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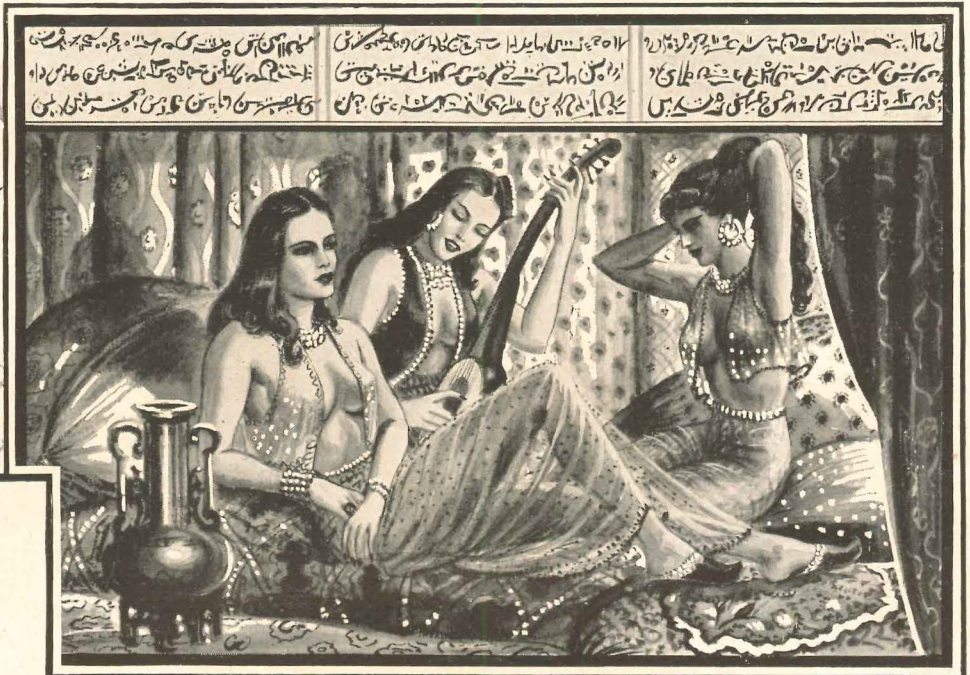
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- ✓ Federal, State and Municipal Acceptance

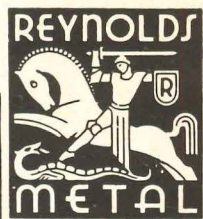
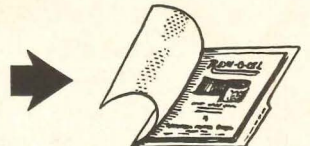
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BUILDING PRODUCTS DIVISION RICHMOND, VIRGINIA

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**TOMORROW'S EATING PLACES  
WILL BE FREE FROM  
NERVE-JANGLING NOISE**

● In designing the restaurants of Tomorrow, architects will find the unique acoustical qualities and adaptability of K&M Sprayed "Limpet" Asbestos desirable indeed.

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*Nature made asbestos;  
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has made it serve mankind . . . since 1873.*

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asbestos-cement shingles and wallboards; asbestos and magnesia insulations for pipes, boilers, furnaces; asbestos textiles; asbestos electrical materials; asbestos paper and millboard; asbestos marine insulations; asbestos acoustical material; asbestos packings; asbestos corrugated sheathing and flat lumbars; asbestos-cement pipe for water mains



# THE BYERS "EXPERIENCE POOL"

*helped write the Piping Specifications on this Project*

Some of today's most aggravating problems come from the non-availability of certain materials, and from the fact that overworked key men cannot delegate their experience when they delegate duties. The Byers "Experience Pool" provides a solution.

For a number of years our Engineering Service Department has been accumulating water analysis, corrosion data, and performance records of all kinds of materials. Back of this Department are excellent laboratories, constantly adding to this "Experience Pool" of valuable engineering data. These records provide the specification writer with a sound, safe guide—based on actual field performance—for selecting piping materials for corrosive services.

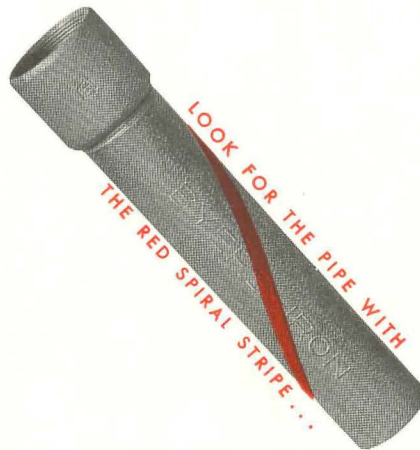
The George W. Parker Homes, a project at Alexandria, Va., provides an excellent example of how the "Experience Pool" functions. Samples of the water supply, and the fill which underlies the site, were sent to the Engineering Serv-

ice Department, analyzed by the laboratory, and corrosive characteristics determined. The reports were interpreted in the light of 78 years' experience with corrosion problems, and translated into recommendations as to where wrought

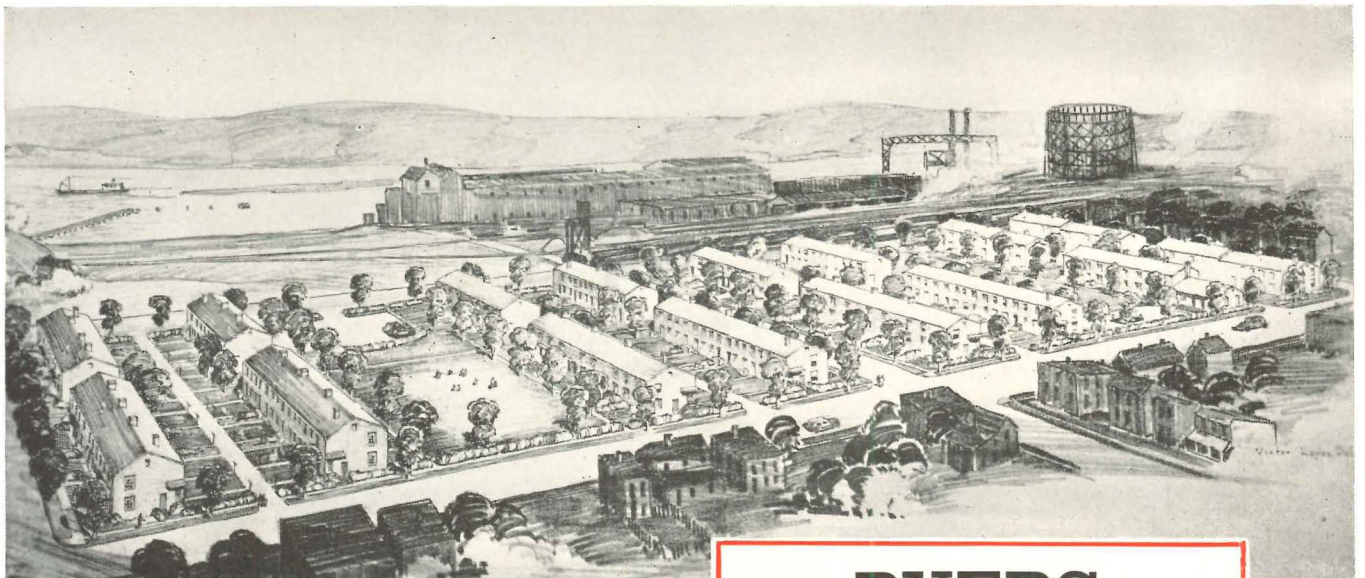
iron could be profitably used. As a consequence, writing the specifications involved no gamble or guess work, and no blind compromise with sound engineering principles because of shortages. Wrought iron was used for all soil, waste and vent lines under 2" in the entire project.

If you have a specification problem involving metals subject to corrosion or fatigue failure, won't you let us place all this accumulated experience at your disposal? You understand, of course, that any present recommendations must be on a "best available" basis. Generally, however, users find that the substitution of wrought iron involves no sacrifice in durability... as a matter of fact, it often brings a definite improvement. Ask, also, for our General Catalog. We will be glad to send you a copy.

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WROUGHT  
IRON**



GEORGE W. PARKER HOMES, Alexandria, Va.  
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*Corrosion costs you more  
than Wrought Iron*

**BYERS  
GENUINE  
WROUGHT IRON**  
Tubular and Hot Rolled Products  
Steel Tubular Products

# RECORD

COMBINED WITH AMERICAN ARCHITECT AND ARCHITECTURE

VOL. 91

JUNE 1942

NO. 6

## NEXT MONTH

WE HOPE to report in July that the architects' representatives assembled in Detroit late in June will have defined the nature of the part they will strive to play in war and post-war America. We hope to report that they recognize the necessity of facing frankly the problems involved in setting up a real program to play that part; that they emphasize the need for broader vision and wider competency on the part of the individual; that they have adopted a program to bring about greater integration and collaboration in the building field; and that they demonstrate their capacity for effective leadership, thus making "the profession of ever-increasing service to society." We will report . . .

Transportation by air has assumed the greatest importance in planning, both during and after the war. Basic principles of airport design are therefore discussed in the July issue, which will show graphically how past mistakes can be avoided. Also, in another article, considerations of practical hangar construction are set forth. Among other features of the July RECORD are a unified modern house designed by Holden & McLaughlin, and a Building Types Study devoted to the newly developed U. S. Health Centers, their need, purposes, design, structure and equipment.

<b>CERTAINTIES IN UNCERTAIN TIMES</b> . . . . .	<b>35</b>
An editorial . . . By Kenneth K. Stowell	
<b>TECHNICAL TEAMS WITH WAR WORK</b> . . . . .	<b>36</b>
Reporting the widespread interest in collaboration-firms of architects and engineers, the story of their progress and successes.	
<b>SHELTER TO SPEED WAR WORK</b> . . . . .	<b>38</b>
An analysis by Frederick L. Ackerman, Architect, and the NHA description of "Duration Dormitories."	
<b>PRODUCER OF PRODUCTION LINES</b> . . . . .	<b>39</b>
Albert Kahn, Architect, how he works and thinks and how his firm is organized to turn out great war plants in incredibly short time.	
<b>ARCHITECTURE FOR WAR PRODUCTION</b> . . . . .	<b>43</b>
Two Wartime Plants by Albert Kahn Associated Architects & Engineers, Inc.	
A Military Aircraft Plant in the East . . . . .	43
An Aircraft Parts Plant in the Midwest . . . . .	49
<b>SIX SMALL HOUSES IN TEXAS</b> . . . . .	<b>53</b>
Incorporating fresh ideas and details in the design of houses in the \$3,000 to \$6,000 class, and offering suggestions for housing in defense areas. Designs by Architects Talbott Wilson and Irwin Morris, and B. W. Crain, Jr.	
<b>CONCERNING COMMISSIONS</b> . . . . .	<b>58</b>
In which men seeking to serve as officers are given timely information about the present situation, the possibilities, where and how to make application.	
<b>REMODELING IDEAS FOR WARTIME USE</b> . . . . .	<b>59</b>
Telling how a typical American small house was remodeled, with illustrations of the various steps and final results. The U. S. Gypsum Remodel Research House, Park Ridge, Illinois. Eugene Voita, Architect.	
<b>INDUSTRIAL PLANTS</b>	
. . . <b>BUILDING TYPES STUDY NO. 66</b> . . . . .	<b>67</b>
The Heating, Power Distribution, Communication Systems, Fire Protection, Safety and Cleaning Provisions.	
<b>TIME-SAVER STANDARDS on Factory Heating</b> . . . . .	<b>73</b>
<b>THE RECORD REPORTS</b> . . . News from the field . . . . .	<b>7</b>
<b>REQUIRED READING</b> . . . Reviewed by Elisabeth Coit, AIA . . . . .	<b>80</b>
<b>FOR BETTER BUILDING</b> . . . News of materials, equipment and methods . . .	<b>82</b>
<b>INDEX TO ADVERTISEMENTS</b> . . . . .	<b>112</b>



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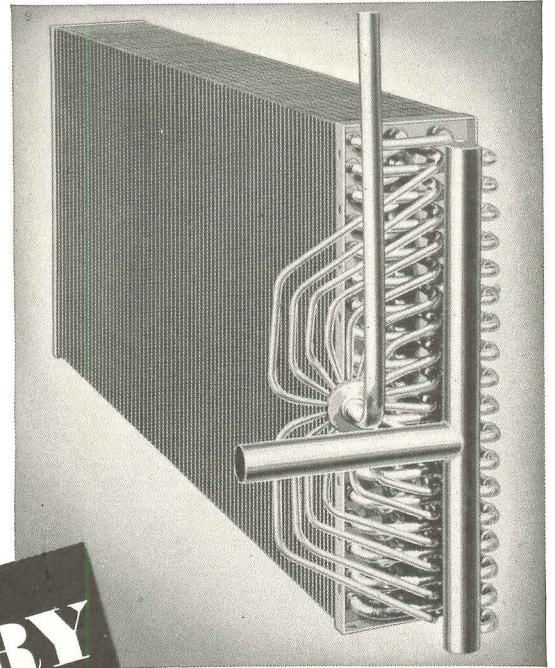
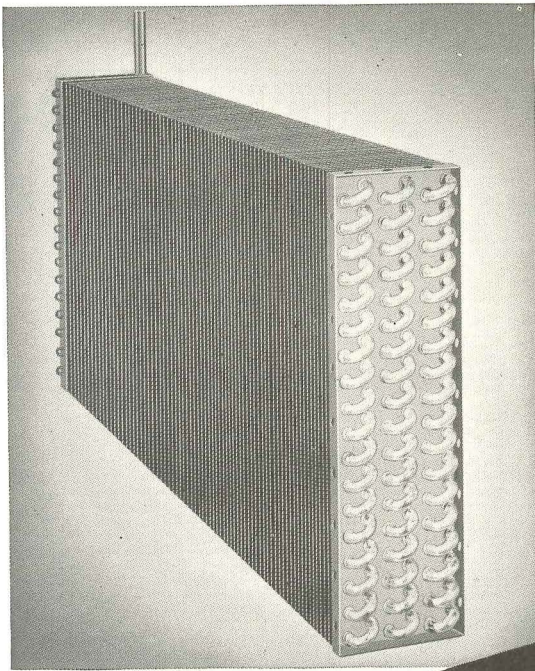
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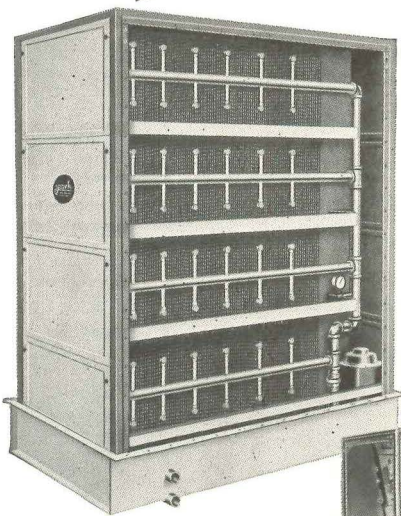
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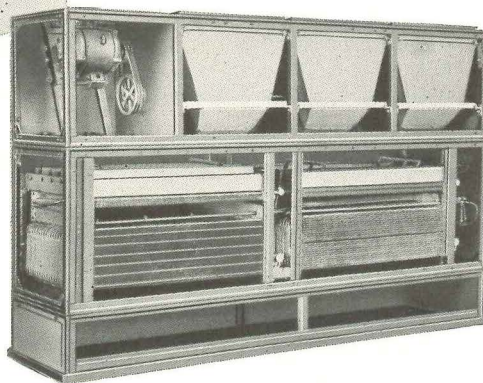
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Wide range of sizes and capacities is your assurance of the proper coils for every physical and load requirement with either chilled water or Freon. York's nationwide network of factory branches and distributors is at your service for engineering assistance, erection service and general expediting. York Ice Machinery Corporation, York, Penna.

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**"KEEP'EM FLYING!"**  
★★★★★



**YORK REFRIGERATION AND AIR CONDITIONING**

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

## WASHINGTON NEWS

By **RAYMOND R. DICKEY**

**WPB to curtail war construction • New FHA Amendments • Local building codes need change • Priority situation • Gas for construction workers • Construction equipment frozen • Price ceilings**

FURTHER ADJUSTMENTS in the construction industry are definitely in the wind, as this is being written, with a strong indication that WPB will examine present contracts to further save critical materials or speed the work. The over-all estimates of construction previously announced by the U. S. Dept. of Commerce, on the basis of the WPB estimate, are unchanged.

A "super committee" composed of Army, Navy, Maritime Commission, OPA, WPB, and some of the Lend-Lease agencies has been investigating the materials situation in the light of present war requirements. It came to the conclusion that while future plant expansion might be desirable, the important thing was to channel materials now into "combat" duty.

It seems that plants already in a substantial stage of production will be completed, according to WPB, but those which are merely under contract will be reviewed.

The need for this drastic action is a reflection of the current military philosophy of "produce now and we will win the war." The fear is that unless materials go into the production of actual munitions at this juncture in the military game, there may be little use for military plants in the future. Put another way, it appears that the Army and Navy feel a gun, ship, bullet, tank or other article of war now is worth 50 two years from now.

At the same time a complete re-examination of the Federal Works Agency's war public works program in the light of present-day war conditions, as contrasted with those which existed when most of the 1,400 projects in the program were approved for construction, is announced by Brig. Gen. Philip B. Fleming, FWA Administrator.

The reasoning underlying this action has far more significance than just another new phase of the war production effort. Re-intensified drives for salvage and curtailment of waste in all operating capacity must inevitably follow. Man power as well as

material power will be affected. Men not in the Army now or not in a civilian activity essential to the war may be stripped from plants and put into one of those two categories. Just as in the case of materials shortage, there is a man power shortage.

### Resources Protection Board

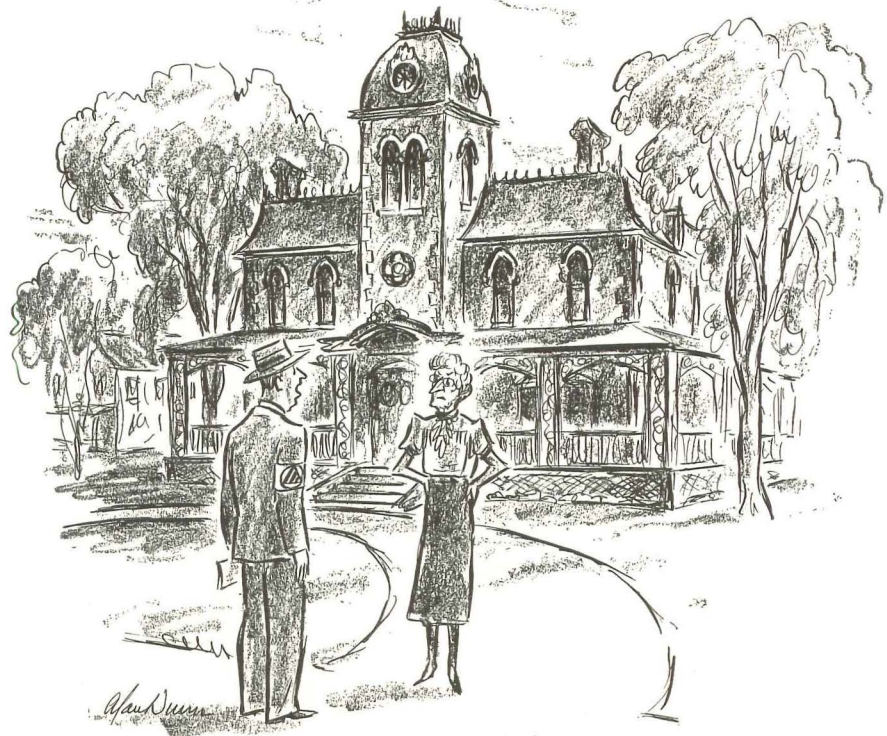
A new board, which will evaluate the relative wartime importance of all industrial plants, war installations, facilities and vital economic resources and make recommendations for their protection, has been named by Donald M. Nelson, chairman of WPB. William K. Frank of the Production Division of WPB was appointed by Nelson to act as Chairman of the new organization. The Resources Protection Board will cooperate closely with the Army and Navy, the Maritime Commission, and Office of Civilian

Defense in furnishing ratings and recommendations to guide them in planning the protection of resources.

### New FHA amendments

The new liberalizing amendments to Title VI are taking shape. The bill probably will pass almost in the originally submitted form. However there were two amendments worth noting. The first was one of which there will be general approval. The amendment gives the Administrator authority to draft regulations which would be sure to give war workers preference in housing built with Title VI insured funds. Labor leaders plumped for an amendment which would make it absolutely impossible for any but war workers to get into housing built with Title VI funds. However, it was pointed out that this might result in holding houses open indefinitely if no war worker bought or rented them, resulting in a loss under the mortgage provisions. The Congress was quick to recognize this when it was pointed out, and merely gave authority to the Administrator to draft regulations

(continued on page 12)



"A direct hit can't be helped—all you have to worry about is a near-miss."  
—Drawn for the RECORD by Alan Dunn

*For Speedy  
Construction . . .  
Fast Relocation . . .*

**JOHNS-MANVILLE  
TRANSITE  
MOVABLE ASBESTOS  
WALLS**



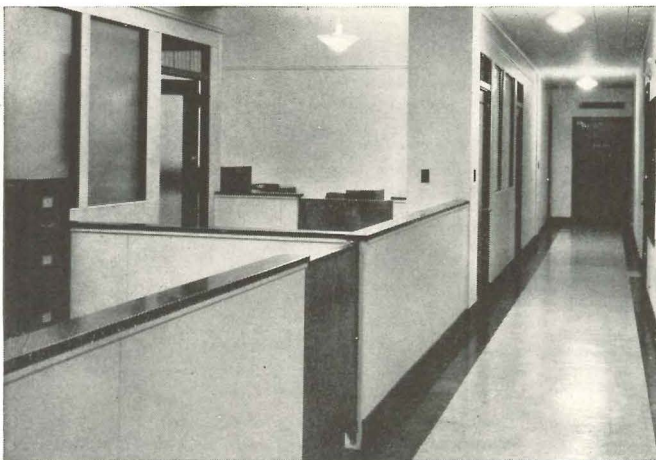
**Quickly Installed and Relocated! . . .** Because of the simple construction method employed, Transite Walls can be rapidly installed without interfering with plant or office routine. Easily relocated, with complete salvage of materials.



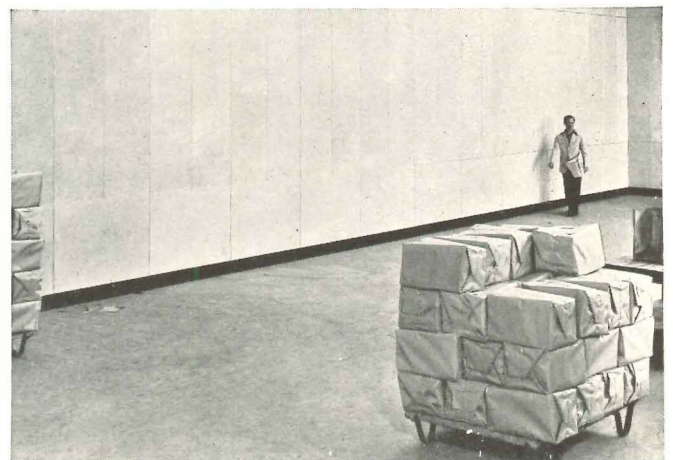
**Solid and Fire-Resistant! . . .** Made of asbestos and cement, Transite Walls are incombustible and provide the privacy and permanence of fixed walls. Unusually tough and durable, they are virtually abuse-proof and require little maintenance.



**Attractive and Versatile! . . .** Transite's natural finish is a neat-looking, neutral gray. May be waxed or painted, as desired. Wood veneers, fabrics, lacquers and other special finishes also available. Vinylite finish shown above.



**Form Any Type Partition! . . .** Any style of office or factory partition can be built quickly and easily with Johns-Manville Transite Walls—free-standing, ceiling-high, bank-screen, solid, or in combination with glass.



**Release Critical Materials for War Production! . . .** Transite Movable Asbestos Walls are composed basically of asbestos and cement sheets. They require only a minimum of metal fittings for their erection.



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Johns-Manville, 22 East 40th Street, New York, N. Y.**



**MAKE THIS TEST -**  
*Prove* **BRIXMENT** *is* **BEST!**



**1**

"Cap" one brick with Brixment mortar (left), and one brick with mortar made with 50-50 cement and lime. After mortars have hardened, place both brick in a pan of shallow water. (Photo 1.)



**2**

Keep about an inch of water in the pan. Even if soluble salts are present in the brick or sand, you will soon be convinced that *Brixment mortar helps prevent efflorescence.* (Photo 2.)

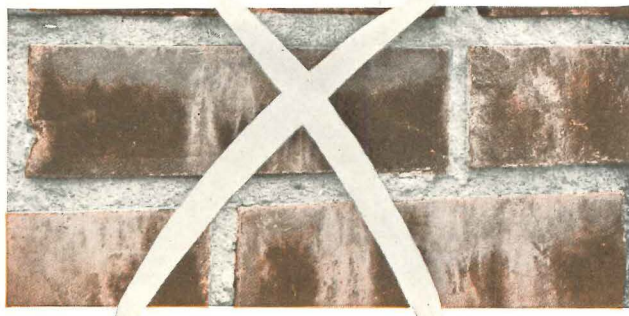
**BRIXMENT Helps**  
**Prevent EFFLORESCENCE!**

EFFLORESCENCE is an outcropping of minute white crystals on brickwork. When these crystals occur on colored mortar joints, the condition is sometimes mistaken for *fading*.

Efflorescence is caused by the presence of soluble salts in masonry materials. When reached by water, these salts dissolve, and are drawn by evaporation to the surface of the wall.

Brixment itself *does not cause efflorescence* because it is practically free from soluble salts. Even when such salts are present in the sand or brick, the waterproofing in Brixment mortar usually *prevents*

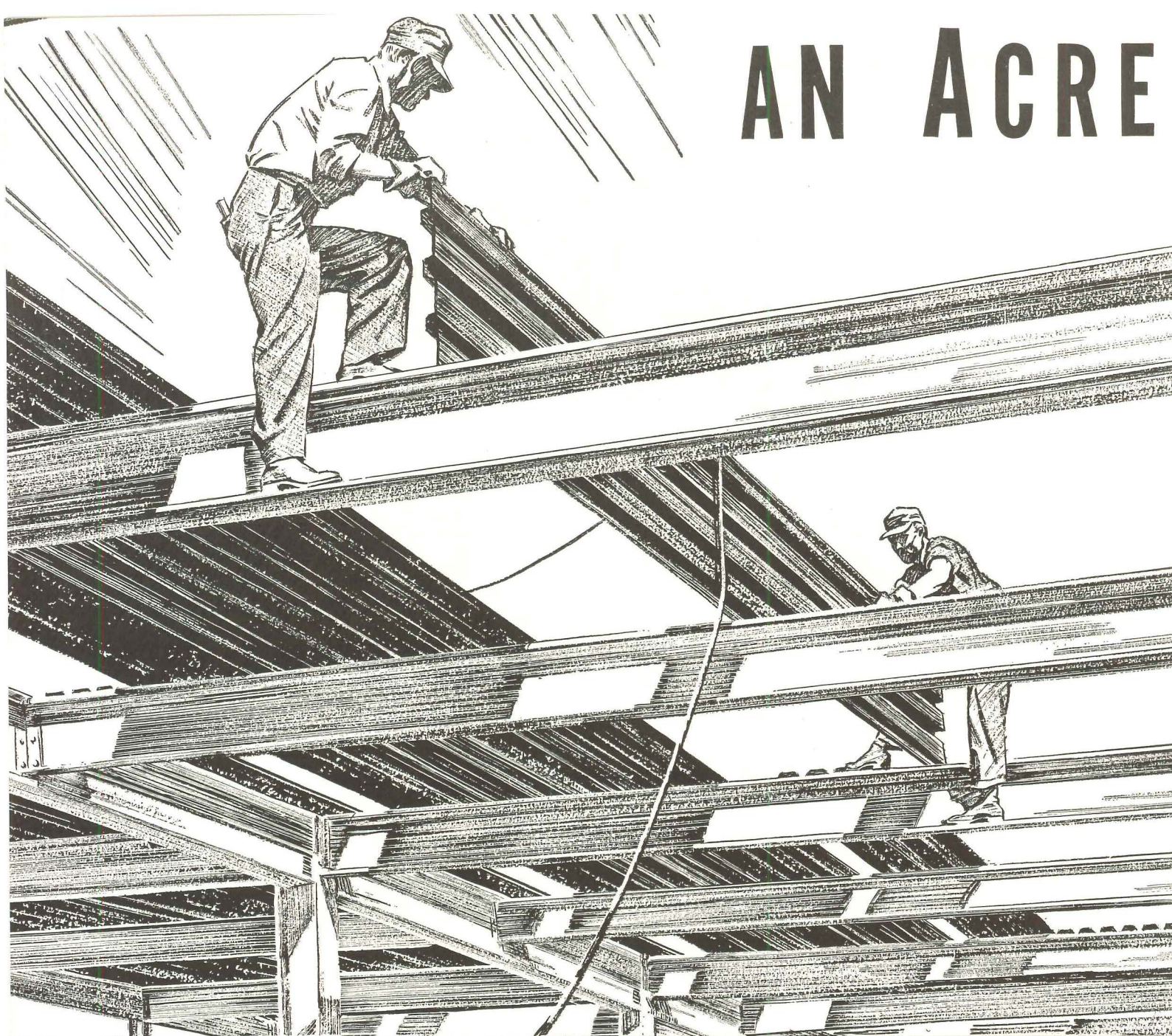
*them from coming to the surface. . . .* Bricklayers who have used Brixment mortar for years say they have far less efflorescence with Brixment mortar than with *any other kind.*



**BRIXMENT**  
**For Mortar and Stucco**

*Louisville Cement Company, Incorporated, Louisville, Kentucky. Cement Manufacturers for Over a Century.*

# AN ACRE



The speed with which these units are laid is an important factor in making possible the construction of an acre of roof in one day.

This three acres of Q-Deck you see here was laid in three days . . . Q-Deck saves working time, thus freeing workmen for other War Production jobs.

As soon as the first area of Q-Deck is laid, application of insulation and waterproofing is carried on concurrently, thus making sp

# ROBERTSON

# Q

# UNDER ROOF IN ONE DAY

## That's Quick

IT'S WARTIME SPEED . . . and speed is a wartime MUST. Because Q-Deck helps put urgently needed plant buildings under roof *quicker* and in production quicker, it has become the architect's cue for speed.

Robertson Q-Deck, plus Q-Panels, saved 45 days' construction time for a 23-acre aviation plant in Texas. And in many other war projects, from the moment the decision was made to roof with Q-Deck, the Robertson organization, streamlined for speed, has gone into time-saving action . . . quick!

Q-Deck is provided in standard two-foot widths and in any length up to 25-feet. Thus, one section (which can be placed in one minute and quickly welded to the purlins) is equal to 50-square feet of roof. *With Q-Deck, you can put an acre under roof in one day.*

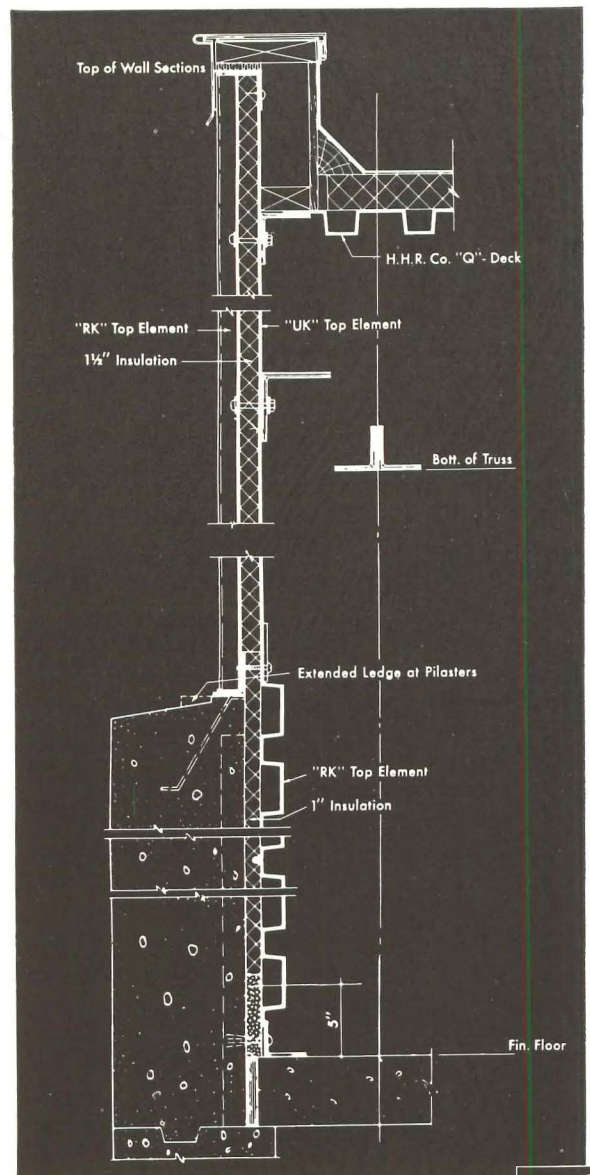
As soon as Q-Deck units are placed, they form a working platform for the installers of insulation and waterproofing, who follow rapidly behind the workmen welding the Q-Deck to the structural frame. Any War Production plant construction is speeded to *completion* by the use of Q-Deck (and Q-Panels for walls).

Q-Deck constitutes "dry" construction, which facilitates "all-weather" building. There's no waiting for wet materials to set, no fire-hazards from combustible forms.

★ ★ ★

*The cross-section at the right indicates the salient features of Q-Deck (roof) and Q-Panel (wall) construction. The greatest speed may be had by combining the two. Q-Deck puts an acre under roof in one day; Q-Panels put an acre of wall up in three days. Further details, estimates, etc., for such a wide variety of structures as aircraft buildings, munition plants, warehouses and many other types of buildings will be gladly furnished.*

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TYPICAL ROOF AND WALL SECTIONS

SEE OUR CATALOG IN SWEET'S

# DECK

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- ( ) Have a Robertson Field Engineer give me Engineering Data.

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City \_\_\_\_\_ State \_\_\_\_\_

(continued from page 7)

which would effectuate the purpose without strangling the house builder.

Under these new regulations a builder cannot obtain a loan of more than the actual cost of physical improvement. Thus taxes, interest and insurance during construction would be excluded. The mortgage may not include the cost of the land and other development costs. This simply means that the value of 90 per cent mortgages, if the 90 per cent merely represented cost of physical improvements, would be substantially lowered. It is probable that no large scale developers would enter into operation on this basis.

