Pennsylvania.

Architect: Vincent G. Kling



Unusual Layout is Dramatic, Conserves Space and Speeds Traffic.

PATTERNS IN STEEL ALONG

Outward Cantilevering Provides Easy Transition from Building to its Foundation.

by Bernard Grad

A lightweight steel cage was chosen for the 13-story Labor & Industry Building, the tallest in Trenton, on the basis of three primary considerations:

a. Foundation Problems
b. Flexibility.
c. Esthetic potential.

The eight-acre tract, on a 25-acre site selected by the State of New Jersey for the State Capitol Development Program, faces the Delaware River and is traversed by Assunpink Creek, which empties into the river. Periodic unavoidable flood conditions cause the river to back into the creek creating subterranean influxes of water. As a result, the Labor & Industry Building was erected on piles, driven thirty feet below the level of the river bed into bedrock.

Engineering investigations indicated that the structural frame, to be imposed

Bernard J. Grad, F.A.I.A., is with Frank Grad & Sons, Architects & Engineers, Newark, New Jersey.

on the piles, must be of the lightest weight consistent with strength and stability. Therefore, a 4,000-ton steel cage was adopted for the rectangular structure, which measures 137 x 249 feet, and has an average wall height of 180 feet. Its volume is approximately 6,500,000 cubic feet, and floor area totals 470,000 square feet.

The site characteristics ruled out a conventional basement, so that the first floor is largely absorbed by the mechanical equipment. A minimum basement space for storage and maintenance workshops is provided by a 56-inch-thick floor of reinforced concrete set three feet higher than the record flood-level of the river, which flows some 150 feet east of the building. The concrete floor and walls are heavily strengthened with steel reinforcing bars. They form, in effect, a concrete boat anchored, to resist hydrostatic pressure based on a theoretical flood-level, twelve feet above the basement floor. It is supported on 276 steel piles of 14- and 8-inch H columns with individual minimum bearing-capacity of 119 tons.

The Folded-plate Expression of the Roofline Softens the Mass Dominating the City's Silhouette As it Meets the Sky.

THE DELAWARE

The first floor and its ceiling are of concrete, and houses the mechanical equipment. (The boiler plant is designed also to serve future buildings in the planned complex through lines contained in a pedestrian tunnel connecting the buildings.) At the second-floor level, exterior steel columns running to the top of the structure are supported on steel cantilevers. These are cantilevered out to articulate the volume of the building, and produce a visually lighter mass.

The building is framed by steel columns spaced in 22½-foot-square bays developed from a 4½-foot-square module with integrated mechanical and lighting design, which was considered the most efficient for illumination and partitioning. Each module contains a continuous row of two- or three-tube recessed fluorescent lighting fixtures.

The frame made it possible for the architects to design the air-handling system as an integral part of the building. Its risers are incorporated in the design of each exterior column, and are fed from a huge horizontal loop supply at the second-floor level. In addition to the perimeter air-conditioning, low-pressure units on the ground-level and the top-level equipment-floor supply the interior areas of the building.

