The various structures designed for multiple family living which are illustrated, discussed, and criticized in this issue indicate pretty clearly the variety of solutions possible within this field. They range from completely efficient, thoroughly economical "housing projects" through comfortable, still efficient apartment houses in a higher economic bracket to more individual, more space-consuming but more friendly semidetached and two-family dwellings.

When a representative of any part of the building economy proclaims the need for rental housing in this continuing emergency, he states an obvious truth, but by no means narrows the field to one type of structure. The architects and their clients, as the work in this issue indicates, are going to translate the requirements in many individual ways.

We have no intention of editorializing or quoting statistics regarding the "housing problem"; others are doing this well. There is an obvious economic interplay of construction costs, rentals, wages, and legitimate profits which affects the architect's commission and influences his solution. These matters, at the present time, boil down to one simple fact: there is need for imaginative, even inspired, designing in this field where costs must be kept to a minimum without sacrifice of pleasant environment.

It is also clear that no building or small group of buildings can in themselves create a completely satisfactory environment. Any architect seriously interested in a dwelling project must be concerned with town planning, with the larger environs of the families he is providing for, with transportation and schools, and health facilities and shops. And yet again, the single individual commission seldom allows the designer to do more than worry about these matters. He can advise his client; he can work on a broader scale for over-all planning through various organizations; his particular assignment will usually be to find the best solution within given limitations.

With our sights thus lowered, the guest critics and the editors of this issue, another in the series of PROGRESSIVE ARCHITECTURE Critiques, found many signs of progress. Some of the structures are notable for study of construction methods, some for a smart use of materials, some for ingenious planning, some for that intangible desirable, amenity. None of them have been designed as routine or tedious commissions; in each case the architect believes, excitedly, that he is offering an important, carefully studied solution to a difficult social problem. We agree. There are no easy answers any more.
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WM. F. JONES  
School of Architecture  
Columbia University

WEIDLINGER'S "WELDING"

Dear Editor: In reading the article, "Welding: Its Implications and Applications," rather thoroughly I find very little upon which to comment. It is care­fully written and appears to state conditions about as they exist, although it has been several years since I was actively engaged in the field of structural welding.

I believe the author might well make a distinction between the different types of rigid frames. Those which are essential­ly of the arch type are quite widely used in some industrial building and in auditoriums or gymnasiums. These are not too difficult to analyze. The office building type composed largely of columns and beams is much more difficult and, doubtless, it is true that engineers have avoided the additional work involved in making the calculations. Full continuity involves a very considerable amount of field welding which, in general, is more expensive than shop welding. I am not in a position to evaluate the difference in cost, but in the earlier years of development we endeavored to keep the field welding to a minimum.

I believe it would be well for the author to include AC welding, since it is also widely used. I trust these few comments may be of some assistance to you in evaluating this discussion.

H. M. PRIEST, Manager  
Railroad Research Bureau  
United States Steel Corp. Subsidiaries

Author's Note: Your remarks regarding the use of AC welding were incorporated in the article. There are—as you have pointed out—various degrees of "difficulties" in the analysis of rigid frames. Simple bents are sometimes easier to design than multistory frames; however, both require more calculations than simple beams and columns. Since the article is written for the architect, whose knowledge of these matters is, unfortunately, somewhat limited, I felt not justified in going into the discussion of various types of rigid frames. Apologies to the structural engineers, from whose point of view these distinctions are quite essential.

PAUL WEIDLINGER

FURTHER APPROVAL

Dear Editor: I think that Mr. Weid­linger's article is timely. Structural welding needs a boost. Mr. Weidlinger has reviewed the past, sized up the present, and pointed the way to the future. Welding progress in the making of metal containers for gases and liquids has been extremely rapid; there has been no comparable advance in the construction of buildings and bridges.

Mr. Weidlinger's article is centered around building construction although his table of the possible metal savings by welding instead of riveting includes data for bridges quoted from Mr. La­Motte Grover.

In my opinion, lack of simple but effective assembly devices has slowed up welded building construction more than any other physical factor. Such devices adapted to field assembled, welded tanks have been used for years. Their design for buildings is more difficult because of the necessity of locating them accurately with little cost, and in such a way that they will not interfere with the welding of the main joint.

In the case of welded bridges the main physical difficulty appears to be one of material. ASTM-A7 steel has long been widely used for riveted bridges and the designs have been based on a strength of 60,000 psi. To maintain this strength throughout the entire range of thickness, it is necessary to vary the carbon content. The welding engineer insists that the carbon be kept to a maximum of .25%; the steelmakers are equally insistent that this cannot be done unless the strength is varied, being less for the greater thicknesses; the bridge builders and users refuse to adopt and use a design strength varying with thickness because, if they did, welded bridges couldn't compete with
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riveted bridges. Thus there is an impasse for large bridges.

Furthermore, fatigue tests on fillet welded joints, such as would now be considered essential for welded bridges, indicate very low fatigue strength. This, also, in the minds of many men accustomed to conventional riveted bridge construction is good reason for continuing to make riveted bridges. A fatigue test program on riveted joints which is now underway may change this viewpoint.

The solution for welded bridges probably lies in radically new designs, using ASTM-A7 tubular members thin enough to have good welding properties and 60,000 psi. strength without excessive carbon. Therefore, I agree with Mr. Weidlinger's favorable appraisal of tubular members.

As to testing: with present radiographing technique, I think it would be practically impossible to radiograph structural girder-to-column welds, so unless new techniques are developed, of which I have seen no indication, reliance must be placed upon good design, good assembly, well trained operators, proper supervision during welding, and visual inspection aided by magnaradiography and trepanning or otherwise removing weld samples to get good work. I think that radiographing will never, of itself, "completely remove uncertainty from welded structures."

The next to last sentence of the last paragraph under "The Role of Building Codes" I do not understand, for it appears to me that prequalified procedures greatly simplify the work for everybody concerned. The provision that procedures other than the ones prequalified may be used, provided the user qualifies them by prescribed tests, encourages the development of new procedures. I cannot imagine a more simple and yet more flexible set of safe rules for welding procedure.

I cannot agree on the propriety of comparing the irregularities of welds to the "forbidden complexity of welding equipment." Furthermore, probably because I am not an artist, I do not understand the antecedent of the expression, "such an approach," which appears in the next sentence. Certainly the weld ripples are insignificant as compared with a building and its structural parts.

This article is excellent and will do much good.

H. C. BOARDMAN
Chicago Bridge and Iron Co.
Chicago, Illinois

Author's Note: I would like to express my appreciation for the thoroughness and thoughtfulness of your remarks. I agree, indeed, with all your general comments. I hope that the editors of PROGRESSIVE ARCHITECTURE will print them, since they will effectively contribute to the purpose of the article, although it was necessarily restricted to the discussion of building construction. The problems which you have pointed out about welded bridges are very pertinent and should be of interest to the reader. In my article I have not discussed the use of assembly devices, partly for the lack of space and partly because, as far as I know, most such devices (like the Sachs Erection System) are patented and used by individual companies only. However, I believe your remarks on this point are correct and important.

I agree also, in general, with your remark that "reliance must be placed upon good design, good assembly, well trained operators, proper supervision etc.," but I do hope that alternately radiographic inspection will advance sufficiently to be used on a large scale. In some instances this has been done already. Of course, it will not remove "completely" the element of uncertainty, since this element will exist in all man-made instruments and in nature itself. The word "completely," therefore, cannot be taken literally.

The paragraph about building codes is open to a different interpretation. Codes,
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JULY, 1947 11
as such, are inherently restrictive. This is a necessary evil and, I believe, it is a matter of natural inertia to use pre-qualified procedures instead of new ones, even though the code does not forbid their use. I admit—as I have also expressed in the article—that with the above qualification the code, at present, is as satisfactory as it can be.

The paragraph on "Architectural Expression of Welded Structures" of course expresses my subjective opinion. It is not trying to give any artistic advice on the adaptation of this process, but rather to point out a potential approach which might lead the architect to think about ways and means of clearer formal, i.e., architectural, expression.

I want to thank you for your interesting letter and your encouraging remarks.

PAUL WEIDLINGER

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It is interesting to note that two times in the Critique, which accompanies the articles, the word "lure" is used, and that, in a word, is what sums up the kind of thinking that accompanies much of the current store planning. Many designers are becoming just a little too glib about the merchandise angle of store planning, and are trying to make that their major contribution, rather than just one part of the general program.

If more designers would think of stores as essentially public buildings which must be designed with a responsibility for public convenience, the merchant would, in the long run, benefit. The "lure," if any, would derive from the general style and quality of the goods and the store's general merchandise policy.

In any store of more than moderate size, many hundreds of thousands of dollars per year are paid for executive merchandising talent. It seems ridiculous for them to buy that advice as the major contribution of their designers, whose principal concern should be the preparation of a sound program with proper regard for circulation, efficiency of operation, sound structure, appropriateness of materials, and stimulating merchandise backgrounds all carried out in accordance with the most progressive design principles.

DANIEL SCHWARTZMAN
New York, N. Y.

THANKS, ANYWAY

Dear Editor: Let me congratulate you on the nice presentation of the Brazilian material, in the April issue. On second thought, though, I think we are the ones to be congratulated.

HENRIQUE E. MINDLIN
Rio de Janeiro, Brasil

NOTICES

NEW PARTNERSHIPS, PRACTICES

VICTOR B. SPECTOR and H. EUGENE MONTGOMERY have opened new offices at 1057 W. Broad St., Falls Church, Va.

E. J. CAPPELLO has announced the opening of a new practice at 164-01 Northern Blvd., Flushing, N. Y.

RAY-SHIELD PRODUCTS MFG. Co., designers, fabricators, and constructors of lighting products, have established New York offices at 200 W. 34th St., with agents in principal cities.

LAURENCE P. JOHNSTON has opened offices to specialize in hospital planning, located at 1515 Sherman Ave., Evanston, Ill.

EDWARD K. SCHADE has become an associate member of the firm of Mitchell & Ritchey, 524 Fourth Ave., Pittsburgh, Pa.

JOSEPH Di STEFANO, JR., has opened an office for architectural practice at 230 Boylston St., Boston, Mass.
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Gordon Drake's home in Los Angeles, California, the first of the 1946 Progressive Architecture Award winners to be presented fully for our readers, appears on page 45 of this issue. (For photograph of Mr. Drake see June 1947 Progressive Architecture.) It was during wartime service as a Marine, although his "assigned tasks were not those of an architect," that Gordon Drake came to the conclusion that to have work constructed as it has been designed, the architect and craftsman must work in complete accord. With the end of the war he returned to Los Angeles and formed a group of veterans who felt responsible for more than the labor they were performing. But, says the young designer, "The sad truth is that it takes much more than willingness to construct our drawings," and, accordingly, the group was disbanded last November and replaced by two experienced contracting firms. The work of the firm of Gordon Drake Associates has been mainly residential, so far, but they expect to enter other design fields in the near future.

Following two successful Critique studies on Hospitals (November 1946) and Retail Stores (May 1947), we present in this issue a critical analysis of Multi-Family Housing. The first project discussed is the Housing Campus for the Illinois Institute of Technology, Chicago, Illinois (p. 54), which comes from the office of Skidmore, Owings & Merrill. While Mr. Owings and Mr. Merrill took an active part in the development of the project, John Lord King and William T. Priestley were the principals in working it out. John Lord King received his B.S. in civil engineering from Yale University, and then went on to study architecture at Yale's School of Fine Arts. After research in Europe as holder of an English Traveling Fellowship, he worked in the office of Holabird & Root, architects of Chicago, 1934-1942, where he became chief of their architectural department and took part in the development of many large Chicago housing projects. After war service, he joined the staff of Skidmore, Owings & Merrill (1945), and was the project manager for the Illinois Tech Housing Campus. William T. Priestley was the chief designer on this project, having also joined the Skidmore, Owings & Merrill staff in 1945 after war duty. His architectural education was received at Princeton; the Bauhaus (Dessau) and Berlin, Germany; and at Columbia University. He was a partner in the firm of Rodgers & Priestley of New York and, subsequently, Chicago, from 1935-1942; also teaching architecture at Cooper Union, New York, N. Y., and at Illinois Institute of Technology.