### Liberal building codes?

NHA Administrator John Blandford talked over with a group of state Governors who met here the necessity of eliminating state and local trade barriers and the problems raised in that line by local building codes. Blandford told the Governors that there was a great need for more uniformity and a higher degree of standardization in building codes and that many of them were extremely antiquated. He urged communities to follow the lead taken by some of the more progressive communities in using the defense housing Emergency Plumbing Standards. The Administrator also pointed out that there was a model building code being released by the Bureau of Standards of the Department of Commerce which had been prepared in collaboration with the old Division of Defense Housing Coordination and Central Housing Committee. One of the features of this code is to allow emergency housing to be built without regard to normal peacetime standards with a proviso that the cities may require their removal or demolition after the war.

### Priority developments

The main development in the field of priorities is that WPB is not satisfied with the way the present system is working out. More and more it is being shown, through the increase in suspension orders and reported wide-spread violations, that without a knowledge of what end products are being manufactured by priority controlled raw materials it is impos-

sible to keep adequate and accurate check. Developments of "black markets" dealing in materials in violation of price orders under strong pressure for materials at any cost—even that of fine or imprisonment—are coming to light. WPB officials admit that it is difficult to control materials unless they list articles which it is illegal to manufacture from those materials.

This is accomplished by the L-type order which lists prohibited uses. Enforcement of other priority orders is made considerably simpler by the L-type order since the appearance on the market of a forbidden product manufactured from the prohibited material is comparatively easy to trace.

In essence that is the basis of the new thinking in WPB circles on the priority situation. Not only will materials be watched carefully and inventories of them checked, but the finished articles which are manufactured from those materials will also be limited. This two-way check may be inaugurated within a few weeks.

### Rationing and construction workers

Workers on construction jobs in the East Coast gas ration area who need their cars not only to drive back and forth to work, but also to travel from job to job, will be given adequate supplies under the gasoline rationing system, according to an OPA announcement. Because of lack of housing facilities near many construction jobs, OPA officials pointed out, many of these workers must be housed several miles from their places of work. Also, skilled workmen, including electricians, plumbers and carpenters, have to transport their own tools, thus making use of their own cars essential. At the finish of one job they must travel to another.

OPA pointed out in its announcement that these workers would get gasoline; that the gasoline rationing regulations permit supplemental rations of gasoline whenever they are needed for cars that must be driven in pursuit of a gainful occupation. Supplemental rations may also be issued to migrant workers who travel from job to job.

A rigid control over the production and distribution of all types of rubber-tired construction equipment was taken effective May 1. Under terms of Limi-

tation Order L-82-a, the future sale, lease, trade, loan, delivery, shipment or transfer of any new rubber-tired construction equipment is prohibited without specific authorization of the Director of Industry Operations, except for orders placed prior to May 2 bearing preference ratings of higher than A-2. On such orders, unless shipment was made by June 1, they cannot be shipped after that without specific approval. After June 1, each manufacturer's production schedule must be approved by the Director of Industry Operations. Proposed schedules must be submitted to WPB on Form PD-446. To obtain release of the equipment frozen by the order, a producer, dealer or an authorized distributor may apply on Form PD-448. Producers, dealers and distributors were supposed to have filed before May 15 a Form PD-445 detailing inventories of rubber-tired construction equipment as of May 2. WPB indicates that this has not been done yet in some cases and urges immediate filing of this information to avoid any penalty for failure to file.

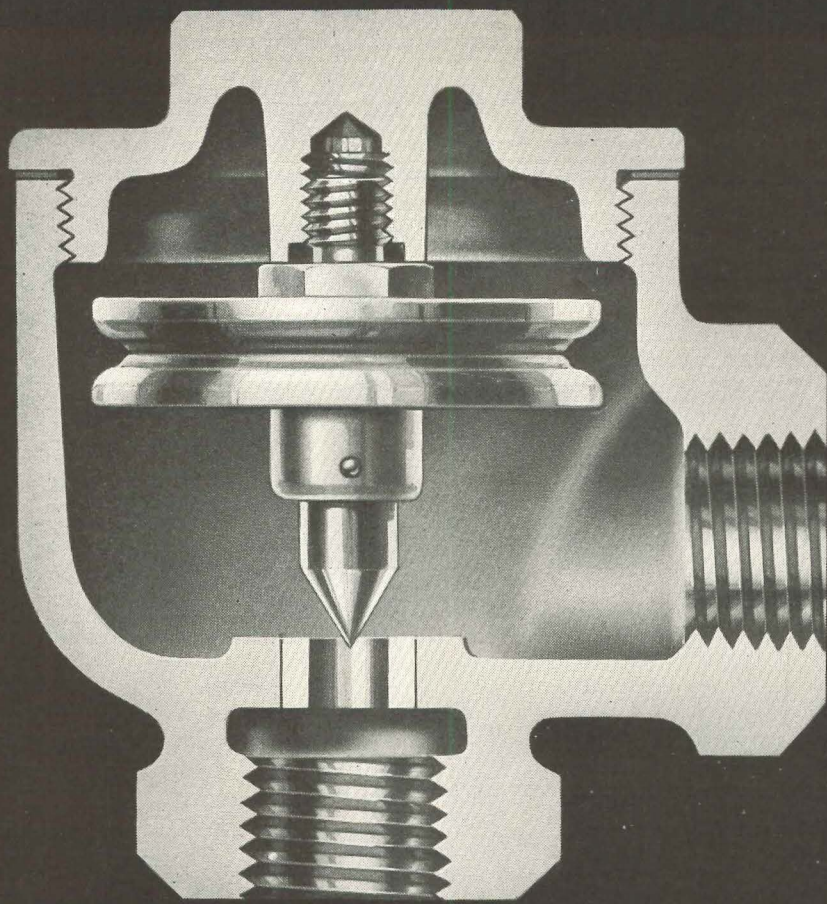
### Fitting in under the OPA price ceiling

Many in the construction industry have been wondering where they fit in under the OPA's General Maximum Price Regulation. In most instances OPA is going to rule that the various segments of the construction industry are covered by the Regulation. Services which are connected with a commodity are covered by the Regulation. This means that such concerns as roofing companies who install and repair roofs would be covered by the Regulation since their installation is a service connected with a commodity (the material used on the roof).

On the other hand, the services of architects would fall under the exempted classification of "professional services" and their charges and fees would not be controlled.

The test which must be applied as an initial rough yardstick of whether a business doing a "service" business is covered or not is whether the service is integrally connected with a commodity. If it is, the prices at which you delivered in March would be prevailing. In dubious cases ask OPA.

(The Record Reports continued on page 14)



Webster 702HF Radiator Trap.

## To Save Critical Materials

# 'Old Ironsides'

It took months of planning . . . But, Webster Engineers are ready with the "Old Ironsides" line of radiator traps and valves conforming with the simplification program of the War Production Board. Cast iron bodies and bonnets. Female inlet and outlet connections. Three sizes of traps— $\frac{1}{2}$ " for 200 sq. ft.;  $\frac{3}{4}$ " for 400 sq. ft.;  $\frac{3}{4}$ " for 700 sq. ft. Two sizes of valves— $\frac{3}{4}$ " and 1", both in angle body—with wheel handle standard; with lockshield handle for institutions. The traps employ the time-tested Webster thermostatic element, a double diaphragm of phosphor bronze fully compensated for pressure. The valves use the proven Webster mechanism, fully meeting the specification for spring-retained packing . . . The "Old Ironsides" line uses the minimum of critical materials; saves machine-tool hours for direct war work; keeps steam available for heating war production plants, Army hospitals, etc. "Old Ironsides" traps and valves will be available on appropriate priority.

Essential repairs for existing Webster System installations are available to our customers on A-10 priority, under provisions of Emergency Plumbing and Heating Repair Order P-84 of the War Production Board. Orders should be limited to actual repair needs.

**WARREN WEBSTER & COMPANY**  
CAMDEN, N. J., EST. 1888, PIONEERS OF VACUUM STEAM HEATING



**L**EAN, savage warbirds . . .

60 thousand in 1942 . . .

125 thousand in 1943 . . .

That is America's promise to the Victory Program—and America is going to beat that promise.

It calls for new construction at record-breaking speeds . . . mile-long bomber plants, the largest in the world.

Heating problems presented by the new building program depend for their solution on the heating lessons learned in peace-time.

Fifty years of experience taught America the practical economy of Webster Systems of Steam Heating. Built around all the natural advantages of steam as a heating medium—flexibility, speed, safety. Used successfully in more than 75,000 buildings.

That is why architects, engineers and heating contractors working on war construction depend on Webster Systems of Steam Heating.

While Ordnance production has the first call on our facilities, we are working day and night to make sure that Webster Steam Heating Equipment is available for use wherever it will help the war effort.

Let our experience serve you now.

Warren Webster & Company, Camden, N. J.  
Representatives in 65 principal Cities

**Webster**  
Steam Heating

This is one of a series of advertisements that will tell the public of the part that Webster Steam Heating and the Webster organization plays in the war effort . . . appearing regularly in leading business, industrial, engineering and technical publications.

(continued from page 12)

## PRIZES FOR BRIDGES

AWARDS for the most beautiful bridges built of steel during the year have been announced by the American Institute of Steel Construction as follows:

Most beautiful monumental bridge: Rainbow Bridge over Niagara River at Niagara Falls. Engineers: Waddell & Hardesty; Edward P. Lupfer Corporation. Architect: Aymar Embury III. Fabricators and Erectors: Bethlehem Steel Company.

Most beautiful small bridge: Fairmount Boulevard Bridge, Cuyahoga County, Ohio. Engineer: John O. McWilliams, County Engineer. Fabricators: Fort Pitt Bridge Works.

Most beautiful movable bridge: Passaic Bridge, Kearny, N. J. Engineers: Morris Goodkind, Bridge Engineer, State Highway Department of New Jersey; Howard, Needles, Tammen &

Bergendoff, Consulting Engineers, Fabricators and Erectors: American Bridge Company.

The Jury making the awards included Grosvenor Atterbury, architect, New York, Professor Carlton T. Bishop, School of Engineering, Yale University, Kenneth Reid, editor *Pencil Points*, New York, Professor Harold E. Wessman, Department of Civil Engineering, New York University, and Frederick J. Woodbridge, architect, New York.

## AIA CONVENTION

WITH Professor L. C. Dillenbeck of Syracuse University directing arrangements, plans are maturing for the 74th annual meeting of AIA, to be held June 23, 24 and 25 in Detroit. Delegates from 71 Chapters, and the Producers' Council, will attend symposia



L. C. DILLENBECK

concerned with postwar planning and construction, the function of the architect in wartime design and building, and programs of education in architectural schools. Principal speaker at the annual dinner will be Albert Kahn; his key position in the current construction picture is attested to by the discussion of his firm and his work, elsewhere in this issue of the RECORD. Dean Walter R. MacCornack of Massachusetts Institute of Technology and William Pope Barney of Philadelphia are to lead discussion groups.

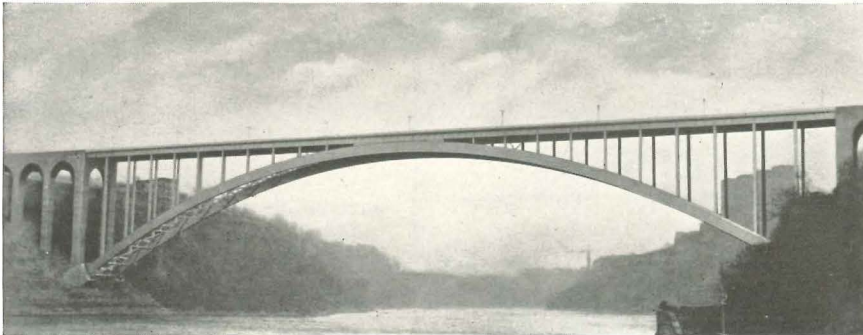
## HOLDEN FOR PREFABRICATION

ARTHUR C. HOLDEN of the New York Chapter of AIA declares in a report to the Institute that opportunities are open to architects in the quantity production of prefabricated housing units. Prefabricators, he says, look upon "open-minded architects as their strongest allies in the movement to get rid of mystery and red tape in the building industry.

"Some architects are ready to throw away their pencils and design in three dimensional models," Mr. Holden said. Others, however, fear that "the spirit of design might be destroyed" in producing drawings for prefabricated units. But, he added, with quantity production the range of design has been greatly extended.

"It is no longer necessary for the individual practicing architect to put on horse blinders to shut out the disharmony of the surrounding neighborhood, while he lavishes his ingenuity on the over-embellishment of one single house. The house now becomes a unit in the neighborhood pattern and

(continued on page 16)



AWARDS of the American Institute of Steel Construction for the most beautiful bridges built of steel during 1941 are as follows: Most beautiful monumental bridge: Rainbow Bridge over Niagara River at Niagara Falls (above); most beautiful movable bridge: Passaic River Bridge, Kearny, N. J. (left); most beautiful small bridge: Fairmount Boulevard Bridge, Cuyahoga County, Ohio (below)



# FLOODS OF DAYLIGHT NOW

Perfectly Diffused to prevent Eye-Fatigue . . .  
Sun Heat Absorbed to prevent Physical Fatigue



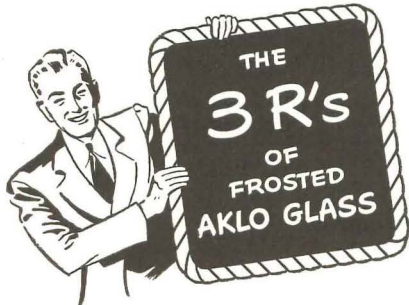
CASE HISTORY No. 6

Sweet Kleen Laundry, Buffalo, N. Y.

"We have floods of daylight now, but the incoming light is perfectly diffused, providing a soft, well-balanced distribution of light. The heat-absorbing properties of Aklo reduce sunray heat so well that temperatures inside are far more easily controlled.

"Your product has done much to add to employee efficiency and comfort in this modern plant, and we want you to know that we are well pleased with the results."

## AKLO GLASS Speaks for itself in this modern Buffalo laundry



**REDUCES GLARE**—eliminates eyestrain and employee fatigue.

**RETARDS SUN HEAT**—keeps workers comfortable on their jobs.

**RENDERS SAVINGS**—eliminates shades or painting of glass.

Scores of installations, in all types of industrial buildings, prove that when Frosted AKLO Glass goes *in*, eyestraining glare and fatiguing sun heat are kept *out*.

This modern industrial glass admits a flood of soft, diffused daylight over working areas. It scientifically breaks up the light rays, prevents direct glare, reduces indirect glare to a minimum. Errors and accidents due to eyestrain are avoided. Bothersome, costly shades are eliminated.

AKLO Glass, manufactured by the Blue Ridge Glass Corporation, Kingsport, Tenn., and sold by Libbey-Owens-Ford Glass Company, Toledo, Ohio, through leading glass distributors, provides greater working comfort, too, by excluding 97½% of the sun's infrared rays. Thus interiors are kept much cooler in summer. Employees feel better and work better.

AKLO Glass is available in hammered and ribbed patterns, both wired and unwired. For full information and catalog, write Blue Ridge Sales Division, Dept. 1269, Libbey-Owens-Ford Glass Company, Toledo, Ohio.



## BLUE RIDGE AKLO GLASS

Heat-Absorbing · Glare-Reducing · Figured and Wire Glass



(continued from page 14)

it is essential that its beauty be of a type which harmonizes with and enhances the beauty of its neighbors, rather than of a type to rival them.

"Give a real architect an understanding of what prefabrication means and he will grasp the opportunity and deftly apply the new technique which is placed at his disposal. He will accept the fabricated chassis; he will put emphasis upon the setting and the variation in detail, texture and color which he can give to it."

## AIR RAID SHELTERS

ADOPTION of a uniform classification of air raid shelters by state and municipal authorities, according to use or occupancy, type and location and degree of protection, is urged by the Air Raid Protection Advisory Board of the State Association of California Architects.

"In the interest of public safety and structural efficiency some general pattern defining shelter types should be established," said J. Francis Ward, director of the board. "If necessary this classification could form the basis of a structural defense code for coastal states liable to attack."

Under "use or occupancy," shelters would be grouped as single-family refuges, multi-family refuges, industrial, commercial or institutional shelters, and public shelters, according to

the plan outlined by Mr. Ward.

Under "location and type" the classification would define shelter trenches, adapted shelter areas within buildings, and specially constructed or "self-contained" refuges—underground, half-underground and surface shelters.

Under "degree of protection" five classes of shelter would be defined—protection against distant bomb effects; protection against blast and bomb splinters from a 600-lb. bomb not closer than 50 ft.; protection against blast and bomb splinters from near hit of a 600-lb. bomb, bombproof against medium case bomb, bombproof against heavy case bomb.

Multi-family, commercial, industrial, institutional and public shelters would be required to meet at least the splinterproof standards indicated. All shelters except single-family refuges would bear signs clearly stating the class of protection provided and their capacity.

## 40th ANNIVERSARY

THE Turner Construction Company, observing its 40th anniversary last month, counted more than 2,000 buildings, representing contract awards in excess of \$565,000,000, completed in 26 states and possessions of the United States since 1902. J. Archer Turner became president last year, succeeding his brother, Henry C. Turner who is now chairman of the board.

## CONTRACTORS CONVENE

WITH THE WAR bringing construction volume in 1942 to an all-time peak, the Associated General Contractors of America look to the Spring meeting of their Governing and Advisory Boards, scheduled for June 8 and 9 at the Stevens Hotel, Chicago, to help solve some basic problems.

## HONORS

THE National Academy of Design on April 17 elected as Associates 12 architects, more than doubling the number of members in this section. Other artists named Associates included four painters, four sculptors and five graphic artists.

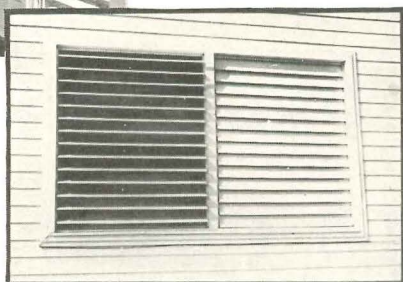
The architects honored were: Archibald Manning Brown, architect member of the New York Art Commission; John Walter Cross, designer of the Tiffany Building and General Electric Building; Eric Gugler, known as painter and sculptor as well as architect for the Business Administration Building at the New York World's Fair; Thomas Harlan Ellett, who designed the Terrace Club at the New York World's Fair; Edward Shephard Hewitt, emeritus member of the Architectural League of New York; William F. Lamb, architect for the Empire State Building and Hollander Building; Harrie T. Lindeberg, known for

(continued on page 18)



Screened jalousie porch or outside wall

Jalousie windows, U. S. Government Project, Guantanamo, Cuba



*Specified*  
FOR GOVERNMENT HOUSING  
MILITARY & NAVAL BUILDINGS

## JALOUSIE DOORS AND WINDOWS

COMBINE THE FUNCTIONS OF SASH, BLINDS, HURRICANE SHUTTERS, BLACKOUT CURTAINS.

Over 50,000 units already furnished to U. S. Army and Navy bases in the Caribbean area! Also used by the Foreign Building Office of the State Department in U. S. Embassy and Minister residences in tropical countries.

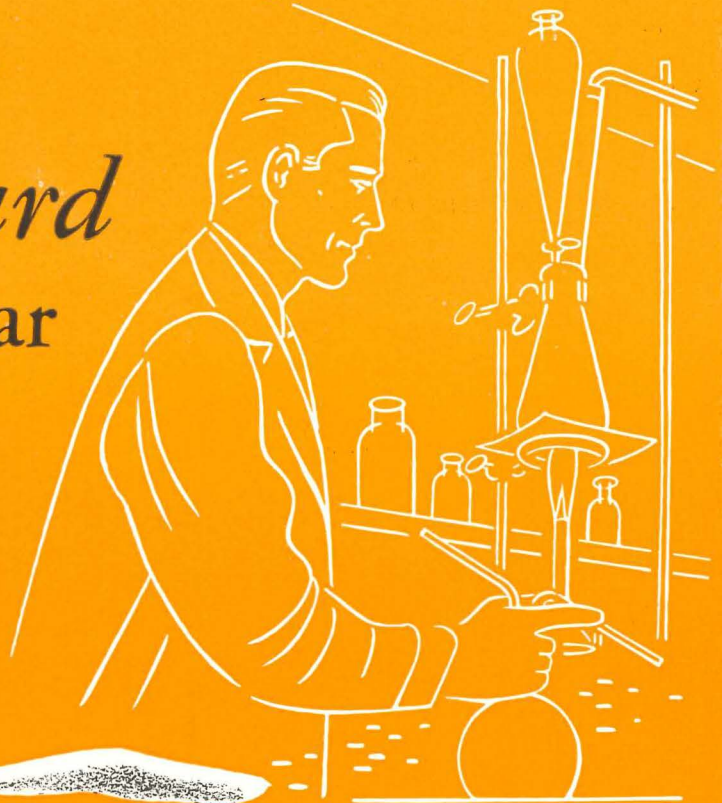
Made of strong cedar slats, adjustable to any position or locked tightly closed by a simple, foolproof mechanism. Readily available, even in quantities. Easy to ship. A complete unit, including insect screen within rigid frame—simple to install. They offer complete ventilation and light control; also storm and hurricane protection and rapid blackout.

See working model at Architects Sample Corporation, 101 Park Ave., New York, N. Y. Complete description in Sweet's Catalog. For literature, shop details and prices, write

PRO-TECT-U AWNING SHUTTER COMPANY 807 N. W. 20TH STREET 101 PARK AVENUE  
MIAMI, FLORIDA NEW YORK, N. Y.



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*Unseen Guard*  
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In electrical wires and cables, the "tremendous trifles", the never-heard-of-improvements, small as many of them are, are lengthening the period between "begin operation" and "breakdown". They are safeguarding *steady* production . . . they have been built to keep pace with 3-shift operation.

Anaconda research has developed scores of product improvements and many completely new products that are today meeting these critical demands. Their improved constructions deliver greater capacities with less power loss, their insulations can withstand high heat, corrosion, abrasion. The research that built these wires and cables continues at a fast pace. Now in addition to delving into experiments for improvements in industrial products, Anaconda is devoting much of its research to

wiring for residential and commercial building.

**When peace returns, adequate commercial and residential wiring will need your attention.**

The electrical future will place greater demands than ever before on those in a position to make wiring selections. Anaconda will cooperate with architects with information and with products measuring up to their specifications.

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This familiar trade-mark symbolizes the best efforts of modern research and production.

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# THE RECORD REPORTS

(continued from page 16)

## Sweeping New W P B Restrictions on Electrical Wiring

Here's Real Help  
Offered by  
**HAZARD**  
for Planning  
Electrical Wiring

HAZACODE --- 12 --- R ---

Let Hazard Engineering Service help you iron out the electrical problems you have to face these days to plan new projects.

Backed by Hazard's more than 40 years' experience with insulated wires ... plus last minute information on what is permissible and available in wires, Hazard Engineers are qualified to advise the best type of wire for you to specify.

With new developments constantly taking place in insulations, it is always worthwhile to make use of the Hazard Engineering Service. Today with War Regulations concerning the use of copper and rubber continually changing, the importance of this service is doubled. There are Hazard district offices in all principal cities of this country. Consult the one nearest you.

### To Save Rubber, Use This Type Wire Wherever Possible Today . . .

HAZACODE, Type R. Rubber insulated and protected by a durable, flame-resisting braid, Hazacode delivers continuous trouble-free service in all ordinary locations. It fully meets the requirements of the National Board of Fire Underwriters and the National Electrical Code. Comes in all sizes and in a complete range of colors for proper circuit identification.

**HAZARD INSULATED WIRE WORKS**  
DIVISION OF THE OKONITE COMPANY  
Works: Wilkes-Barre, Pennsylvania  
Offices in Principal Cities



# HAZARD

Building Wires for Every Purpose

work in low-cost housing and for foreign Embassies; John Gaw Meem, Santa Fe, New Mexico, designer of the Colorado Springs Art Center; William Graves Perry, Boston, who reconstructed Colonial Williamsburg in Virginia; William Platt, son of Charles A. Platt and architect for the Central Mall and Pylons of Light at the New York World's Fair; James Kellum Smith, president of the American Academy in Rome; Clarence C. Zantinger, Philadelphia, former director of the Pennsylvania Academy of Fine Arts.

J. ANDRE FOUILHOX was elected president and director of the New York Building Congress, Inc., at the 21st annual meeting of the Congress on May 6. He succeeds Max H. Foley. J. Archer Turner was named vice-president. Re-elected were vice-president Alfred Rheinstein, L. Andre Reinhard, John J. Brennan and Arthur C. Holden; treasurer, John W. Pickworth, and secretary, William Arthur Payne.

To Charles Donagh Maginnis "in tribute to his eminence in architecture and art," the American Irish Historical Society has awarded its gold medal. Tributes were paid to the medalist at a dinner on May 2 by Archbishop Spellman, Senator Taft, Justice Daniel F. Cohalan, His Excellency, Robert Brennan, Irish Minister at Washington, and Dr. Fred Norris Robinson of Harvard University, James Mc Gurrin, president-general of the Society, presided.

DEAN Leopold Arnaud of the Columbia University School of Architecture has been named Ware Professor of Architecture at Columbia, Dr. Nicholas Murray Butler, president of the University, announces. He is the second recipient of the Ware Chair, installed in 1929, which was held by William A. Boring until his retirement in 1934. Dean Arnaud has been associated with Columbia since 1929.

To Ralph E. Myers was awarded the Francis J. Plym Fellowship in Architecture at the University of Illinois for his drawings for "An Airport for a Middle Western Industrial City of

100,000 Population." Richard E. Drover won second place in this 29th competition for the Fellowship, L. H. Provine, Secretary of the Plym Fellowship Committee, announces.

FOR THE second time Hayden Johnson of Jackson Heights, N. Y., has won the Henry Wright Memorial Prize competition at the Columbia University School of Architecture, Dean Leopold Arnaud announces. Johnson, a graduate student, also placed first as a sophomore in the competition of 1939.

Contestants this year were judged on the basis of sketch plans delineating a possible solution to a serious defense housing problem existing in a central Atlantic coastal city.

### SUMMER COURSE

CATHERINE BAUER and Richard J. Neutra will give courses at the Summer session of Mills College, California, their subjects combining, according to announcement from the college, to provide a "curriculum on modern building, planning and architectural problems as they relate to the gradual development of a human environment suitable to our resources, needs and desires."

### 4-YEAR CITY PLAN COURSE

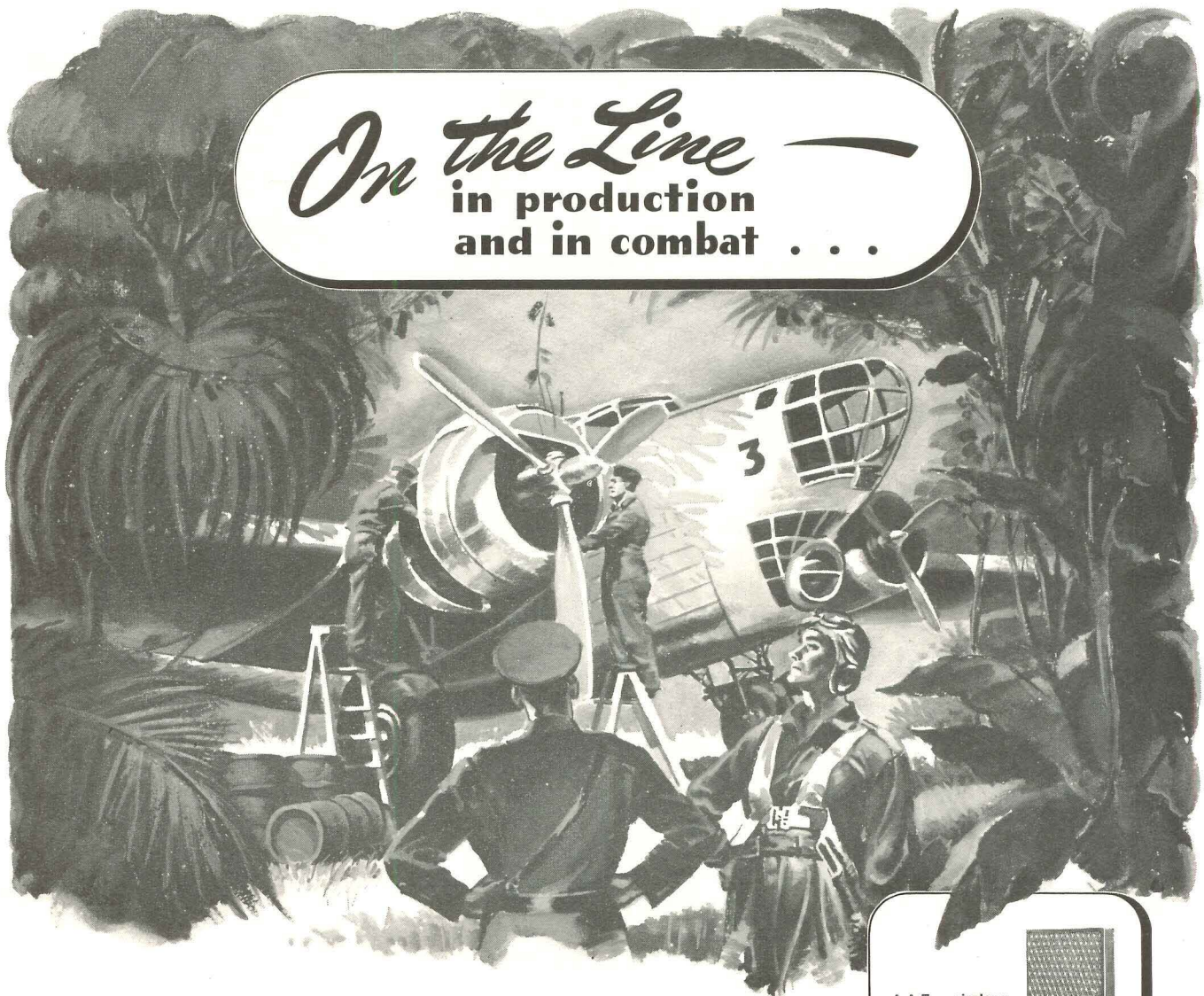
MASSACHUSETTS Institute of Technology has announced the inauguration of a four-year undergraduate curriculum leading to the degree of Bachelor in City Planning, to be available in September. The program is under the direction of Professor Frederick J. Adams, and includes preparatory subjects in engineering, natural and social sciences, economic and administrative aspects, and the working out in the drafting room of actual problems in city and regional planning.

### KAHN SCHOLARSHIP

DEPARTMENT of Architecture of the University of Pennsylvania is offering the Albert Kahn Scholarship in Industrial Architecture to that applicant who has the best record in both Design and Construction at the end of the first four years of an architectural course. This is a part-tuition scholarship. Fur-

(continued on page 20)

*On the Line* —  
**in production  
 and in combat . . .**



## **AAF Filters protect them from dust**

Dust is a major problem both in the manufacture and maintenance of our great air armada. The important part which dust control plays in manufacture was soon discovered by airplane builders who turned to AAF engineers early in the war emergency to solve their dust problems.

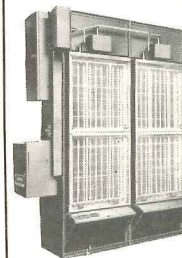
Following manufacture came maintenance, which due to make-shift airport facilities necessary in combat zones, again found dust a serious hazard. Engine performance records in Libya, Australia and elsewhere, made under actual fighting conditions, show that motors not

protected by air filters, require overhauling and rebuilding after only 20 to 30 hours, due to the severe dust conditions. With AAF airplane engine filters, which remove 90% to 99% of the dust which causes this excessive wear, the overhaul period can be increased to 300 or 400 hours, thus saving valuable replacement parts and reducing oil and gas consumption.

So—on the line—in production and in combat AAF filters protect our war planes.

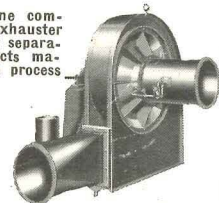
If you are confronted with a dust problem in your business—write us—we can help you too!

AAF airplane engine filters protect our fighting planes against destruction by dust.



AAF atmospheric dust control equipment is installed in every major airplane factory in the U. S. A.

Roto-Clone combined exhaustor and dust separator protects materials in process and personnel against all forms of process dust.



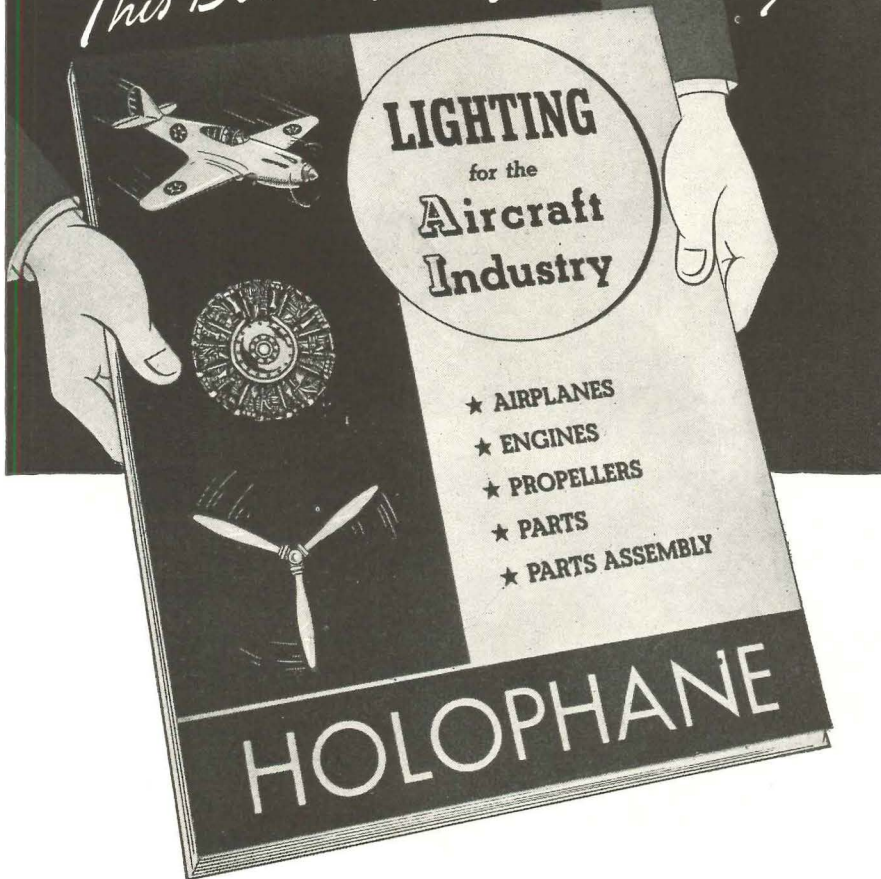
**AMERICAN AIR FILTER COMPANY, INC., 389 CENTRAL AVE, LOUISVILLE, KY.**

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# For AIRCRAFT PRODUCTION EXECUTIVES:

How to Plan the Most Efficient Plant Lighting  
How to Get the Full Results of Your Planning  
How to Figure Cost, Maintenance, Installation

*This Book is Yours for the Asking*



It is a fact that many new plants now in war production are operating with a fraction (some as little as one-half) of the illumination for which they planned and paid. This waste is unnecessary . . .