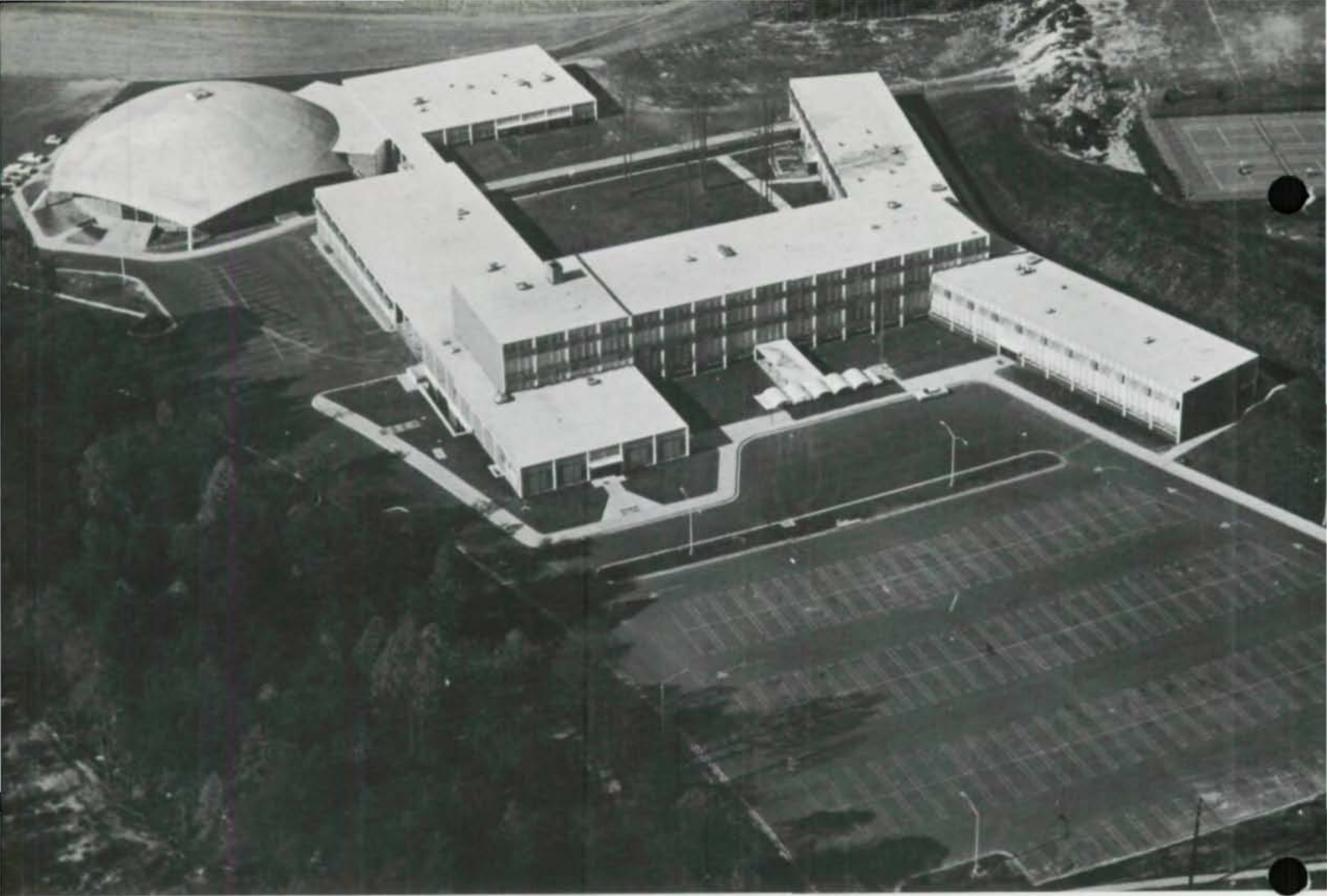
The frame also made possible the installation of cellular steel floors, giving added flexibility to the finished office space. The floors consist of cellular decking of light-gauge steel forming a structural section supporting the floor load. At six-inch intervals the sheets form cells providing channels for power, telephone and signal-system wiring, and resulting in greater freedom in placing outlets for desks and office equipment. Movable partitions divide the floor areas into office spaces. The use of steel anticipates future changes in needs by allowing the greatest liberty in relocating air diffusers and lighting fixtures, as well as partitions.

Esthetically, the steel frame made possible the creation of a graceful, light-looking building. Stainless steel was specified for all entry and elevator doors, and all exterior first-floor metal work because of its beauty as well as its durability. The recessing of the first-floor area, and the outward cantilevering beyond its supports, effect a visually light transition to the ground, and clearly implies the difference in function between it and the office floors.

The feeling of the delicacy and grace of steel is carried out in the exterior walls. White marble-sheathed columns and black glazed brick surround the windowless first-floor mechanical area. The vertical exterior columns soaring from the cantilevers are clad in aluminum, and separated by heat-absorbing, glare-resistant tinted plateglass, and by marble spandrel panels.

Designed to efficiently and economically centralize the previously dispersed offices and activities of the State Department of Labor and Industry, the building has a capacity of 2,000 employees, with allowance for anticipated future expansion. The second floor houses a 500-seat cafeteria and offices. General offices occupy the third through twelfth floors. On the thirteenth floor are executive offices and a large meeting room, and on the level above is mechancial equipment.

The Labor & Industry Building is the first project to be completed by Frank Grad & Sons in the State Capitol Development Program, for which the firm is the master planner. Another Grad design for the program, the four-unit Cultural Center, is currently under construction.



GEODESIC DOME WINS BIDDING COMPETITION

R. Buckminster Fuller's brainchild, the geodesic dome, has been getting a practical workout in a host of structures today – among them, the Union Tank Car Company roundhouse at Baton Rouge, Louisiana, and the observatory at Mt. Washington in New Hampshire. Now a new one has been added to the list. It soars over the Physical education facilities at Walt Whitman High School in Bethesda, Maryland.

The dome solved some fundamental space problems, turned out to be less expensive than the bid for a conventional gymnasium, and the whole project came into being in rather a unique way.