Synonymous with advanced apartment house design in Washington, D. C., are the names of Berla & Abel, architects of the President and Phillips Apartments on pages 59 and 62. Julian E. Berla received his B.S. from Massachusetts Institute of Technology, and is a registered architect in the District of Columbia, Maryland, Virginia, and New York. He is now president of the Washington Chapter, A.I.A. His partner, Joseph H. Abel, is a B. Arch. from George Washington University and also is registered in several states. A member of the A.I.A., Washington Building Congress, and Board of Trade, Abel is at present working on the design section of Apartment Houses, soon to be published by Reinhold Publishing Corporation as the second book of the Progressive Architecture series.

Park Planned Homes, Altadena, California (p. 66), and Garden Apartments, Hollywood, California (p. 64), the next projects considered in the Critique, are the work of Gregory Ain, architect of Los Angeles. Ain studied mathematics (Continued on page 16)
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and physics at U.C.L.A. and architecture at U.S.C. From 1933-1935 he was associated with Richard Neutra. He has done much work in the housing field and in 1940 was the recipient of the Guggenheim Fellowship for research in low-cost housing.

Last of the Critique subjects is a Six-Family Project in Seattle, Washington (p. 70), the work of Paul Hayden Kirk of the office of Chiarelli & Kirk. A graduate of University of Washington School of Architecture in 1937, Kirk started his own practice in 1939. The partnership of Chiarelli & Kirk was established in 1944. Summing up the firm's design theories, he says, "We are both interested in using the local building materials in their most simple and straightforward manner."

The Materials and Methods section features this month an article on Row House Construction (p. 73) which is closely allied to the Critique study, written by Bauer and Swinburne, Newark, New Jersey, architects. Charles H. Bauer, Jr., studied civil engineering at Lehigh University and architecture in the Newark Atelier of the Beaux Arts, University of Pennsylvania, New York University, and the American School at Fontainebleau. His experience includes work in the offices of Guilbert & Betelle, Newark, New Jersey; and Crow, Lewis & Wick, Eggers & Higgins.

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New Literature

A complete reprint of the 72-page insert in SWEET'S, covering all types and sizes of Truscon Steel Windows, with their installation details, is available on request.
and Gibbs & Hill, all of New York, N. Y. He opened his Newark office after three years' service in the armed forces, and is a member of the A.I.A.

His associate, Herbert H. Winburne, is a native of Nevada. After graduating from University of Pennsylvania he returned home, and in 1935 was appointed architect for the State of Nevada. In this capacity he handled the design and construction of public works for the state and was a member of the State Planning Board and National Resources Committee. He was also the architect of Nevada's exhibits at the San Francisco and New York World's Fairs. He went back to New York in 1941 to work on various military projects, and after war service formed the association with Bauer in Newark.

The second and concluding part of "Welding," by Paul Weidlinger, appears on page 78 of the Materials and Methods section. Biographical data about the consulting engineer-author can be found in the June 1946 PROGRESSIVE ARCHITECTURE.

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**NEXT MONTH**

- Turning on the rebels against traditional design the searching light of their own critical attitude toward eclecticism, Milton Frederick Kirchman, architect of New York, N. Y., uncovers new fields for sharp evaluation in irrationalism in modern architecture, to be a feature of our August issue. If pulses are stirred, heads are hit, we will welcome readers' letters of dissension or comment.

- Structures to be presented in the issue will include two handsome Swedish museums, one at Norrkoping designed by Kurt von Schmalensee, and another at Linkoping designed by Nils Ahrbom and Helge Zimdahl. We will also show two branch airline terminals in California designed for United Airlines by Ernest J. Kump Company, of San Francisco. Supplementing these presentations will be two proposed projects—All Saints' Episcopal Church, Riverside, California, designed by Ralph C. Fawcett & Associates, and a church and shelter designed by Pietro Belluschi for the Church of the People, Seattle, Washington. The residential example selected by the editors for the August issue is an inviting California home in Berkeley, designed by John Ekin Dinwiddie, architect; Albert Henry Hill and the late Philip Joseph, associates.

- A discussion of the characteristics of "Cavity Wall Construction"—with suggestion of its many design possibilities illustrated by structures where the principle has been successfully used—will be the concluding feature of the issue. It has been prepared for the magazine by Ben John Small.

**NOTICES**

**APPOINTMENTS**

E. E. Michaelis has been appointed Sales Director at Gordon Obrig Associates, Inc., in charge of product design and commercial interiors.

Max W. Sullivan has been elected president of the corporation of Rhode Island School of Design, succeeding Mrs. Murray S. Danforth who has been named chairman of the board of trustees.

**NEW ADDRESSES**

Friedman, Alscher & Sincere, Brooks Bldg., 223 W. Jackson Blvd., Chicago 6, Ill.

The Francis Co., engineers and designers, 222 N. Michigan Ave., Chicago 1, Ill.

Chester Nagel (summer address), 3215 Churchill Dr., Austin 21, Tex.

Philip A. Kessler, Route #5, Box A-167, West Bend, Wis.

Boyd Jossy, Menlo Hotel, Box 643, Redmond, Ore.
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Several conventions of architects and planners held within recent months have indicated increased interest in social, as well as professional, responsibilities. The A.I.A., meeting in Grand Rapids early in May, devoted a large part of the convention time to seminars and "contemporary trends." The pre-convention weekend was given over to meetings on hospital planning, school planning, and town planning. Reactions of those who attended varied from warm enthusiasm to a tepid remark that "it's all in the books, if anyone would ever read; what's all the shouting about?" Certainly the idea of seminars on professional subjects is to be applauded; early in May, devoted a large part of discussions in the future will depend on the reactions of those who attended varied from warm enthusiasm, patronizing ("we'll be glad to have young men come into the Institute and take their proper place") to the constructive (John Bolles: "It is the duty of these people to enter the Institute and work toward its liberalization").

The usual contradiction in attitude appeared when resolutions were introduced. The Taft-Ellender-Wagner omnibus housing bill was approved with reservations. A resolution from the New York Chapter was adopted which pledges the Institute to decide by "an expression from the Chapters" whether its policy should emphasize "the architectural profession as an integral part of the construction industry" or "as a servant of society as a whole by securing the best possible physical environment from the construction industry."

And then, with quite some objection, the convention decided that "Whereas, the architectural profession is an integral part of the construction industry," it should be resolved that "the A.I.A. . . . is opposed to the principle of the closed shop in the construction industry."

Confusion and inconsistency remain, but an increasingly important undercurrent of sober professional responsibility appears. The Institute must stand for progress in this period of rapid change; apparently that fact is becoming recognized.

Douglas Orr of Connecticut, a fine architect and a respected professional, was elected president. A three-way contest for vice-president was won by Searle von Storch, also an excellent designer and a responsible worker for the good of the profession. The convention ended on a very happy note, with Eliel Saarinen receiving the Institute's Gold Medal.

The two planning organizations exist avowedly for different purposes: A.P.C.A. claims to serve citizen groups primarily, while A.S.P.O. draws its membership largely from the planning officials. Actually there was quite a dearth of representatives from the various citizen groups at Milwaukee and Cincinnati and attendance in both cities seemed to draw the same (or same type of) planners. The programs were quite similar and each included the usual sessions on planning standards and zoning, urban redevelopment, transportation, and the planning problems of the small community. Milwaukee and Cincinnati sent along exhibits which enhanced the sessions held on the problems of the host areas. There were also exhibits from related planning programs, and of particular note was a comprehensive show put on by state planning and development agencies in Cincinnati. The visiting planners were taken on tours of Milwaukee and Cincinnati in order to study the significant physical planning, housing, and public works projects in each area.

The "young planners movement," which had its organizational beginnings at last year's A.S.P.O. meeting in New York City, added considerable luster to the National Planning Conference. These young (or progressive) planning groups have maintained a loose, decentralized structure nationally and in their individual development have proceeded autonomously and, consequently, differently in each area. They did, however, attract considerable attention for their energetic ideas, among them that the various conferences consolidate their annual meetings in one city, avoiding the duplication and overlapping work covered by two or more separate meetings.

In addition, the "young planners" put forth a resolution calling for improved administrative practices in cities and urging the adoption of municipal land acquisition policies. The resolution also protested the sprawling fringe developments "now going on" and gave support to the Taft-Ellender-Wagner bill.

It is interesting to note that at the planners' meetings and at the A.I.A. convention, "young" professionals—young in attitude, rather than years—held the center of the stage.

Louis Wirth, professor of sociology at the University of Chicago, keynoted the A.S.P.O. conference with a significant talk on the social responsibility of planning. Stressing the importance of planning in a democracy, Professor Wirth pointed out that administrative planning need not mean regimentation but rather a rational approach to freedom.
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Remember — Roddiscraft beauty is more than veneer deep.
There's more than beauty in this storefront by Architect Louis Redstone of Detroit. To mention just a few of its practical points:

1. It's a Visual Front. Note how the center section is open to full view through large windows of plate glass. This makes the store look more inviting—brings customers in. Daylight brightens the sales floor—and at night, the lighted interior makes the whole store a showcase.

2. The second floor is "opened" with a glass front. Merchandise displays can be seen from the street. This floor, too, is brightened by daylight.

3. The Tuf-flex* tempered plate glass doors lend a modern note to the entire front and accentuate the openness.

4. Display windows in the "wings" permit excellent model room displays. Low bulkheads make the prospect feel almost as though he were in the room.

5. The roof extension keeps direct rays of the high summer sun out of the store. And at night, lights this in canopy flood the front and the sidewalk.

6. Patterned Glass in second floor windows provides privacy where it is wanted—without sacrifice of daylight. Day and night, the glass adds a decorative note.

Not every storefront offers such design opportunity. But this one shows how glass was used to make a home furnishings store more attractive and a better business-getter.

For information on Visual Fronts, write for our storefront brochures. Just tell us which types of stores interest you most. Libbey·Owens·Ford Glass Company, 7177 Nicholas Bldg., Toledo 3, Ohio.

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Note the emphasis placed on operating sash—providing ample ventilation for this lakeside home. This is the way to combine view, sunshine, ventilation and weather-tight comfort. It's the Andersen Windowall way.

McEnery and Krafft, architects, designed this installation, and specified Andersen Complete Window Units to bring their inspiration into reality.

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DESIGNER'S OWN HOUSE, LOS ANGELES, CALIFORNIA

GORDON DRAKE, Designer
A WARD WINNER

1. VIEW FROM THE ROAD. The site was cut into a steep hillside. Car shelter at left; entry at right.

DESIGNER'S OWN HOUSE. LOS ANGELES. CALIFORNIA

GORDON DRAKE. Designer

A winner of the PROGRESSIVE ARCHITECTURE Award* for private residences, completed during 1946, that best exemplify sound design progress, this engaging small house was cited for its imaginative contribution as an architectural concept as well as for its brilliant plan. The house is a minimum home—hardly more than a single room, with space partitioned off for the kitchen and bath. Yet within these modest confines, plus the nicely schemed outside living terrace, it achieves the living amenity of a house many times its size, quite apart from the factor of cost, where it also scores a triumph.

*For full report of the Award, see June 1947 PROGRESSIVE ARCHITECTURE.

The design of this prize-winning house started when Gordon Drake was in the Marines. When the war was over, he wanted to build a house for himself and, as he heard other servicemen talk about the houses they planned to build, he realized that high postwar costs would likely explode many a dream—unless somebody did something about it. So, he determined to work out a basic unit, high in livability and as low in cost as possible, that might meet the needs and budgets of average young couples. The house shown on these pages was the result. Cost, incredibly, was kept to 8 dollars a square foot.

FOR A DEEPER LOT, Mr. Drake feels that the plan would be improved if the sleeping-dressing area were a little larger, as above.
2. THE TERRACE, toward the west, is shaded by trees and screened from the road by a louvered wall beside the front door.
3. FRONT DOOR SHELTER. Note the obscure glass panels, and roof extension embracing the tree.