The new bulletin "LIGHTING FOR THE AIRCRAFT INDUSTRY" contains:

- *Comprehensive information on processes and economy in maintenance . . .*
- *Accurate tables for arriving at costs and economic comparisons of various lighting methods . . .*
- *Easy-to-use illumination charts (available for the first time) which give pre-determined information of expected lighting results.*

Send today for this important reference book, prepared by the Holophane Engineering Department. No charge.

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## THE RECORD REPORTS

(continued from page 18)

ther details may be had by writing to Dean George S. Koyl, School of Fine Arts, University of Pennsylvania, Philadelphia.

### PAUL B. LA VELLE 1879-1942

PAUL B. LA VELLE, AIA, died in Philadelphia May 5. He was a past president of the Westchester Chapter, AIA, and was chiefly known for his work in hospital design, civic center planning and apartment house architecture. A Swiss, educated in the Universities of Zurich and Stuttgart and the Ecole des Beaux Arts, he came to the United States in 1899 and resided and practiced in White Plains, N. Y.

### HOSPITAL PLAN CRITICIZED

FROM Isadore Rosenfield of the Department of Public Works of the City of New York comes a letter which he asks us to publish, making it clear that it is his personal opinion and not an expression of his department:

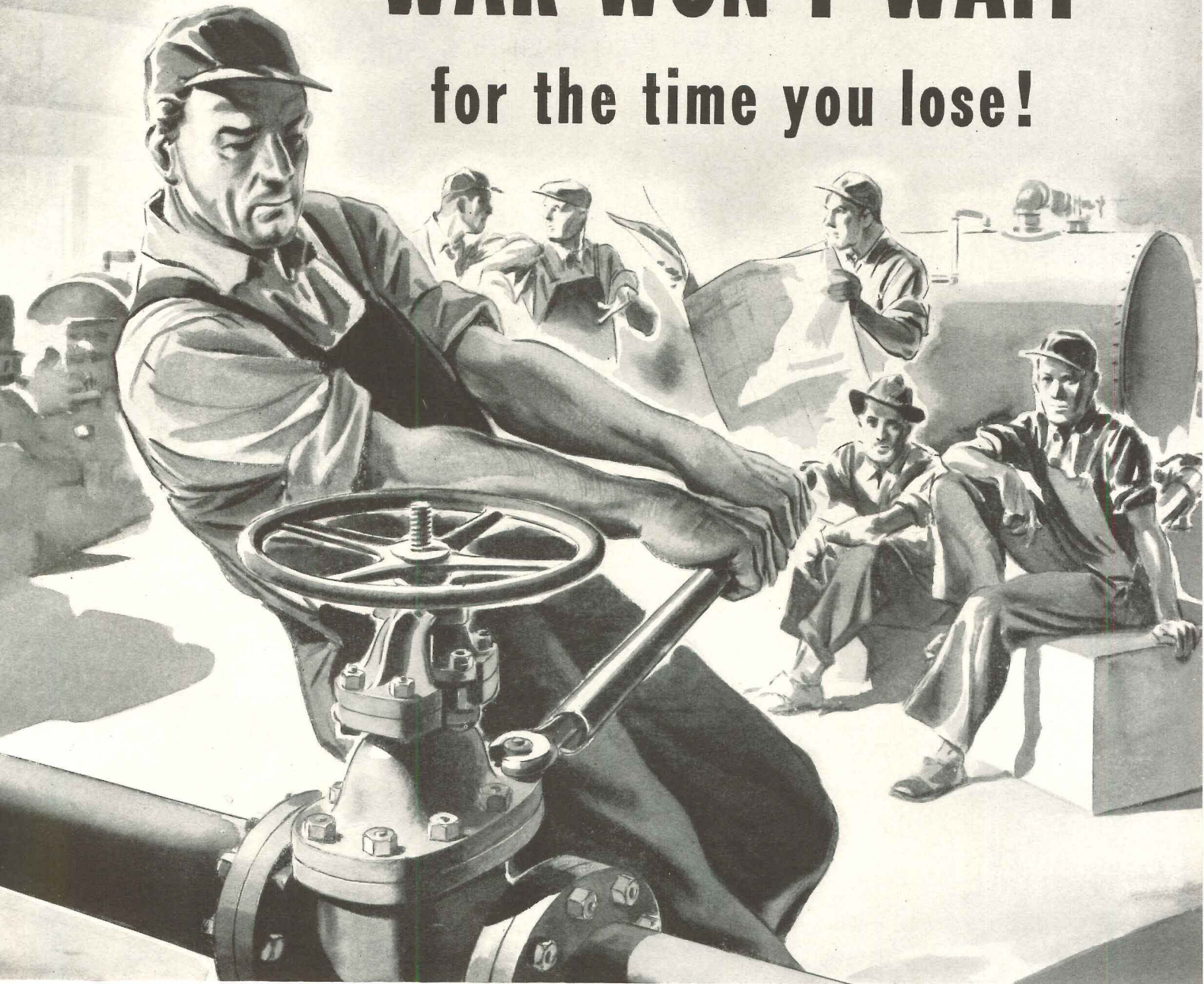
Mr. Neergaard's Double Pavilion Hospital Plan, which was published in the March issue of *Hospital and The Modern Hospital*, as well as in your magazine, is susceptible of criticism in many important details. To mention a few: there are no shafts for pipes; no space for vent ducts; toilets and baths open directly into the corridor with loss of privacy and a gain of odors; ramps which are hazardous and impractical; a suggestion of using the basement for patients, which lowers the standards and deprives the hospital of necessary storage space (pipe spaces would still have to be provided); nurses' station, utility rooms, treatment rooms, and diet kitchens without exterior light; narrow corridors; insufficient space to accommodate the equipment in most of the service rooms; doors opening through service rooms on both sides would make control of ventilation very difficult; it is inherent in this scheme that a large proportion of the beds would face north; not a single quiet room in a wing of 84 ward beds; placing quiet rooms away from the wards and grouping them with semi-private and infants, etc.

It should not be difficult to build up these criticisms to a point where, in the aggregate, they may be sufficient to condemn the scheme itself. The above shortcomings may be due to the fact that the drawings are only schematic. On the other hand, a detailed working out will undoubtedly reduce the claimed advantages. The scheme is offered to us as a means of meeting the war emergency. We seem to meet most war emergencies by spending about double normal cost. It is, there-

(continued on page 28)

# WAR WON'T WAIT

## for the time you lose!



### Ward Against Valve Breakdowns...Specify Jenkins Valves

Today you take an extra risk in specifications for valve installations.

For plants which would ordinarily run eight hours a day are called on for twenty-four hour duty. And shutdowns due to valve failures waste precious production time.

Play safe. Specify Jenkins Valves. Experience has proved that Jenkins Valves have an extra quality margin

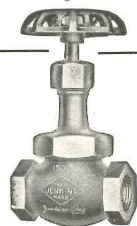
that enables them to stand up longer — to avoid work interruptions due to valve failures — to reduce maintenance time and labor.

Yet Jenkins Valves cost no more to

buy; they actually cost less to use!



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## JENKINS VALVES

For every industrial, engineering, marine and power plant service . . . in Bronze, Iron, Cast Steel and Corrosion-Resisting Alloys . . . 125 to 600 lbs. pressure.

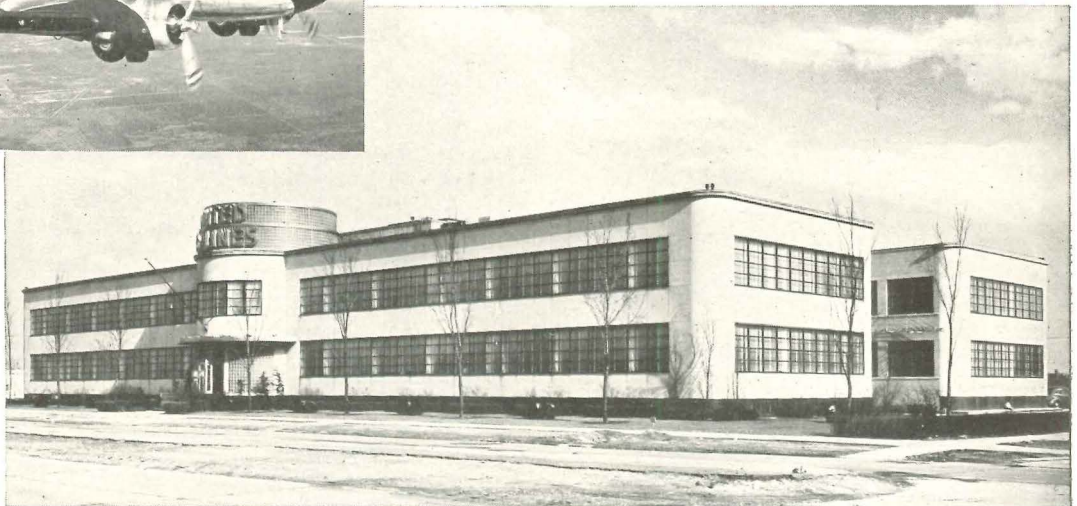


# TRANSPORTATION *is* A-1-A!

A United Air Lines Mainliner, which flies from coast to coast overnight, helping to knit into a unified force, the various elements in America's war production. At right, the newly completed United Air Lines headquarters at Chicago.

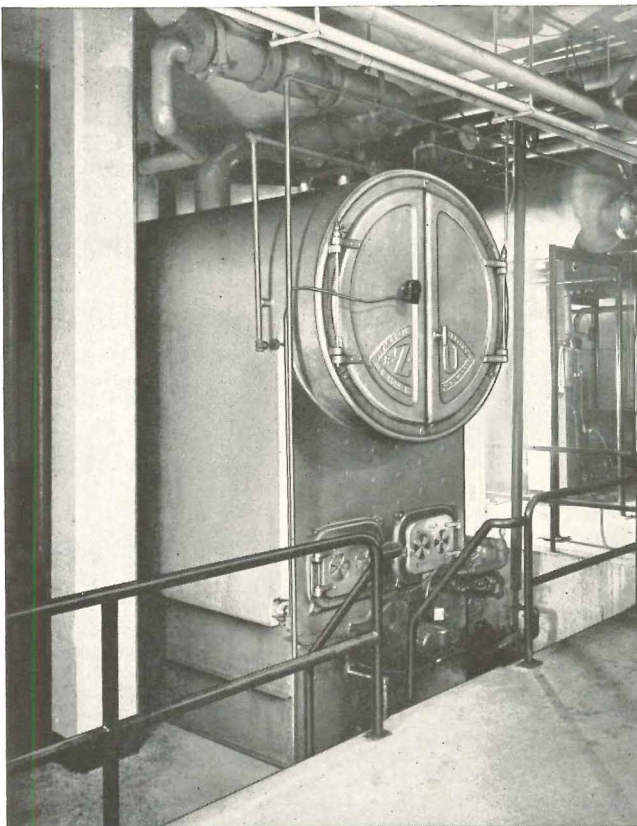
Architect, Albert Kahn, Inc., Detroit, Mich.

Heating Contractor, O. A. Wendt, Chicago, Ill.



## *The* LARGEST AIRLINE HEADQUARTERS

### *selects HEAT by* **FITZGIBBONS** **R-Z-U STEEL BOILERS**



Another installation of first importance, another heating job that carries with it something of the spirit in the conferring of honors, falls to Fitzgibbons. The completion of the final wing which more than doubles the size of the United Air Lines general headquarters at Chicago, makes this the largest general office headquarters of any airline in the world. A Fitzgibbons R-Z-U steel heating boiler heats the new structure.

From large edifices like this, hospitals and public buildings, down to the modest 5-room homes for war workers, the qualities which provide economical, dependable heating comfort are found in steel boilers, conditioners and furnaces by Fitzgibbons.

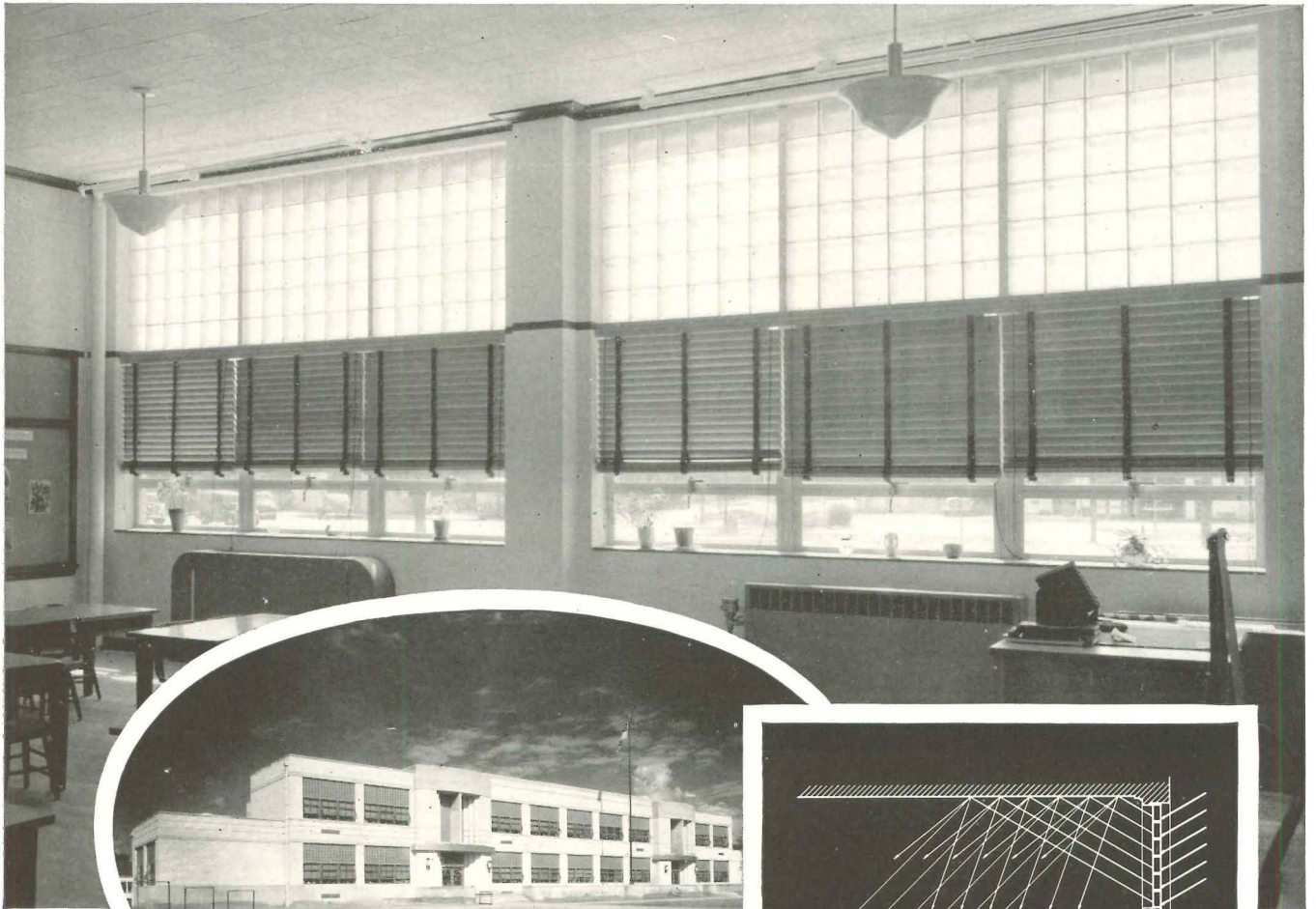
The Fitzgibbons R-Z-U Steel Boiler in the boiler-room of the United Air Lines headquarters. This is an oil-fired unit, with the especially proportioned combustion area typical of Fitzgibbons oil burning steel boilers to get maximum results from burner and fuel.

(Photos on this page, by courtesy of United Air Lines).

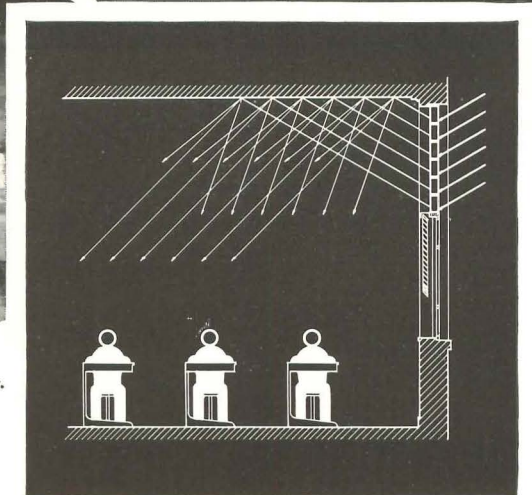
### ***Fitzgibbons Boiler Company, Inc.***

101 PARK AVENUE, NEW YORK, N. Y.  
WORKS: OSWEGO, N. Y.

Branches and Representatives in Principal Cities



Kellogg School, Wichita, Kansas. Architects: Overend and Boucher.



**THIS DETAIL ILLUSTRATES** how PC Prism Light-Directing Glass Blocks work for better illumination. Areas near the windows in the room are illuminated by daylight coming directly through the transparent glass, while areas farther removed are lighted indirectly from the ceiling by the light which the PC Glass Blocks direct upon it.

## PC Prism Light-Directing Glass Blocks

● Prisms on the two inside faces of this special-purpose PC Glass Block direct the greater part of transmitted light *upward* . . . away from the direct vision or glare zone . . . to the ceiling, whence it is reflected downward to afford excellent indirect "daylighting". The use of this block in light-transmitting areas of schools, hospitals, factories, drafting rooms and similar structures has proved exceptionally successful. In many cases, as in the new school building shown on this page, Prism Light-Directing Blocks are combined with areas of transparent glass to achieve ideal daylighting conditions. This block, like all other PC patterns, is immediately available. And it makes an extremely attractive panel from an appearance standpoint. Upon request, complete information, including installation details, will be sent you on this and other PC Glass Blocks. Pittsburgh Corning Corporation, 2068-2 Grant Bldg., Pittsburgh, Pa.



## GLASS BLOCKS

*Distributed by*  
PITTSBURGH PLATE GLASS COMPANY  
and by W. P. Fuller & Co. on the Pacific Coast

*"PITTSBURGH" stands for Quality Glass*

# IMAGINEERING: GETTING OUT OF THE GROOVE



**THESE FOUR YOUNG WOMEN**, so earnestly mastering the art of torch-welding aluminum, suggest that someone, somewhere, has checked out of the groove and started some practical Imagineering.

**THEY PROVE** what we've been saying for years: Alcoa Aluminum is easy to fabricate. The man who started the school where these girls are learning, and graduating to war jobs, simply had imagination enough to believe that

easy really means easy. Then he did something about it!

**IMAGINEERING** is letting your imagination soar and then engineering it down to earth. It is ingenuity in modern dress.

**IT IS THE THING** that has enabled the aluminum industry to keep on top of a plane schedule, increased tremendously in numbers, but also calling for almost twice as much aluminum per plane as the average plane needed two years ago.

**IT IS WHAT EVERY ONE OF YOU** are doing on your war job. Simplification, standardization, training. New methods, new materials, new records.

**THIS WAR** is showing Americans what they really can do if they try.

**LET'S MAKE** a vow to carry this same spirit over into postwar America. We'll all have the skills, the habit of work, the thrill of doing. There will be lots of aluminum to make into better products than peacetime America ever knew. It will be a great day for Imagineers.

Aluminum Company of America, 2167 Gulf Building, Pittsburgh, Pennsylvania.

★  
**SO MUCH  
SO SOON**  
★

# ALCOA ALUMINUM







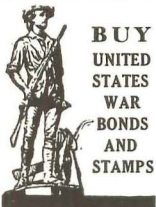
## *40,000 TODD UNITS*

# *helping to cook Hitler's goose!*

**D**EFEAT of the Axis begins in America's power plants, where fuel-energy is unleashed and put to work . . . is transformed into machines turning . . . planes flying . . . shells blasting the enemy's strongholds! All-out power production . . . top combustion efficiency . . . mean more tools for the job . . . speedier overthrow of Berlin, Rome and Tokio!

Todd equipment, in power plants of every type, is taking today's three-shift load in its stride . . . setting the pace everywhere for minimum-maintenance and maximum-performance in the firing of liquid and gaseous fuels. Over 40,000 Todd units are now in service, in individually designed installations, backed by more than a quarter-century of combustion engineering experience. Todd technical service staffs in key cities, with parts and replacements always available, are helping industry to reach—and surpass—the power-quotas required by America-at-war.

FOR VICTORY



BUY  
UNITED  
STATES  
WAR  
BONDS  
AND  
STAMPS

## **TODD COMBUSTION EQUIPMENT, INC.**

*(Division of Todd Shipyards Corporation)*

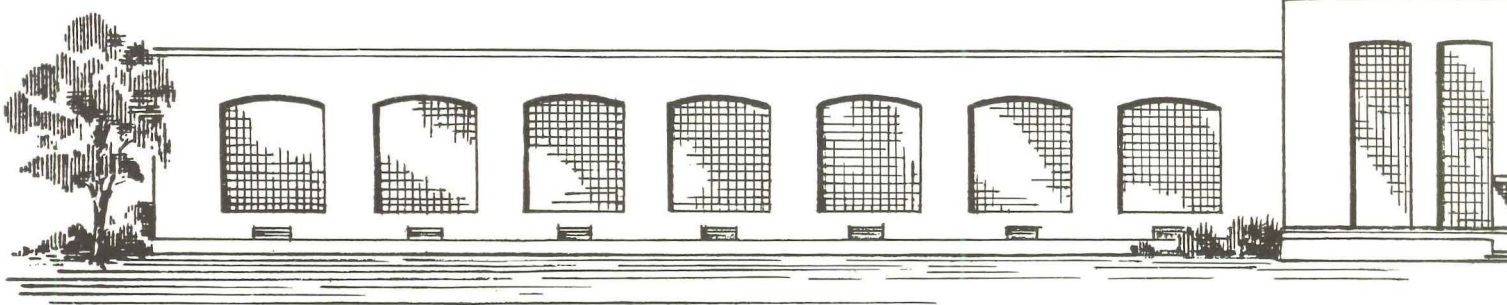
601 West 26th Street, New York City



NEW YORK    MOBILE    NEW ORLEANS    GALVESTON    SEATTLE    BUENOS AIRES    LONDON

# INSULUX Glass Block

## Daylights This Fireproof Building



### INSULUX SERVES WAR PRODUCTION

- ★ Saves Critical Materials
- ★ High Insulating Value
- ★ Fireproof—Non-Combustible
- ★ Efficient Light Transmission

INSULUX Glass Block, a functional industrial building material, can help speed war production by efficient daylighting of factories. At the same time it serves America's cause through savings of money and materials.

Panels of INSULUX provide light-transmitting areas that diffuse, distribute, and direct daylight evenly to all parts of the plant.

Made of glass and laid up in mortar, INSULUX makes other valuable contributions to war work and conservation of war material. Under a new technique, it can be laid up without metal in areas not exceeding 50 square feet, with a maximum

width of ten feet—subject to local ordinance; in larger areas with little metal.

A hollow, evacuated block of water-clear glass, INSULUX provides insulation from heat and cold. Because it is fireproof and will not support combustion, it protects inflammable war production.

Because the industrial applications of glass block have constantly broadened, INSULUX has not advanced in price along with other building costs.

INSULUX is now available for war buildings. In construction it is quickly installed by bricklayers or masons.

OWENS-ILLINOIS GLASS COMPANY, INSULUX Products Division, Department 53, Ohio Building, Toledo, Ohio.

Gentlemen: Please send me, without obligation, your free book entitled "Alternate Construction Details" showing how to save metal and aid war construction.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_

Check here if you want an INSULUX technical representative to visit your plant for a survey of your particular problem.



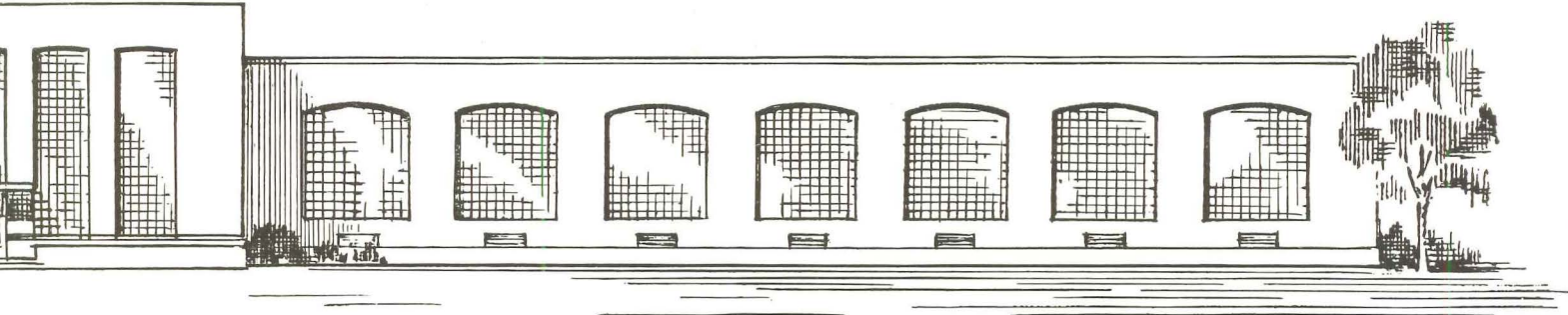
### NEW "Alternate Construction Details"

The new technique for new construction or maintenance with INSULUX is fully described in a book just printed—"Alternate Construction Details to Save Metal and Aid War Construction." It shows in picture and detail form how to use INSULUX under Order L-41. Write today.

# No Steel Shapes Used in Exterior Walls

## EXTERIOR WALL SPECIFICATIONS:

Glass Block Panels • Masonry Walls • Masonry Arches



INSULUX in New Construction.  
This architectural rendering—a practical design for war plants—shows the application of *INSULUX* to arched head masonry construction. By fastening wood blocking to masonry head, steel lintels are eliminated. In such construction *INSULUX* provides adequate natural lighting while protecting war work from outside eyes.

**SAVES STEEL**—In factories *INSULUX* saves many tons of steel, for it can be erected in areas not over 50 square feet (ten feet maximum width) with mortar alone. In larger areas with little metal.

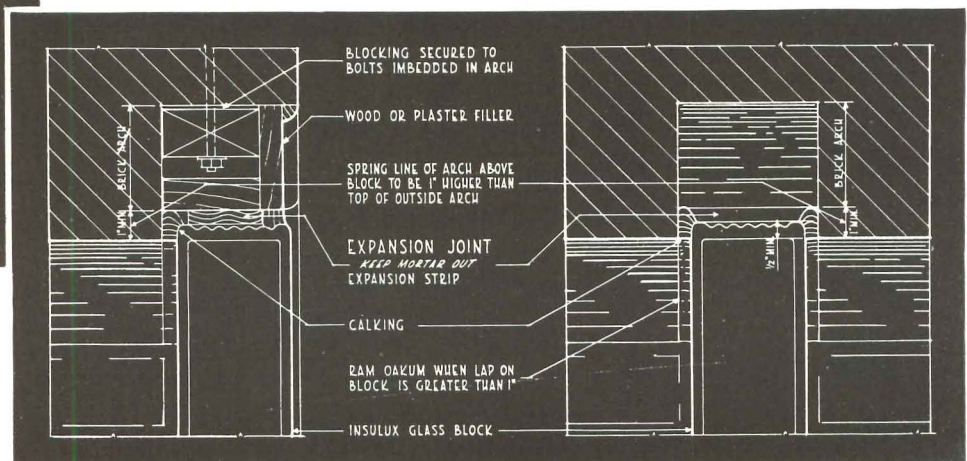
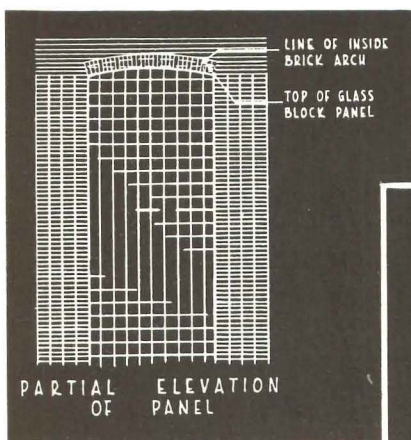
**SAVES MEN**—By bringing in light, keeping out dirt, *INSULUX* improves working conditions, steps up employee morale. At the same time it cuts down lighting costs.

**SAVES PAINT**—*INSULUX* eliminates maintenance painting, requires only occasional cleaning.

**SAVES FUEL**—Because of its high insulating value, *INSULUX* saves fuel used in heating and power used in air conditioning.

**SAVES WAR WORK**—Translucent *INSULUX* keeps war work away from prying eyes. (Where limited outside vision may be desired a transparent block is offered).

## OWENS-ILLINOIS **INSULUX** GLASS BLOCK



(continued from page 20)

fore, difficult to understand why the hospital emergency has to be met by reducing normal cost by at least one-third.

### Better as one-story scheme

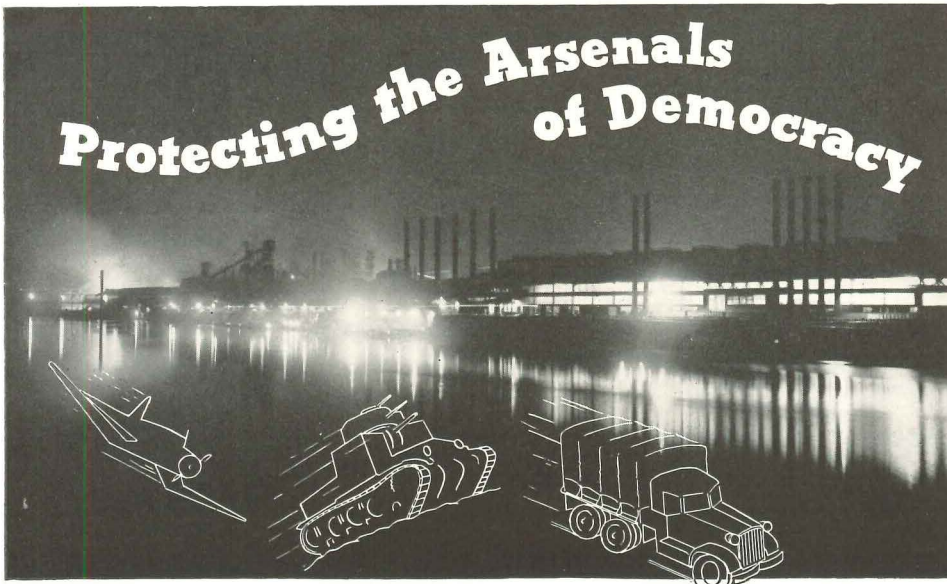
As a one-story scheme, the Double Pavilion is not so very objectionable because of the relief that would be had from the skylights, but we cannot solve all problems by one-story schemes which involve costly large sites, expensive foundation, roof and skylight sandwiched between which is only one story. If the war emergency conditions require us to build one-story hospitals, or any other kind of hospitals, then that is what we must do. But

let us not confuse emergency requirements with permanent policy.

Otherwise the Double Pavilion is essentially a slum because it condemns nurses and attendants to almost eternal artificial light, poor ventilation and slop and smells due to double use of fixtures. It encourages the elements in our community who are more interested in saving dollars, provided they are saving them at the expense of the other fellow, than in conserving life. We already experience great difficulty in attracting people to the nursing profession. Mr. Neergaard's scheme will not attract them.

During the first World War many of

our cities had thrown up substandard hospitals, with which we still have to contend today. In a large eastern city it is proposed to solve the problem of providing emergency beds by building hospitals which are rather simple and inexpensive, but not lacking in any of the amenities, for the various categories of chronics. By moving the chronics out of the acute hospitals, beds will be vacated to take care of the influx of acute cases or possible war casualties. When the war is over, the city will have reduced the load on the acute hospitals and made suitable and wholesome provision for chronics and convalescents.



## KEEP BUILDING — KEEP PRODUCING — AMERICA !!

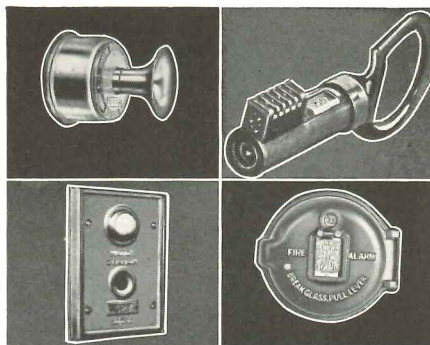
Down the long assembly line of thousands of plants speeding airplanes, tanks, trucks, munitions and war goods Holtzer-Cabot Fire Alarm and Watch Patrol systems guard against fire and sabotage.

"All Out Top Speed for the Duration" — night and day shifts — new buildings — plant expansions increase the need for electrical protective systems that there may be no interruption in the production of the important materials and equipment needed by our men in the "Front Lines".

Fire hazards increase with industry's quickening pace. Sabotage is in our midst. Air Raids are an expectancy for which we must prepare. Never before have electrical protective systems been of more importance than they are today.

Mr. Architect, Mr. Builder — You are responsible for the protection of life and property at home and the uninterrupted delivery of needed materials abroad. Let Holtzer-Cabot help you provide maximum protection. Remember to include "Signals" in your specifications for Power and Light. Write for your copy of: Air Raid, Fire Alarm and Watch Patrol System Bulletins. See Sweet's Architectural and Industrial File.

**The Holtzer-Cabot Electric Company**  
125 AMORY ST., BOSTON, MASSACHUSETTS  
Offices in all principal cities.



Manufacturers of Electrical Signal Systems since 1875. One responsibility — Satisfactory Operation of Complete Systems.