To begin, the firm of McLeod and Ferrara, Architects, A.I.A., was awarded the contract to design the school, in toto. When the award was made, the superintendent of schools, Dr. C. Taylor Whittier, asked the architects to try and develop a better solution for physical education facilities indoors. As time wore on, the architects became more and more interested in using a geodesic dome to break out of the conventional, rectangular mold for gymnasiums. But it became increasingly apparent that the school board could not venture into untested territory without a clear idea of costs. And a true picture of costs was virtually out of the question unless comparative bids were made on the conventional gym vs. the geodesic field house. And that would take money.

Since such a study might benefit school construction throughout the nation, the board and the architects went to Educational Facilities Laboratories and its president, Harold Gores. EFL proved a willing and enthusiastic sponsor, and after several standard-setting sessions among all parties involved, funds were advanced, and the project began to roll.

One of the first things McLeod and Ferrara did was to retain Synergetics, Inc., of Raleigh, North Carolina – the firm that Fuller established to carry out the design of his geodesic structure. James W. Fitzgibbon, T. C. Howard, and J. F. Barnwell of Synergetics worked closely with the architects and with J. Gibson Wilson, consulting structural engineer on the job.

According to the architects' report, published by EFL, "The seemingly simple question of establishing the size of the dome structure was one of the first problems tackled. Criteria established for the comparative study required that space and activity areas be as nearly identical as possible, and that total aggregate space be nearly the same.

"The conventional gymnasium was designed as a two-floor structure, with playing areas above and showers and lockers below. Floor area for the two levels came to 31,586 square feet.... The geodesic field house, as finally designed, contains 35,800 square feet, or some 4,200 square feet more than the gymnasium gross floor area.

"From the many design studies and cost analyses made by Synergetics, Inc., for the dome superstructure, the most practical and economical type appeared to be the combination of a structural steel framing system, covered with a gypsum roof deck and composition roof covering.

"The structural steel framing was left exposed on the underside of the roof, thus giving a honeycomb effect to the dome ceiling. This arrangement, creating a whole series of coffers at the ceiling, together with the use of acoustical panelboard as forming for the gypsum deck, will help offset some of the acoustical difficulties inherent in a hemispherical shape."

At this point, eight contractors were asked to bid on the school as a whole, with a special take-out on the gym and field house, itemized to show exact differences. Merando, Inc., of Washington, D. C., was low bidder and won the job. Its comparison between gym and field house resulted in a $6,087 saving for the field house at a total cost of $583,674.

It should be explained that three of the eight contractors estimated that the field house would be more costly than the gym. Despite this, the architects and EFL were encouraged enough to believe that costs would be lower for some future geodesic dome project that utilized steel in this way.

Thus the field house proved a success in saving the school board money and delivering more usable interior space. Was it a success in other ways? The answer seems to be, yes. For example, while the playing floor itself is somewhat smaller in the field house than it would have been in the gym, the large side and rear areas of the raised deck around the room permit many group activities to be carried on simultaneously.

In addition, the field house provides seating for 1,000 more spectators, and can accommodate a total of 3,500 persons when the area is converted to auditorium use. One of the primary advantages from EFL's point of view is the fact that interior space is unmarked by structural supports. As it reports:

"Whatever barriers are placed within the structure can be dictated by the physical education program, not by the need for holding up the roof. The mutable interior space of the dome offers freedom of movement for both program and occupants.

"Whatever the nature of physical edu-

A Study in Patterns as the 8B10 Geodesic Grid Members Near Final Erection.

cation is in this century and the next, the dome should be adaptable enough to accommodate it."

Highlights of the dome design: because the dome is rather a complicated structure, Synergetics' staff engineer, Dr. M. E. Uyanik, agreed to explain its design and outstanding features. The following are Dr. Uyanik's comments.

"The structure is a spherical dome with a fine geodesic grid framing supported by a ring of columns and a tension ring at the column tops. The frame extends into five edge arches constituting the edge boundaries of the geodesic framing. These arches are, in turn, supported by five piers extended to the spread footings connected by tie rods; thus constituting a pentagonal foundation layout.

"A 2"-thick structural gypsum deck on bulb tees, cast on 1¼" form boards, provides insulation as well as forming a thin shell that supports the dead load of the built-up roofing and all other live loads, including the wind stresses above the tension ring.

"The gypsum deck was poured out of a gyp-concrete mix with a guaranteed compressive strength of 1,000 psi. This was reinforced with 10-gauge wire mesh increasing in thickness from 2" to 3". There was an additional increase in steel reinforcing to provide for the boundary bending stresses at the tension ring level. Making the gypsum deck a part of the structural system reduced the structural requirement of the steel geodesic framing (resulting in considerable economy.)