5. THE BRICK-PAVED TERRACE doubles the living space of the house.
One wall of the house opens onto the landscaped terrace which, in mild weather, with pairs of wide, glazed doors opened, becomes part of the living area. A good proportion of the terrace is paved, with special planting occurring only around the pool near the entrance and at the base of trees—a factor planned for ease of maintenance. The indoor-outdoor space relationship is further carried out by the extension of the roof soffit into the house, forming a trough for concealed lighting. The house is framed with 4" x 4" posts, 6 feet on center, with redwood plywood used as the exterior surface, and 1" x 8" shiplap siding, placed horizontally, on interiors. In certain sections, panels of either clear or diffused glass take the place of the wood. Floors, except in the kitchen and bath (where floor tile is used), are surfaced with Chinese matting.
DESIGNER'S OWN HOUSE
LOS ANGELES, CALIFORNIA

GORDON DRAKE
Designer
DESIGNER'S OWN HOUSE
LOS ANGELES, CALIFORNIA

GORDON DRAKE
Designer

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Much of the furniture, in the form of storage shelves and drawers, is built into the house, so that only a minimum of portable furniture is required—another economical feature of the design. Provision is made for a radiant warm-air heating system, in which heated air is carried through a grid of ducts in the concrete floor slab and, as it cools, automatically returned to the centrally located furnace for reheating.
A Critique

MULTI-FAMILY HOUSING

Last fall we launched our series of critical studies of a particular building type, with a comparative analysis of several outstanding hospitals. In May of this year, the same technique was applied to retail stores. Now, in this issue we consider the current status of design of several categories of private, multi-family housing. As with the previous Critiques, we are indebted to a panel of experts who assisted us in assaying the work shown. Three distinct areas of specialization were represented on the panel. From the field of private practice, there was Simon Breines of the firm of Pomerance & Breines; representing investment and project development aspects was George D. Brown, Jr., architect and housing consultant for The Mutual Life Insurance Company of New York; and finally—but hardly least—we had the specialized knowledge and experience of John Dean, sociologist and housing economist.

Although only six projects are shown in the group, they represent the widest range of types of group housing. The housing campus developed by Skidmore, Owings & Merrill for the Illinois Institute of Technology is a large-scale project that includes ten-story apartment buildings, three-story, walk-up apartment houses, and four-story dormitory structures. Independent apartment houses, both of the elevator type and walk-ups, are represented in the two Washington, D. C., buildings by Berla & Abel. Gregory Ain’s work in California includes both single-family row houses and a group of semidetached individual homes, and the project in Seattle by Paul Hayden Kirk consists of but six dwelling units arranged in three adjoining structures.

In developing the study, the following process was followed. In joint session, the editors and panel of consultants used a fine-tooth comb on the jobs selected for publication. Whatever was questioned or in any way criticized was then forwarded to the architect or designer for rebuttal or additional comment. The editors then weighed the finished jobs in the light of the experts’ critical comments balanced by the explanations sent in by the architects. Thus we hope—and correspondence increasingly supports this hope—that we are presenting a useful evaluation of a building type that no one person, professional or otherwise, or any one editorial group could hope to produce independently.

The Editors
HOUSING CAMPUS, ILLINOIS INSTITUTE OF TECHNOLOGY

SKIDMORE, OWINGS & MERRILL, Architects

A 42-acre project, this housing campus for students and faculty is just east of State Street from the Institute's academic campus, planned by Mies van der Rohe. Eventually, there will be three 10-story apartment buildings (360 apartments); three 3-story, walk-up buildings (18 apartments each); and ten 4-story dormitories (each accommodating 93 students). The openness of the scheme brings light and air into an area of Chicago that has been notably overbuilt in the past. Nor is the campus being developed in a vacuum. One large housing project is in the immediate neighborhood, and insurance companies are considering additional low-cost housing for the area. The panel's one critical observation on the site plan was to question its rectangularity and axial arrangement across 33rd Street. This parti is explained by the architects: "It seemed logical to open up the 33rd Street entrance to the campus as much as possible—to set off the principal entrance... to create an inside mall between the housing and academic groups."

1. FOUR-FLOOR DORMITORY

The consulting panel applauded the plan layout and east-west orientation of most of the dormitory buildings, since this avoids western sun in single-exposure rooms. Chief discussion raged around the arrangement of the individual double rooms. The jury felt that things might work out better with a parallel symmetrical scheme, with beds at either side, giving each student identical accommodations. The architects gave much study to this but developed the present scheme because, as with the other campus buildings, minimums were required to meet the budget, and the adopted plan locates all doors, closets, bureaus, entrances, etc., together, leaving a maximum of uninterrupted wall space—"we felt it better to make one good unsymmetrical room, of more general use to the students, than two 'half rooms' that would be entirely cut up by furniture or doors."
Sketch of TYPICAL LIVING ROOM. Entrance hall at left.

HOUSING CAMPUS, ILLINOIS INSTITUTE OF TECHNOLOGY

SKIDMORE, OWINGS & MERRILL, Architects

2. THREE-STORY, WALK-UP APARTMENT

Of the three main building types, the jury found the three-story walk-ups the most successful. The ingenuity of the scissors type stairway, providing the two exits (and incidentally a service stair) required by the Chicago ordinance, without adding much cubage, was much admired; also the arrangement of the typical apartment plan for privacy and cross ventilation and the economy of back-to-back placement of bath and kitchen. Two of the panel missed storage space for baby carriages, etc., pointing out that the basement storage, while a good thing, is not adaptable to such uses. This problem is admittedly not solved at the moment, but the current idea is to make one ground floor apartment in each entry into a one-room unit, utilizing the space gained for bulk storage. Another juror felt that it should be possible to close off the kitchen. With the minimum square footage available, the architects comment, opening up the dining alcove into the living room gives considerably greater apparent size to the room. Also, with any sensible furniture arrangement, there would be no point from which any seated person would see the kitchen unit.
MODEL. Like the dormitories, the three-story walk-ups are of wall-bearing brick and tile construction, with reinforced flat-slab floors.
The critics were concerned with the orientation of the buildings themselves, with the long axis north-south. One contended that if you must choose but one exposure, north is preferable to the heat and glare of west. The architects answer that it is desirable to have sun in every apartment and that, due to the prevailing summer southwest wind, the problem of unbearable heat is not too pertinent. One critic thought the kitchen unit would be more cheerful if moved up front. True, the architects say, but this would sacrifice the nice shape of the living room with its 21 feet of window and substitute a hotel-room-like affair. Furthermore, they point out, placement near the entrance simplifies handling of garbage and trash.
Critique: MULTI-FAMILY HOUSING

It is quite a jump in building type from a housing campus to the speculatively built house of apartments for rent in a large city. The former has sufficient design restrictions—the budget, the limits of site, and so on. But compared with the commercial, competitive, “for rent” apartment house, these seem slight. For, with the built-up city situation, there is not only the budget, but zoning restrictions dictating maximum plot coverage; height and depth of setbacks; usually, local restrictions on placement of kitchens or bathrooms; the need (so that they will rent readily in normal times) to make the apartments themselves as attractive as (preferably more attractive than) the nearest competitor; and the owner’s sole objective—to make money. Not one cent for amenity or beauty (unless it will clearly pay off). Not the remotest interest in architecture, except insofar as the building will constitute a better than average investment. Maximum rental space at minimum cost. Period.

So, what can the progressive-minded architect do about it? In a great many instances, damn little. Come to think of it, perhaps that is one of the reasons why so few top-flight progressives in this country are distinguished for city apartment work. But here and there evidence proves that, even with the restrictions and stupidity, the apartment house planner can push on and find better ways of doing things and produce better architecture in that category. We think the firm of Berla & Abel in Washington, D. C., deserves special mention in this regard.

Two projects from this firm are shown on the following pages.

THE PRESIDENT
APARTMENTS
WASHINGTON, D. C.

BERLA & ABEL
Architects
REINFORCED CONCRETE frame, with 8-inch masonry walls surfaced with buff brick.

PRESIDENT APARTMENTS, WASHINGTON, D. C.

Located near numerous Government departments, this apartment house is the home (primarily) of young married couples, both of whom work, or Government employees who team up to share an apartment. Hence, most of the units are of the so-called "efficiency" type. Land in this locality is very expensive and therefore the lot had to be developed to maximum potentials. From a lobby with an angled glass wall toward the street, a few steps lead up to the elevator corridor. The typical floor plan consists of a T-shaped corridor (with an offset extension in the rear portion) with one-room apartments opening off at both sides. At the rear is a pair of apartments with separate bedrooms.

Most of the jury discussion was around whether the same
number of units might not have worked out even more happily had the bathrooms and kitchens both had interior locations (either side of an entrance passage) leaving the whole outside wall for the living room. This brings into sharp focus the conflict between design ideals and what is possible. Very likely, the architects agree, but the Washington building code (at the time this apartment was built) required that bathrooms be outside rooms, while mechanically ventilated inside kitchens were allowed. Granted, then, that the baths had to be on the perimeter and kitchens could go inside, the architects developed the plan (with kitchens, dressing closets, and bathrooms in rows wherever possible) to give all possible remaining exterior wall space to the living rooms. While this produces deep rooms, with windows at one end, this is not at all a bad plan for the torrid Washington summers. Another curious Washington idiosyncrasy allows solarium-like extensions beyond the legal building line. This accounts for the windowed extensions at the front of the building, which are used either as dining bays or bedrooms, although tenants pay for only one-room apartments. Large ventilating shafts provide cross ventilation for all interior apartments.

The jury challenged the big dressing closets outside the bathrooms, feeling that, people’s habits being what they are, these would present a disarray; also that steam from the bathroom would not be too good for clothes hung there. This is frankly a choice and a matter of opinion. It would have been possible to provide separate entrances to the closet and bathroom, but “most tenants prefer having the bath open into the closet rather than directly into the living space, as this arrangement provides more privacy.”
The deep lot suggested the basic arrangement of the building, with a sidewalk leading to side entrances. Among plan points discussed were difficulties implicit in entrance to four apartments on each landing and the fact that in many units there are numerous openings and traffic-ways in living rooms. The architects’ answer is that both these matters stem from the reality necessity of making every square foot of rental space count. Had landings been larger, the space would have had to come from the apartments. As to cross-circulation, “this fault is common to this type of grouped-plan building. Any arrangement with better circulation would use much more floor area, and the economy resulting from use of a grouped plan would disappear.” The unusual exterior incinerator stacks were used because (1) the D. C. zoning law allows them without counting against the building area, and (2) if located inside, they would have used some available rental space. In answer to a juror’s question why continuous fenestration was not employed, the architects explain that, without fireproofed lintels, the local code allows openings in wall-bearing masonry up to only 8 feet.
"Where are baby carriages, etc., stored?" asked the jury. "In the basement reached by a rear drive," the architects replied.

PLASTERED HALLWAYS raised the question of damage by movers. Access to incinerators is directly off stair landings.