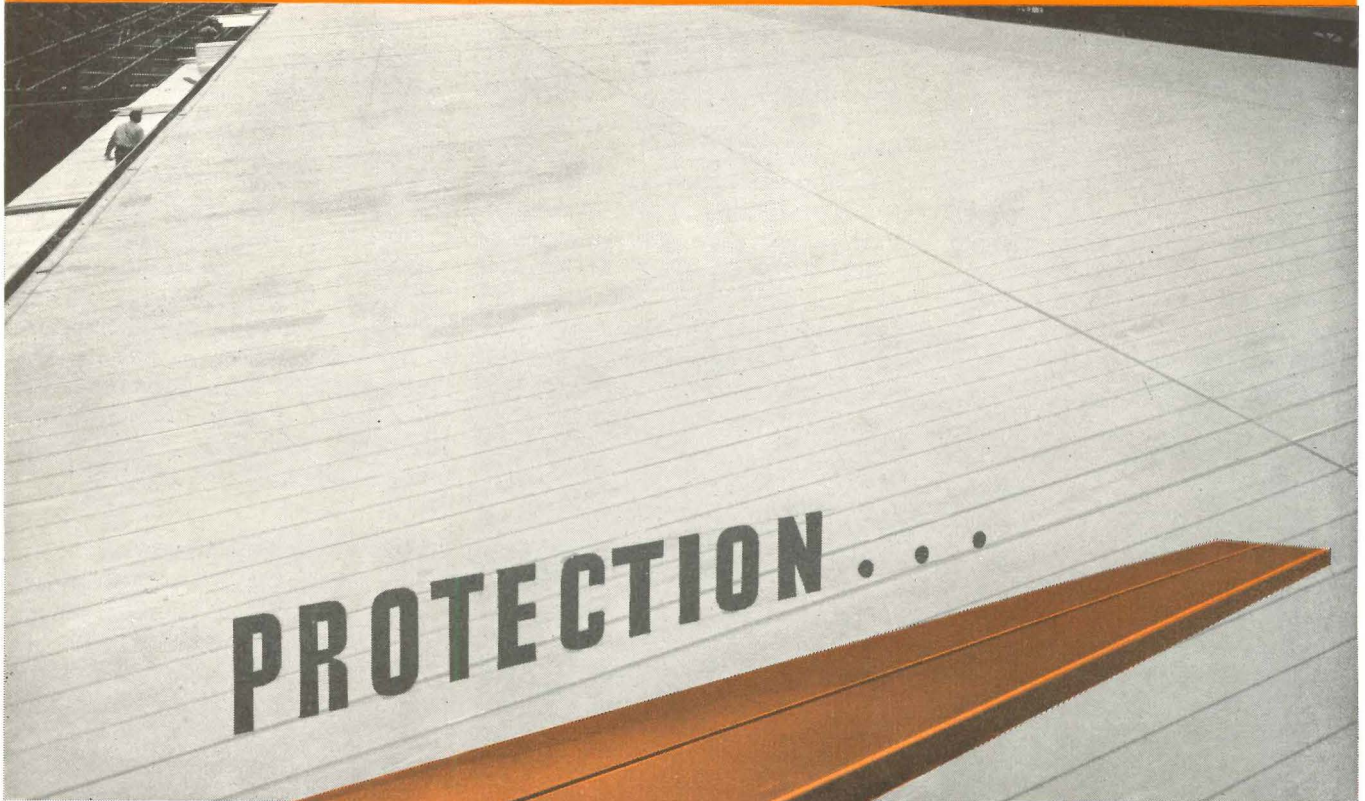
## NEWS FROM LONDON

By J. EUGENE REID

IN THE EARLY DAYS of the war private architects in this country had to fight hard to get hold of building work. A gradual falling-off in private building was to be expected, but when in October, 1940, licensing laws were introduced which put a stop to private building altogether, excepting that which formed part of the Government's war program, private practices touched rock bottom, and the practitioners had to look around for ways of getting some of the Government work. After a good deal of agitation on their part, the Government, through its constructional Ministries such as Works and Buildings, implemented a scheme whereby panels of private architects were drawn upon to carry out wartime buildings. In the main this work consisted of adapting stock plans, devising layouts and supervising the construction of temporary hospitals, hostels, camps and stores, and though official figures are not available it can be assessed from the total fees (roughly \$264,000) paid out by the Ministry of Works and Buildings over a period of six months that only a very small number of peacetime practitioners were able to derive anything like a reasonable income from panel work. Many architects were therefore left to their own devices to get work, and two very good examples of how architects managed to corner a respectable slice of Government work through their own individual efforts have now come to light with the recent release of descriptions of housing accommodation that is being provided for vast communities of workers who are em-

(continued on page 30)

# Mahon Steel Roof Deck



## *Speedily Installed*

because a Mahon Steel Deck Roof is a simple assembly of interlocking, vertical-ribbed steel plates (as pictured above) securely welded together and to the supporting framework into a continuous sheet of protective steel—light in weight, yet exceptionally strong and rigid. Work on the building beneath can continue without interference or interruption.

Now—that war plant construction has monopolized all other building activities—the **FIRESAFETY** and **PERMANENT SECURITY** of Mahon Steel Roof Deck assumes a new importance. Here is proved protection—*overhead*—where protection is so vitally essential. For the roof of any building is a most vulnerable point of danger—especially from fire.

To the protection Mahon Steel Roof Deck provides against **FIRE—WEATHER—and TROUBLE**—add the speed and ease with which it can be installed—the economy effected throughout the entire supporting structure because of lighter weight—and the numerous outstanding advantages in its design and manufacture. Consider these things and you will understand why this superior roof construction has the preference on so many buildings erected for war production.

For detailed information, refer to Sweet's—or the **NEW Mahon Steel Roof Deck** catalog recently mailed to you. If you haven't a copy, send for one at once.

**THE R. C. MAHON COMPANY • DETROIT • CHICAGO**

*Representatives in Principal Cities*

Manufacturers of Steel Roof Deck, Rolling Steel Doors, Shutters and Grilles, Kalamein Doors, Tin Clad Doors, Cast Iron Roof Sumps and Roof Sump Recesses.

# MAHON

# THE RECORD REPORTS

WHO + WHAT + WHEN  
WHERE + WHY + HOW

(continued from page 28)

ployed in the new ordnance factories. In view of the rapid expansion of American war industry some account of these schemes is opposite.

## Technical teams formed

Shortly after war broke out local architects in one of the industrial areas, foreseeing the upheaval war would bring to the architectural profession and to every branch of the building industry, were instrumental in creating a building organization which embraced

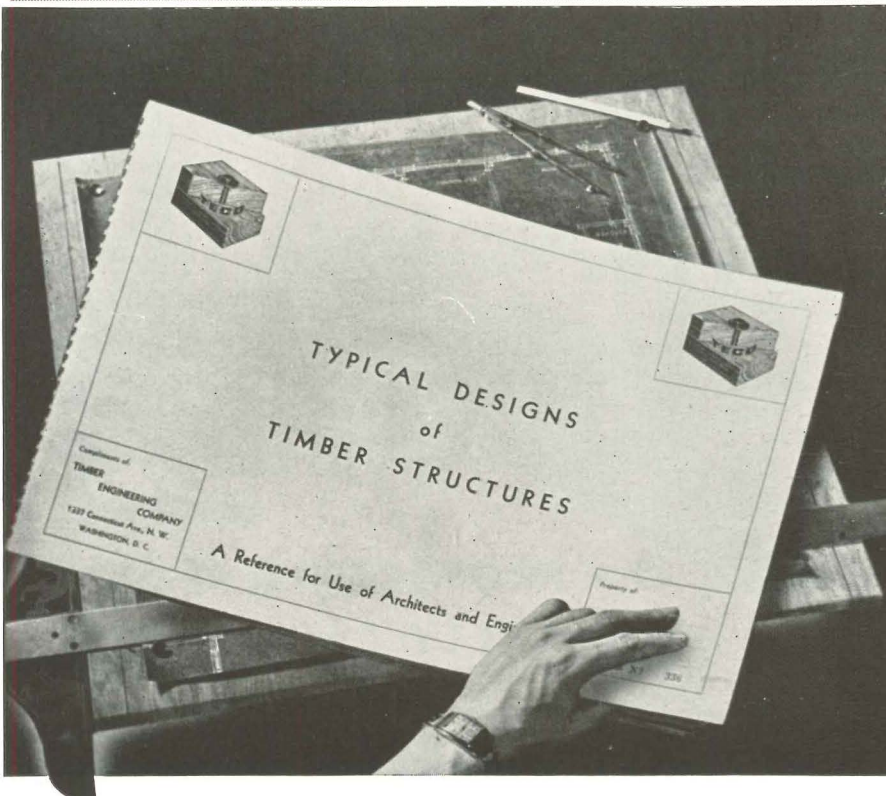
all the local building interests—architects, contractors, small builders and merchants alike, the idea behind its formation being that because of its thoroughly cooperative nature the organization would be in a position to carry out speedily and with a maximum efficiency large scale wartime building projects for the Government.

An opportunity to put the organization to test arose when the Supply Ministry was faced with the problem of providing living accommodations

for factory workers in its district. The organization put up a scheme for building within a period of nine months, at a cost of \$3,200,000, two estates consisting in all of some 500 three-bedroomed parlour type houses and roughly 200 houses of the same type but designed as three-roomed flats. The scheme received official sanction and the organization went into action. The houses were of permanent-type brick construction, and to eliminate timber as far as possible floors and roofs were formed with pre-cast concrete beams, and precast units were also used for staircase treads and roof eaves. The estate was pleasantly laid out, quadrangles and cul-de-sacs adding interest to the grouping.

## Cooperation with contractors

It is impossible in this short reference to delve deeply into all the machinations of the organization, but briefly the scheme was built by a group of local contractors who, though working as independent firms, nevertheless worked in close cooperation in the interests both of themselves and the job. One of their number was elected chief contractor with whom the Ministry conducted its business, and it was through this contractor that the others purchased their materials at little more than cost price. The same spirit of cooperation was evinced among the local builders' merchants who agreed to form a special company to avoid overlapping and to assure fair distribution of orders. And indeed everyone connected with the job was imbued with the "get-together" atmosphere of the whole project. The architect's part in the organization differed widely from peacetime practice, but nevertheless it contributed handsomely to the final result. The work was shared among the architects locally, and their job, once the designs, layouts and detailed drawings had been prepared, was a supervisory one. Under the architect's control was the allocation of materials among separate contractors, the transference of labour from one contractor to another as necessity arose, and the time scheduling of the entire scheme. Altogether it was a job from which many a useful lesson could be learnt for more universal application.



## FREE— A REFERENCE FOR THE USE OF ARCHITECTS AND ENGINEERS

You draw on the successful experiences of many leading designers of timber structures . . . when you consult this fine reference book.

Detailed framing plans of 45 representative structures are included in *Typical Designs of Timber Structures*, with handy tables for use in timber design.

You will see how capable the TECO System of construction handles . . . short-span, as well as longer trusses. If you haven't received your copy . . . Please use the attached coupon.



TECO Ring Connectors spread the load on a timber joint over practically the entire cross-section of the wood.

**Timber**  
**ENGINEERING COMPANY**  
1319 EIGHTEENTH STREET, N. W.  
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TIMBER ENGINEERING COMPANY, 6-F  
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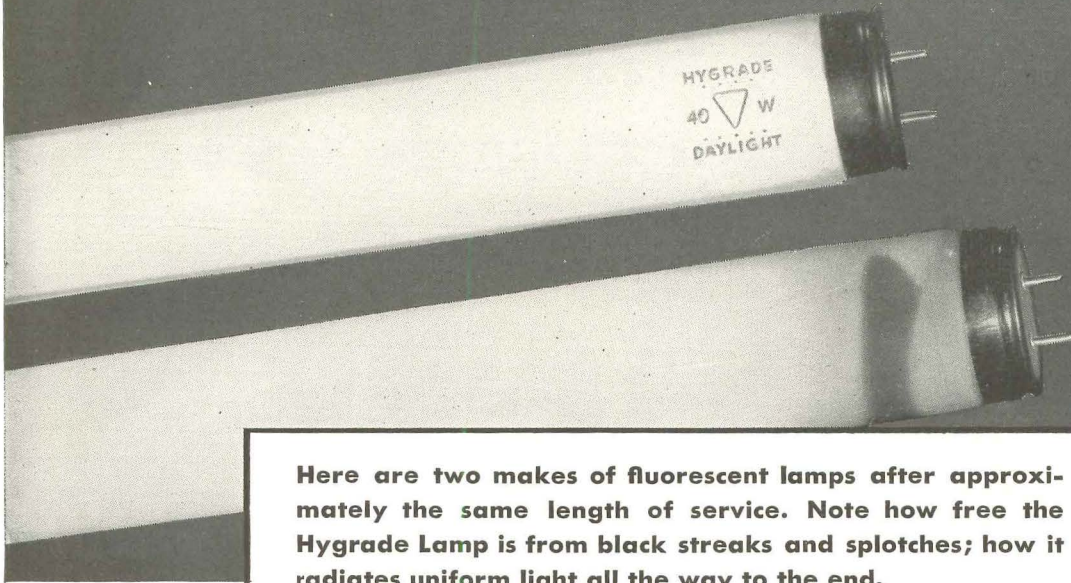
Gentlemen:

As yet I haven't received *Typical Designs of Timber Structures*. Please rush my copy.

Name.....  
Firm.....  
Street.....  
City..... State.....

(continued on page 92)

# What Keeps a Fluorescent Lamp "BRIGHT TO THE LAST INCH"?



Here are two makes of fluorescent lamps after approximately the same length of service. Note how free the Hygrade Lamp is from black streaks and splotches; how it radiates uniform light all the way to the end.

If you've ever looked closely at different fluorescent lamps, you must have noticed how many of them develop thin black streaks and heavy black splotches, which cut down their lumen output.

Thanks to the continued pioneering efforts of Hygrade Sylvania engineers, such unsightly discolorations are minimized on Hygrade Lamps. The newly patented "Mercury Bomb" not only reduces them but also saves up to 50% of the critical war material — mercury — otherwise wasted.

The early appearance of dark end-bands on Hygrade Lamps has been effectively retarded by marked improvement in cathode construction.

But Hygrade superiority doesn't stop there.

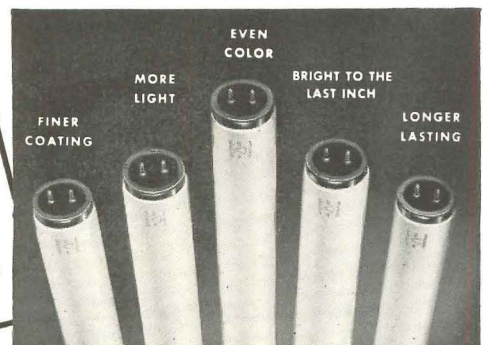
Talk to any user and you'll find that these lamps have a smoother, superior coating; give

light of uniform color; give *more* light; *last longer*.

These fine lamps operate well in any type of fluorescent fixture. But they achieve their peak performance in Hygrade Sylvania fixtures—complete fluorescent units with all parts designed and engineered by Hygrade, every element operating in precision smoothness with the rest.

If you haven't yet received our free file-size kit—containing catalogs, prices and complete technical specifications on all Hygrade Fluorescent Lighting Equipment—write today to Dept. AR-6.

**Patent Received on "Mercury Bomb"**  
Hygrade's remarkable new device, the "mercury bomb," has now been patented (No. 2,283,189). This exclusive feature precisely controls the amount of mercury going into each Hygrade Sylvania Lamp—preventing the dark splotches that result from too much mercury, the below-par lighting that comes from too little.



## HYGRADE SYLVANIA CORPORATION SALEM, MASS.

Makers of Hygrade Incandescent Lamps, Fluorescent Lamps, Fixtures, Starters, Sockets, and Sylvania Radio Tubes



START PLANNING NOW  
FOR SLOAN-EQUIPPED HOMES



FOR 36 years Sloan engineering has made and kept Sloan Flush Valves the world's standard of excellence. You will find them today in luxury homes, apartments, clubs, hotels, hospitals, schools, and all types of large buildings everywhere. During all these years Sloan Flush Valves have protected health by preventing back-syphonage. They have saved both water and the power cost necessary to pump it. They have always been amazingly low in maintenance cost.

Now, thanks to Sloan engineers, we are able to make this promise:—*after the war Sloan Flush Valves, with all their inherent advantages, will be available to even the modest homes.*

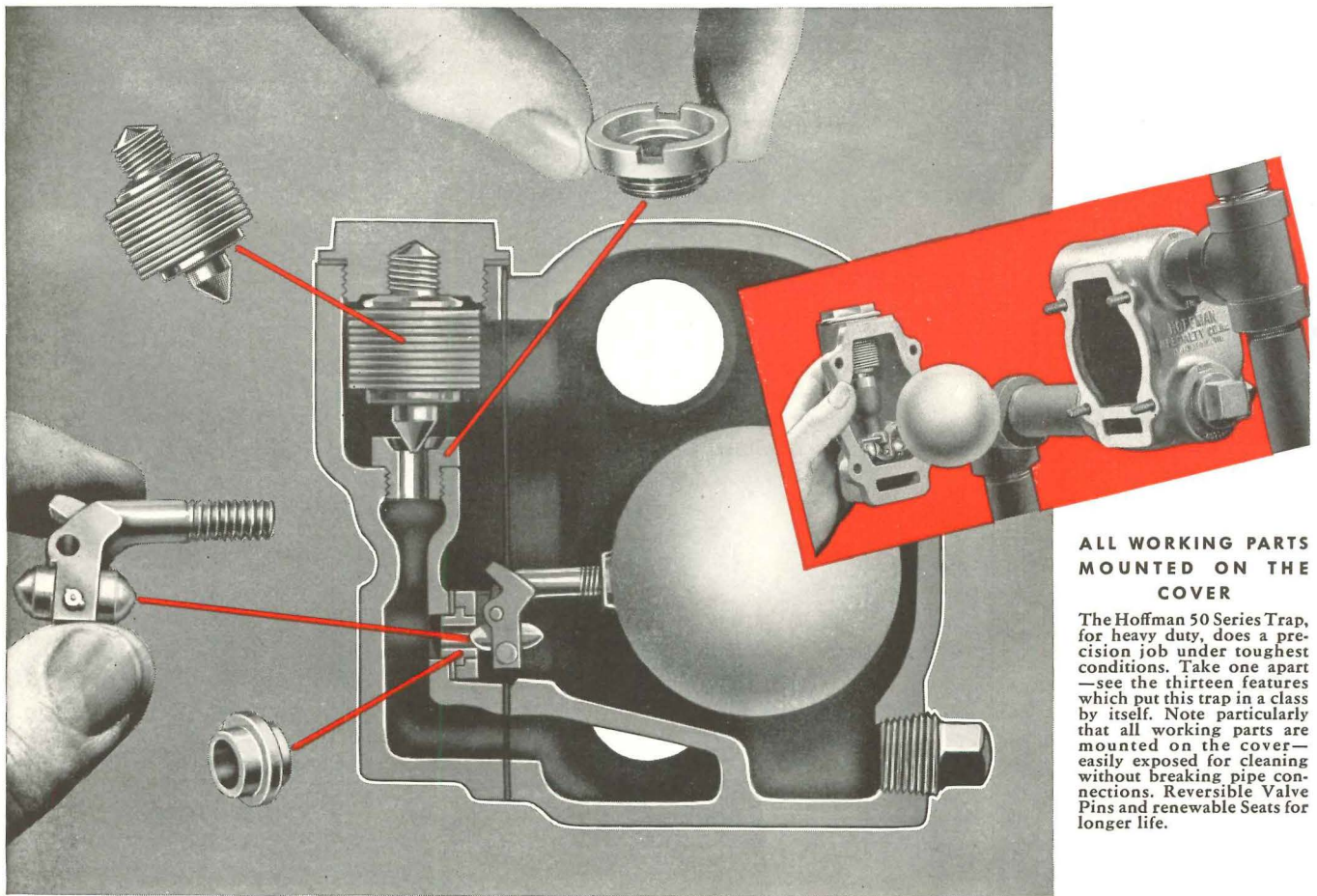
Sloan-equipped homes are the ultimate in convenience, health and economy. Start planning now for Sloan-equipped residences. Remember: there are more Sloan Flush Valves sold than all other makes combined.



SLOAN VALVE COMPANY

4300 WEST LAKE STREET • CHICAGO





**ALL WORKING PARTS MOUNTED ON THE COVER**

The Hoffman 50 Series Trap, for heavy duty, does a precision job under toughest conditions. Take one apart—see the thirteen features which put this trap in a class by itself. Note particularly that all working parts are mounted on the cover—easily exposed for cleaning without breaking pipe connections. Reversible Valve Pins and renewable Seats for longer life.

**EVERY PART RENEWABLE!**



*Hoffman Steam Specialty bulletins will help you select the right heating equipment on your next job.*

**A SPECIFICATION OF HOFFMAN STEAM SPECIALTIES IS DIRECT AND PRACTICAL COOPERATION WITH OUR WAR ECONOMY PROGRAM**

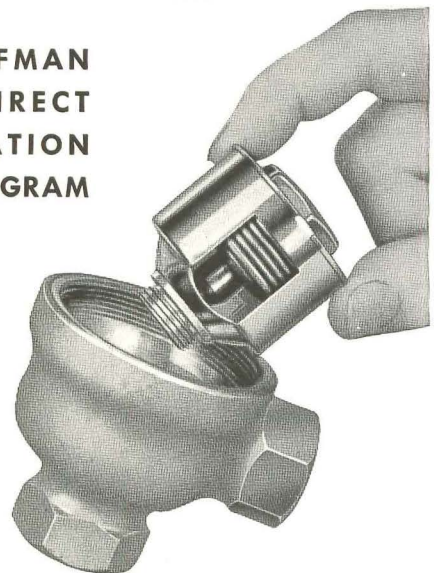
Vital metals go into the Specialties necessary to steam heating system operation. It is good business judgment and practical patriotism to use those which give better service longer . . . and

*which can be repaired when needed with little expenditure of critical materials!*

Hoffman Steam Specialties conform to these standards. They provide for full utilization of every last BTU . . . because they are designed that way! They can be maintained at full efficiency for years by inexpensively replacing those parts in which long usage is bound to cause wear.

This is genuine cooperation with our war economy. Instead of junking a complete unit, the reversing or replacement of perhaps a single part will put a Hoffman Specialty back in operation.

Hoffman offers Steam Traps in a complete capacity and pressure range . . . a full line of Air and Vacuum Valves for venting heating units and mains . . . and Vacuum and Condensation Heating Pumps. Detailed information on each is given in illustrated bulletins—send for your copies. Hoffman Specialty Company, Dept. AR-6, 1001 York St., Indianapolis, Indiana.



**INTERCHANGEABLE THERMOSTATS**

Many Hoffman high and low pressure traps have Bellows Thermostat, Valve Pin and Seat combined in a single unit, easily removed for cleaning or inspection. The Thermal Unit can be replaced without adjustment and interchanged between valve bodies of the same size.

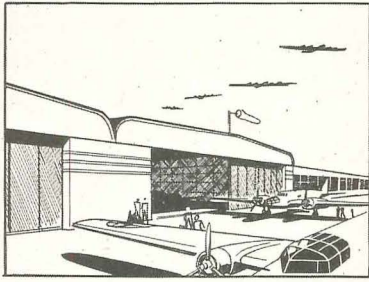
**HOFFMAN**

*Controlled Heating*

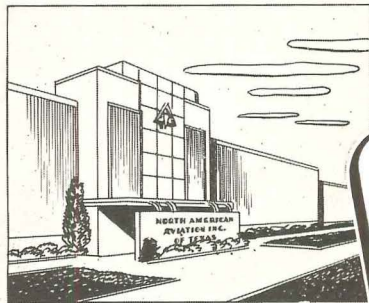


VALVES, TRAPS, VACUUM AND CONDENSATION PUMPS, FORCED HOT WATER HEATING SYSTEMS

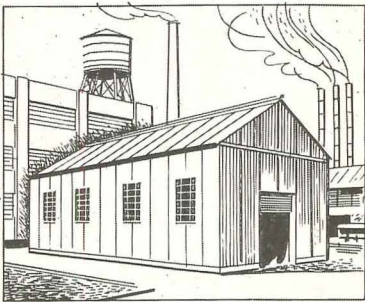
STEAM / HOT WATER



**MOVABLE AIRCRAFT HANGARS** can be designed with U·S·S Steel Sheets so that they can be dismantled and moved to a new location quickly and without damage.



**45 EXTRA DAYS OF PLANE PRODUCTION** were made possible because steel panel construction enabled the contractor to complete this important aircraft plant ahead of schedule. Walls were erected at a rate of more than 2500 sq. ft. in an 8-hour shift.



**U·S·S PANELBILT CONSTRUCTION** offers countless variations in sizes and arrangements of industrial or war buildings. All can be quickly erected from factory-built panels and sections of steel. Also quickly demountable with complete salvage value. Available in the South from Tennessee Coal, Iron & Railroad Co.



**TAKE A TIP**  
*from the British!*

## THEY'VE FOUND SHEET STEEL CONSTRUCTION IDEAL FOR WAR-VITAL BUILDINGS

**O**UR friends in England have learned first-hand that steel construction behaves better than other types when subjected to bombing. It doesn't shatter into deadly fragments. It resists fire. Damage is confined to smaller areas. Repairs can be made quickly by replacing sections. The portability of steel structures has proved an important war asset, too. They can be dismantled and set up in new locations with little loss of time or material.

*Steel saves time* because it can be used in complete structural units, cut to the right length and width for easy handling. Sections can be designed to lock together automatically. Or where utmost simplicity is desired, standard corrugated steel sheets can be used for walls, partitions and roofing. Unskilled

labor can carry out erection with little supervision. Steel construction goes up fast in any weather, because there are no wet materials to set.

*More and more architects* are specifying steel construction to shrink the completion schedules of such important buildings as aircraft plants, hangars, powerhouses, barracks, portable buildings, munitions factories and plant extensions.

### *What Steels to Use . . .*

U·S·S Galvanized Sheets are ideal for sectional steel construction. For most applications, a base metal of plain steel or pure iron is satisfactory.

For immediate painting, specify U·S·S Paint-bond, a Bonderized galvanized sheet that holds paint tighter. In the South and West, the special sheet for quick painting is known as U·S·S Dul-Kote.

# U·S·S ROOFING AND SIDING SHEETS



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United States Steel Export Company, *New York*

# UNITED STATES STEEL

# CERTAINTIES IN UNCERTAIN TIMES

## IT IS CERTAIN THAT—

- ◆ every man must do his utmost to win this war—must find his place in the armed services, in any corps or department as commissioned officer, employee or under contract where he can be used. Architectural and engineering manpower is and must be converted to the war effort.
- ◆ all new building for the duration will be war building and the consequent cessation of all other public and private building is piling up a shortage which will have to be filled after the war.
- ◆ this will produce a post-war building boom in America which will provide employment for men released from war service and war industries. The post-war building program must provide a comprehensive but flexible pattern for building a better America.
- ◆ a Public Works Reserve and a Private Works Reserve may be found necessary, and be coordinated. But it would be foolhardy to attempt to set them up without anticipating the trends of population, the probable future local industries, the probable income levels, the increased public demand for educational, recreational, cultural and other facilities.
- ◆ before knowing what facilities exist and what will be needed, and why, and by whom, and when and how—it would be premature to start working drawings. And who is the prophet who knows the answers now? What will be the extent and nature of Governmental participation and controls in planning and building? What will be the effect of the national and local debt structure, both public and private? What is involved in the legal untangling of the web of absentee land ownership to permit replanning and rehabilitation? When will organized labor support new economical and efficient construction methods and materials? And a thousand other questions must be answered.
- ◆ we must take into account also the revolutionary changes to be expected in transportation (coordinated air-surface-and-water systems), the new types of materials and equipment that will be available through the conversion of the gigantic new war production plants to peacetime uses, cheap steel, aluminum, magnesium, plastics, glass, synthetics of all kinds.
- ◆ the study must be undertaken with due regard to the possible or probable changes in controlling factors—social, economic, political and technical.

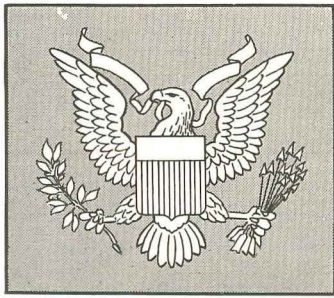
## IT IS EQUALLY CERTAIN THAT—

- ◆ men trained to analyze, plan, design and create buildings will be called upon to perform these functions no matter what social, political or economic patterns may evolve. These men will have a broader scope and a larger and more exacting task than ever before. They may work in new ways, under new auspices, with new materials and techniques, with new collaborators and even under new titles.
- ◆ this opportunity for service carries with it equal responsibility which calls for all the vision, imagination, technical knowledge, organizing capacity and executive ability the professions afford. The great need now is to prepare for this opportunity and responsibility by increasing our capacity for leadership through a *clearer understanding* of all that is involved.
- ◆ leadership is a matter of competence and initiative, not assertiveness. Leadership will not be achieved by legislation, by wishful thinking, by vilification of others for usurping prerogatives, nor merely by crusading for recognition of "our rightful place."

These things are certain. They must guide our thought and action now, that we may be prepared to be "of ever-increasing service to society."



EDITOR-IN-CHIEF



SOME DID and some didn't. Those few words sum up the "success stories" of architectural firms who have joined forces with other architects and engineers to handle war work for the Army and Navy. Some got work and some just got favorable reactions.

But all who made the patriotic effort have first-hand experience with one of the most interesting trends of the times, and their many reports to the RECORD show how and why some combinations clicked immediately, how some were by degrees organized into workable units, also how widespread has been the impact of war on the profession.

The future potential of the current integration of design services is not completely apparent. But whatever it might be, the records of the consolidations and combinations show one vitally important characteristic of the architectural fraternity—its amazing adaptability to the demands made upon it. Designers have successfully made the switch from houses, schools, office buildings to bomber plants, operational bases, ordnance works. The change has involved many organizational upsets, much frantic hurrying, much sharpening of wits as well as pencils. And if the building industry generally has been charged with a lack of integration, the RECORD's record of the times clearly shows that the design profession, like the rest of the industry, can accomplish any integration that a situation demands.

Experiences of architects and engineers in their efforts to meet Government requirements run the full gamut from a complete "brush-off" in Washington to remarkable and continued success. All letters report great interest in the idea of consolidations for war contracts. One or two, particularly earlier ones, carried a note of grumbling, a tendency to demand that Washington explain why local architects were not sought out and put to work. Almost universally, however, the reports indicate complete acceptance of the war emergency, and a desire to do anything required.

Sometimes the most logical combinations of architects and engineers did not finally manage to get the call. Sometimes there was a reason, sometimes the group did not add up just right. One large and important consolidation, actually formed at the invitation of the Government, did not get the job because it refused to promise the necessary speed. In some instances groups were formed, properly presented to Washington, and quickly got their boards swamped with work. Some of these are functioning on several jobs at the same time. In still other cases, a big combination was formed for one job, then disbanded.

In more than a few reported instances, architects and engineers have been grouped and regrouped according to the requirements of the projects—one group for a housing project, another for an air training station, and so on.

There is no logical reason why an engineer cannot be included in several architectural-engineering associations, and,

## TECHNICAL TEAMS

in fact, one nationally-known engineer is reported to have established official association with some thirty-two affiliates.

It would seem equally logical that an architect, recognized as a specialist in hospital, school, or some other type of building, might belong to several different architectural-engineering groups. In this way, his services would be available for Government contract through several different sources, instead of just one. He would therefore have a better opportunity of being where the lightning struck.

A few selected letters to the RECORD give interesting details of existing combinations and their experiences.

The first one is notable for a cheerful lack of interest in forming new combinations. It is from Roi L. Morin, president of the Oregon AIA Chapter, dated April 9:

*"Your letter of April 2 is the sort of communication that drives us frantic—but I am burning daylight to answer it hoping to stem the tide.*

*"Mr. Clarence H. Wick, our present secretary, is in the midst of a 550-unit housing project—due April 10, (commissioned March 20)—my project of 450 units is not due until April 20, so I can spare a few minutes.*

*"There are 10,000 houses on the Portland boards at present, not counting some 10 airports, two 30-million dollar cantonments, 2 shipyards, etc. etc.,—more than 150 millions in construction. We could use 5,000 first-class carpenters here from now until November. . . .*

*"You don't have to specialize in anything here to be snowed under! Every man in Oregon who has one arm, is not blind and can draw—is drawing like mad. The current work is 1000 per cent above last year's and practically every architectural office is open from 10 to 18 hours per day including Sundays. How long it will last we do not know but certainly we don't have time to write reports or "case histories" for any publication. . . .*

*"P. S. Perhaps next spring we will be idle and write about how it happened."*

One of the most straightforward stories of a successful group made up for war work is told by the Associated Architects & Engineers of Oklahoma City. It is just such an organization as fits in well with specifications for design groups by the Navy Department (ARCHITECTURAL RECORD, May, 1942, page 40), and is doing several Navy jobs. The group comprises Leonard H. Bailey, president, two other architects, B. Gaylord Noftsgger and Martin Lawrence, and two engineers, I. G. Howlett and E. T. Palmer Ellingson. Mr. Bailey relates their story:

*"Some months ago when the Government began to assign architects and engineers to large projects throughout the country, it was noted that they invariably chose large firms located in the most populous sections of the country to perform the necessary services in connection with the designing of said projects. This left the local architects and engineers entirely out of the picture, much to their chagrin. However, the necessity of assigning this large work to these large firms was perfectly justifiable in the emergency, and in the absence of any attempt on the part*

# WITH WAR WORK

of local architects and engineers to associate and offer an organization comparable with theirs.

"I wrote all of the Government bureaus connected with the assignment of this work and suggested the possibility of creating local organizations that could handle projects located in their vicinity. This would offer the additional advantage of employing men with full knowledge of the use and availability of local materials. I also called their attention to the fact that these local architects and engineers would be left high and dry unless some consideration was given to them on the basis of their associating together.

"About this time news came out of Washington that an effort would be made to assign work to local firms. The above group was thereupon organized and proceeded to prepare and mail brochures to all the departments of Government responsible for the assignment of building projects.

"Shortly thereafter, we were assigned the Naval flying and training school at ——— together with other Naval projects in the vicinity. We have been offered work by the Army, but . . . we are limiting our activities to Naval work and to our ability to produce."

Mr. Bailey's organization provides a pure case of a group that saw early the needs of the moment and took the initiative in forming an organization and presenting its story. The Navy has been keeping it busy.

An architect-engineer group in Memphis tells a similar story, reporting in more detail (at the RECORD's request) as to the actual working of the organization. Here is a simple plan for keeping clear the lines of authority in a group working simultaneously on various parts of a large project, and for assuring thorough integration in the work:

"In order to contribute to the extent of our ability in the Government war program, the Allied Architects & Engineers organization was formed of a group of architects and engineers in this city.

"The architect members are M. H. Furbringer, Merrill G. Ehrman and Everett Woods. The engineers are H. N. Howe, structural engineer and Thomas J. O'Brien, mechanical engineer. For the purpose of designing the U. S. Naval Reserve Aviation Base at ———, an office was set up which includes in its personnel, besides the principals, the necessary clerical staff.

"Immediately upon notice that we had been selected as architects and engineers, key men were employed as squad captains and as rapidly as preliminary plans were approved these groups were assigned the task of making the working drawings and the additional drafting help employed. . . .

"To have as smooth working an organization as possible, each principal of the group has been delegated to have charge of some portion of the work. A conference of the entire group is held every morning at which time the Lieutenant Commander in charge of this project reviews the work, answers questions and advises with us on matters requiring his decision or suggestions.