"The geodesic steel framing, due to the fineness of its grid, was analyzed on the theory of membrane behavior, with axial stresses computed from components of the membrane stresses within the effective area of each steel framing member. All the members of the steel geodesic grid are of one size (8B10), since change in stress from zenith to boundary is very small. Any change in member size would have resulted in additional cost for detailing, and in erection procedures.

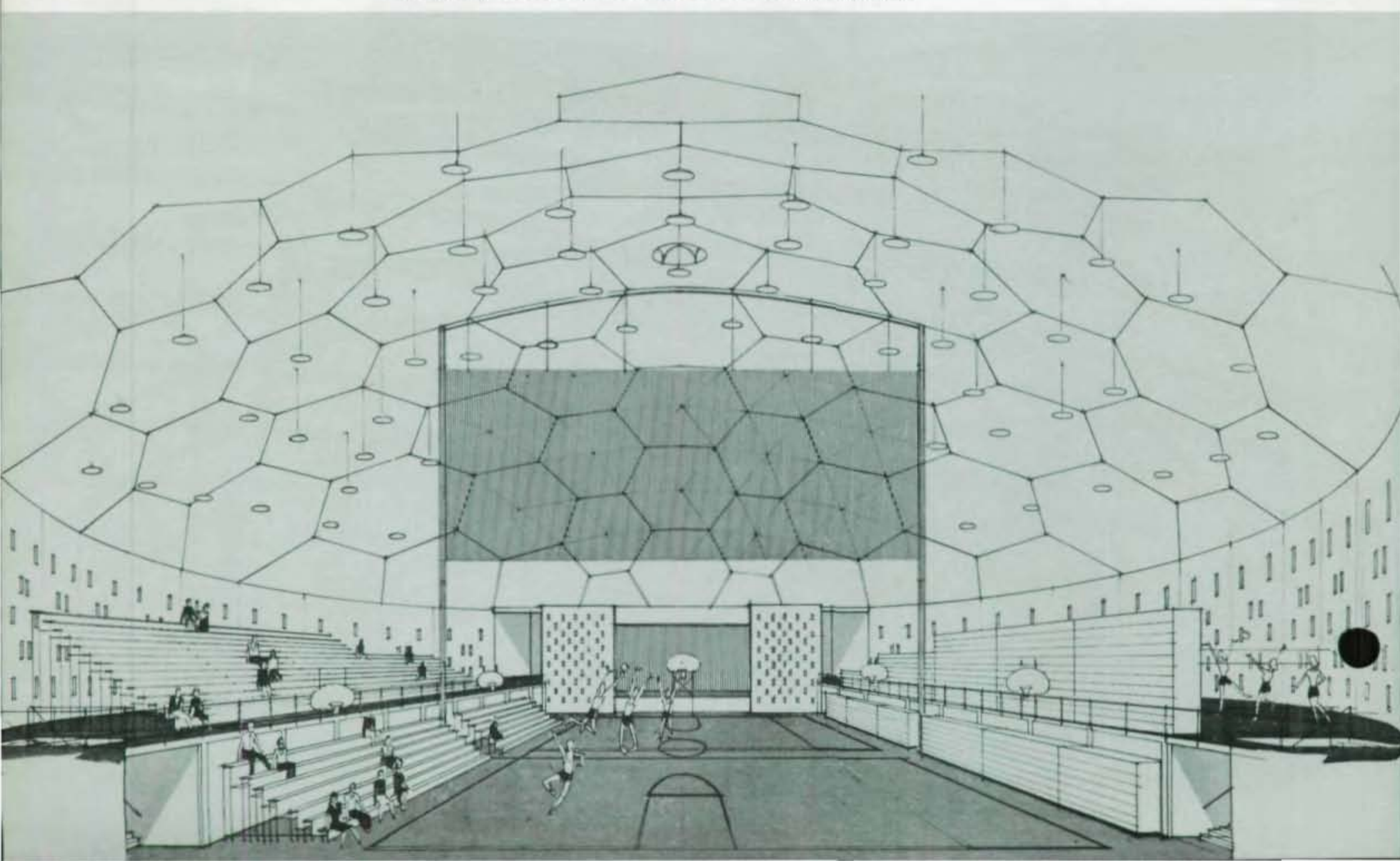
"The most complex problem of this framing was encountered at its boundaries, where members of the dome framing were connected to five edge arches. Stresses in the arches and connecting framing members are extremely complicated, due to the necessary requirement of their deformation compatibility. The solution of this problem was an iteration process used by approximately equating the deformations of framing members to those of the arches at their connections.

"Loading compiled with the Maryland building code of 25 psf live load and a wind load of 25 psf (corresponding to a 100 mph wind pressure, or suction).