RESTRICTIONS limited ground coverage to 40 percent; height to three floors.
Critique: MULTI-FAMILY HOUSING

Somewhere between the apartment house speculatively built on an acquired site in a part of town where the real estate gamble is highest, and well considered neighborhood planning, lies the occasionally enlightened development of group housing—individual houses in rows or semidetached, planned in conjunction with landscaped walkways, gardens, and other genial amenities. While it is neither as fragmentary as the isolated apartment building—speaking in a design sense—nor as inclusive as the completely planned neighborhood, it has real importance to those concerned with more healthy community development. For, if well done, this in-between type of multi-family housing can act like the proverbial pebble dropped in the middle of a pond. Its influence is felt in the immediate neighborhood and, in time, the standard over a wide area may be measurably affected. We are pleased to be able to present two such projects, one of row houses, the other of semidetached individual homes, from the competent hand of Gregory Ain of Los Angeles. Then, to complete this month's Critique, we present a most unusual project—a series of three duplex apartment buildings wherein Paul Hayden Kirk of Seattle not only exercises his highly individual design talent but is, in fact, entrepreneur and owner of the group.
GARDEN APARTMENTS, HOLLYWOOD, CALIFORNIA

GREGORY AIN, Architect

Built on two adjoining lots, this row house project consists of 20 dwelling units arranged with the ends toward the street. Between the rows of two-story, two-bedroom units (plus an end unit with one 1-bedroom apartment on each floor) is an access walk, bordered on one side by a high wall enclosing the southern patios provided for each home. Above each of the garage blocks are two 1-room apartments, each with a big outside deck. Our consulting jury had little but praise for the scheme—the cross ventilation; entrance next to stair and separated from living room; centralization of plumbing stacks; and the privacy provided. One juror thought that from the upper row one could look directly into bathrooms of the lower; the architect explains that windows of bath, closet, and stair are of obscure glass. Another felt that kitchen smells would travel readily through the house; all kitchens, however, may be closed off by doors or sliding panels.
MODEL. The houses are at either side of a street running north and south; thus, main living rooms face either east or west. For those houses with living rooms to the west, Garrett Eckbo’s planting scheme (not shown in model) places tall trees at the back of the garden to shade out late afternoon sunlight. Paired garages along the street provide privacy for each house, as well as form the central service and children’s play yard. A dropped clerestory runs three quarters the length of each house, bringing cross light and air to all rooms.
A remarkable project, this 28-house subdivision demonstrates what can be done within the severe limitations of speculative building, real estate custom, and the unintegrated building "industry." By careful planning the architect has achieved some of the economies of prefabrication, although the houses are built piece by piece as usual. For the plans are worked out on an assembly of standard 12' x 16' plan modules, each including two walls and the roof; and while the plumbing lines do not constitute a prefabricated "core," arrangement of fixtures requiring water is closely coordinated. He has further managed to provide each family with privacy, both in a service and play yard and in the garden, and through the collaboration of Garrett Eckbo, landscape architect, insured natural beauty and amenity to the residents of Park Planned Homes. In fact, top priority has been given to the privacy of the individual family, this being chosen in favor of facing living rooms of all houses south. But, with the site plan organized along a north-south axis, he has provided sunlight in every room and (by introduction of an inset clerestory) windows on two sides; hence, cross ventilation and added light in every room.
1. TYPICAL GARDEN FRONT. The landscaping is yet to be done.

DETAIL PLAN, showing 12' x 16' framing plan module, floor plan with excellent circulation, and relation of pairs of houses.
PARK PLANNED HOMES
ALTADENA, CALIFORNIA

GREGORY AIN, Architect

One of the jurors questioned whether the clerestory wouldn’t be difficult to maintain and keep clean. Mr. Ain thinks that at most this would require a good washing twice a year. Clerestories, like the framing elements, are built in 12-foot units, with outer 3-foot sections sliding (by means of cord and pulley) across the fixed central 6-foot unit. Actually, the architect planned the houses so that they would be satisfactory in any orientation. The Altadena site is on a slope, hence retaining walls step down in the center of each paired driveway. The frame houses are stuccoed and have white heat-reflective roofing, as well as aluminum foil insulation in the ceilings.

SECTION. Light and air throughout.

3. FROM A FRONT PORCH to the house next door.

4. LOOKING THROUGH SERVICE YARDS. Note overhead shelter from garage to house.
FROM THE STREET, the duplexes appear to be one-story buildings.

CEDAR SIDING is stained gray; trim is chartreuse or vermilion.
GROUP OF THREE 2-FAMILY UNITS
SEATTLE, WASHINGTON

PAUL HAYDEN KIRK, Architect-Owner
(of Chiarelli & Kirk)

When the architect is also the entrepreneur, something particularly interesting should result; and the three 2-family rental units shown here are a good instance. All three buildings were built from the same plan, though one is exactly the reverse of the other two. The site is 125 feet along the street, with the depth of 90 feet sloping abruptly back to an adjoining wooded public park. Separate placement of the three structures provides service yards between them; front yards are simply entry areas, and the rear gardens (and balconies of upstairs units) overlook the park. Each of the three buildings has (on the street level floor) an apartment of two bedrooms, while garden-level apartments are one-bedroom units. Our consulting panel with one minor exception were enthusiastic about the entire job, the site plan, and the plan of the individual apartments. The one minor exception was to question whether the design of the balcony railing wasn’t too open to be safe for children. The answer is: undoubtedly, but the apartments are at present rented to people without children; if the problem comes up, “another railing could be added.”
MULTI-FAMILY HOUSING

IN UPPER APARTMENTS, continuous windows and a door adjoin the balcony.

THREE 2-FAMILY UNITS
SEATTLE, WASHINGTON

PAUL HAYDEN KIRK, Architect-Owner
(of Chicarelli & Kirk)

As one of the panel put it: "The plan is excellent, providing a maximum of open space for entertainment and living purposes and, at the same time, privacy for bedrooms." Interior walls are plastered; the ceilings surfaced with acoustical insulation material; floor surfaces are hard-board squares. Each unit has its own oil-fired, warm-air furnace, located on the lower floor.

VIEW OF LIVING ROOM from balcony.

ENTRANCE HALLS are well lighted through large panels of obscure glass.
Originally conceived as an answer to the veterans' housing problem, the structural system here presented was at first accepted by the National Housing Agency as a basis for further research. After the change in that Agency's administration it was politely dropped. There is too much value for designers in the scheme, however, to let it pass without comment.

This is one of the few instances in which planning of multi-family housing is thoroughly integrated with the construction system. Its simplicity and extreme flexibility are indicated by the fact that units can be arranged for one-, two-, or three-bedroom layouts; they may have central heat, laundry, and storage facilities, or they may be detached or repeating duplex garden apartments with individual laundry, heating, and garage. Another advantage is that these schemes provide a substantial volume of flexible living space.

Construction is based on several premises: use of conventional materials now in production; establishment of a site production line utilizing labor in a manner familiar to the building industry; elimination of any overlapping of building trades; elimination of cutting and patching (and consequent waste); employment of inert, permanent building products which are both structural and finished. Materials used are not the cheapest available, but the designers believe that direct labor costs, simplicity of material and detail, easy scheduling, reduction in number of trades, and speed of erection will produce economies that will result in lower cost per unit than conventional construction. Considered as a whole, the system requires a minimum of materials which, though in production, are still relatively scarce; and it permits use of materials readily available locally.

The system, fully illustrated on the following pages, is set up in eight successive operations. The first, grade preparation and foundation construction, is quite conventional except that foundations are less extensive than usual. The second employs any available masonry to form dividing walls (including supports for floor and roof systems) which are bearing walls, fire walls, and finished walls; second floors and roofs span between them. The third step is laying the first floor slab, directly on grade; fourth comes installation of second floor and roof panels, of steel, concrete, aluminum, or any other material suitable for the span, capable of being fabricated to size at the factory, and having top and bottom surfaces suitable for applying the necessary finishes.

Fifth is installation of the prefabricated stairs and glazed exterior wall panels. The latter extend from first floor to underside of the roof and are entirely self-supporting. With the structure thus enclosed, step six is the installation of mechanical services; seven, application of finishes, equipment, and prebuilt closets which form most of the partitions. Step eight is simply moving in.

Such a procedure, since it follows customary building practices, alleviates many grievances of labor with respect to unfamiliar techniques. Extremely important is the high degree of job control possible, with its attendant advantages of scheduling, speed, reduced labor costs, reduction of number of subcontracts, and exact quantity surveys. The permanent materials employed reduce maintenance and depreciation and provide a relatively fireproof and verminproof structure.
Plans on this page show the basic strip scheme, which has a studio living room, dining alcove, kitchen, and study corner on the first floor. Second floor may have one or two bedrooms. Mechanical services, installed in a trench below the first floor slab, branch at each of the mechanical spaces shown in the plan to serve two adjacent units. Variations in planning appear on the following pages.
ALTERNATE FIRST FLOOR
Showing individual heater, garage. Second floor can have three bedrooms.

ALTERNATE ONE-FLOOR SCHEME
With one bedroom, individual heater.

Scale for all plans, 1/16" = 1'-0"
ALTERNATE (two-bedroom) SECOND FLOOR

BED ROOM #1
10' x 12' x 7'-6" HIGH
CLOSET AREA, 12 SQ. FT.
FURNITURE
TWIN BED
NIGHT TABLE, 15" x 17"
DRESSER, 25" x 30"
BABY CHAIR SPACE, 20 x 48"

BED ROOM #2
10' x 12' x 7'-6" HIGH
CLOSET AREA, 16 SQ. FT.
FURNITURE
DOUBLE BED
NIGHT TABLE, 17" x 17"
DRESSER, 30" x 36"
DRESSER SPACE, 20" x 36"

ALTERNATE FIRST FLOOR

Strip type with individual heating systems.

Scale for all plans, 1/16" = 1'-0"

ALTERNATE FIRST FLOOR

Slightly more spacious, with individual heating.

STEP 5
ERECT PREFABRICATED STAIR AND GLASS PANELS

STEP 6
INSTALL MECHANICAL SERVICES
ALTERNATE (two-bedroom) SECOND FLOOR

DINING ALCOVE
10' x 13' x 7'-6" HIGH 120 SQ. FT.
FURNITURE
TABLE 36" x 72"
6 STRAIGHT CHAIRS
1 DINING TABLE 90" x 42"

LIVING ROOM
10'-9" x 21' x 7'-6" HIGH 257 SQ. FT.
FURNITURE
SOFA 7'6" x 64"
2 UPHOL. CHAIRS 30" x 36"
COFFEE TABLE 24" x 24"
OCCASIONAL TABLE 24" x 32"
ENTRY 4' x 7', 28 SQ. FT.

ALTERNATE FIRST FLOOR
With separate heater room, other services grouped.

DINING ALCOVE
12' x 12' x 7'-6" HIGH 144 SQ. FT.
FURNITURE
TABLE 36" x 72"
6 STRAIGHT CHAIRS
2 SOFA CHAIRS 30" x 36"

LIVING ROOM
15'-9" x 21' x 7'-6" HIGH 283 SQ. FT.
FURNITURE
SOFA 8' x 94"
2 UPHOL. CHAIRS 30" x 36"
COFFEE TABLE 24" x 24"
OCCASIONAL TABLE 24" x 32"
ENTRY 4' x 7', 28 SQ. FT.

ALTERNATE (three-bedroom) SECOND FLOOR

DINING ALCOVE
12' x 12' x 7'-6" HIGH 144 SQ. FT.
FURNITURE
TABLE 36" x 72"
6 STRAIGHT CHAIRS
2 SOFA CHAIRS 30" x 36"

LIVING ROOM
15'-9" x 21' x 7'-6" HIGH 283 SQ. FT.
FURNITURE
SOFA 8' x 94"
2 UPHOL. CHAIRS 30" x 36"
COFFEE TABLE 24" x 24"
OCCASIONAL TABLE 24" x 32"
ENTRY 4' x 7', 28 SQ. FT.

ALTERNATE FIRST FLOOR

DINING ALCOVE
12' x 12' x 7'-6" HIGH 144 SQ. FT.
FURNITURE
TABLE 36" x 72"
6 STRAIGHT CHAIRS
2 SOFA CHAIRS 30" x 36"

LIVING ROOM
15'-9" x 21' x 7'-6" HIGH 283 SQ. FT.
FURNITURE
SOFA 8' x 94"
2 UPHOL. CHAIRS 30" x 36"
COFFEE TABLE 24" x 24"
OCCASIONAL TABLE 24" x 32"
ENTRY 4' x 7', 28 SQ. FT.

STEP 7
INSTALL FINISHES AND EQUIPMENT

STEP 8
MOVE IN
PART II. This is the concluding portion of an article of great importance to designers, engineering and architectural.