"Under this procedure all portions of the work are carried on simultaneously, i.e. the site planning, drainage and runways are being developed while the building plans

are in progress and the mechanical work, that is the heating, plumbing and wiring, is carried on at the same time.

"Thus far there has been no conflict of opinion or authority. Perhaps this is due to the fact that all the members of our group have at various times worked together on other projects in private practice.

"In any event we have a smooth working organization and there seems no reason why it should not so continue."

For an architect in the Southeast the story of "war conversion" started considerably earlier, and in this busy territory this architect, William Henley Deitrick, Raleigh, N. C., has served as coordinating architect or chief in a number of different combinations.

His story starts early in 1941 with housing projects for officers and shipyard workers. Mr. Deitrick set up an office in Wilmington, with a nucleus of five members of his own staff, adding to it as required, and engaging a local engineer. Several housing projects were so handled.

Meanwhile Mr. Deitrick was investigating work for the Army, and learned of the necessity for a more formal combination with engineers. The necessary combination was effected by forming an "associateship (on a temporary basis for defense work)" with William C. Olsen, consulting engineer of Raleigh. This combination was soon busy on an Army quartermaster depot, which called for still another field office. Again key men from the two organizations formed a nucleus, a project manager was employed, and the field office personnel eventually numbered 60 people. The work was design and supervision.

Later Deitrick & Olsen were invited to join still another associateship for a Marine Air Base for the Navy Department. For this job they formed a committee of four principals and employed a project manager to take charge in the field. The organization for this job went up to 175 people. The committee of principals determines policies, supervises the design, and finances the undertaking.

"The three major projects," Mr. Deitrick said, "have required much diversified talent and very often we have had to go far afield to bring in specialists who were qualified to render the service desired. This has been our main problem, since the competition for skilled engineering and architectural designers has been severe. However by much long distance telephoning and the use of want ad service in professional publications and in metropolitan newspapers we have been able to take care of the demand."

Similar in many respects is the record of another group of architects and engineers in the busy California section. There were groups of architects for housing projects, and a more formal association with engineers for large Naval bases and air stations, the size and type of project determining the number and selection of the designers. Adrian Wilson, Los Angeles architect, reports the groups as including, besides himself: Paul R. Williams, Gordon B. Kaufmann, Richard J. Neutra, Walter Wurdeman, Welton Becket, and Theodore Criley—all architects.

First group for the Navy work, known as Allied Engineers, Inc., included Paul R. Williams and Adrian Wilson, architects, Donald R. Warren, structural, civil and marine engineer, S. B. Barnes and E. A. Evans, structural engineers, and E. L. Ellingwood and C. A. Sanborn, mechanical engineers. At the completion of some of the work, the latter organization was reduced to three members—

(continued on page 94)

# SHELTER TO SPEED WAR WORK

Decisive action, based on clear thinking, has now been taken. We present two timely documents — one, an analysis of the problem by an able architect, the other, an announcement of the program by a Federal Agency.

## SHELTER AND "ALL-OUT" INDUSTRIAL EFFORT\*

Frederick L. Ackerman

WHEN I was inspecting facilities for workers in munitions plants and shipyards in Great Britain during the Fall of 1917, when Great Britain was at the peak of her "All-Out" effort, I sometimes felt that the "Housing Schemes" had a phony, socio-economic relation to the war, whereas the "Hostels" struck me as an integral part of that "All-Out" effort. A year later when I went, as I did occasionally, from the Shipping Board Housing Project, Yorkshire Village, to Hog Island, where housing of shipyard workers was provided in "Hotels," the same doubts recurred.

I cannot now recall the relative proportions as between the number of British workers which were accommodated in War Houses and in Hostels in the war housing of 1914-1918. But I know that a very large number were well housed in Hostels—some designed for women and some for men. Generally these Hostels were large, temporary structures containing adequate lounging space and dining facilities. While they were of low cost, they were neither bleak nor barren. One thing in particular about the Hostels made sense. The structures were so designed that each of the three shifts was completely isolated, assuring quiet—a condition found by experience to be essential. Recreation facilities in connection with such developments had not been overlooked.

For a third time, during my recent participation in our Defense Housing effort and when visiting other Defense Housing Projects in the East, old doubts developed into deep concern. Here are some of the reasons:

What we have been doing recently in the field of Defense Housing does not seem to have been integrated nor put into gear with an "All-out" war effort, nor with a rational concept of Peace-Time housing. The so-called "permanent" housing is neither durable nor physically adequate. So-called "demountable" housing costs so much that it is not likely to be scrapped; it is more likely to remain to plague us. No small proportion of both kinds of housing may be said to be already earmarked as potential slums. However, what has been done, before "All-Out" became a fact, is water over the dam—and that's that!

I am without a sufficient body of facts, I realize, to demonstrate all that follows: all I know is what I read in and between the lines of the papers. But it looks as if our "All-Out" effort is at the point of changing phase. If figures, used in forecasting the number of men and women workers yet to be inducted into our industrial "All-Out" effort, approximate the facts, then it seems that a drastic revision of our "Defense" Housing program is overdue.

\*Memorandum prepared March 27, 1942, for consideration by the Wartime Housing Committee of the Citizens' Housing Council of New York, and published by permission. At the request of NHA, Mr. Ackerman visited Willow Run and is now developing basic designs for "Duration Dormitories."

I have deep-rooted and rapidly growing doubts concerning our ability, *under the whole range of surrounding conditions*, to produce, in time to count, a sufficient number of living units in housing projects—demountable or permanent—with roads and utilities, to meet more than a fraction of the maximum need. To produce a sufficient number of houses on scattered areas or lots where there are adequate utilities already available is to me a fantastic proposal, completely out of scale with an "All-Out" industrial effort. Both of these proposals ignore the revolutionary changes which will have taken effect in our ways of living before our tires are worn out. One thing, it seems, we must not do, viz: create new transportation problems. Rather, we should so locate new shelter facilities as to do away with the need for transportation altogether. We have not yet faced the problems of a world without tires.

It may be argued that any such procedure as suggested above will require new legislative action, that the proposal is too revolutionary from *every point of view*. But one answer to arguments along that line is this: "All-Out" is revolutionary and calls for responsive action all along the line. Rather than here argue the case it would be more to the point to now reexamine the shelter problem as it has acquired new shape since Pearl Harbor, to determine whether or not an "All-Out" program of industrial production is possible so long as we cling to the original program of providing shelter for "Defense" workers.

Our present program of providing shelter in one, two and three bedroom houses requires floor areas ranging from approximately 600 to 1500 sq. ft. to house in many cases no more than one worker. Hotels, barracks or houses—whatever we choose to call them—provide shelter for workers in rooms of some 75 to 80 sq. ft., more or less, plus a proportional area occupied by common rooms. Site development cost, the same as the time consumed in building, would be correspondingly low.

In going about our recently built "Defense" Housing Projects I was shocked when I realized that under our current concept of what constitutes shelter we build an entire house in order to put, in most cases, no more than a single worker into our "All-Out" productive effort. When I realized that, the whole procedure took on an utterly fantastic character.

## NATIONAL HOUSING AGENCY

Federal Public Housing Authority

Release No. 675

May 23, 1942

WASHINGTON, D. C.—"Duration dormitories," temporary in structure but providing the accommodations essential to the health and welfare of war workers, are now being developed by the Federal Public Housing Authority as part of its war housing program. (continued on page 96)



**ALBERT KAHN,  
ARCHITECT**

*Wide World*

## PRODUCER OF PRODUCTION LINES

**I**T WAS on Thursday, February 5, 1939, that Albert Kahn received a telephone call from the Glenn L. Martin Company, Baltimore.

"Can you furnish plans quickly enough for us to put up a 440,000 sq. ft. building by May 1?"

That was quite an order: a mammoth aircraft factory building to be ready for use in 84 days. But Kahn was prepared to answer, "Yes." Actually manufacturing began in that building on April 27, just 81 days after the call.

Mr. Kahn did not realize, then, that this request was to set the pattern and the pace for a program of war-impelled plant expansion such as industry had never seen before. Or that this order, one of dozens to come, was setting a pattern and a pace for building designers, which, though previ-

ously unheard of, would come to be accepted as the wartime obligation of architects and engineers.

Such miracles of speed in design and construction have not been wrought without greatly expanded planning organizations, and, more significantly, a highly developed coordination of planning procedures. They have required coordination not only within the architectural and engineering organization, but also among designers, contractors, manufacturers, and wartime clients.

Take the case of the Glenn Martin expansion. After receiving the long-distance call from Baltimore, Kahn and members of his organization left Detroit immediately for the East. They arrived at the Martin plant Friday morning, February 6, and set to work immediately, aided by a

general plan and details that had been worked out by Martin engineers. The structural steel contract was negotiated at two o'clock Saturday afternoon. Later that same afternoon, the excavation contract was let to a company that agreed to move 83,000 cubic yards of wet clay from the site of the building within an eight-day period. Within the next few days still other important contracts were awarded. And on February 16, the concrete footings for the new building were poured.

On April 23, only 77 days after word had been given to go ahead with the building, the manufacturing area was under roof and well enclosed, and machines were being set in place. Actual manufacturing was started April 27, just 81 days after February 5. So was set not only a building record, but a production record as well, for a million dollars worth of tools had to be ordered and installed as construction work proceeded.

Another case in point is the new \$37,000,000 airplane engine plant of the Wright Aeronautical Corporation, which, until the mammoth Ford bomber plant began to take form, encompassed the nation's largest one-story industrial building.

Wright's engineers started work on the plant layout even before it was known where the building would be located. Then, in swift succession, land near Cincinnati was purchased, the architects were called in, sketches were turned out within a matter of a few days and approved. Structural steel drawings were prepared with great rapidity, and the architectural drawings were prepared coincidentally by a large staff of architects and engineers.

Steel bids were taken and contracts let while excavation plans were being completed. Contracts for the architectural trades were awarded while steel work was being fabricated.

The foundations were ready by the time the steel was delivered for erection. Ground was broken October 23, 1940; steel erection began January 3, 1941, and installation of machinery was under way February 15. All major con-

struction had been completed in June, when the first airplane engines rolled off the line two months ahead of schedule. Just 142 days after ground breaking, manufacturing operations were in progress!

The magic in the formula for such work is the coordination of experienced experts. And coordination gets more important as the personnel is expanded. Normally, the Detroit firm of Albert Kahn Associated Architects and Engineers, Inc. employs approximately 150 men and women—architectural designers and draftsmen, specifications writers, estimators and expeditors, field superintendents, mechanical, electrical and ventilation engineers and office workers. Now the organization has expanded until this spring it was employing over 600, and was still increasing. Last year Kahn and his associates designed and supervised the construction of more than three-score buildings for the production of implements of war—armor plate foundries, synthetic rubber plants, airplane plants, naval bases,

In telling how it was all done, Mr. Kahn stresses three elements—organization, teamwork and business management. It is the hard-hitting teamwork of real specialists.

Instead of working in successive stages, all departments of the Kahn firm start their work simultaneously. If under normal conditions the group could turn out complete drawings for a factory in a week or ten days, under the war speed-up it is done almost literally overnight.

In Kahn's own words the building of a war plant goes thus:

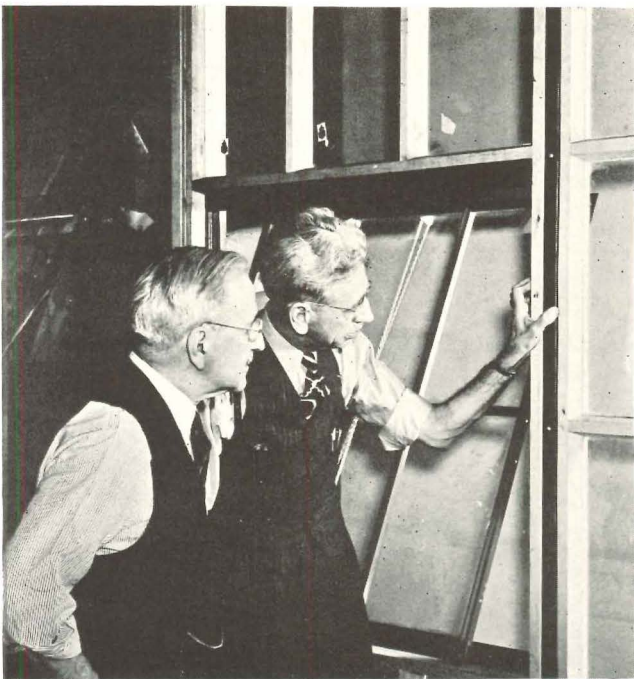
"Even before definite commitments are made by the Government, the respective manufacturers have spent night and day on process layouts and the architects and engineers have been called in to prepare tentative schemes for properly housing their equipment.

"With contracts definitely placed, not a moment can be lost. The type of building best suited has been decided upon; so has the floor space required. Often, within less than a week's time, the structural steel drawings must be developed sufficiently to obtain competitive prices ready for placing contracts. Supplying the steel frame, obtaining the necessary material, much of which must come from the mills, and fabricating it are the bottlenecks. We used to have five and six weeks' deliveries. Today 12 weeks' delivery is considered remarkable, and 18 weeks is normal.

"To save time, we must exercise care in employing structural shapes most readily obtainable. Certain sections are practically unavailable. And to speed up deliveries, substitutions must often be made to suit the company's stock piles or rollings of the mills. Standardization, as far as possible, is all-important, and so is simplicity of construction.

"To accomplish the necessary results requires an organization keyed up to the situation, thoroughly experienced so that decisions may be immediate and accurate, and production must be just about machinelike. Defense work means quantity production. The many problems must be handled systematically and all coordinated so that the results desired are turned out with greatest dispatch, as well as accuracy. In attacking these problems, the process is something like this:

"With preliminary sketches approved by the owners, a meeting is held of the men selected to take charge of the architectural work, the structural engineering, the sanitary engineering, the ventilating, the heating, the air cooling, sprinkler work, electrical engineering, power house work

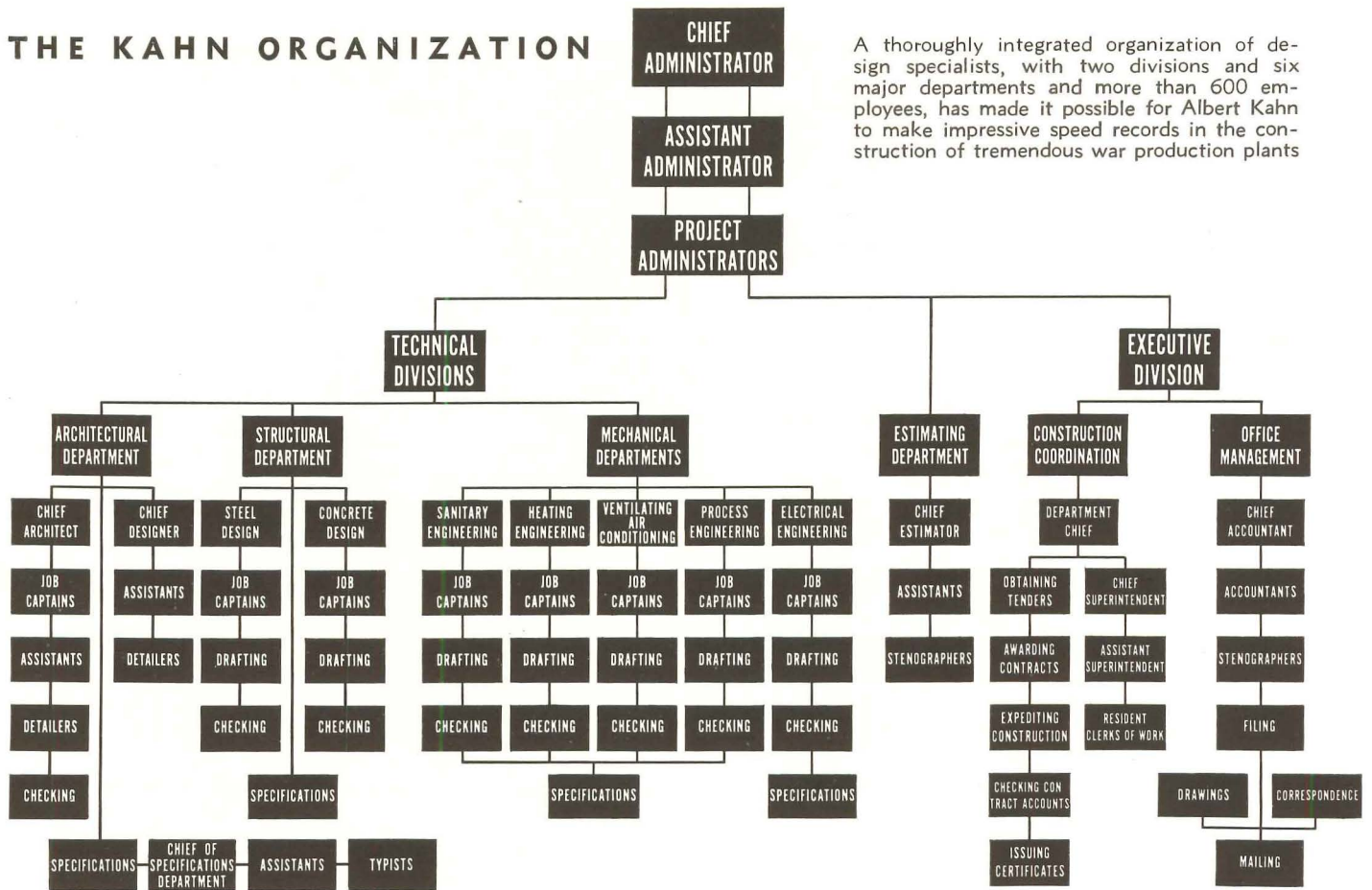


Albert Kahn and John Schurman inspect the "Victory Sash," their newly-developed steel-saving factory window (see page 82)



# THE KAHN ORGANIZATION

A thoroughly integrated organization of design specialists, with two divisions and six major departments and more than 600 employees, has made it possible for Albert Kahn to make impressive speed records in the construction of tremendous war production plants



and specification writing. The most important points are taken up and at least tentatively decided upon, each representative taking notes. And the drawings and calculations are started. Frequent other meetings naturally follow, and many additional conferences are required to determine lesser details."

While these several departments of the Technical Division are working simultaneously on planning, other functions are left to the Executive Division. This Division is responsible for the management of the project in the course of construction. One department obtains competitive bids from contractors, then submits them to the owner. When the contractor has been selected, another department drafts contracts for submission to the owner's attorney for approval. This department also takes care of the various types of liability and fire insurance.

There is still another department that coordinates all the work in the field. It acts as liaison office between the contractor and the owner. It obtains from the owner such special requirements as may arise, or as may be modified during building operations, and sees that they are properly incorporated in the work. This department, through weekly reports and diagrammatic schedules, keeps the owner fully informed as to progress of the work. As far as possible, it shoulders the many troublesome details connected with actual construction.

Chief functions of the Executive Division are the supervision of the work which falls behind the construction schedule; the checking of the contractor's charges for additions and his credits for deductions; the checking of the contractor's requisitions for payments and the issuing of payment certificates.

In spite of the high priority ratings that most of Kahn's work receives, his organization has encountered many problems of material shortages and substitutions. Kahn himself speaks with especial emphasis on the need for building code revisions, to permit of substantial savings in construction materials:

"I feel strongly that a National Building Code should be adopted. It would substantially help us in our effort to conserve critical materials, and, at the same time, meet the obligations of the vast war building program that lies ahead. The attempt to set up a National Building Code, sponsored by Herbert Hoover when he was Secretary of Commerce and continued until the days of the depression, was based upon the principle that maximum allowances be permitted skilled designers and not minimum allowances as established in most cities to guard against the unskilled. . . . Those who are highly competent would be encouraged to use their skill to the utmost in planning entirely safe buildings utilizing a minimum of material."

Some of the most interesting experiences of Kahn engineers have to do with shortages of metals normally of relatively minor importance in building, but now critical even in small amounts.

So far, the electrical engineers are feeling the shortages of aluminum and zinc the most. Diversion of vast amounts of aluminum to the aircraft industry has made considerable difference in the planning of industrial electrical systems. For instance, aluminum cases for lighting fixtures are definitely out of the picture. In line with Government stipulations as to materials, plant designers are substituting cases of steel or of iron, with baked-on paint finish. Where once highly-burnished aluminum served for reflectors in

lighting fixtures, silvered glass or porcelain-enameled steel is now called upon to do the job.

Next to aluminum, the greatest metal shortage so far as the electrical engineers are concerned is zinc. That, at any rate, is the experience of the Albert Kahn organization. So great is the pinch when it comes to zinc that these designers are now incorporating into plant electrical systems pull-boxes, panel boxes, conduit and outside transformer fences of plain, black painted iron.

Tungsten is another of the critical materials. And tungsten is used as filament material in incandescent lamps. Thus, to conserve the supply of this valuable metal and make it available for other war purposes, the Government is suggesting that fluorescent lights be used in place of incandescents. This suggestion meets with the hearty approval of the Kahn engineers who are planning the lighting systems of war plants. They are specifying fluorescent tubes and fixtures widely, for this type of lighting is more efficient and less expensive to operate than tungsten filament bulbs.

Important plants being built for war production are getting what rubber they need for electrical purposes. However, the Government is suggesting and engineers are using wherever they can certain substitute insulating materials. At least, they are using these substitute materials to the extent that they are commercially available.

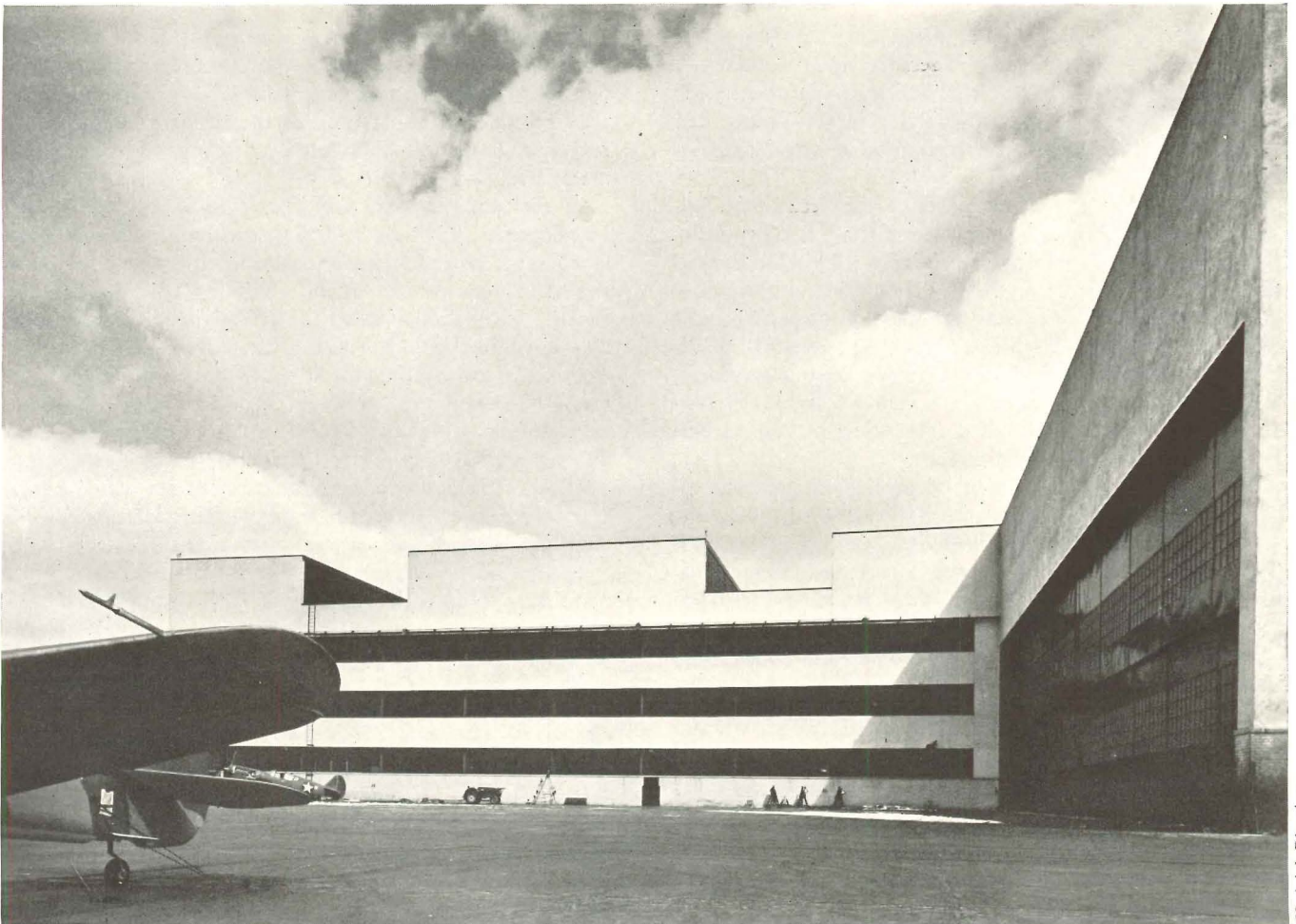
For instance, a thermoplastic insulation is suggested for building wire that carries a load of 600 volts or less.

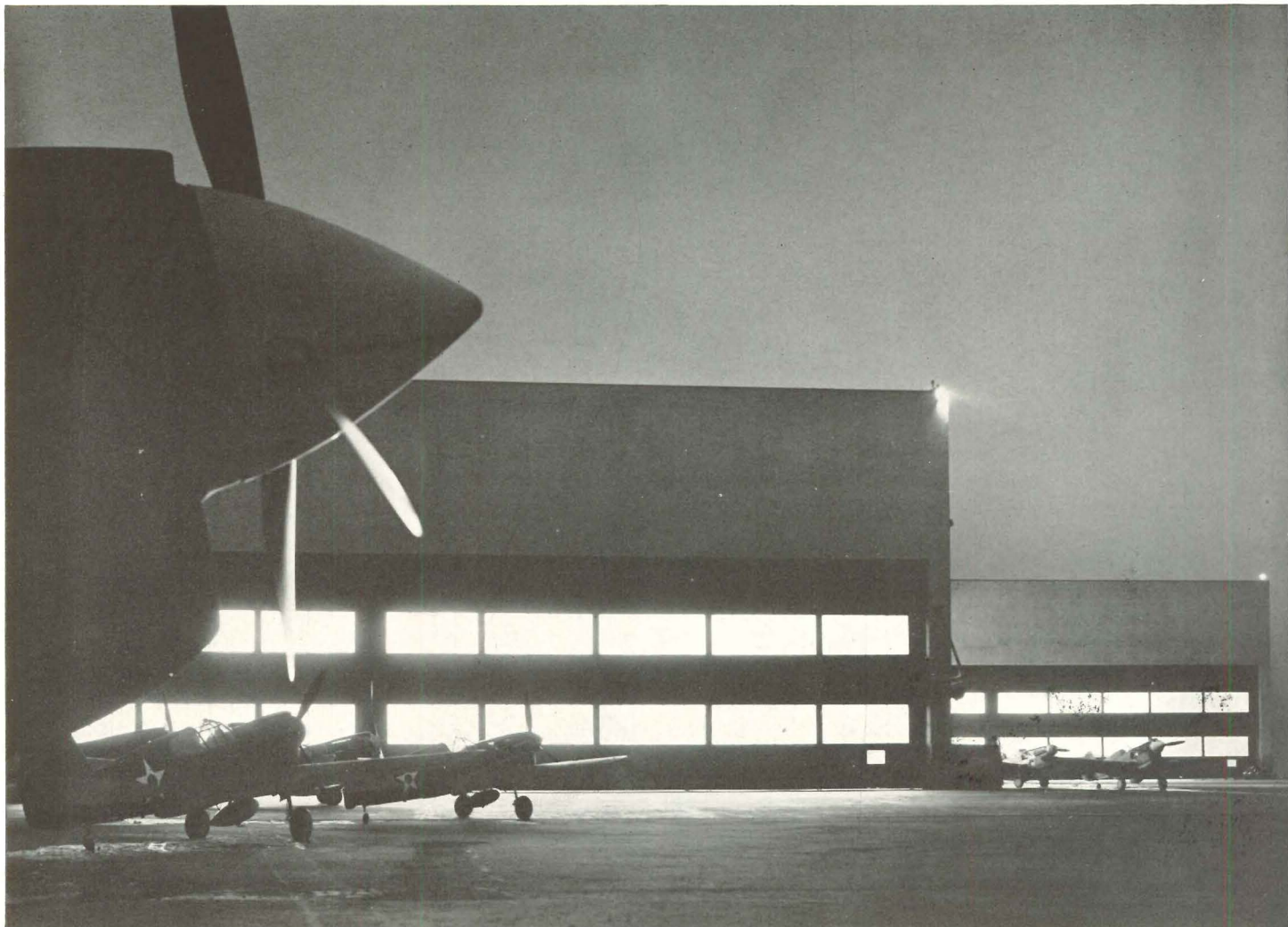
Other alternatives along lines of insulation for such wire include varnished cambric (N. E. Code Type V), slow-burning Weatherproof (N. E. Code Type SBW), or Weatherproof (N. E. Code Type W), the last-named installed on insulators only, not less than 10 feet above the floor except where suitably enclosed and protected. The Government points out that synthetic plastic, varnished cambric and slow-burning Weatherproof insulation may be used in the following classes of wiring: (1) Single conductors for installation in raceways or on insulators, (2) non-metallic sheathed cable, and (3) covered neutral cable.

In plumbing, heating, ventilating and air conditioning, due regard is being paid to the existing metal shortages in all respects, according to members of the Albert Kahn organization. For engineers in these categories realize they must give utmost consideration to the business of conserving critical metals and other materials, even though the defense work in which they are engaged receives preferred priority treatment.

Shortages of materials, coupled with the continual demand for speed and more speed in the construction of the country's war production plants, have not made the task of architectural and engineering organizations exactly easy. But, taking their cue from the coordinated production and assembly techniques of the manufacturers whose buildings they are erecting, designers are making records quite as spectacular as the output of fighters and bombers—working on "impossible" schedules and finishing ahead of time.

Typical of Kahn's current war work is this huge military aircraft plant in an eastern city





# ARCHITECTURE FOR WAR PRODUCTION

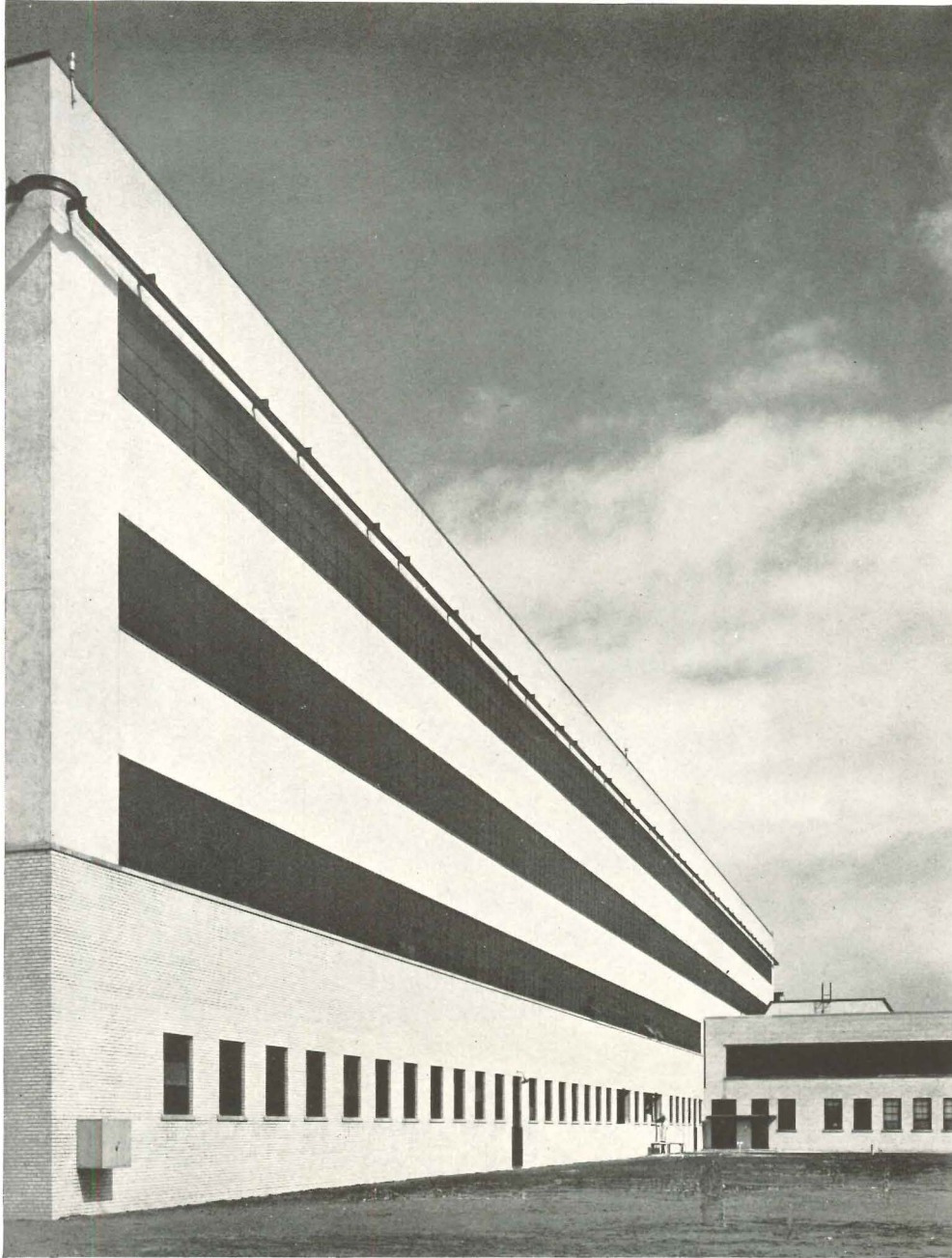
A MILITARY AIRCRAFT PLANT IN THE EAST, BY ALBERT KAHN

Associated Architects & Engineers, Inc.



Hedrich-Blessing

THE NEAR-MIRACULOUS SPEED with which the United States is ordering its war production program is nowhere more impressively demonstrated than in the series of giant factories that is rapidly creating a new industrial skyline across the nation. The one presented on these first pages—one of the real giants—was erected and put into operation within seven months. In the efficient organization of this high-speed, mass-production factory, which was worked out in close collaboration with company engineers, the Kahn organization applied many of the lessons learned from experience in designing plants for the automobile industry. Of additional news interest and timeliness is the incorporation of numerous defensive features which provide a high degree of plant and employee protection against potential wartime emergencies.