"Except for the geometry of the geodesic dome framing (which was done by a digital computer), all the analysis and design calculations were carried on a desk calculator. Design specifications of AISC governed all the design of steel parts; and of ACI Building Code for Reinforced Concrete Design for all concrete work."

Architects were McLeod and Ferra.

The Circular Space Arrangements Provides Side and Rear Areas so That Many Group Activities Can Occur Simultaneously.



Mary Agnes Hall, D'Youville College

The ten story dormitory building with a developed lower level is the first of a six building, ten million dollar expansion program for the College. It will house 265 students, ten guests and ten proctors in single and double rooms. Toilet facilities are private and semi-private.

Being an urban college in a developed residential area it was necessary to purchase six residences and to build in a vertical direction. The college campus borders on the edge of portions of the city scheduled for renewal and rehabilitation.

Since the student population consists of women who prefer a small college atmosphere, it was decided to assimilate as closely as possible a home environment without losing the advantages of group living. Therefore, a "floor living" plan pattern was followed.

Because accommodation requirements differ with personalities, the architects planned each floor so as to offer a variety in the type of rooms. Provisions are made for a group of four students to be housed in two double bedrooms, interconnected with a passage which gives access to a room containing a watercloset and a washbasin, also to another separate room containing a shower. Single rooms with similarly arranged toilet facilities are included, except that a tub is substituted for the shower. The fourth type of accommodation consists of a private room with a private bath. A suite for the Proctor is located on each floor.

The Nurses Station on the first floor will be available for first aid and minor medication. Private telephones are installed in all rooms. Contact from a central point within the building with rooms will be by means of an intercom system. The intercom system will also be used for musical programming. A lounge on each floor, with a snack bar, will serve for "chit-chat" sessions during leisure hours. Upper floor lounges will overlook two city parks, the city lake harbor and a river.

The lower level of the building contains a recreation room and canteen, hair care center, laundry for students to care for personal items of wearing apparel, a trunk storage area, also a distribution center for bed linen, etc.

Reception lobby will be arranged for visiting, having the furniture in a conversation pattern for privacy. "Loose" furniture in bedrooms caters to the women's urge to periodically rearrange. Carefully selected draperies with matching bedspreads and venetian blinds will provide a pleasant decor. Varied schemes throughout the building and carpeted corridors will assist in promoting a philosophy of relaxed living.

Prefabricated, prefinished wardrobes and cabinets reduced the construction time, effected savings by using mass production methods of manufacture, also reduced installation costs. Acoustical tile ceilings having a three hour fire rating set in an exposed tee system eliminated drying time required for plaster ceilings at a reduced cost in addition to providing quieter living quarters.

Construction was speeded and the costs were kept low by using seven-story column sections of A 441 high strength steel without splices. This permitted erection in one piece. Three story and four story bents, 18 feet wide, weighing a minimum of four tons were preassembled and erected as a unit to top of steel framework. Castelled beams were used in outside 156 foot wide north and south walls above the first floor at a saving of 22 tons of steel. Steel deck and concrete fill were placed immediately to eliminate the cost of temporary planking. Modular framing of floor construction assisted in reducing costs. Erection of the 600 ton structural steel framework was completed in 24 working days by the structural steel fabricator.

Architects were Foit & Baschnagel, Buffalo, N. Y.

What do you know about Welding Symbols?

ask **CLEMENT F. BROWN**
professional engineer

IN BRIEF: Welding symbols should be duck soup for designers and welding supervisors, engineers, and technicians. But, are they?

Here's a short test that will tell you what you really know about welding symbols. All 10 problems on this page cover commonly used arc and gas welding symbols.