First Applications and Development History

Fabrication of all-welded building frames started in 1920. Welding itself is not new: when two pieces of metal are brought into such close contact that their adjoining surfaces are held within the mutual atomic field of attraction, they will be completely joined. This can be accomplished by pressing two pieces of soft metals (gold or lead) together at room temperature. Iron must be heated nearly to the melting point before such joining takes place; for years this has been done with wrought iron. The same results are accomplished today with more efficient methods.

Only 14 years after the invention of the airplane the first aircraft with welded framing appeared; it took about twice as much time to adapt welding to steel building construction. All-welded bridges were first constructed in 1928. Welding was applied to certain portions of steel building for various purposes even before World War I; that war, like the more recent one, brought about a more widespread use and radical development of welding in shipbuilding and other industrial fields.

Between construction of the first one-story, all-welded buildings in 1920 and erection of the now (from the point of view of welding) historic Westinghouse factory in Sharon, Pa., six years went by. The factory was the first heavy, five-story, all-welded structure; it required 790 tons of steel (in comparison with the alternate riveted design requiring about 900 tons); while in the earliest buildings welding was simply substituted for riveted joints, this building was designed especially for welded joints—its beams and girders were continuous and its plate girders welded. Before construction, full-size models of the more important joints in the Westinghouse plant were tested to destruction. From this date (1926) on, welded structures were built each year at an increasing rate. In 1928 the first welded railway truss bridge was erected at Chicopee Falls, Mass.; it had a span of 135 ft. The first gas-welded construction (Union Carbide Research Laboratories) was built in 1929.

Although most of these examples showed a varying amount of savings in steel as compared to riveted construction, this fact alone did not necessarily result in a reduction of over-all costs. Quite often the reduction of materials has been offset by increased cost due to unfamiliar operations, lack of experience, etc. Later examples, however, show over-all savings of considerable magnitude.

Resistance to Its Acceptance

Although it was thus demonstrated that as the process gained familiarity its potential economies became tangible, welding has nevertheless encountered all the resistances one would expect. Any innovation meets opposition; we need not review in detail a story familiar to all who have followed the development of new materials and processes. Welding, which presupposes use of a familiar material, has probably encountered fewer difficulties than, for instance, reinforced concrete, in which both the materials and the techniques were once unfamiliar.

But this semi-familiarity is also a drawback: for this very reason welding is not always recognized as a process important enough to command special attention. Consider a late edition (1943) of a well known 629-page textbook on structural members and connections, in which welded connections are disposed of in a summary two pages. This tendency, to consider welding merely a substitute for riveting, is not only a disadvantage to the process. At the very least it is a limitation on progress in structural design; and even if the approach could have been considered justifiable early in the technique’s history, today it is indefensible.

Photos left and below (courtesy Westinghouse Electric Corp.) show the first multistory building designed to be all-welded: Westinghouse Plant, Sharon, Pa., built 1926. About 110 tons of steel were saved by using welding rather than riveting. Bridges at right (photos courtesy Lincoln Electric Co.) are typical of many all-welded secondary road structures in the Middle West. Building at extreme right (photo courtesy Lincoln Electric Co.), a 13-story addition to the Chamber of Commerce Building, Houston, Tex., shows a combination of riveting and welding. Framing was shop-riveted, but assemblies were field-welded for noiseless construction.
Resistance to full exploitation of welding due to the complexity of stress calculation has been discussed. Recently there has been some standardization of welding details, which is contributing to a wider acceptance by structural engineers (see Grover, Manual of Design for Arc Welded Steel Structures).

If World War I gave the initial impetus to welding, the second war laid down fundamentals for further advancement and general acceptance. During the war the steel saving aspects of welded structures became of vital importance. At the same time, a number of structural steel fabricating shops converted to the fabrication of barges, various parts of ships, and other military construction, all requiring welding equipment and skills. Despite the reluctance of some larger fabricators to reorganize their plants for welding operations, there are now a sufficient number of smaller shops well organized and equipped to undertake structural steel welding economically and reliably. This makes it possible to execute large portions of welded structures in the shop, thereby increasing the savings which can be achieved. The accelerated training and wide use of personnel during the war will also provide sufficient trained, experienced operators and inspectors.

The attitude of the architect has much to do with the acceptance and use of welding. If structures are initially conceived as welded, they will be more likely to succeed practically and esthetically than the ones in which the decision to use welding or riveting is left almost to chance.

The Role of Building Codes

Before 1940, welding of structural steel in buildings was not generally permitted in city building ordinances, although some notable exceptions had been made. New York allowed, in 1920, the erection of its first welded structure; Chicago permitted the construction of a shop-welded parking garage in 1931. At present about one hundred larger cities have provisions in their codes for welding. However, a number of large cities still require special permits, as for instance, Boston, Mass.; Dallas, Tex.; Los Angeles and San Francisco, Calif. Welding of steel buildings is approved by the U. S. Government and was usually required as a steel-conservation measure during the war. For the control of welding in fabricating steel frame buildings the American Welding Society adopted and issued a code for Arc and Gas Welding in Building Construction, which has just been revised and reissued. This code deals with the welding process itself. The American Institute of Steel Construction has adopted Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings. These specifications accept the provisions of the AWS code. The quality of the structural steel and of welding electrodes is specified by reference to standards of the American Welding Society for Testing Materials; the AWS code provides for allowable weld unit stresses equal to those allowed for the steel being welded.

Worthwhile noting is the fact that sufficient experience has accumulated to permit both metal arc and gas welding to be given prequalified status in the AWS code and AISC specifications, provided the familiar procedures are adhered to. Certain types of joints are equally prequalified. Whenever such prequalified joints and processes are used, in view of the established record of satisfactory performance, no further evidence is required as to their performance. The Code states, "... it is not presumed that these are the only procedures that might be employed ... When other procedures are proposed they are subject to qualifying tests ..." These provisions greatly simplify the work of the designer, but on the other hand, of course, do not encourage the practicing engineer to look toward their adaptation, nor toward new developments. One must admit that it is difficult to avoid such clauses, and their positive effect is probably important today.
Architectural Expression of Welded Structures: Potentialities

In light of present-day practice, code restrictions, and welding techniques, there is no doubt that the opportunity for full expression of welding's characteristics is limited. The multistory frame building, the skyscraper, reflects only the basic characteristics of structural steel—large spans, slender columns, etc. Although continuous girders, cantilevers, and the like (which, if properly applied, will increase the structure's efficiency) are characteristic of welded structures, their advantages can also be obtained with riveting. Cantilevers do not necessarily result from welding. Over-all savings in steel do result in added lightness, but such reductions in dimensions may not be appreciable in a finished building whose framing is embedded in "fireproofing" or otherwise camouflaged. The airiness of the steel skeleton is usually lost in the finished skyscraper—and with it the ingenuity of the engineer.

Exposed framing—rigid frames and other structural members—affords more opportunity to exploit welding's characteristics. The simple appearance of the welded joint, in which only the essentials are apparent; the straightforwardness of column-girder connections; truss-member connections in which the heavy gusset plates of riveted construction have no part—these characteristics can be emphasized and are safe to expose, not only because they possess distinctive qualities of form but also because they are less susceptible to corrosion.

The typically handicraft nature of the man-made weld, and even the less irregular automatically welded joint, reflect the characteristics of the process just as the marks of the chisel are visible in stonework. The typical formations of the hardened melted metal are as much visible as the grain on a piece of lumber. This irregularity is in strange contrast to the machine-like exactitude of the pieces joined, and to the complexity of welding equipment. Yet the irregular weld is minute in comparison to the large geometric shapes of the structural framework, which might indicate that such an approach is unnecessary refinement. I do not know of any technical-aesthetic experiments of this kind, either in architecture or in the field of industrial design of smaller objects; but might not such an approach be profitable?

The fact that welded steel structures have not yet found their individual forms of expression might be ascribed to these objective limitations. If this is the case it is not deplorable, nor does it need to be remedied. But the subject need not be so summarily dismissed; other structural technics than welding, and other industrial developments, have benefited from the techniques and experiences of unrelated fields; an investigation of the applications of welding in fields other than structural may be beneficial. Immediately the discussion is thus broadened there arise such possibilities as the use of other than arc or gas welding techniques; applications of structural shapes specifically designed for welding, use of sheet metals, etc.

Standard structural shapes have been developed especially for use in riveted steel buildings. Without going too far into this question, it is safe to assume that some shapes used in welded structures should be different. As an example, the desirability of special shapes for chord members in welded trusses can be cited. At the chord several members are joined, which requires a flat surface to accommodate a sufficient length of weld. At present this is usually accomplished in one of two ways: either a gusset plate is used, which means additional weight; or standard I-beams, split lengthwise along the center of the web, which of course requires the additional cutting operation. The special shape would be a Tee section with a web sufficiently long to accommodate the members to be connected.

Whether such differences will be expressed in new forms to such a degree as to merit architectural attention is difficult to predict; a noticeable difference would seem unlikely since the form of the structural shape is governed to a great degree by requirements of the statically efficient cross-section. Then, too, there are manufacturing difficulties, some due to the nature of the material, others to the economics involved; but our economic history is one of production of the "impossible" when the demand has become urgent.

An important exception to such a statement might be more widespread use of tubular shapes. The tube section is highly efficient in compression and offers equal resistance to bending in all directions. Efficient connection of such elements is possible only by welding. This fact was recognized in aircraft structures, where most motor mounts consist of welded tubular members. The lightness and rigidity of the motor mount suggests many possibilities for other structures. (Incidentally, analysis of these statically indeterminate structures is considerably more complex than the analysis of the even "so difficult" multi-story rigid frame.)

In connection with special shapes, the use of metals other than steel should be considered, especially aluminum. Welding of this metal has progressed rapidly in recent years, and its application to structures, even bridges, is now being explored. The different characteristics of the metal itself and its adaptability to extrusion, in conjunction with the special requirements of welding design and operation, might lead to structural shapes of quite different design than steel requires.
The use of sheet steel is an equally stimulating subject for investigation. The design of stiffened thin sheet constructions has also advanced during the war through the necessity of designing large, rigid aircraft structures. Although such structures, when built of aluminum, have usually been riveted, a comparable application of steel in various forms suggests high-speed spot and seam welding. Sheet metals have already been employed architecturally—functionally and structurally—in some steel and aluminum prefab houses. Sheet metal in welded stiffened plates, or non-rigid shells, for larger constructions is only one step removed from existing small metal houses.

Comparison with cylindrical or spherical welded pressure-vessels, tanks, or containers suggests welded sheet metal as the ideal combination of material and process for an architecture which would exploit the potentialities of large unbroken curved surfaces.

The road starting from the “column-girder” structure (which is basically one-dimensional) and leading through the two-dimensional rigid welded frame to the three-dimensionally conceived and designed welded sheet-metal structure, is certainly logical. Whether the pattern of development will traverse this straight road is unpredictable. For the immediate future it would seem desirable to focus our attention on clean structural solution and honest expression of the rigid welded frame. Development rarely follows cold logic. The structure combining the rigid frame with special structural shapes, emphasizing and exposing the texture of the arc weld, a product of the human hand, and contrasting it with the regularity of the automatically produced stitches of the spot weld on the three-dimensionally-curved sheet-metal surface, may eventually emerge. It will certainly present a startling new architecture, a true expression of our mechanized and complex civilization.

BIBLIOGRAPHY


Such structures as these spheroids demonstrate the possibility, not yet realized in building construction, of employing welded sheet metal structurally. The curved shape imparts rigidity to the sheets. Upper left, 12,500 bbl Hortonsphere; lower photo, 80,000 bbl Hortonspheric, both in Texas oil fields (photos courtesy Lincoln Electric Co.). Upper right, an early “atom-smasher,” of all-welded construction (photo courtesy Westinghouse Electric Corp.).
Adjusting duct openings of the new Exhaust-Water Spray Fire Protective System.

System in operation: smoke and gases from the roaring fire below, instead of entering the stairwell, are cooled and drawn out of the test building.

System not operating: with exhaust fans shut off, smoke and gases begin to pour up the well.