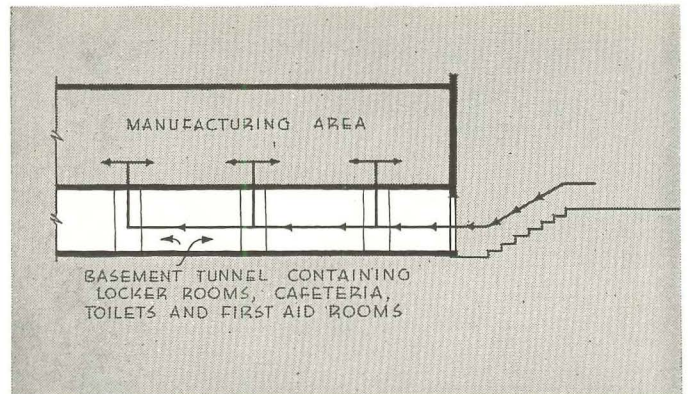


## GENERAL

STRAIGHT-LINE production at maximum efficiency is the planning keynote. Censorship wisely forbids precise reporting on scope of plant, processes involved, and layout, but the basic organization and structural system are of considerable interest. The scheme comprises three main areas—offices; engineering and planning departments; and manufacturing area. Of these, the manufacturing area occupies roughly 56 per cent of the total. Spaces allotted to the various production departments are equalized in such a way that each individual process, whether minute and simple or complex and large in scale, keeps pace with all others in moving a stream of parts into a production line, at the end of which emerge finished aircraft—aimed at our enemies.



*Geo. A. Ostertag*



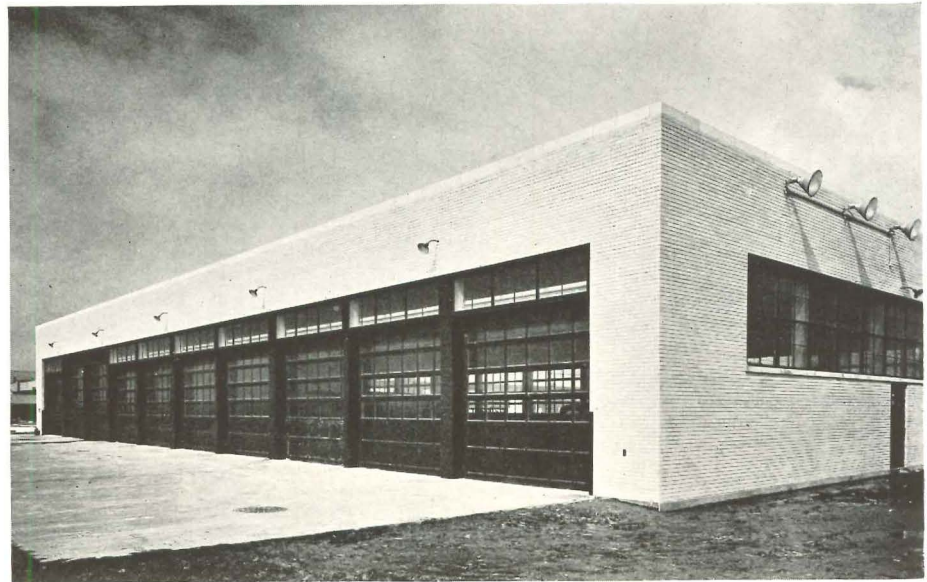
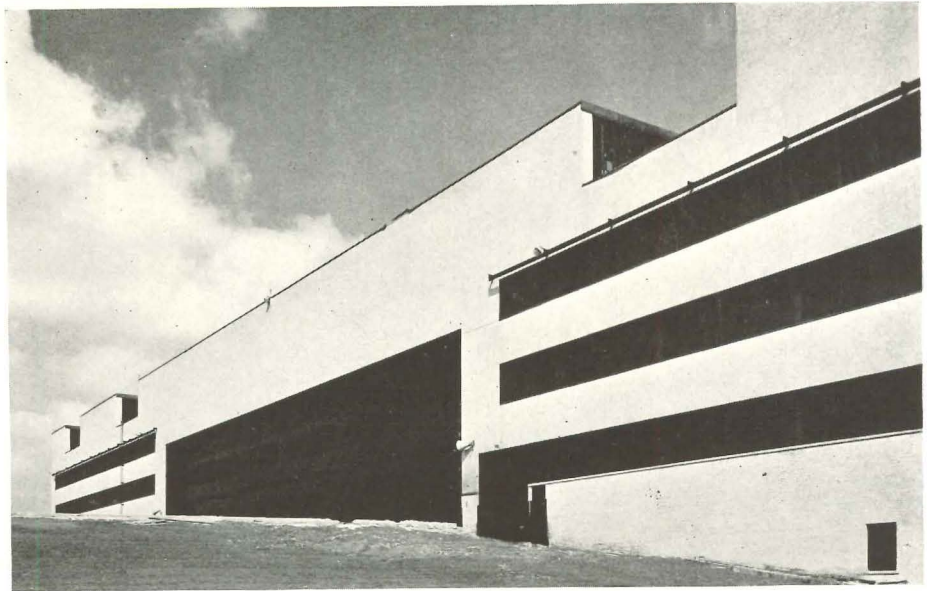
## BASEMENT ENTRANCE TUNNEL

Workers arrive and leave through this centrally located basement tunnel. At intervals, stairs lead up to factory work-station points, thus reducing cross traffic on the main work floor to a minimum. Adjacent location of various employee-use rooms desirably segregates these areas—out of the way of production-line operations

## STRUCTURE

A REVERSE-MONITOR TYPE of structure, the big building was erected in segments or sections. The whole is a compact unit, largely uninterrupted by posts or columns, well lighted and thoroughly insulated against heat and cold. To form a perfectly level surface for exact setting of machinery, the entire factory floor is of smooth cement laid by a special super-accurate, machine-trowelling process. Construction consists of concrete piling and foundations, steel framing, walls (in the factory portion) of gun-sprayed concrete on metal lath and (in offices and engineering departments) brick over tile. Finished roofing is underlaid by slabs of prefabricated concrete-like material. The roof is insulated with cork. Sash throughout are of steel.

THE STRUCTURE is of the "semi-blackout" type with provision in the design for total blackout, should this be necessary. Coordinated in design with the larger portions of the plant are the accessory buildings, such as plant garage (right center) and the power house (bottom right). Because of the increased efficiency gained by the basement tunnel circulation feature (see facing page), the architects feel that this system of control of persons may well become standard practice in the design of many of the peacetime plants yet to be built. On factory portions of the plant, note the trolley beam, treated as an architectural member just above the upper window band. This element provides for easy access for servicing and washing the sash.



Hedrich-Blessing



DRAFTING ROOM. Rigid frame design with bent beams provides uninterrupted light distribution from inclined monitor

## THE INTERIOR — DESIGNED TO FACILITATE MAXIMUM EFFICIENCY

### SYSTEMS AND EQUIPMENT

FLEXIBILITY to provide for quick changes when new plans are put into effect was a design feature of the wiring system. Fixtures with numerous outlets line the factory area. When it is necessary to change the placement of motor driven machinery, no wiring or conduits have to be ripped out or relocated. A machine is merely moved and plugged into another outlet at its new location. In addition to good daylighting, fluorescent units are used throughout the factory and other work areas.

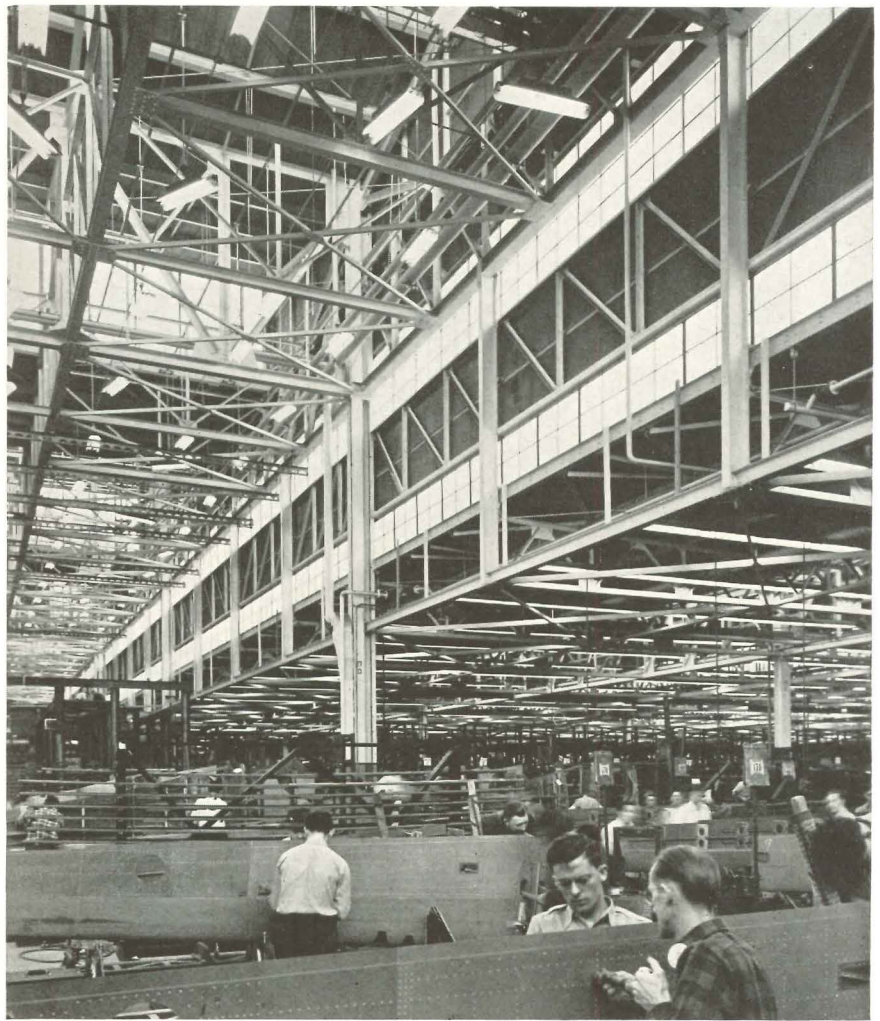
The heating systems vary according to the areas they serve. In the office building and plant hospital, a two-pipe forced circulation hot water system with direct radiators is used; in the engineering department, the system is low pressure steam with gravity return. For the manufacturing, sub-assembly and assembly areas—and also in the unfinished basement and garage—a medium pressure steam system with overhead unit heaters and gravity returns is used.

### FACTORY AREA



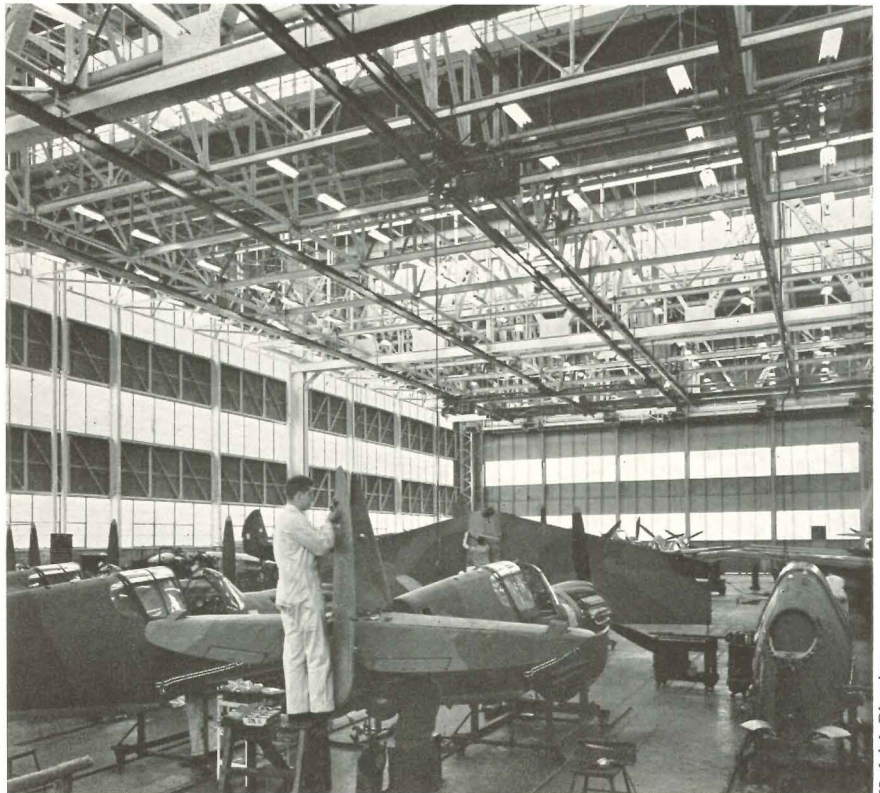
## MANUFACTURING AREA

IN THE FACTORY PORTION, the frame consists of continuous trusses with bottom chords of proper strength to permit handling monorail loads at any point, thus providing flexibility in manufacturing operations. Heating pipes are fastened to the truss work, and immediately above is a catwalk, making the installation accessible at all times. Cobalt-colored, heat-resistant glazing fills the window areas on east, west and south walls and in monitors running north and south.

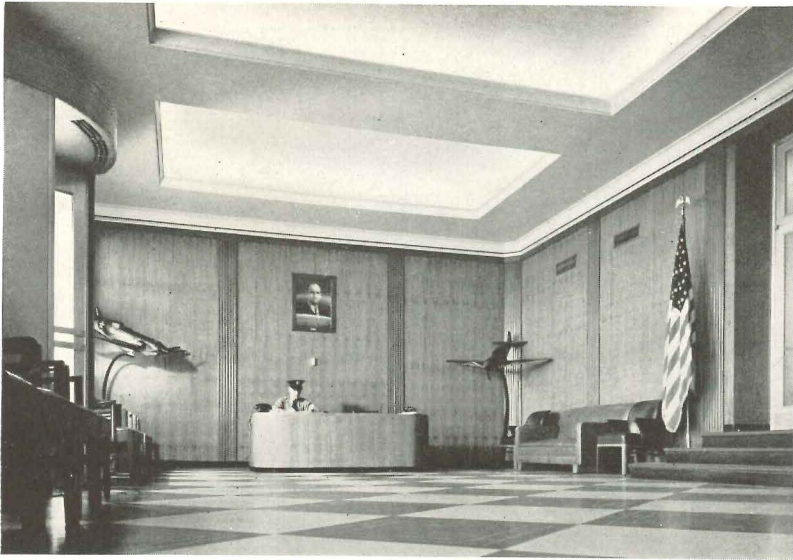


## PLAN FEATURES

AT THE RAILROAD SIDING where the raw materials arrive, sections of the rails are mounted on large elevators. Thus any freight car may be raised or lowered to bring it at the exact level for optimum efficiency. In addition to the basement tunnel shown on page 44, partial basements with toilet facilities occur at regular intervals underneath the entire factory area. These solve two important operating problems: travel to and fro never removes a worker far from his work station point; with foot traffic kept to a minimum, obstruction to factory production is kept to a minimum.



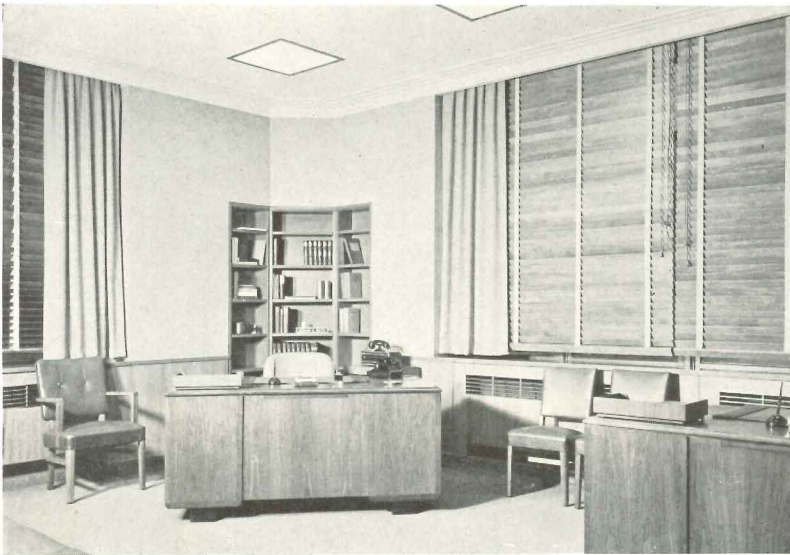
Hedrich-Blessing



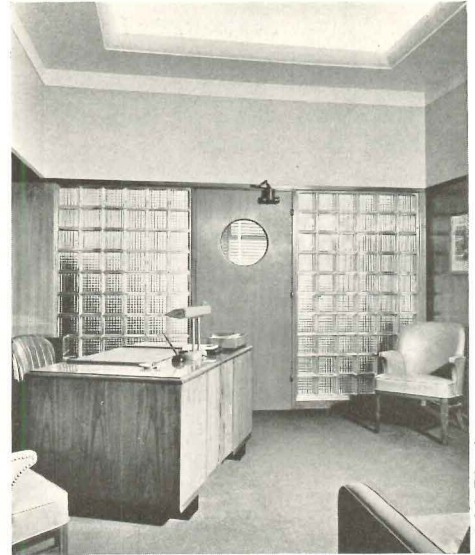
LOBBY. Terrazzo floor; walls canvas-backed bleached walnut veneer

## FACILITIES

THE ROOMS the public sees—such as the main entrance lobby and the private offices—are as up to the minute in their modern appointments as are the more strictly utilitarian areas. For employee comfort, the cafeteria, which is located just off the basement tunnel entrance, is air-conditioned. Adjoining this pleasant, brightly lighted room are employee wash and locker rooms and a completely equipped plant hospital.



PRIVATE OFFICES



Glass wall borders corridor

*Hedrich-Blessing*



THE CAFETERIA. Serving counters



Completely air-conditioned

*George A. Ostrerag*





Hedrick-Blessing

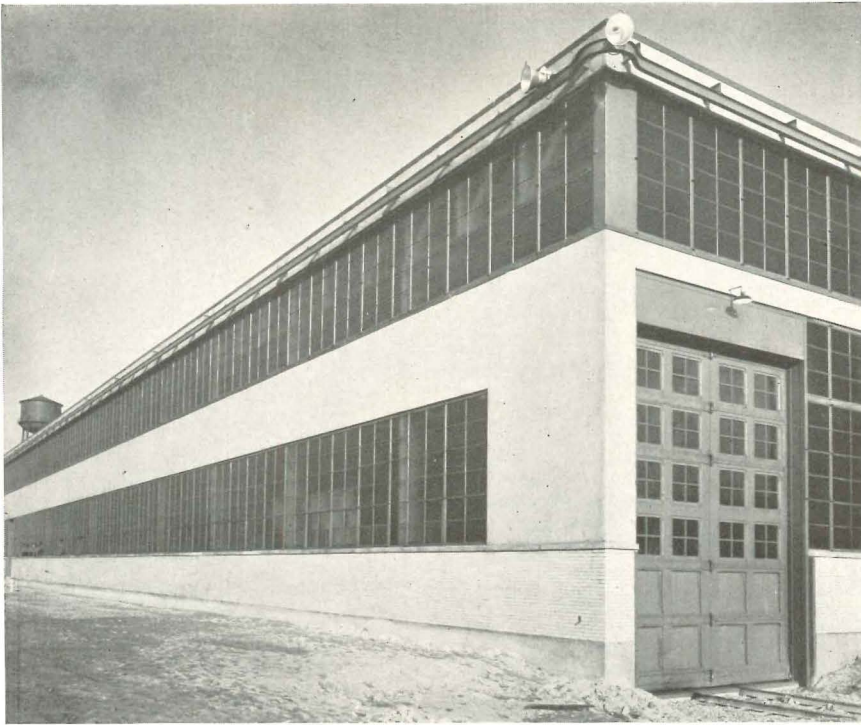
## ARCHITECTURE FOR WAR PRODUCTION

AN AIRCRAFT PARTS PLANT IN THE MIDWEST, BY ALBERT KAHN

Associated Architects & Engineers, Inc.

LIKE THE PRECEDING PLANT, this sizable airplane-parts factory was built within seven months' time and is dedicated to making it increasingly tough for Hitler and his junior partners. An unusual site condition—a marshy slope—presented two alternatives: the site could be leveled off; the

floor could conform to the slope. Time and expense dictated the latter procedure. Result: the factory floor slopes about 2 inches in each 64 feet; walls are at right angles to the floor. If it were perceptible—which it is not—the effect would be of a huge box slightly tilted to the north.



## STRUCTURE

THE GROUP CONSISTS of three main areas—office building, engineering department and manufacturing space. The two former units are of reinforced concrete construction, with tile-backed brick-filled walls topped with a stone coping. Sash are steel.

## FACTORY

THE MANUFACTURING AREA is of steel construction, with walls of brick, hollow tile and glazed tile with a high proportion of steel sash to wall area. Floors of the factory space are of wood block laid on a 6-in. concrete slab, except in certain heavy-duty areas. Monitors are of the butterfly type with top-hung fixed sash. The roof is insulated metal decking.





## SYSTEMS OF CONTROL

BESIDES the large amount of daylight in the factory area, fluorescent tube lighting provides 28 foot candles of illumination at working level. The units, located almost at the level of the bottom chords of the trusses, are suspended from messengers.

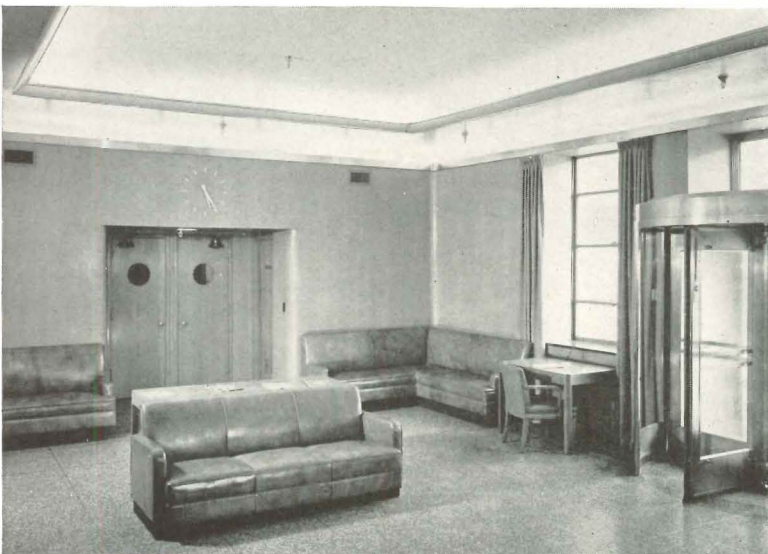
The factory building is heated by projection-type unit heaters which are installed overhead in the truss space; the office and engineering buildings are heated by means of forced circulation of hot water thermostatically controlled. These two latter areas are equipped with complete ventilation and year-round air conditioning. Fresh air, introduced into the manufacturing area at all times for ventilating purposes, is heated in winter; in summer the outside air is used as is. Exhaust ventilators in roof remove vitiated air.



Hedrich-Blessing



FACTORY WALLS—largely window area



## FLEXIBILITY

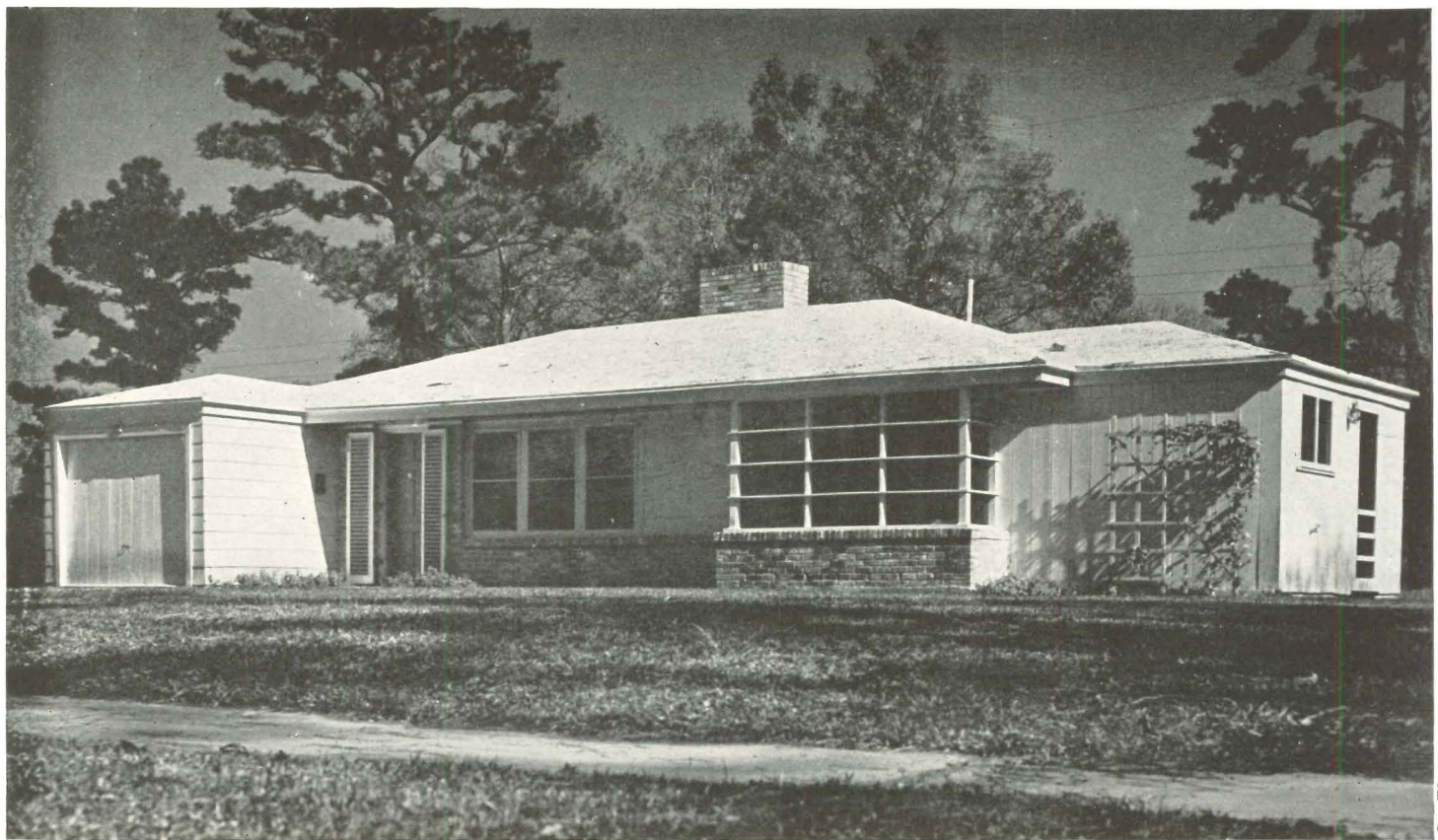
THE ENTIRE PLANT is designed so that it can be readily expanded—to the north or to the east—without interfering with present activities. A notable plan feature is the placement and arrangement of the toilets. These are located at regular intervals in small basements under the main work floor. Each is served by two stairways and is organized into six sections, governed by doors. When the proportion of men to women workers is 50-50, each is allotted half of the toilet area. As the ratio changes, the spaces may be increased or decreased by opening or sealing doors as required. The basement location for toilets was preferred to a mezzanine, as this gives clear space in the work area, and no worker has far to travel.



CAFETERIA

OFFICE BUILDING LOBBY. The main lobby of the office building (see photo at left) has a floor of terrazzo, walls of walnut veneer on canvas with metal trim, and an acoustic ceiling. Fluorescent tubes, concealed in coves, provide indirect illumination. The cafeteria (above), with an arched suspended acoustic ceiling, is as quiet as a hotel dining room. The room is entirely air conditioned. Included in the cafeteria area are kitchen and two serving rooms; a large private dining room adjoins the area

Hedrick-Blessing



St. Thomas

## SIX SMALL HOUSES IN TEXAS

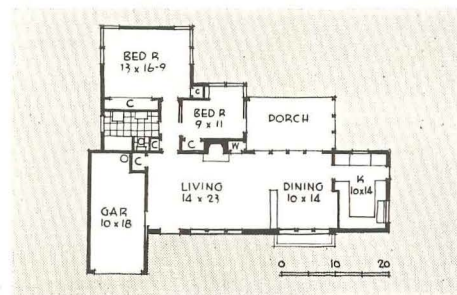
**H**OUSES for war production workers—whether permanent or temporary, whether publicly or privately financed—are key elements in the assembly line leading to victory. For temporary housing, perhaps certain compromises and makeshifts are admissible. But where the houses are being built as a permanent part of the future community, their design calls for as much care and study as time allows. The better the houses, the better the future community. Low cost is, of course, essential; a minimum of critical materials can be used. But neither of these factors is inconsistent with good planning, superior design. The houses shown here—none actually built as victory housing, but all within a \$3,000-to-\$4,600 cost range—are six good cases in point. The architects of Texas have achieved unusual success in small-house design. In these examples of their work, all concerned with designing better houses—and particularly those commissioned to provide single-family war housing—will find a directness in handling and freshness in detail that merits careful analysis.

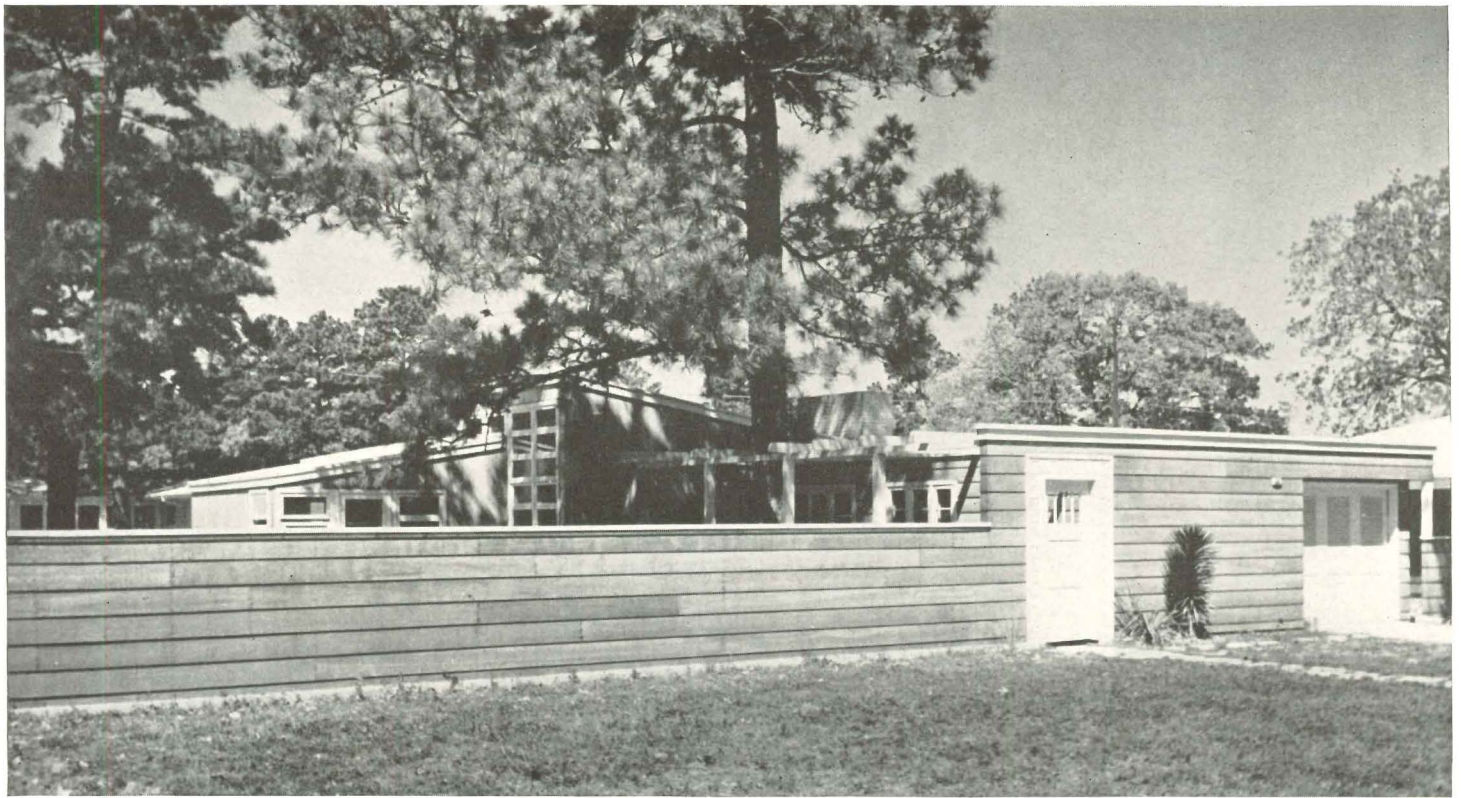
**BUILT FOR \$4400**

**TALBOTT WILSON • IRWIN MORRIS, ARCHITECTS**

THE COMMON DEVICE of combining living and dining areas is uncommonly successful in this Houston, Texas, house. An open screen of bamboo marks the division of the spaces, and facing this, in the dining portion, is a mirror-lined recess with glass shelves. The planting bay increases the apparent size of the dining room area appreciably. On the garden side of the house, the living porch extends the entire living-dining area to the outdoors. The two bedrooms and bath are nicely organized for privacy, and access to them from the front door is kept at one end of the living room. Construction is of frame on a concrete slab; the siding is yellow pine. Interior walls are surfaced in wallboard with a textured finish. The built-up roofing is covered with white limestone. Cost of the house in the fall of 1940: \$4,400.