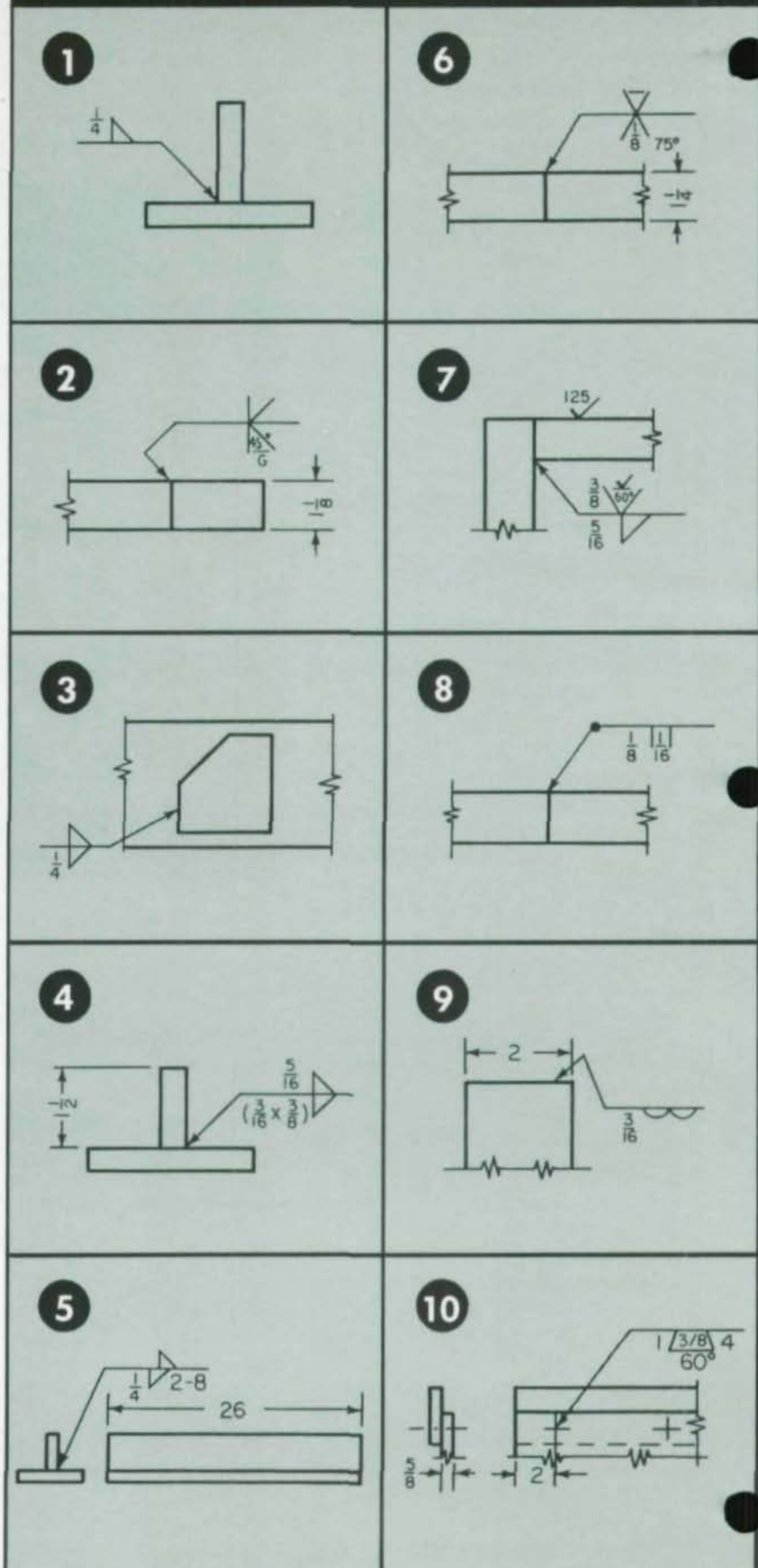
Do you know what weld each calls for? Sketch in your answers on this page or a separate sheet of paper.

When you're finished, refer to page 15 for the answers and a brief explanation of each.