**FIRE-PROTECTION SYSTEM**

**DEVELOPED JOINTLY BY OTIS, WESTINGHOUSE, GRINNELL**

Loss of life in the recent series of disastrous hotel fires has apparently been due in great part to toxic smoke, combustion gases, and heat sweeping up flue-like stairwells and other openings to upper floors of buildings. An obvious answer might seem to be completely enclosing such well-ways; in fact, some building and fire codes now require this. But there is hot debate on the value of the enclosed shaft, which becomes, so some experts say, a perfect flue when a lower-floor door is opened. With an enclosed stair, people seeking escape from fire would have to open a door to the shaft, and not only might a panic develop at the entrance, but also toxic gases would be admitted to the shaft.

Otis Elevator Company and Westinghouse Electric Corporation, manufacturers of elevators and moving stairways (Westinghouse also makes ventilating equipment), and the Grinnell Company, Inc., fire-protection equipment manufacturers, have pooled their facilities to devise a means of protecting open wells against these two hazards. Illustrated at the left, the system they have jointly developed draws off the products of combustion and exhausts them to the roof through insulated ducts; at the same time, the open well is curtained off by a wall of water at whatever floors are necessary, and the exhaust suction draws fresh air down the shaft from an intake located directly above it. This reverses the natural flow of air, inhibiting the updraft or flue action which might otherwise spread poisonous smoke through the building.

The system also operates automatically and instantaneously in several other ways. The sprinkler system applies water to the seat of the fire and to new areas to which fire may spread. The fire department is called and Escalators are stopped and made useful as emergency exists.

If a flash-fire should develop, causing flames and gases to penetrate the water curtain, a reserve set of high-velocity waterspray projectors comes into operation to seal the well against further penetration. In addition, the system prevents the building from being entered by smoke and heat.

G. N. Thompson, National Bureau of Standards; Lt. M. C. Hope, U. S. Public Health Service; H. L. Schaller, plumbing journeymen and apprentices' representative; V. T. Manas, NHA.
up of explosive pressures in the area where the fire starts; dissipates heat from the fire and cools the gases; shuts down the air conditioning system, preventing recirculation of fire gases and smoke; isolates the fire; and provides ventilation to assist firemen in entering the fire area and fighting the fire.

Any one or more of several available devices may be employed to operate the system. The opening of the first sprinkler head near the fire may put the whole system into action, or it may be started by thermostats, photoelectric smoke detectors, or heat-sensitive rate-of-rise devices. These should be supplemented by a manual push button for testing and for emergencies.

None of the three companies who undertook to solve this problem plans to offer the system as a packaged unit. It is contemplated that installations will be made under the direction of consulting or designing engineers. The companies’ engineers, however, will cooperate with others in designing projected installations to insure their proper functioning. Essential performance characteristics will be made available so that applications can be individually designed to meet any given set of conditions.

Convincing demonstrations of the new system have been made privately to such official and semi-official organizations as the National Board of Fire Underwriters, New York Board of Standards and Appeals, insurance company laboratories, National Fire Protection Association, National Bureau of Standards, and others. A public showing and series of demonstrations are being held. Tests have been made in a steel-framed, tar-paper-covered building at the Grinnell laboratories, in which mock-up escalators were installed, one over another. Large pans of alcohol and other combustibles were set afire on the first floor around the well. Photos, left, above, show how well the system operated. Further information may be obtained from Grinnell Company, Providence 1, Rhode Island; from Otis Elevator Company, 250 Eleventh Avenue, New York, New York; and from Westinghouse Electric Corporation, 40 Wall Street, New York, New York.

**THIS MONTH’S PRODUCTS**

**AIR AND TEMPERATURE CONTROL**

**Splend-Aire.** Portable electric window ventilator, supplies 12 air changes hourly. Fits windows—22” to 27”, 24” to 31”, and 27” to 36” wide. Installation does not interfere with window operation. Metal-Tex Corp., 1600 Junction Ave., Racine, Wis.

**Rect-O-Valve.** A “straight-through” powered roof ventilator with a propeller fan to exhaust heat, fumes, smoke, etc., through a divided top that opens and closes automatically. Made in five sizes. The Swartwout Co., Cleveland, Ohio.

**DOORS AND WINDOWS**

**Hines Windows.** A new window featuring removable panes for cleaning. Set in aluminum and stainless steel frames with small mullions; affords 33% more ventilation as top and bottom panes open entire area. May be used individually or in tandem; simple to install in concrete, masonry, frame, or metal walls. Hines-Frederick Corp., Inc., 1026 17th St., N.W., Washington, D. C.

**Gladaway.** Sliding door unit without rollers, designed for standard 4” walls, available for both single and double pocket openings. Frames also available in stock sizes to fit various door widths and heights; door of any design may be adapted to a frame if not more than 1¾” thick. U. S. Plywood Corp., 55 W. 44th St., New York, N. Y.

**ELECTRICAL EQUIPMENT AND LIGHTING**

**Tulox Fluorescent Diffusers.** Tulox tubing of Tenite extruded in transparent colors for diffusing fluorescent lighting. Installed by slipping tubes over standard fluorescent lamps. Extruded Plastics, Inc., Norwalk, Conn.

**Hinged-Glass Aristotile.** Luminaire with hinged-glass diffusers that swing open, for ease of cleaning and relamping. Available in 2, 3, or 4-40 Watt sizes, can be mounted individually or in continuous rows. Edwin F. Guth Co., 2615 Washington Ave., St. Louis, Mo.

**MATERIALS OF INSTALLATION**

**Prolyt.** An aluminum solder used to solder aluminum to aluminum without a flux or flux substitute. Restated sheathing after 250 hr salt spray corrosion test. Also showed excellent luming and electrical properties. Aluminium Solder Corp., 10 E. 52nd St., New York, N. Y.

**Chromedge Trims.** Metal trims of channel strip, also threshold weather strips. Channel strips available in three sizes for all standard gages of plate glass. Weather strips designed to fit door bottoms of any size or thickness. Are drilled and counter-sunk assuring flush installations. Available in 32, 36, 42, and 48” lengths. B & T Metals Co., 425 W. Town St., Columbus 6, Ohio.

**NON-LOAD-BEARING STRUCTURES**

**Welchboard.** Plywood with a smooth, relatively hard, durable surface in the color of the wood from which it is made but without grain pattern; suitable for outdoor or indoor use. Will be available to the public within the year. Douglas Fir Plywood Assn., Tacoma 2, Wash.

**SPECIALIZED EQUIPMENT**

**Tip Toe Iron.** A lightweight electric automatic iron with a hinged sole plate at tip for ironing gathers, ruffles, pleats, etc., has its own cast-in tubular heating element. For regular ironing tip connects with rest of iron making a total of 29 sq. in. sole plate. Has a ten thousand cycle reversible cord. Yale & Towne Mfg. Co., Empire State Bldg., New York 1, N. Y.

**SURFACING MATERIALS**

**Stryon Tile.** Thin, lightweight plastic wall tile in variety of colors. Said to be non-warping, non-checking; color is all the way through. Can be installed on new or old walls, Dow Chemical Co., Midland, Mich.

**Hardwood Flooring.** Three-ply, cross-laminated hardwood flooring available 12” wide and in any length. Made in a continuous glue press from small-size, cell-type hardwood logs. Best part is used as top layer, remainder as other two layers. Laminated Wood Products Co., Knoxville, Tenn.

**TRAFFIC EQUIPMENT**

**Lockstep.** A permanent, fireproof, sectional steel stair unit of fourteen treads. Can be erected in about 90 minutes. The Home-Ohio Corp., 9 South Clinton St., Chicago 6, Ill.

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Left: Production of Welchboard, new plywood product of the West Coast Plywood Co. Waterproof exterior-grade plywood is surfaced with a layer of ground wood waste and resin binder to make it suitable for the finest of finishes. Right: Welded wood construction. A pair of motorized gates to an estate in Bel Air, Calif., designed by Paul Robinson Hunter, architect, are made of ½” plywood bonded to a wood frame with waterproof glue (also used to assemble the grille); the entire assembly was cured with the high-frequency Woodwelder perfected by Jack Cunningham of the Short Wave Plastics Forming Co., Burbank, Calif. No nails were used.
MANUFACTURERS' LITERATURE

Editor's Note: Items starred are particularly noteworthy, due to immediate and underlined interest in their contents, to the conciseness and clarity with which information is presented, or to announcement of a new, important product, or to some other factor which makes them especially valuable.

Air and Temperature Control

1-115. Open for Inspection (Bul. AE-247), Bell & Gosssett Co. Reviewed June.
1-119. Night Cooling of Industrial Buildings (Form 1104W), 4-p. illus. booklet on cooling plants at night by using self-cooled motor propeller fans to draw cool air in and exhaust foul air. To be installed in windows, walls, skylights, etc. Ilg Electric Ventilating Co.
1-117. Radiant 'Sun Warmth' in Every Room (Form 3089), International Heating Corporation. 24-p. illus. booklet on the selection of and application of electric appliances; principles of planning a modern kitchen and laundry, and essentials of modern wiring, including a layout of control centers, feeders, and circuits for a house. Westinghouse Electric Corp.
1-120. Enjoy Better Living With Radiant Sunny Warmth, 21-p. booklet on four applications of radiant heating for houses. Essentials of good heating, selection of heating system, and principles of radiant heat. Operating data and installation data. Institute of Boiler and Radiator Mfrs.

Doors and Windows

4-93. How To Make The Most of Your Cellar, The Bilco Co. Reviewed June.
4-88. Prestomatic Industrial Doors, Clark Door Co., Inc. Reviewed June.
4-95. Aluminum Windows of Alcoa Aluminum, 6-p. illus. booklet on aluminum double hung and picture windows in stock sizes; four different muntin arrangements. Full-sized details, installation data, and specifications. Cupples Products Corp.
4-96. Something New in Windows, 6-p. illus. folder on a window featuring removable panes set in aluminum and stainless steel frames with minimal muntins. Top and bottom panels open entire areas providing 33% more ventilation. Details for installing in concrete, frame, or metal walls. Hines-Frederick Corp., Inc.
4-94. Space-Saver Kennetrack for Interior Sliding Doors, Jay G. McKenna, Inc. Reviewed June.

Electrical Equipment and Lighting

5-80. Leader Modern Lighting, 36-p. illus. folder on line of fluorescent luminaires for industrial and commercial use. Can be mounted individually or in continuous rows, suspended or direct on ceiling. Installation details, specifications, price list. Leader Electric Mfg. Corp.
5-81. A Miracle of Light (Form 107), 4-p. illus. folder on fluorescent lamps, describing the four shades of fluorescent light available and recommending uses for proper balance for display and interior store illumination. Lustra Corp. of America.
Four booklets from Stromberg-Carlson. Reviewed June:
5-76. Sound Systems for Churches.
5-77. Sound Systems for Hospitals.
5-78. Sound Systems for Industrial Plants.
5-79. Sound Equipment for Schools.
Two booklets on efficiently planning a complete modern electric wiring system for a farm or school, and specifying the materials with National Electric Code. Wiring design for interiors and exteriors of farm houses and farm buildings. Westinghouse Electric Corp.
5-83. Farmstead Wiring (B-8374), (25 cents per copy—make check or money order payable to International Headquarters, Inc.) Reviewed June.
5-84. Putting Electricity to Work On Your Farm (B-3524).

Finishers and Protectors

Two booklets from Pittsburgh Plate Glass Co. Reviewed June:
6-94. Pittsburgh Color Dynamics for The Home.
6-95. Pittsburgh Color Dynamics in Industry.
6-97. Prufcoat Protective Coatings, 4-p. illus. booklet on a protective coating against weather, acid, water, etc. Can be applied by brush or spray to masonry, metal, or wood. Application directions. Prufcoat Laboratories, Inc.
6-96. Hydrocide Colorless (BP-3007), L. Sonneborn Sons, Inc. Reviewed June.
6-98. Tamms Agrassale, 4-p. illus. folder (3½ x 6¼) on a new waterproof brush coating for exterior or interior application to cinder blocks, lightweight aggregate, and concrete blocks. Application and mixing data; advantages, colors available. Tamms Silica Co.