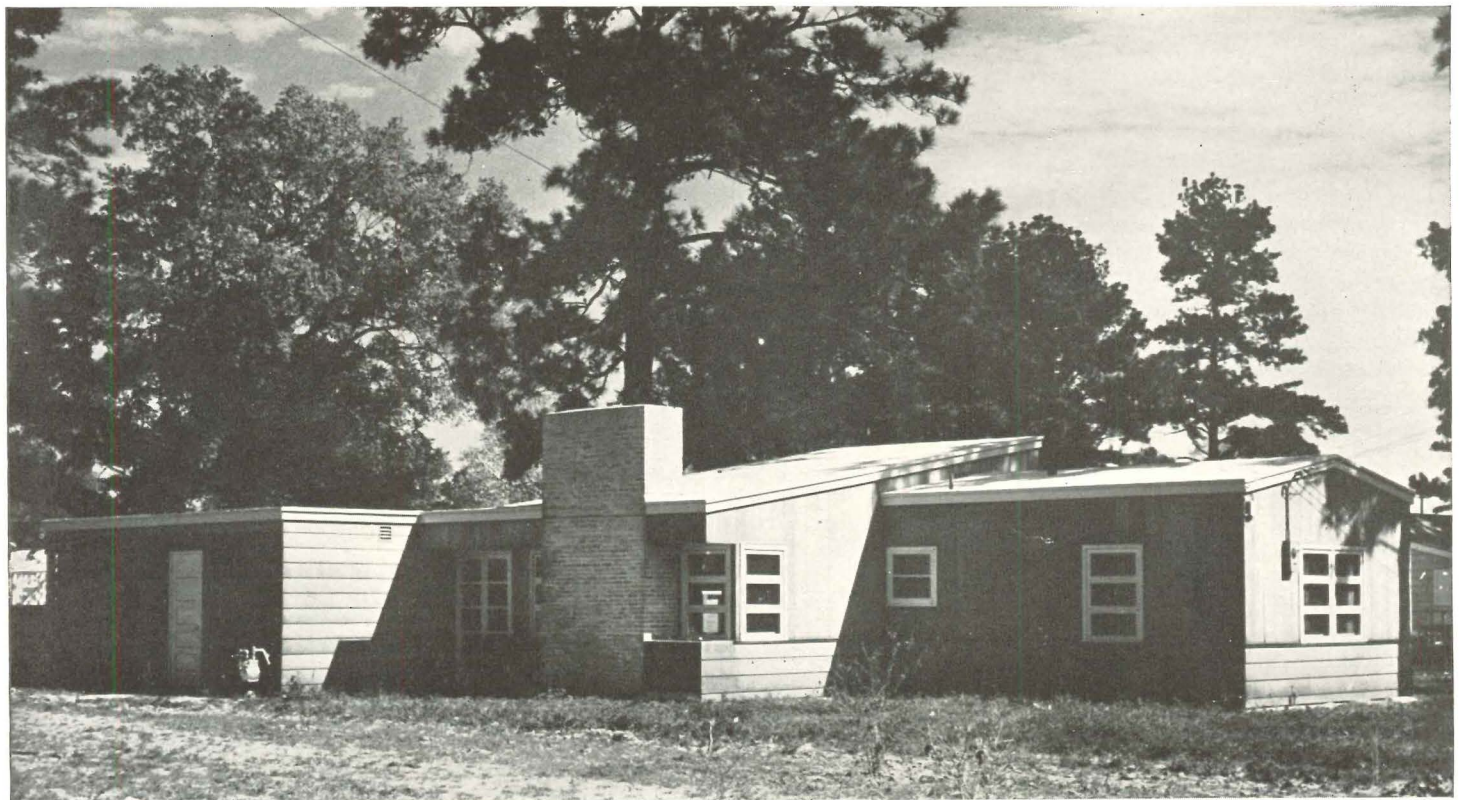
THE PLAN. Unusual study has been given to storage areas. Garden implements go at the end of the garage



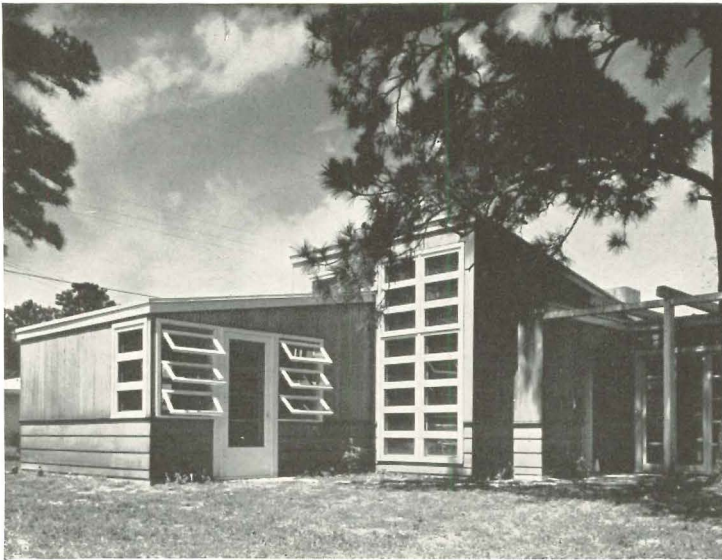


A high fence defines the private garden setting for the house

**A HOUSE DESIGNED FOR A PHOTOGRAPHER  
TALBOTT WILSON • IRWIN MORRIS, ARCHITECTS**



The built-up roofing is surfaced with crushed white limestone

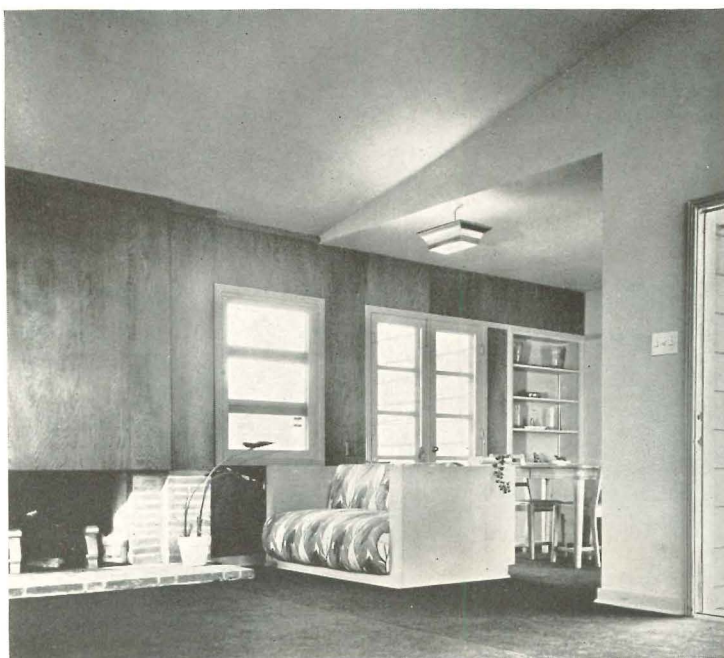
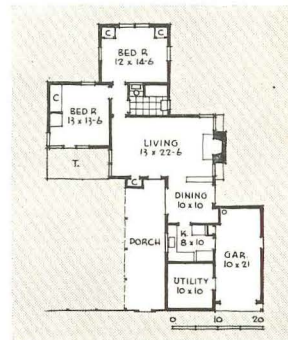


The tall transom-type window lights one end of living room

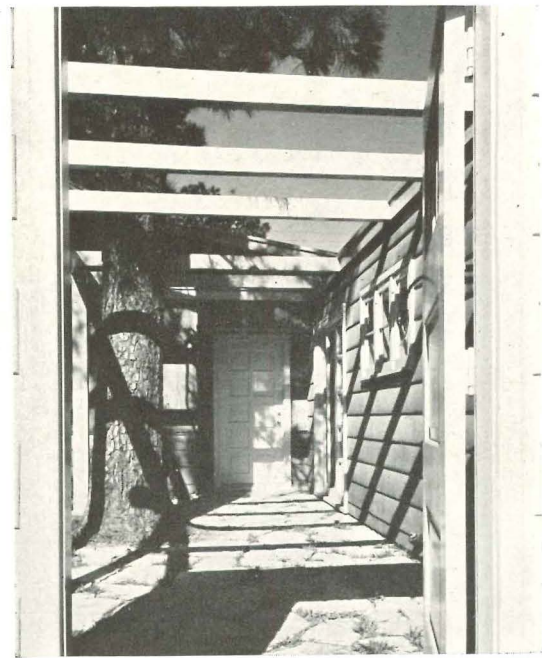


Interior view of transom-window corner

AWARDED the 1941 Medal of Merit in the "under \$6,000" class by the South Texas Chapter of the American Institute of Architects, this striking house in Houston is both home and workshop of a professional photographer and his family. Cost of the house in the Fall of 1940 was \$4,600. Built on a concrete slab, the structure is of redwood-surfaced frame, with texture-surfaced wallboard interiors. The roof is insulated. Extension of the garage and utility room to the front sets the main living quarters well back from street noises. The specially designed windows of a transom type interlock when closed to form effective weatherstripping. Particularly good for use in local summer rainy periods, they have the added advantage of opening up the entire window.

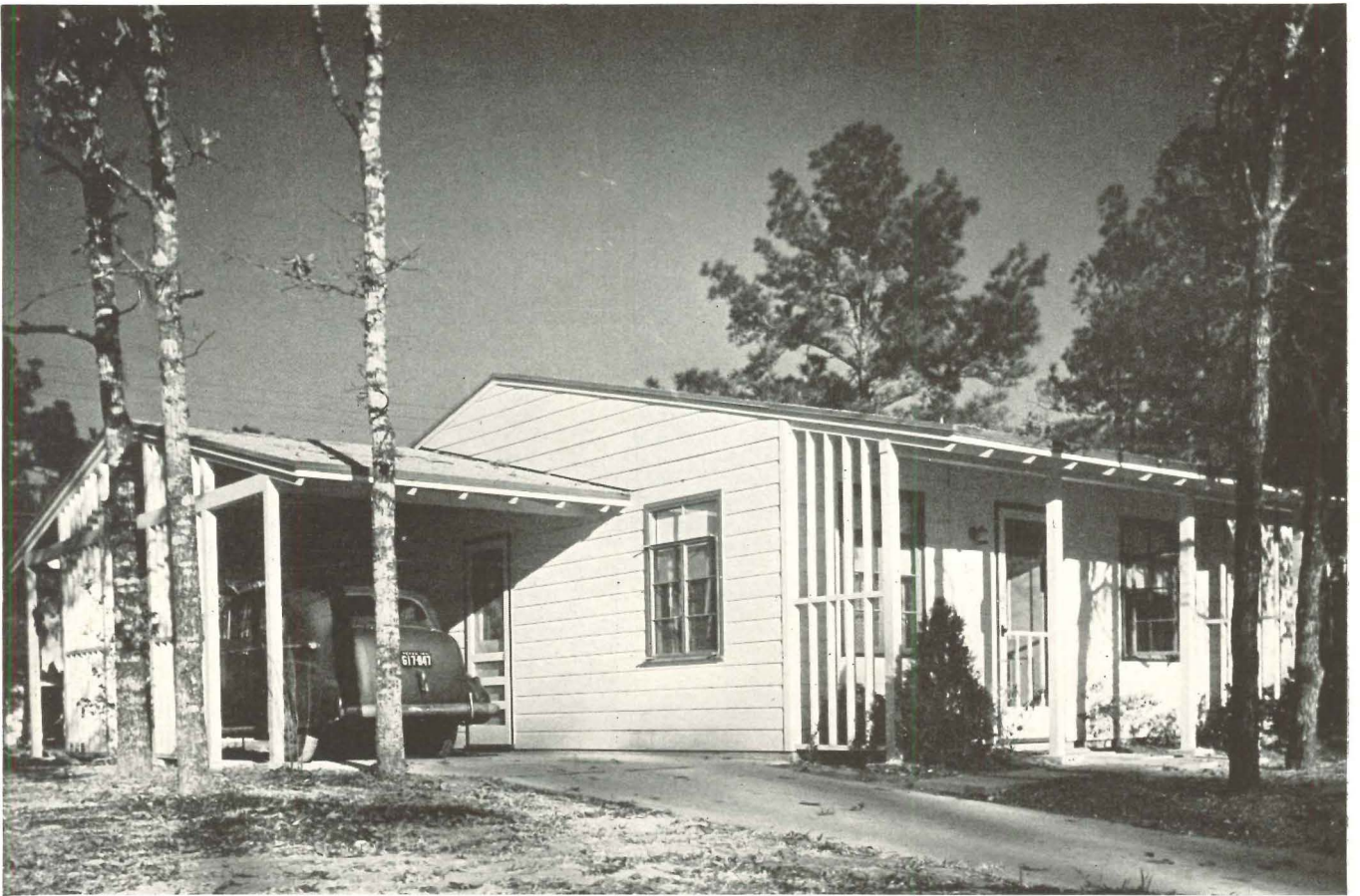


Living and dining areas are separated by a low storage unit



Entrance door detail

St. Thomas



**FOUR HOUSES  
BY B. W. CRAIN, JR., ARCHITECT**

All of the houses on these two pages are in Garden Oaks, Houston. Exact building costs are not available, but each of the houses was sold for \$3,195, exclusive of land. Practically minimum family units, they achieve individuality and distinction through the incorporation of fresh—and inexpensive—detailing. The planning of the bedrooms, similar in all of the houses, is notable. The recess between the paired closets provides space for a dressing table or chest, out of the path of circulation. Thus these small rooms gain the amenities and “furnishability” of rooms of considerably larger floor area.

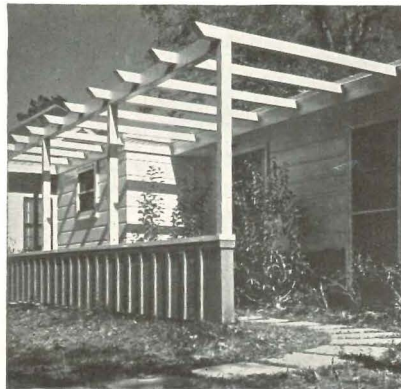
Built on a slab, this house has frame walls with 8-in. wood siding on the exterior, wallboard inside. Floors are oak, except for linoleum in the kitchen

**DETAILS**



*B. W. Crain, Jr., Architect*

A simple bay window treatment



*Wilson & Morris, Architects*

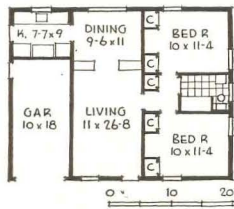
Pergola of a dooryard garden



*B. W. Crain, Jr., Architect*

Louver-type carport panels





Above, at right

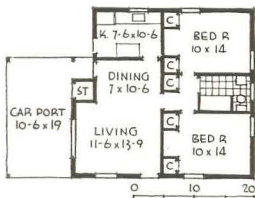


One of the adaptations of the basic floor plan shown at left

IN this house, the space allotted to the living-dining room is more generous than in the other houses shown. The built-up composition roofing is surfaced with crushed white marble. Interior walls are of wallboard, with taped joints. Note the lattice treatment at end of porch and beside the garage door which visually unifies the design.

Center and below

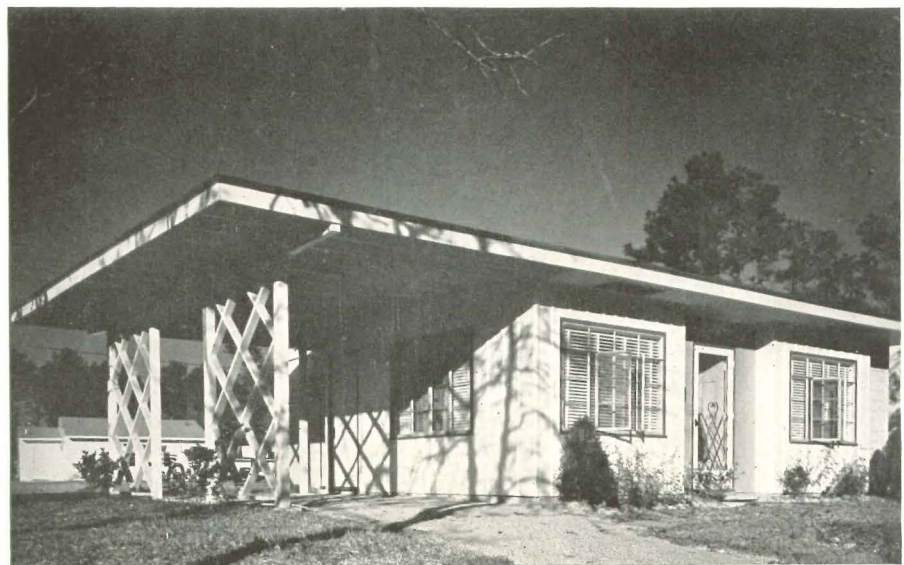
TWO variations of the plan shown below. The living space of the one in the center is increased by substitution of a screened porch for the carport. Built like the others on concrete slabs, the wood siding is laid over No. 15 felt. Interior walls are finished with canvas and with paper applied to liner board.



An unusual amount of storage space is provided in the compact basic plan. The outside closet is for garden tools



Lead-gray wainscot; white upper wall; roof of crushed dust-red brick



Walls are white; windows and door recess, gray; screen door, dark red

St. Thomas

# CONCERNING COMMISSIONS

by J. MAXWELL DICKEY

**Our Army and Navy need qualified men. Getting a commission depends upon both what and whom you know—and military experience may mean more than professional degrees. Here is how to find out if and where you fit.**

**A**T THIS MOMENT there are more than 14,000 applications for officers' commissions now on file with the Office of the Corps of Engineers of the Army. And applications are coming in at the rate of about a hundred a day, filled out by technically skilled men—engineers, architects, draftsmen bulking large in this number. In the Navy, the situation is very much the same.

Recent agitation in Congress over the practice of commissioning civilians for service in the Army and Navy has caused both branches of the service to scrutinize their commissioning procedure, but both retain the right to commission expert civilians they deem necessary for the speeding up of war work.

Department offices in Washington have been swamped with applicants for commissions. The answer is now decentralization. Thirteen additional offices of the Army Corps of Engineers have been established, with district offices in addition. Technical men apply first at the district offices, as the initial applications for commissions are being handled as far as possible through local offices.

A new branch of war service—the Army Specialist Corps—was created by Executive Order and its regulations were announced on May 7 by the War Department. This Corps was created to make available to the Army such men of technical, professional, administrative, scientific and managerial abilities as may be required. These men can relieve present military personnel for combat duty. Appointment to this Corps is made only to meet specific needs and upon request of the Army. Members of the Corps will be available to all branches of the Army for service anywhere. Applicants must be United States citizens and pass a physical examination. There is no specific age limitation but men subject to call for induction under the Selective Service Act will not be considered for Specialist Corps appointments. Application should be made through the Corps area headquarters of the Army nearest the residence of the applicant. Local post offices will give applicants the address of the proper Corps Area Headquarters.

The Army Air Corps is still expanding and there are opportunities for the right men from the construction field.

The Navy has created Naval Officer Procurement offices in various Naval districts to obtain necessary personnel. The Navy's Bureau of Yards and Docks calls upon the United States Civil Service Commission for technically qualified personnel to meet its needs. Much of the Bureau work is delegated to the Officer in Charge of each particular construction project and he may hire technical personnel. He may obtain men through the Civil Service Commission.

Detailed information regarding Civil Service Commission applications can be obtained at all first and second class post offices and they will provide Standard Form No. 57

for making applications. Detailed information about qualifications is contained in Civil Service Commission circulars 173, 174 and 222. Applications for war service appointments are investigated by the Civil Service Commission and appointments are issued for the duration plus six months.

The present need is for engineers, structural, naval, architectural, mechanical, electrical, civil and aeronautical, as well as for draftsmen of various types. Salaries range from \$1,440 to \$6,500 per year, averaging from \$2,000 to \$3,200 for architectural positions.

In seeking a commission, it is wise to talk with officers in the various branches of the Army or Navy, to determine their needs and how well your experience and ability fit their requirements. It is useful to be personally known by the officers where need exists, and to have the recommendation and sponsorship of persons in authority. Getting an officer's commission is a full-time job in itself, requiring initiative, ingenuity and personal contacts, and persistent application to the problem of finding where best one can serve.

## In the following places are district Engineer Offices, Corps of Engineers, U. S. Army:

ALBUQUERQUE, N. M.	MILWAUKEE, Wis.
ARLINGTON, Va.	MOBILE, Ala.
ATLANTA, Ga.	NASHVILLE, Tenn.
BALTIMORE, Md.	NEWFOUNDLAND
BERMUDA	NEW ORLEANS, La.
BOSTON, Mass.	NEW YORK, N. Y.
BUFFALO, N. Y.	NORFOLK, Va.
CHARLESTON, S. C.	OMAHA, Neb.
CHICAGO, Ill.	PHILADELPHIA, Pa.
CINCINNATI, Ohio	PITTSBURGH, Pa.
COLUMBUS, Ohio	PORTLAND, Ore.
DENISON, Texas	PROVIDENCE, R. I.
DENVER, Col.	PUERTO RICO
DETROIT, Mich.	ROCK ISLAND, Ill.
DULUTH, Minn.	SACRAMENTO, Calif.
FORT PECK, Mont.	SALT LAKE CITY, Utah
GALVESTON, Texas	SAN ANTONIO, Texas
HONOLULU, T. H.	SAN FRANCISCO, Calif.
HUNTINGTON, W. Va.	SAVANNAH, Ga.
JACKSONVILLE, Fla.	SEATTLE, Wash.
KANSAS CITY, Mo.	ST. LOUIS, Mo.
LAKE SURVEY, Detroit, Mich.	ST. PAUL, Minn.
LITTLE ROCK, Ark.	SYRACUSE, N. Y.
LOS ANGELES, Calif.	TULSA, Okla.
LOUISVILLE, Ky.	VICKSBURG, Miss.
MEMPHIS, Tenn.	WASHINGTON, D. C.
	WILMINGTON, N. C.
	WRIGHT FIELD, Ohio



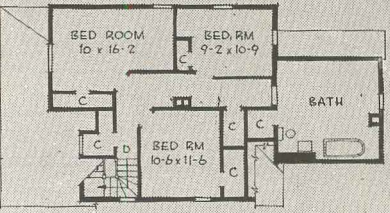
Hedrich-Blessing

## REMODELING IDEAS FOR WARTIME USE

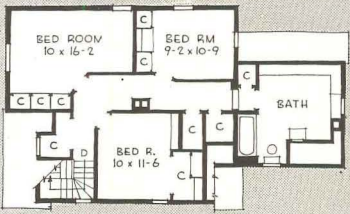
THE HOUSING NEED in war production centers is becoming increasingly critical. And so is the need for saving metals and other war materials in building construction. Remodeling is one answer to both problems. It might be remodeling to make an ancient house again habitable, or it might be the fitting up of spare rooms for added living units. Or just a small improvement in an old house to save fuel or to keep a house serviceable for the duration. To show, in one all-out remodeling project, a multitude of ideas and techniques that are possible in this type of work, the United States Gypsum Company undertook its Remodel Research House project. The house was selected for its typical problems, not for its architectural possibilities. It offered most of the usual problems of plan revision, styling, structural repair, decorating and equipment modernization. Hedrich-Blessing cameramen recorded each "before and after" and took a process picture of every interesting technical job so that both the "what" and the "how" are told here pictorially. Eugene Voita was the ingenious architect; and the decoration was by *Better Homes and Gardens*. The finished house demonstrates many ideas for using space more effectively, for inexpensively gaining new attractiveness and efficiency and for making use of existing facilities to save critical materials.

—and their practical application, as demonstrated  
in the U. S. Gypsum Remodel Research House,  
Park Ridge, Illinois. Eugene Voita, architect.

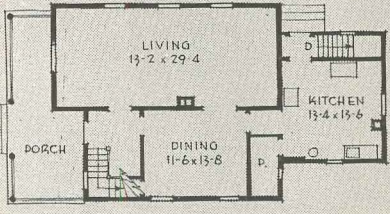




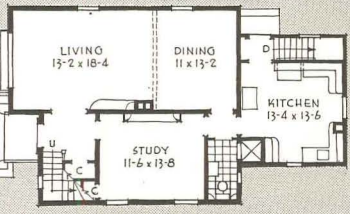
SECOND FLOOR - BEFORE



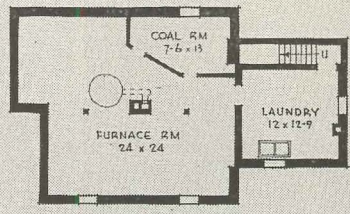
SECOND FLOOR - AFTER



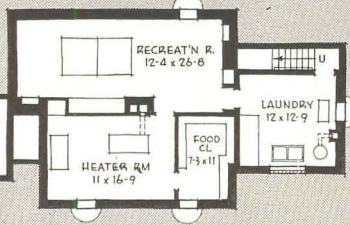
FIRST FLOOR - BEFORE



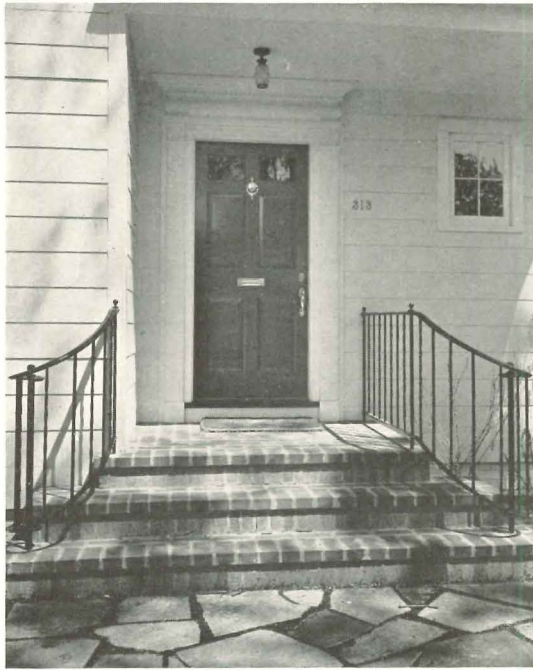
FIRST FLOOR - AFTER



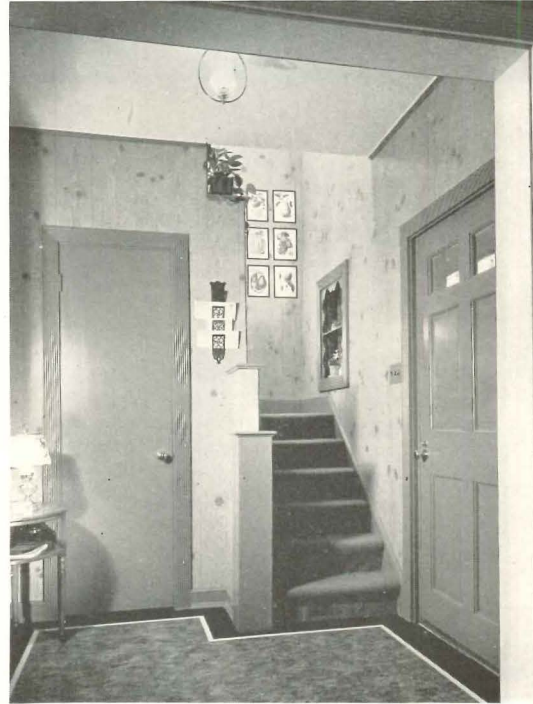
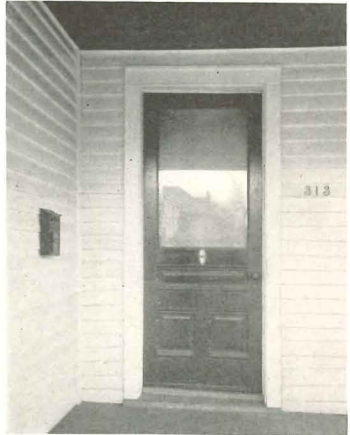
BASEMENT - BEFORE



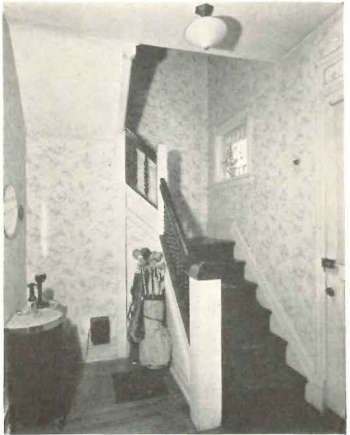
BASEMENT - AFTER



With the old front porch gone, as the first improvement, the ancient entrance was transformed with a new one of simple stock design. Extending the original roof at the same pitch provided a natural canopy over the entrance

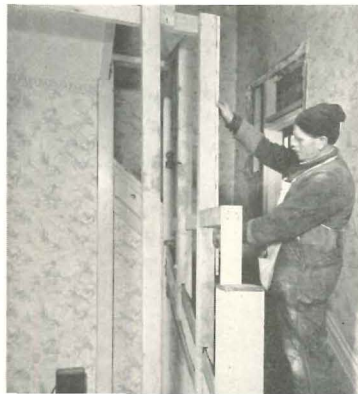


An ingenious idea for treating a not-too-happy stair arrangement, and at the same time gaining a front hall closet in what was waste space. Walls are done in gypsum wallboard with knotty pine finish, woodwork painted brown, Blue marbled linoleum on floor, blue carpet on stairs

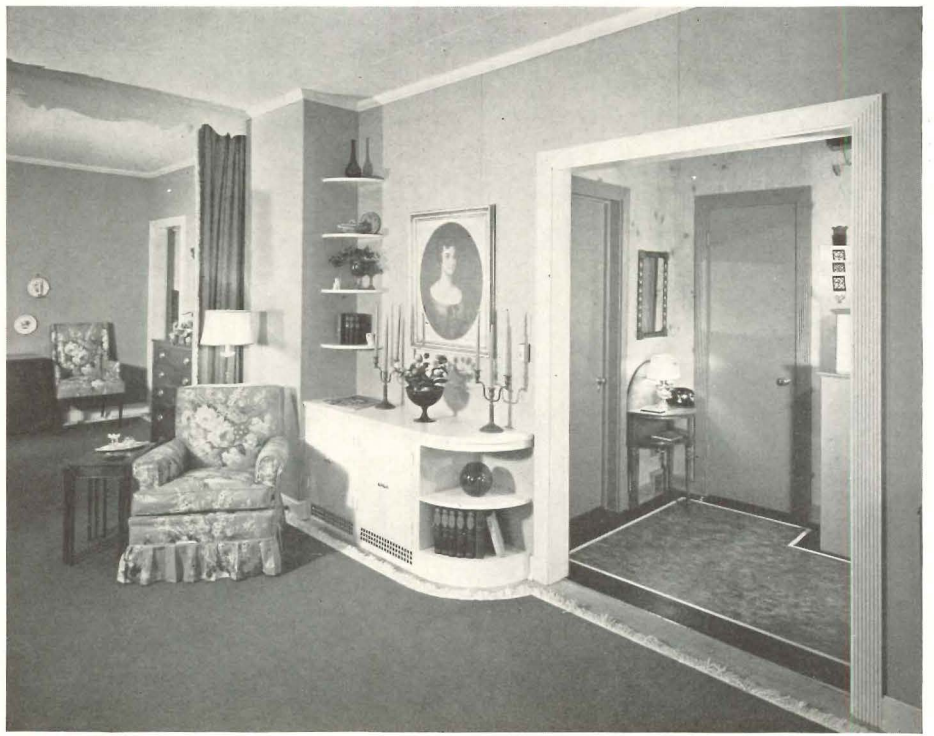


1. This interesting framing scheme was developed to accomplish two improvements—construction of a front-hall closet in unused space and the

transformation of the antiquated stairs. 2. Flagstones for new walks on the re-graded lot were made by breaking up the old concrete walk



An ingenious use of cabinets and bookshelves makes an attractive feature in a difficult corner. The chimney jutted into the living room at this point, but it was not economical to install a fireplace. The heating duct location was retained and the base of the cabinets shows the new grille. Walls are of dry-wall construction, finished with light blue washable paint. Ceiling also is surfaced with wallboard, painted white



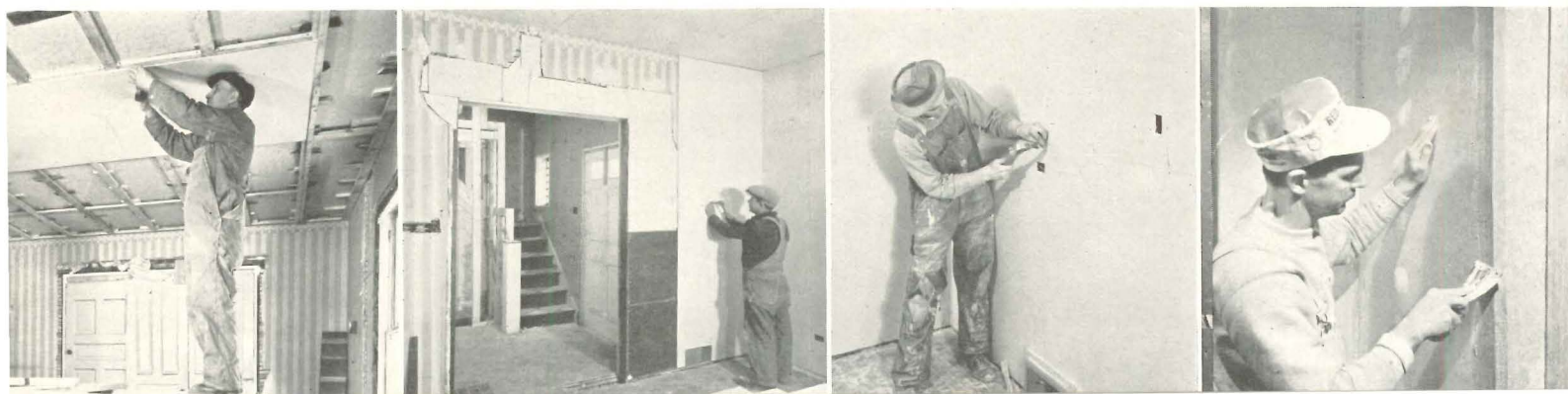
The problem of a living room 30 ft. long by 13 ft. 4 in. wide was solved by devoting one end to dining space, which can be closed off by drapery. This view shows the living room portion, with matching drapery used for the large picture window at the front. To gain better wall spaces for the living room furnishings an old window (formerly centered behind the new davenport) was closed up. The former dining room was converted into a downstairs study



Hedrick-Blessing

1. Much-patched ceilings were simply resurfaced with furring and gypsum board. 2. Where walls were generally smooth, but had been cut into for wiring and such, openings were patched to provide an even

surface. 3. Nailing the board for the "panel-wall" system, to be painted. 4. Finishing the taped joint where, as in the dining room, a smooth joint was required for wallpaper





The odd shape of the master bedrooms—in the form of an L—presented a problem. But it also suggested a novel arrangement of furniture which would leave much useful space in the larger portion of the room. The combination of shape of room and sloping wall suggested the wallpaper treatment

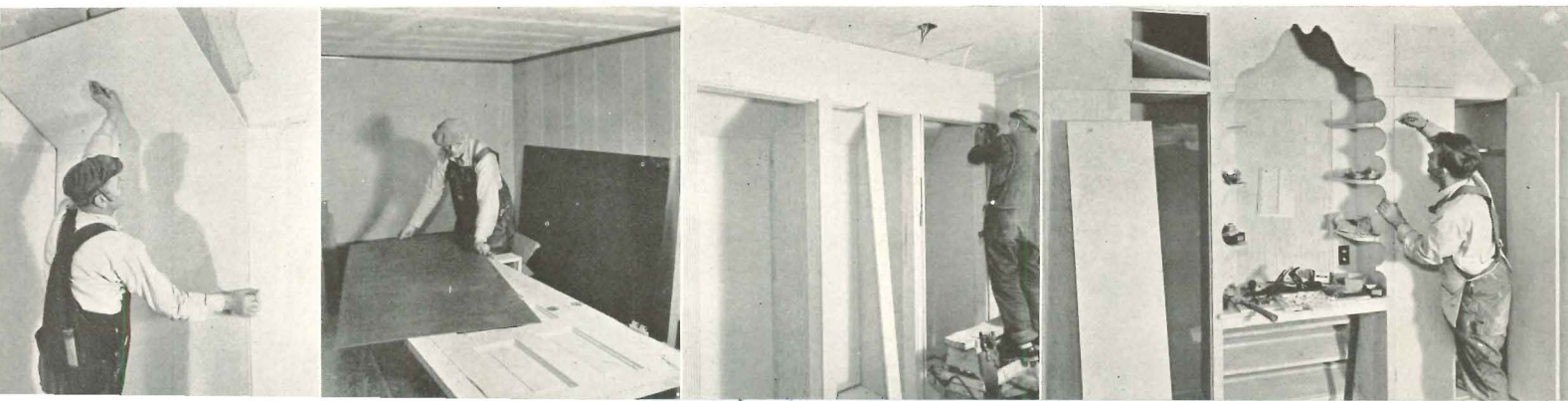


The closet of the master bedroom was long and narrow, extending the full width of one wall; and had one small door in the center. Its arrangement was inconvenient. In the remodeling the wall was taken out and three separate wardrobes built in, with full-length mirrors in the doors. Doors are hung so that they may be used as a triple mirror. And, of course, with three doors the full utility of the space is realized