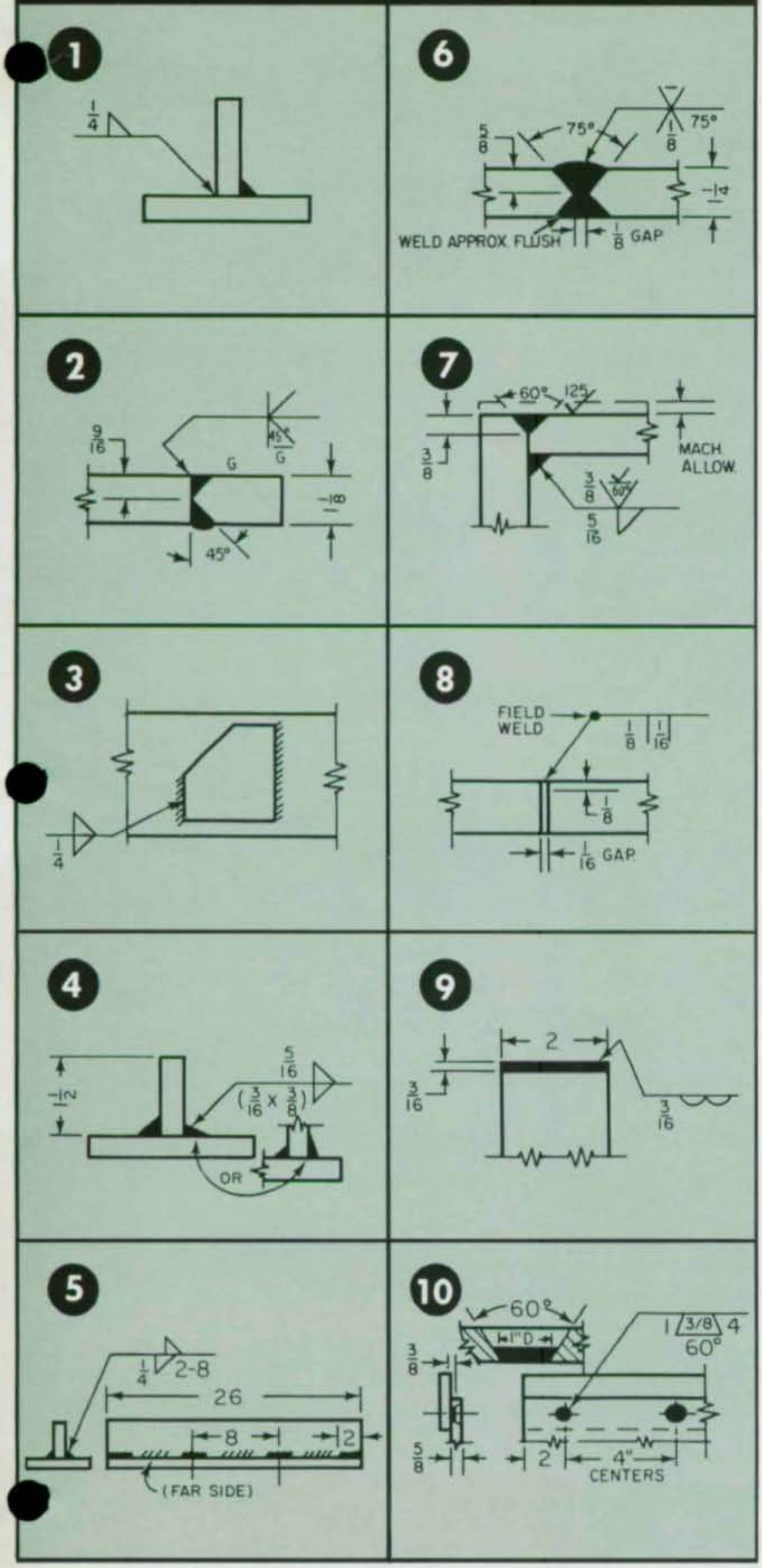
Give yourself 10 points for each correct answer. Give yourself 5 points for an answer that is half correct, etc. Rate yourself as follows:

- 100: Expert; you probably were on the AWS Symbols Committee.
- 80-90: Master; few symbols will trip you up.
- 60-70: Journeyman; still better than average.
- 40-50: Amateur; you have lots of company.
- 0-30: Better start studying.

Welding Symbol Problems



Answers To Weld Symbol Problems



Weld symbol test

Here are the answers to the welding symbol problems on page 14. Explanations of each are given below. Section numbers referred to are from the American Welding Society's Handbook—Standard Welding Symbols (4th Edition, 1958, Section 2, Chapter 33).

1: Fillet weld (¼-inch) is called for on far side. Better practice (wherever possible) would be to place symbol on weld side of joint and show weld as near side. (Section 302-a and 302-b).

2: Butt joint with single bevels on one plate. Definite break in arrow points to beveled member (Section 315). Groove bevels are equal and extend completely through plate (Section 902-b1). Angle of bevel is 45°; if unmarked, user's standard (Section 903-b). Near side of weld is ground flush (Section 905-b).

3: Fillet weld on both sides of part, but not on angular cut edge (abrupt change of direction—Section 310-a).

4: Orientation or position of fillet welds with unequal legs must be shown on drawing (Section 402-b). Lacking designation, short leg could be in either plane—horizontal or vertical. (Note: If 1½-inch dimension was at least 3/16-inch and less than ⅜-inch, orientation would be predetermined.)

5: Staggered intermittent fillet welds—2-inches-long on 8-inch centers (Section 405-d).