Insulation (Thermal, Acoustic)


Load-Bearing Structures

12-116. Facts You Should Know About Prefabricated Houses, 10-p. illus. booklet (5½ x 10) providing a brief summary of available information on prefabricated houses. Said to cut construction costs; can be bought or rented. Typical layouts, erection data. Irvington Form & Tank Corp.
12-119. Rigidized Metals (Bul. 447), 12-p. illus. booklet explaining a process that redistributes metal throughout sheets of stainless steel, aluminum, copper, brass, etc., thus strengthening, rigidizing, and producing a textured pattern on the metal. Use eliminates "waving," etc. Designs and uses of Rigidized metals. Rigid-Tex Corp.

Materials of Installation

13-55. Spartan Adhesives, 4-p. illus. booklet on four types of glues for setting floor, wall, and acoustical tile, putty, and plaster. Directions for use. Sparta Ceramic Co.
Non-Load Bearing Structures

14-36. Rambusch Block de Cor, 4-p. illus. booklet on decorated glass blocks. Designs and color in any pattern is applied to standard glass bricks. Said not to fade, can be washed, light is transmitted, colored and diffused. Rambusch Craftsmen.

Two books from Reynolds Metals Co., Inc. ($2.00 for both sections—make check or money order payable to Reynolds Metals Co., Inc.): Reviewed June.

Sanitary Equipment. Water Supply & Drainage

19-122. B. J. Hydropress Pump (Bul. 46-600C), Byron Jackson Co. Reviewed June.
19-123. Delany Flash Valves, Coyne & Delany Co. Reviewed June.
19-132. Prefabricated Insulated Pipe Units (Form 1628), 14-p. illus. pamphlet of specifications for underground steam and hot water distribution piping with prefab pipe conduit. Tables and dimensions for one or more conduits in a trench, details and dimension charts for loop expansion and maximum conduit capacities of wrought iron and steel pipe sizes. The Ric-Wil Co.
19-134. Sizing the Job in Electric Water Heater Sales, 6-p. illus. pamphlet on selecting proper sizes of hot water heating equipment for residences. Selection tables, construction details, specifications. D. W. Whitehead.

Specialized Equipment

19-126. Architect's Handbook, AIA 35-D, Bendix Home Appliance Co., Inc. ($2.00 per copy—make check or money order payable to Bendix Home Appliance Co., Inc.) Reviewed June.
19-137. Rex-Weld, 4-p. illus. folder on flexible bronze gas range connections that allow ranges to be moved close to wall; painting and cleaning can be done without disconnecting gas. Installation data, specifications. Chicago Metal Hose Corp.
19-138. Kaiser Dishwasher, folder on operating characteristics of the Kaiser Dishwasher which employs the "venturi-jet-propelled" principle, multiplying the hot water pressure to four times natural force as it sprays the china and whirls dishbasket. Kaiser Fleetings, Inc.
19-139. Youngstown Kitchens, AIA 35-C-1, 6-p. illus. booklet on arranging wall, base, and sink cabinets for efficient kitchen plans. Typical layouts, dimensional details, and specifications. Mullins Mfg. Corp.

Surfacing Materials

19-140. Marlite for Interiors, 8-p. illus. booklet on factory-finished wall and ceiling panels of Masonite tempered Preswood base with a hard flexible plastic surface. Installation details, general specifications, color chips and patterns available. Marlite Wall Products, Inc.
19-142. Vitrolite Glass Facing (V-126), 10-p. illus. booklet on Vitrolite—opaque structural glass 11/32" or more in thickness for use on walls, storefronts, and other vertical or horizontal areas. Colors, thickness, and finishes available. Installation data. Also Glastone, a glass-faced lightweight masonry unit. Libbey-Owens-Ford Glass Co.
19-130. Concrete Floors Designed for Comfort, Research Study 13, John B. Pierce Foundation. (35 cents per copy—make check or money order payable to John B. Pierce Foundation.) Reviewed June.
19-137. Q-Panels, AIA 12-1, (Q-22), H. H. Robertson Co. (See No. 14-37 under "Non-Load Bearing Structures.")

Traffic Equipment

20-10. Electravator, 4-p. illus. brochure on modern electric dumbwaiters for use in commercial and industrial installations. Powered by 1 hp 1750 rpm motor providing a lift speed of 35 ft per min. Installation and operating data, specifications. Electravator Corp.
20-41. Lamson Conveyors (Form 746), 4-p. illus. booklet on conveyor systems for use in industrial buildings. Brief operating and dimensional data. Lamson Corp.

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REVIEWS

FROM THE TECHNICAL PRESS

JOHN RANNELLS

FROM OTHER PUBLICATIONS


The author gives a picture of the problem of noise reduction as it exists now. A subject that "creates its own myths," its importance is generally either overestimated or underestimated but not generally understood. The major risk likely to be run is that planning is the introduction of loud noise sources into a relatively quiet background.

"Background noise" is illustrated by three empirical "acoustic climates": (1) urban, having sustained traffic noise; (2) quiet rural or suburban, exposed to aircraft noise; (3) industrial, having traffic plus factory noise.

A loud, familiar, nonirritating background may be a blessing in disguise, cutting out a great deal of intruding noise which would otherwise be a nuisance. In architectural practice a comparatively lightweight partition will serve in city offices and will not do at all in the home. In town planning the noise menace is noise which is intrusive relative to the background. In regional planning the aim is to alter the background.

An assessment is made of noise nuisance from various sources in defense not only of loudness but also of frequency or irregularity and pitch make-up. Suggestions for planning include consideration of zoning distances of housing from main traffic arteries, railroads, etc., city super-blocks of offices and industrial work-rooms planned away from the surrounding streets, etc. Again the British architects are tackling a problem broadly and telling each other about it.


This paper enumerates the various considerations that arise in planning urban dwellings under the British Housing Acts; discusses variations in plan forms resulting from considerations of orientation, methods of heating, use of elevators, etc.; refers to questions of refuse disposal and clothes washing, provisions of clubrooms, workshops, etc.; and suggests some solutions.

Separate space heating of apartments still predominates, with separate hot water systems for each apartment a general practice. However, the need for stringent economy in fuel is rapidly bringing about the use of central heating.

The author is not too enthusiastic about the changes in plan type which will be brought about by subsidized lifts. The greater number of apartments per lift will be poorer apartments than "the twin-flat type with its acknowledged superior virtues" of sunlight, through ventilation, and comparative privacy.

The British are tackling their housing problem seriously and this report and subsequent discussion give a good overall view of housing in urban areas in England.

HEATING


This is the report of a session called "to bring out useful information and to clarify Society (ASHVE) thinking on the subject of panel and radiant heating." To the interested architect it gives a lively "inside" look at this fascinating development.

The distinction is not too finely drawn, but in panel heating both radiation and convection are taken into account, while in radiant heating only the heat radiated from panels is effective. Yet the term radiant heating is frequently used to include both. The British term is panel-warming.

The engineers were concerned with temperatures of floor and ceiling panels, controls and time lag, fuel economy (there isn't any except with high ceilings), etc. They left their technical lingo in the office so any layman can read this report with pleasure.


Similar houses, differing only in window area, were studied together in terms of economy of heating. In mild weather the "solar" house showed a saving, in severe weather a loss. Final data for the entire season have not been reported and it was not then possible to predict which will have the least seasonal heating cost. (See also Progressive Architecture, May 1947.)


This report (which was reprinted in the February and March issues of Heating and Ventilating) gives thorough data on air temperatures at various levels in the various rooms of a four-room bungalow built to test temperature distribution obtainable from various types of heaters. No cost data are reported, so the uniformity of temperates obtained by some systems cannot be evaluated intelligently. There are no conclusions drawn from the results and it is exasperating to try to dig sense out of the various tables. Perhaps later reports will combine with this one into something useful.

MANUALS, PAMPHLETS

Daylight in School Classrooms. Hugh Paul. Owens-Illinois Glass Co., Ohio Building, Toledo 1, Ohio. 72 pp., 8½" x 11", diagrams, tables, index. Free

This study is based on data from a special lighting laboratory set up at the University of Michigan. Starting with examination of existing methods of daylight transmission, distribution, and measurement, the study proceeds to examine all-over interior illumination under various outdoor light conditions. The goal of full daylight utilization with low brightness contrast seems to have been met with the use of prismatic block in the upper portion of the window wall.

The bulk of this publication is concerned with the results of Owens-Illinois No. 351 (prismatic) blocks above a strip of clear windows. Detailed performance diagrams and sample formula and tables are given for calculating task brightness in any part of a sample classroom for any hour and any sky condition for various orientations and for any latitude in the United States. The same data could be used equally well for an office or workroom. This book (or inflated booklet) seems a rather large handling for just one somewhat limited solution of the daylighting problem. The solution, by the way, is not as recent as the author intimates (10 years). Prismatic glazing for throwing daylight into deep stores was on the market at least 35 years ago.

The presentation of material in this study is a beautiful job of graphics making it a pleasure to work with.

Grid Lines. Published Monthly by Modular Service Assn., 110 Arlington St., Boston 16, Mass. 8 pp., 8½" x 11", illus. Requests accepted for placement on the mailing list.

(Continued on page 90)
QUESTION: What is the best way to determine locations of expansion joints in sheet copper construction?

ANSWER: Use the chart on page 28 in Revere's Manual of Sheet Copper Construction*

A CHART which makes it easy for you to determine the correct gauge copper for any gutter lining as well as the maximum distance that may safely be used between an expansion joint and a fixed point is one of the important results of Revere's extensive sheet copper research program. This chart and simple instructions for using it are on pages 28-29 in Revere's 96-page manual of sheet copper construction.*

This booklet is filled with new facts which enable you to design or install gutter linings, flashings and roofs that give extra years of service. It is complete with charts, illustrations and detailed information so arranged that you can read and apply final figures that insure the finest sheet copper construction.

This book has been widely distributed to architects and sheet metal contractors, and in all probability it is in your office files. Be sure to refer to it. If you do not have a copy, write for one now on your office letterhead.

For further information or assistance with the design or installation of sheet copper, the Revere Technical Advisory Service, Architectural, will be glad to help you.

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The Sloan house uses the entire floor area as a radi-

Servel-conditioned air emerges from this specially designed grille below living room windows to form a solid curtain between pane and room.

Air returns to the Servel All-Year Gas Air Conditioning unit are conveniently placed in the attic.

Heart of the solar-radiant heated Sloan house is the Servel Conditioner. At right is Servel Ball-Type Gas Water Heater.
in first all-sealed house

ant heating panel. Six separate ducts bring air from the Servel Conditioner to six plenum chambers under the various rooms. Openings under windows allow conditioned air to circulate from bottom to top of glass areas. It returns through openings in the ceilings. Outside air for ventilation is taken through unit, where it is cleaned and conditioned before being delivered to rooms.

The air supply ducts for the six zones in the house are equipped with splitter dampers where air leaves the Servel All-Year Gas Air Conditioner. Thus the flow of air to zones can be adjusted to provide the most desirable year-round temperatures in each room. What's more, distribution of heat generated by the sun is assured by the fan operating continuously in the Servel unit. In this way all rooms are kept at uniform ideal temperature and humidity, in winter as in summer.

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In addition, the use of fixed windows eliminates window screens, window hardware, weather stripping as well as the need for a screen porch. Mr. Sloan states that "the economies in design and construction made possible by the Servel All-Year Gas Air Conditioner actually made it cost little, if any, more than an ordinary heating system!"

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The Servel All-Year Gas Air Conditioner is already operating successfully in hundreds of installations from coast to coast. Some have been running for more than seven years. The equipment is tried, tested . . . and approved by users everywhere.
REVIEWS

(Continued from page 86)

Beginning with the April number this circular is being distributed to architects and the building industry to further the American Standards Association project A62. It is published with the cooperation of the Department of Commerce. Continuing development of modular products will be reprinted and modular details used in actual construction projects will be reproduced.

This monthly bulletin promises to be a most effective means of spreading the gospel of modular coordination. It will certainly be the best means of keeping architects and builders informed as to the continuing development of modular products.