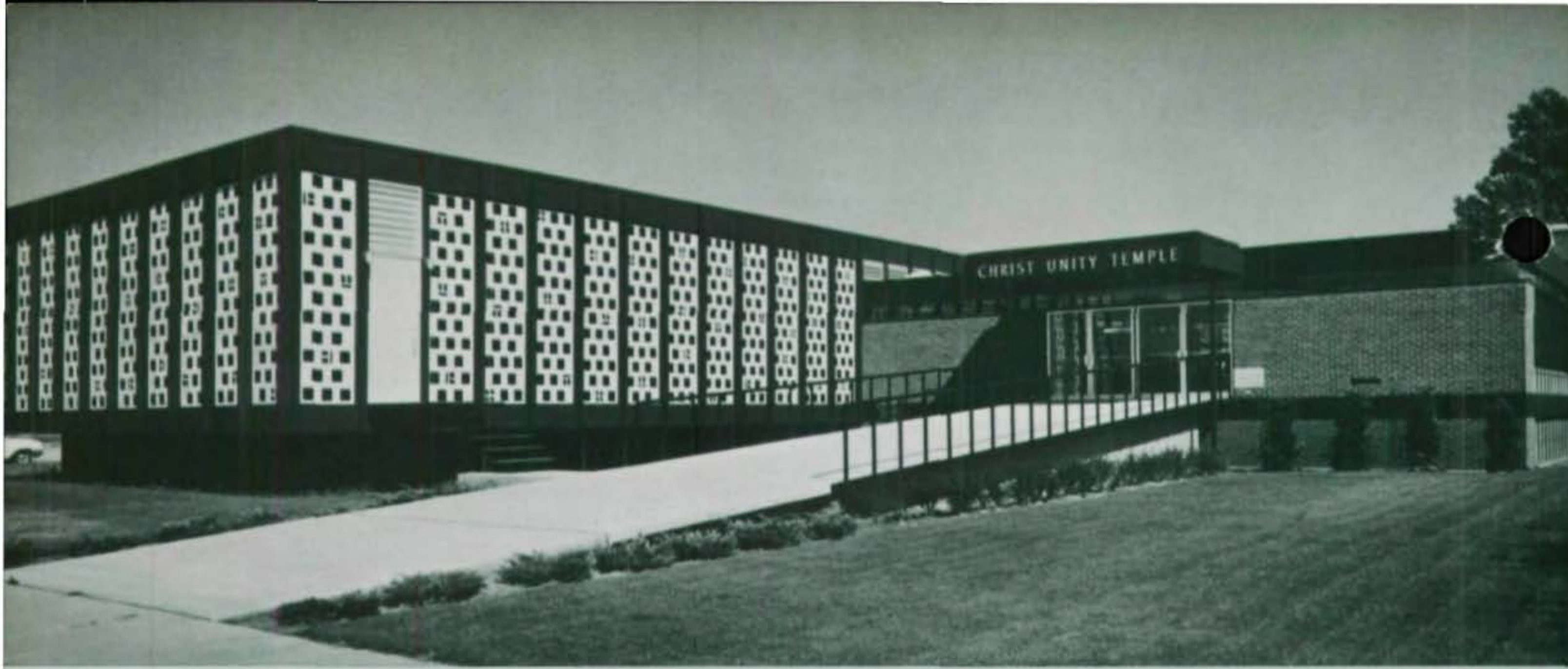
6: Butt joints with both members beveled. Groove bevels are equal and extend completely through members (Section 902-b1). Included groove angle is 75° (Section 903-b). Root opening, or gap, is ⅛-inch—or user's standard if not otherwise indicated (903-a). Far side weld is approximately flush—as welded—without finishing (Section 905-a).

7: Combined fillet and double bevel 60° groove weld. Finished depth of groove weld is ⅜-inch (Section 905-b). Groove depth before welding must be increased by an amount equal to machining allowance.

8: Square groove butt joint. Root opening, or gap, is 1/16-inch (Section 903-a). Joint is not beveled; required weld penetration is ⅛-inch (Section 902-c). Weld is made in the field (Section 309).

9: Single or multi-pass weld build-up of surface—3/16-inch-high (Section 1202-a to 1202-c and 1203-a).

10: Plug welds 1-inch in diameter on 4-inch centers. Holes are counter-sunk to 60° included angle and filled with weld to a depth of ⅜-inch (Section 501 to 505, inclusive).



CHRIST UNITY TEMPLE

Religious expression has taken as many forms as the centuries of recorded human history. In most of the structures built for worship, the motivation was to design a cathedral, a mosque, a synagogue, a shrine, that would in itself be a tribute to whatever deity was the object of that worship. In the case of the predominantly Negro congregation of Christ Unity Temple of Chicago, they express their faith through the scriptures, preaching and song. They did not require anything traditional, or symbolic, including a cross. What they wanted was a building that would complement their fervor.

The church building was conceived as a "jewel box" on one-inch thick slab glass. The exposed steel mullions and spandrel beams serve as a series of "frames" that contain this brilliantly colored glass. In fact, steel is the only material which could have been used for the purpose. The interior glow produces an exhilarating religious atmosphere.

The office wing has a floating roof which hovers over the brick work.

Cooley and Borre, A.I.A. and Associates, Park Ridge, Illinois are the architects. Kenneth and Thomas Carroll, Inc., Chicago, Illinois was the general contractor.

(Ed. Note: Mr. Cooley is President of the Guild for Religious Architecture.)