The first issues are attractive and rich in information.

Prefabricators and Prefabricating Systems. The Housing Institute, Inc., 850 Fifth Ave., New York, N.Y., 1947. 25 pp., 6" x 9". $1.00

A listing of a hundred or more companies throughout the country which are supplying prefabricated material or complete houses, with a brief description of each company’s contribution.

BOOKS

PLANNING FOR HUMANITY


Most books on city planning seem to consider a plan as an autonomous, almost unconditioned fact existing in a human vacuum. They aim at efficiency without asking “efficiency for what?” or at amenity without defining amenity in life terms. Communitas is a superb antidote to such thinking, for its authors have seen, as Geddes and Mumford have seen, that, since life quality is the end in view, all plans—architectural, municipal, or regional—must be criticized according to the kind of human lives they will engender.

Such a book can be no mere analysis of the mechanics of building or transportation or land subdivision, for it must cut relentlessly through means to ends. Since it is the quality of human living that is at stake, planning is necessarily a political and ethical activity or voting or education, and any basic political and ethical decisions will conversely determine city and building forms. The Goodmans have given this general theory exciting and definite form.

On this basis they criticize many existing plans, both practical (that is, merely ameliorative, merely crystallizing still further present evil trends) and impractical (that is, working out certain ideals to their logical conclusions). They start with the basic assumption that we are in a surplus economy and that this fact gives us an opportunity to change; it makes society plastic. And they seize upon the relation of industrial production to human lives as the most important unsolved question of the day. They show how Le Corbusier’s Ville Radieuse brilliantly diagrams a world of high capitalism; how suburbianism and the garden suburb alike are dependent on the basic concept that factory work is intolerable though necessary (something to flee from in loathing); how Buckminster Fuller’s daringly consistent utopia ends up in a concept of isolated, unsocial individuals making more and more things for no true social use. Similarly they assay the Moscow Plan, the Collective Farm system of Russia, the Kvutzah of Palestine, and the TVA. Only in the last three is there apparent that true inventiveness, that careful subordination of means to an ideal of more creative individual living, which alone can better the lives of men.

But this historical and critical background serves only as the preface to the most exciting portion of the book—

(Continued on page 92)
A NEW, BETTER GENERATION OF A DISTINGUISHED FAMILY...

The Complete Line of
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Smart and compact for small home installation in kitchen, basement or utility room.

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the attempt to define the kind of plan which would result from the intelligent adaptation of basic economic and ethical systems to the aims of fuller human living. The authors show three such schemes, based on three concepts: one, the development of "Efficient Consumption," based on mass production and distribution; the second, "The Elimination of the Difference between Production and Consumption," (that is, the humanization of production itself); and the third, "Planned Security with Minimum Regulation." In all the aim has been to minimize nonproductive work, and all of them aim at a basic efficiency in the relation of production and "satisfaction." They differ in their concept of wherein satisfaction lies.

The first is the world of things, of goods, of the department store gigantic, of the most rapid and even wasteful consumption. It is naturally a world of concentration, of extraordinarily centralized great cities, where all the work is done in one circular building 20 stories high and a mile in diameter, and people live in standardized apartments around communal gardened areas. It is a world of speed and spending, with mass amusements, mass education, and mass advertising to establish mass fashions and the mass mind. The individual exists for consumption; his value is as consumer only.

The second world is based on the ideal that satisfaction lies in other matters than things; that work itself becomes a satisfaction when the worker knows, plans, and, at least to some extent, controls his products; that work and leisure and family life can be a unit. It is a world of human scale; of small plants incorporated closely with housing; of cooperatives; of small city squares that are surrounded by factory, church, community hall, and recreation facilities—squares that are symbols of the oneness of an integrated life. And it is a world in which country and city, agriculture and industry, and cultural activities are functionally as well as physically related.

The third scheme is based on direct, rather than indirect, security insurance—that is, on the idea that each individual should be guaranteed minimum security by minimum hours of work in factories producing the minimum material—minimum shelters, standardized food products, and clothing. Everything else is left completely free for such development and exploitation as the society and the individual may decide upon. Thus no one starves, and the ambitious man can become rich, and the man who wishes to use his time for art or learning or contemplation can still do so, and neither starve nor be dependent on the vagaries of a patron. Yet in the minimum areas the effect is bound to be drab and even brutal; one wonders if crime would not flourish there, fed on boredom and frustration and "leisure"...

Communitas is not always easy reading: it is too packed with profound and pregnant ideas to be absorbed in one hurried scanning. It is tightly written, but occasionally elliptical—where a phrase, innocent enough at first acquaintance, suddenly flowers with suggestion for further thought. It is bitterly critical of the thoughtless emotions generally current as ideals today, but its real savagery is often veiled in the simplest of statements. It is therefore a book to read at least twice, and then to ponder over.

There is one serious criticism to be made—the authors' apparent misunderstanding of the ideals both of the "garden city" and of the "satellite town." Neither was conceived as a mere dormitory suburb. The entire concept of the garden city depends on integrating industry, agriculture, and residence, and both Letchworth and Welwyn were designed to be self-supported by means of local industries. It was only an accident of the monstrous growth of London that Welwyn, despite its flourishing industries, became also a dormitory suburb. And the new satellite towns proposed by the present British Government are similarly supposed to be complete with their own means of livelihood, though with close business and administrative

---

**REVIEWS**

(Continued from page 92)

(Continued on page 94)
lighting with a new versatility of application... ceilings unlimited

You get "good lighting" from MILLER FLUORESCENT TROFFER LIGHTING SYSTEMS — you get, in addition, the opportunity to plan the lighting to form any ceiling pattern desired — CEILINGS UNLIMITED! Interiors of stores, schools, offices, factories, and public buildings are thereby modernized as well as lighted by the use of this one basic lighting system. Installation is simplified. Wiring costs are cut up to 50%, conduit and conduit fitting costs up to 80%. Supports from structural ceiling reduced 50 to 75%.

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HOT-WATER HEATING, RADIANT HEATING, AND RADIANT COOLING

F. E. Giesecke. Technical Book Co., Austin, Tex., 1946. 262 pp., illus., 6" x 9", diagrams. $4.00 (10% discount for two or more copies ordered at one time)

The author has assembled in easily usable form the "knowledge relating to hot-water heating, radiant heating, and radiant cooling which he has acquired during more than fifty years of study, teaching, research, and professional practice." The bulk of the book deals with the design of different types of hot-water systems, giving step-by-step examples. The presentation is so clear and easily read that anyone can follow the development of each system with ease.

The section on radiant heating gives a brief history as well as full theoretical discussion and chapters on design. The chapters on radiant cooling (which is largely a Swiss development) should give us some new ideas on attaining comfort more simply than with full air conditioning.

It is amazing that such an excellently well organized book should have no index.

JOHN RANNELLS

Reviews (Continued from page 94)

at the low ebb typical of such strenuous eras. Unfortunately, the striking modern architectural achievements of recent years and the vigorous murals of Orozco, Rivera, Siqueiros, Charlot, and others do not receive adequate recognition and attention—a serious deficiency in this book.

A list of the Cathedral Cities of Mexico, a working glossary of Spanish and Mexican architectural terms and of Mexican place names, a lengthy bibliography, and extensive index are helpfully given in the appendix. Good photographs enrich all sections of the book. Written for a wide circle of readers, particularly for the tourist, the survey of historical, social, geographical, geological, religious factors which have affected and molded Mexican architecture will seem wordy and tedious to the average architectural reader. However, such a reader can profit much from the architect-author's comments on the architectural features of the structures studied. Employment of conversational expressions, possibly in an attempt to popularize, appears out of character with the importance of the subject, even though this work was not intended to be and is not monumental.

LAWRENCE E. MAWN

LAWRENCE E. MAWN

HOT-WATER HEATING, RADIANT HEATING, AND RADIANT COOLING

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It is amazing that such an excellently well organized book should have no index.

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(Continued on page 100)
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JOBS AND MEN

(CONTINUED FROM PAGE 98)

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JULY, 1947 107
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122 PROGRESSIVE ARCHITECTURE
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What is the world coming to? This picture was snapped surreptitiously at AN ARCHITETURAL SCHOOL. Have we lost all respect for THE CLASSICS? Is the younger generation completely OUT OF HAND?

OBSEVATIONS

ERNST KUMP CLAIMS THAT ARCHITETURAL EDUCATION SHOULD BEGIN IN FIRST GRADE. I'm inclined to agree with him that only by some such drastic move can the general public be made aware of the meaning of architecture and accept readily—even insist upon—good design. However, the question remains, what is going to be taught? Who would determine the point of view to be followed? How many local school boards would consider familiarity with the Greek orders an understanding of architecture?

Many intelligent, well educated adults can discuss music and painting and the theater with perspicacity and discrimination, but judge architecture by superficial standards. I have had two instances recently. In the town next to mine a bank was built on a prominent corner. Space was limited, and it hurt him that only by some such drastic move can the general public be made aware of the meaning of architecture and accept readily—even insist upon—good design. However, the question remains, what is going to be taught? Who would determine the point of view to be followed? How many local school boards would consider familiarity with the Greek orders an understanding of architecture?

yellow brick facade and said, "It's nice architecture, though, isn't it?" I agree that early, general education in the elements of architecture is needed, but it might be a dangerous move until there is a much larger body of potential teachers who understand what goes on in the design process. The architectural schools themselves can't find enough qualified teachers.

ARCHITECTURE THRIVES WHEN IT IS A DEMOCRATIC PROCESS. becomes introspective and sere when it has no relation to the people it is meant for. That's a pretty obvious fact, but it's one that is too often overlooked both in a historical and a contemporary sense. The history books blandly say, "Architecture reflects its times." That isn't true, except in the periods when architects understood and were a part of the "times" they were presumably expressing. It is possible for architecture to deny its times; I think the airport building I mentioned is an example.

This is leading up to a profound observation: The important native contemporary architecture in this country is beginning to show up in those regions with no strong cultural prejudices, designed by men who are in close touch with the users of their architecture. An architect working in a small town in Texas may never become rich, but he has a double likelihood of producing important work; he is not apt to be deterred by local tradition, and he has the opportunity to be close to the people of the region.

On the other hand, a practitioner in a large city in New England has a double handicap; he meets face to face the remains of Early American culture, and he designs largely for clients who represent business rather than people. I know that at the moment—even in the pages of PROGRESSIVE ARCHITECTURE—the end products we publish seem to deny this. Yet I'd be willing to bet that in the next decade the well known big city firms will be less important (architecturally, not profit-wise) than a multitude of designers you've never heard of, all over the country.

That isn't a blind bet. We've seen work from many sources which is crude, stumbling, unpublishable, but which shows native expression and understanding. I've seen buildings—in Minnesota, Tennessee, Oklahoma, Indiana—which aren't nearly as good architecture as almost any shop on Fifth Avenue, but which come from a sincere attempt to provide appropriate structures for good neighbors, not from a flashy, impersonal design ability.

Give these boys time to season, add to them some of the recent school graduates, shake well and let simmer through a stable period of building activity, and you'll have the beginnings of that U. S. architectural expression that Sullivan and Wright hinted at back before the turn of the century. It got lost somewhere in the last fifty years, but it'll be along any generation now. Sometimes it's hard to be patient.

ENTHUSIASM DOESN'T NECESSARILY PRODUCE GOOD ARCHITECTURE, but it's astonishing to see how often a designer who is simply bubbling over with excitement about his work has good reason to be proud of the product. Conversely, when I go in an office and find principals dour and drafting room bored, I can be fairly sure that run-of-the-mill architecture is being turned out. I could mention many instances, but two come quickly to mind. Long & Thorshov's office in Minneapolis, doing some of the finest work in that region, is a hive of excited, enthusiastic activity. In Louis Justement's drafting room, in Washington, D. C., the whole staff stops work to help explain the features of a model of a veterans' hospital—one of the best in that program that I've seen. For obvious reasons I would prefer not to give examples of the reverse attitude.