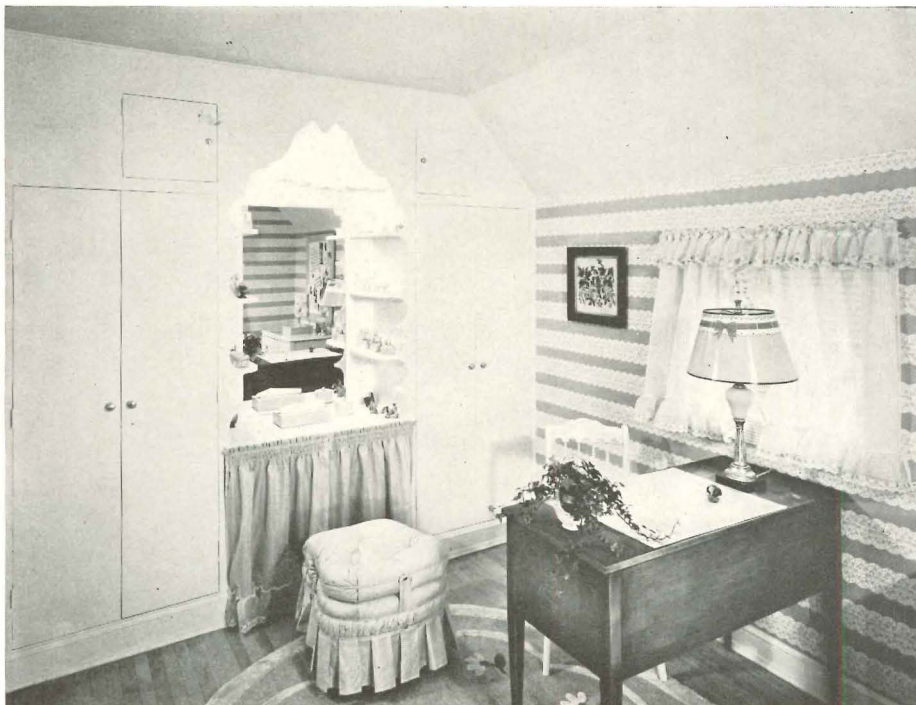


1. Rather than attempting to relath, patch and replaster the old walls, most of them were resurfaced with gypsum wallboard, giving a good surface for either paint or wallpaper. 2. Battered old panel doors were converted

into flush doors by surfacing with eighth-inch hardboard. 3. Interior construction and trim of the triple closet in the master bedroom. 4. Built-in closets and dressing table with hardboard cutout in girl's room



Here is a rather neat solution to another problem of awkward closet arrangement. Again the full end wall was developed for usefulness; a built-in vanity flanked on either side by a wardrobe closet gives a definite feminine note to this "girl's room," besides increasing space utility



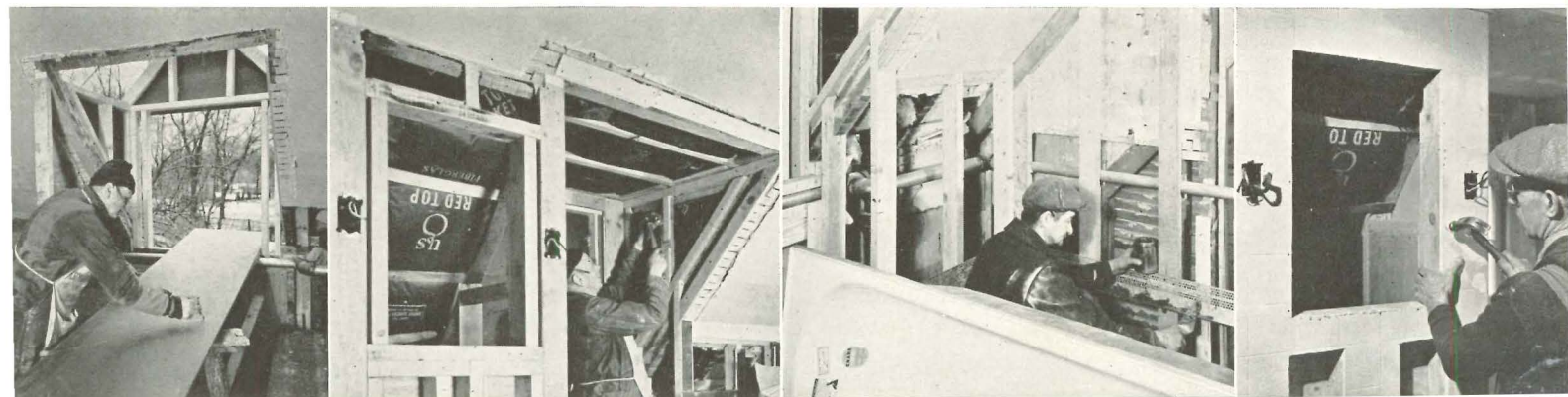
In the "boy's room" the closet space problem called for some ingenuity for the sloping roof left too little height for a full hanging rod. To gain height, the closet was extended out to the window; and the space along the low wall was developed with built-in cabinet and shelves for extra storage. The wall space beside the closet made an ideal place for more cabinets and for shelves, something a boy always needs



Hedrich-Blessing

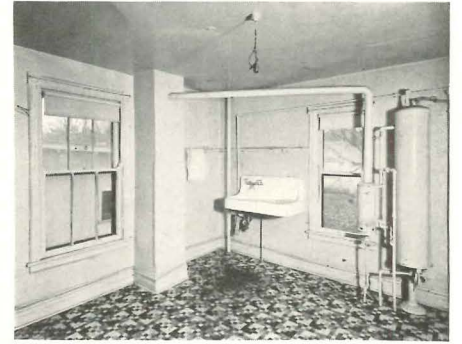
1. Cutting sheathing for extensive alterations to bathroom, including new dormer window and furring in one wall. 2. Insulation was installed in second floor ceilings and bathroom dormer. 3. Proper method of hanging

a bathtub to anchor it firmly to the wall and to insure against a leak developing behind the rim. 4. One wall of the extra large bathroom was finished to ceiling height with gypsum tile board





The old kitchen is hardly recognizable, yet no structural changes were involved in redesigning it. To use existing plumbing lines, the new sink was put in the old location even though it left something of a problem in using the corner space. But an ingenious cabinet group makes the corner thoroughly useful and attractive

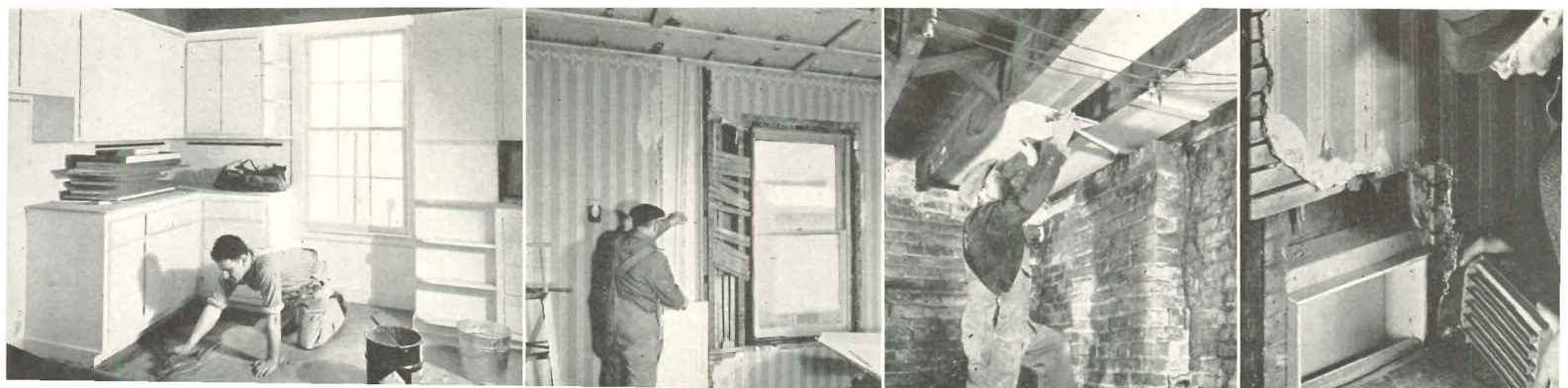


Relocating the new range and refrigerator and adding wooden cabinets and handy shelving worked a remarkable transformation in the kitchen. And furring down and making a new soffit contributed a unity to the design. Adequate lighting has been provided, with fluorescent lights over work counters. Color scheme is white, black and bright red in ceiling and soffit, with decalcomanias adding a gay note



1. Floors of the kitchen, lavatory and connecting hall were all covered with linoleum. To provide a smooth, flush base for it, one-eighth-inch hardboard was laid over the old pine floors. 2, 3, 4. Cold air ducts for

the new heating system were easily provided, and critical metal saved, by simply lining spaces between studs and joists with gypsum board and boxing them in to form ducts of the proper dimensions

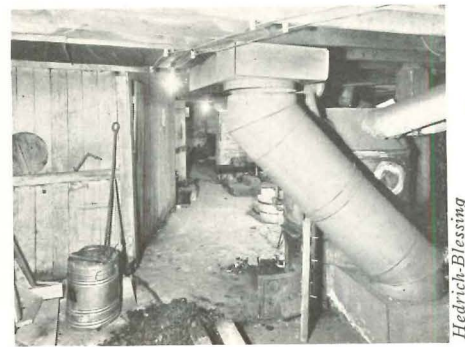




The bathroom, a "gigantic monstrosity," had a large floor area (13 ft. 6 in. square) but its useful space was reduced by the sloping ceilings. It was improved by extensive alterations which included putting the new tub where the linen closet was, building a new dormer, and furring back one wall to increase the effective height



A typical situation in an old-time basement, and a thoroughly modern transformation. The ceiling was low, and furnace pipes spoiled the utility of the space. A new heating plant, with forced air circulation, permitted a furnace location that left clear space for a large recreation room. The decoration on the end wall is a hinged wall-table; the nose drops down to form the leg. Old doorknobs form the eyes



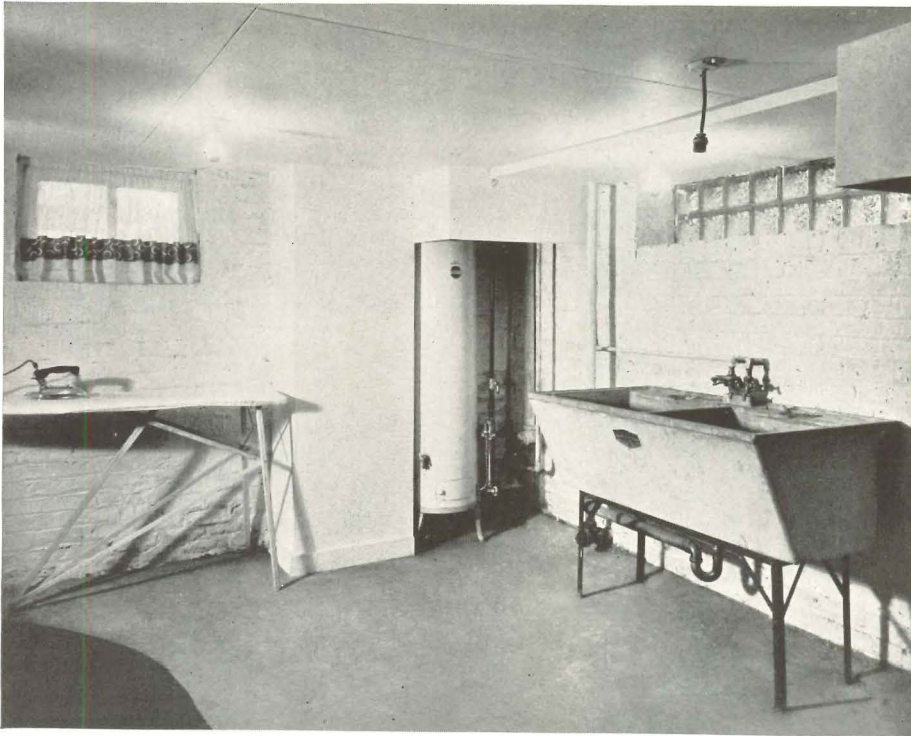
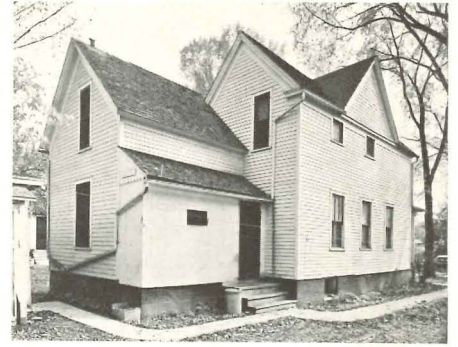
1. Furring strips ready for walls and ceilings in the new recreation room. Lighting is recessed into the ceiling. 2. Framing for a built-in seat in recess between chimney and foundation wall. 3. Recreation room walls

are of prefinished insulation board plank, with tongue and groove edge. 4. Glass block lets in light over the tubs in the modernized laundry, replacing an old and rather unattractive basement window





Like so many houses of its age, this one was a "nondescript mongrel." But fairly simple changes accomplished a considerable improvement. Wide asbestos cement siding shingles gave stronger horizontal lines, which were further strengthened by wood fascia boards at first floor ceiling and below the original siding on foundation.



A few improvements brighten a dingy laundry room. New domestic hot water system and new laundry tubs were the major equipment changes. The appearance of the room was greatly improved by finishing the ceiling, furring in pipes, and by replacing the old window over the tubs with two courses of glass block. Rough brick foundation walls were painted with cement paint; concrete floor was painted to brighten it and prevent dusting.

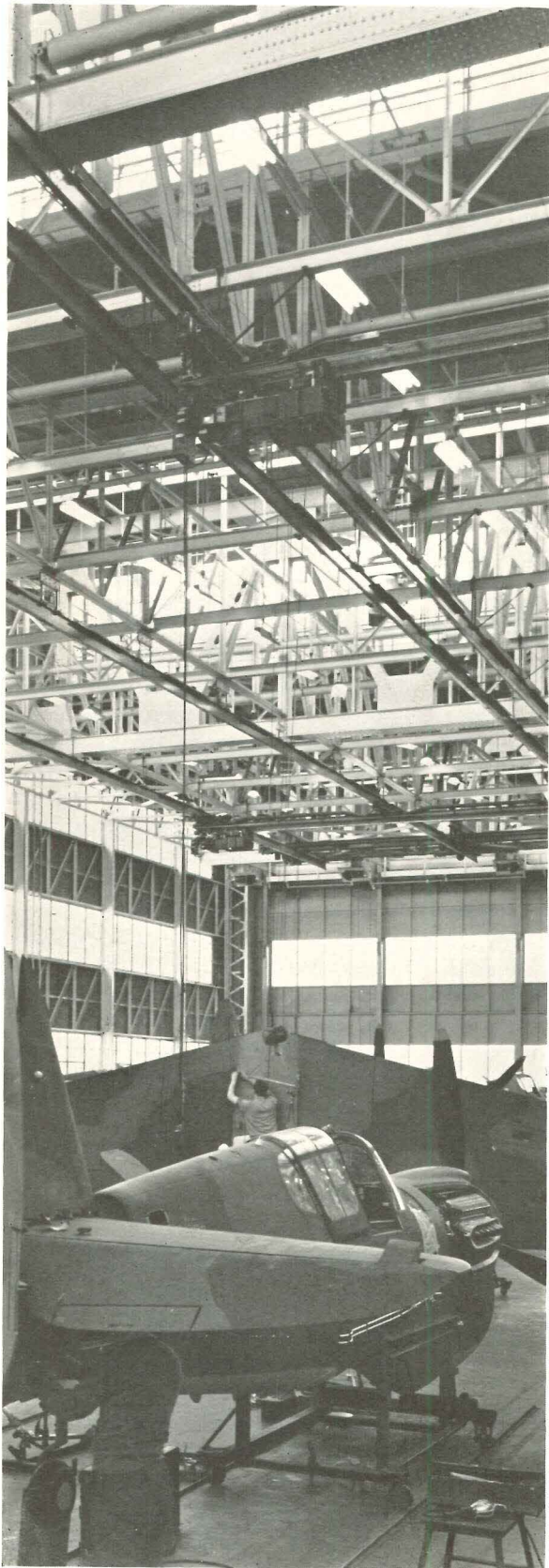


Hedrich-Blessing

1. Foundation walls were generally sound, but had to be opened for jacking up the structure. After the patching, the lot was graded up one foot, and a wide fascia board added to make the house appear to settle

closer to the ground. 2. Putting the new siding over the old. 3. The shingle roof being beyond fixing, the whole house was reroofed with asphalt shingles. The new shingles were laid right over the old





Hedrich-Blessing

## INDUSTRIAL PLANTS

UNIT HEATING SYSTEMS

POWER DISTRIBUTION

PLANT MAINTENANCE

COMMUNICATION SYSTEMS

EFFICIENCY AND SAFETY

THE BASIC NEED of all manufacturing plants—and especially those which are rolling out the increasing volume of all-important war material—is production efficiency. Various technical means are at hand to serve this end: better planning, better structural systems, better mechanical systems, improved materials, advanced equipment, provisions for workers' health, safety and welfare. To the extent that these diverse elements are all present and well integrated, the better and more effective is the resultant plant. In many of the new war production factories, improvement in these techniques has been marked and impressive—a real tribute to the ability of architects and engineers working together for a common cause. The RECORD has analyzed several of these in past Building Types Studies (FACTORY DESIGN: January, 1941; WAR REQUIREMENTS FOR FACTORY DESIGN AND CONSTRUCTION: January, 1942). In this month's study, we direct our focus on efficient heating systems for manufacturing areas, desirable standards for handling distribution of power, advanced types of day-by-day plant maintenance, effective intra-plant communication systems, and a few of the devices and techniques that promote greater plant efficiency and safety.

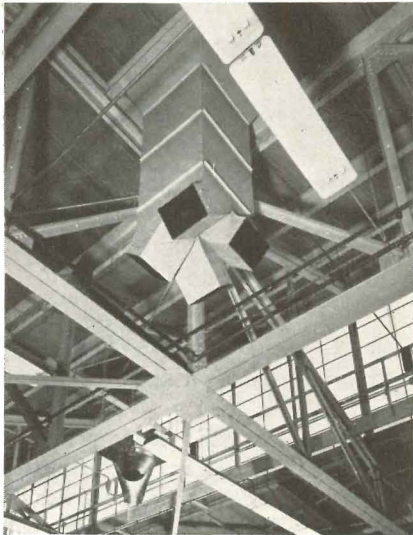
## . . . BUILDING TYPES STUDY NO. 66

PREPARED FOR ARCHITECTURAL RECORD BY WALTER SANDERS, ARCHITECT

# UNIT HEATING SYSTEMS



WINTER FRESH AIR supply unit



SUMMER supply unit



SPLITTER DUCT on heater outlet

UNIT HEATER SYSTEMS continue to move strongly to the fore in industrial installations. The many advantages of this type of heater in its application to all large spaces to be heated comfortably and economically have resulted in the rapid development of equipment to the point where there is today a wide variety of models to meet almost every heating demand or condition. The success of such systems has allowed these factory-assembled units to occupy a place of their own in the industry.

With industrial plants, aimed at optimum war production, forced to new all-time highs in capacity and size, it was only natural that a point should be reached where atomizing of the factory utilities systems became good sense, eliminating individual layout and handling of many parts in field fabrication. Heating and power distribution systems particularly were vulnerable in this breaking up into smaller units or atomizing process. The standardized, volume-produced, factory-assembled, packaged heating units that resulted allow flexibility of installation heretofore unknown in heating: 1) they can be readily located in existing buildings without necessitating changes for duct work, etc.; 2) they can be relocated to meet changing production requirements; 3) their range of capacities in either individual units or combinations of units meets the heating demands of both small and large spaces; 4) they give positive circulation of warmed air, particularly desirable in industrial type buildings where manufacturing processes may demand high ceilings and a tendency for heated air to collect near the ceiling exists; 5) suspended, they save valuable floor and wall space.

Because fewer heating elements are required in unit heater installations than in other types of systems, less piping, fewer connections and a generally simpler heating system are needed. This reduces the first cost of the system and, to a certain extent, the cost of operation and maintenance as well. (Concerning maintenance, use of heavier building insulation will, of course, lessen heating loads and contribute considerably to summer comfort.) Other cost reductions result

from the higher efficiency of the system and the reduction in heat losses due to excessive ceiling temperatures. Unit heaters also make it possible to take care of special requirements, such as the need for one temperature condition at one point and another temperature condition at an adjacent point.

In general, present-day heating requirements for industrial type buildings vary with plant production, weather, new operations within the plant, and consequent relocation of equipment and spaces to be heated. Inevitability of such changes is anticipated with unit heater systems.

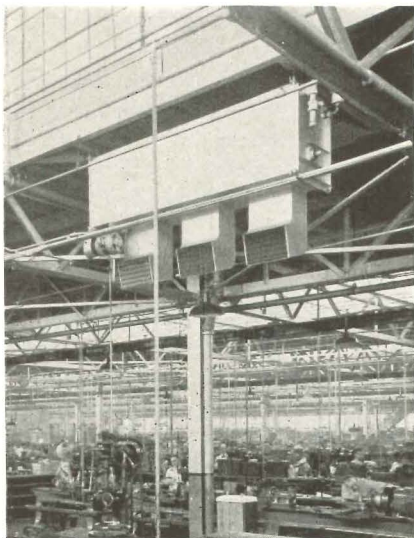
Many designs and models are available. All employ some form of heat transfer surface supplied by 1) steam, 2) hot water, 3) gas, or 4) electricity. Air is forced over or drawn through the heat transfer surface by a fan, either propeller or multi-vane centrifugal type. Convector heating surfaces are variously made of non-ferrous tubes or pipes with extended surfaces (fins), pressed or built-up sections similar to automobile radiators, and cast iron. Heretofore primarily of non-ferrous materials, coils are now made in many ferrous types as well, due to restrictions on the use of copper (tubes) and aluminum (fins). The new steel coils are built in essentially the same manner as the original copper type. In general the tubing is expanded against the fins for permanent contact. Steel coils, although somewhat heavier than copper



CEILING OUTLETS, factory cafeteria

for a given capacity, are serviceable in every respect. They may be used for high pressure service as well as low pressure.

Unit heaters are classified according to the type of fan employed: propeller or centrifugal. Propeller fan heaters use a fan of disc propeller type; centrifugal fan heaters use a multi-vaned or "squirrel-cage" type fan. This latter type is commonly called a "blower," and has outlet velocities considerably higher than the propeller type. In most units the heating medium is steam, and this at 2 lbs. pressure with entering-air temperature at 60°F serves as the basis on which unit heaters are rated in Btu. per hour output. Comparatively few manufacturers today employ coils especially made for use with hot water. Most adapt the more popular steam type. In addition to these two types, which employ heating mediums distributed from a central plant and electric motors to drive the fans, there are others somewhat more specialized also available. The all-electric types use electrical resistance heating elements in place of steam or hot water convectors. Direct fired gas burning units use flue-like heat exchanger sections through which the hot burned gases pass. Where high pressure steam is available, still another type of heater is sometimes used. This employs a steam turbine to drive the fan, with the exhaust steam from the turbine, reduced in pressure, passing through the coil and acting as the heating medium. This type, using no motor to drive the fan, may undergo rapid development and find wide application



CEILING BLOWER, triple nozzle

in these days of increasingly curtailed equipment.

Industrial processes, seeking to cut time in all manufacturing as a result of the war production effort, are finding wide outlet in the use of unit heaters. Heated air in rapid circulation and uniform distribution is of particular advantage in drying and curing. For moisture absorption and for the prevention of condensation on ceilings or other cold surfaces in which process moisture is given off, they are also proving valuable. When such conditions are severe it is necessary that the heaters draw air from the outside in enough volume to provide a rapid air change and that they operate with ventilators or fans for exhausting the moisture-laden air.

Vibratory noises, a disease of the industry's infancy, have disappeared with maturity. Quiet operation is today an accepted fact.

## POWER DISTRIBUTION

THE LIFEblood of a modern industrial plant is electrical power; the proper distribution of this power is as vital a part of planning the plant as the layout of the structural elements. In the very early planning stages, therefore, the architect must work closely with the electrical engineer, each with an intelligent understanding of one another's functions and problems. The architect need not burden himself with a detailed knowledge of the intricacies of circuit design, but certain more or less general items should be clear in his mind: First, the *characteristics* of power distribution systems; second, the *objectives* to be attained by good electrical design; and third, the *methods* by means of which these objectives may be approached.

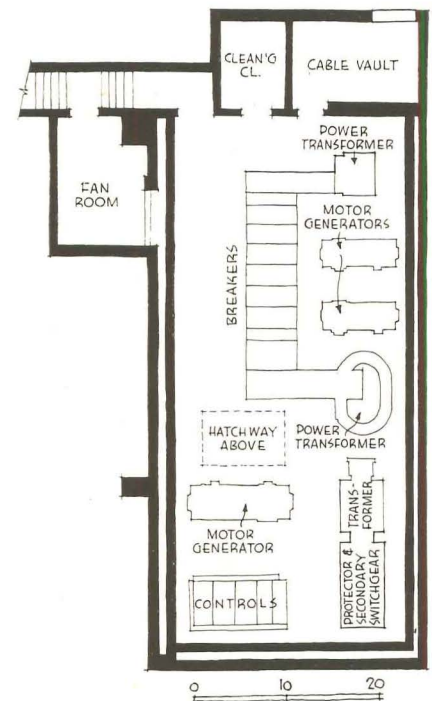
### CHARACTERISTICS

ELECTRICAL CURRENT usually enters the plant from the lines of a utility company. (In not many modern plants is power self-generated.) This current is of high voltage, necessarily so because of the long distances the current must travel, both before and after reaching the plant. Voltages are between 2,300 and 13,200 as usual limits, with 4,000 volts a good average for medium-sized plants. From the mas-

Most manufacturers now furnish decibel ratings for their various models and sizes of units. It is possible to select a unit to suit a given average sound level present in the space to be heated, with the assurance that the noise made by the heater will not be objectionable. Motor mounting, entering-air orifices, type, diameter and form of fan blades, have in their development contributed more to quiet operation than all the study earlier devoted to fan speeds.

Not least in the long list of developments that have catapulted unit heating systems to the industrial foreground is the wide variety of directional devices, diffusers, grilles and nozzles designed to meet practically every heating distribution problem or condition. Of standard manufacture, these almost human helpers for the first time make "heat control" more fact than fable.

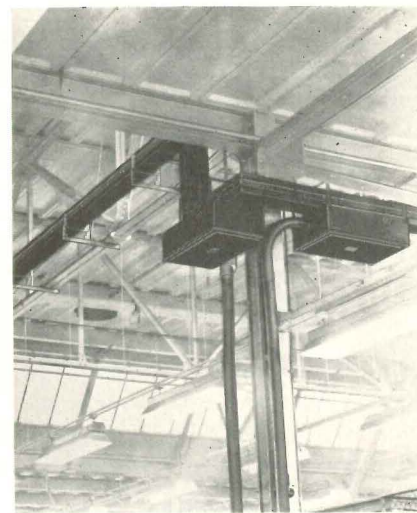
ter station, where the current is received, it is sent out to substations in various parts of the plant, traveling through cables or bus-bars. At the sub-



VAULT SUBSTATION. Primary feeders can be brought in directly underground; less vulnerable to air attack. But costly, and transformer ventilation is a problem



Hedrich-Blessing



**FLEXIBLE POWER DISTRIBUTION.** Bus bars with outlets at 12-in. intervals allow freedom in machine placement or relocation

stations the voltage is lowered by transformers to that level called for by the machines to be served, and sent out to these machines. The whole set-up may be compared to the water supply system of a large building, with its high-pressure mains, secondary tanks and pressure reducing devices.

### OBJECTIVES

THE GOAL of war production plants is 24-hour, seven-day operation; consequently, the primary objective in power distribution design is *dependability*. There must be no work stoppages due to equipment failure, while damage from fire, explosion or sabotage must be guarded against to the utmost. A further objective looks toward the day when arms plants will return to production of consumers' goods. The power distribution system must be sufficiently *flexible* to permit adaptation to the changed uses and to allow the capacity to meet increased power demands through ready expansion. The stress of the times means that systems must be designed with *economy*, both

as regards critical materials and servicing personnel. Waste, undesirable at any time, is doubly to be avoided now.

### METHODS

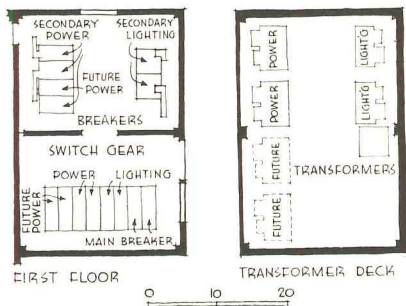
INCOMING CURRENT should be carried by two or more high voltage lines, any one being capable of bearing the entire power load should the others break down. Double-throw switches or breakers at the master station make any such shift a matter of a moment. If possible, the high voltage circuit within the plant should be at the same voltage level as the serving utility, so that in the event of an emergency equipment may be exchanged. Electrical engineers find that bus-bars use less critical materials than do insulated cables, the copper of the bar being the only scarce item. Also, they recommend the radial system of distribution, which may be visualized as a spider's web, with the high voltage lines tapping the utility lines at several points and the substations connected circumferentially by lowered voltage lines. This system, with the necessary panels, switches and breakers, makes for easy isolation of any section where a breakdown has occurred and substitution of power through another substation. The radial system has, of course, many variations, suited to particular cases, while in some plants an entirely different system may be indicated by the special needs.

Substations will naturally go where "rent" is cheapest. This means roofs or basements, rather than valuable production floor space. Latterly, the basement location seems favored, because of comparative safety from bombing,

greater ease of guarding and the opportunity of using underground feeding lines which do not complicate crane operation as overhead lines sometimes do. The principal drawback, poor ventilation for the transformers, may be relatively overcome by the installation of ducts and fans, if not a complete air conditioning system. A minor disadvantage lies in the fact that underground lines are not as completely salvageable as overhead ones.

In planning the number and placement of substations about the plant, the lighting load is frequently used as a guide, since this is practically the only stable and predictable load the substations will have to bear. As a rule of thumb, a square foot of factory floor needs 5 to 6 watts if the lighting is incandescent, or 2 watts if the lighting is fluorescent. Disregarding the lighting qualities, therefore, and also the amount of current consumed, war plants prefer fluorescent lighting because of the economy in the sizes of the transformers required at the substations for lighting current. Lighting controls the placing of substations in another way, too, in that lighting feeders may not generally be longer than 300 feet, if good voltage is to be received at the lamp.

Not all the objectives are completely attainable. For instance, a highly breakdown-proof system would require so large a servicing staff that it would become economically unfeasible. Other factors operate, too, such as the cost of special equipment as against the possible savings that may be effected. Such knotty problems will indicate, in part, why a good electrical engineer is well worth his fee.



**TWO-LEVEL ROOF SUBSTATION.** Good ventilation; short direct routing of feeder cables. But vulnerable to air attack

# PLANT MAINTENANCE

VACUUM CLEANING as it is being used in industry today is more than a mere aid to good housekeeping. It is finding increasing use as an aid to production and as an aid to accident prevention. The basic elements that made up the first "suction sweeping machine," patented shortly after the Civil War, however, remain the same: a fan for creating suction, a cleaning nozzle, and between them a conductor with a receptacle for retaining the litter while allowing the air to escape.

The two general types of modern systems are well known and have been widely installed: 1) the central or stationary type and 2) the portable type. The advantages of the stationary system are many. With the vacuum producer and separator or collector permanently located there is no limit to size or storage capacity. The cleaning plant may be installed to accommodate a large number of operators working simultaneously, and with adequate separator capacities to accommodate the day's accumulation of litter by all operators. Other advantages are low maintenance, unobstructed aisles and work spaces, and planned inlets to serve overhead or otherwise hard-to-reach structure or equipment.

Portable units are, in general, no more than small stationary plants on wheels. To achieve portability their size is necessarily limited, both in horsepower and storage capacity. Their advantages consist of lower initial cost, flexibility of application where special need may arise, and availability for

occasional cleaning of remotely situated areas.

A system combining some of the features of the central and portable types is achieved by using pipe flues to secondary plant levels such as mezzanine locker and toilet rooms, commonly found in recently planned industrial plants, connecting a portable unit at the bottom for localized vacuum pressure, a hose and nozzle attachment at the top for cleaning purposes. This combination system eliminates transporting of the portable equipment to upper levels and allows the use of heavier duty portable type equipment.

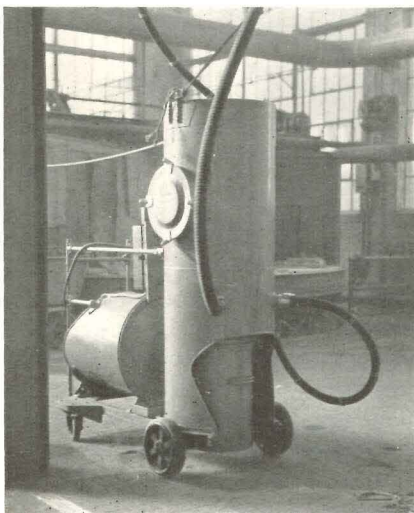
In recently erected, windowless, control-conditioned plants cleaning is of paramount importance from operating and maintenance viewpoints. Replacement of air-cleaning devices is lessened, and artificial illumination levels maintained longer due to cleaner reflective surfaces. And, whether windowed or windowless, dry methods of cleaning interfere less with plant operation, particularly during 24-hour three-shift production periods.

While routine maintenance and general cleaning are among the leading applications for vacuum cleaning equipment in industry, more spectacular and more important in all-out war production times are the many and varied uses that these units are finding as production aids in certain manufacturing processes. Reclamation of materials and prevention of damage are vital parts of present production. In the aviation industry large portable

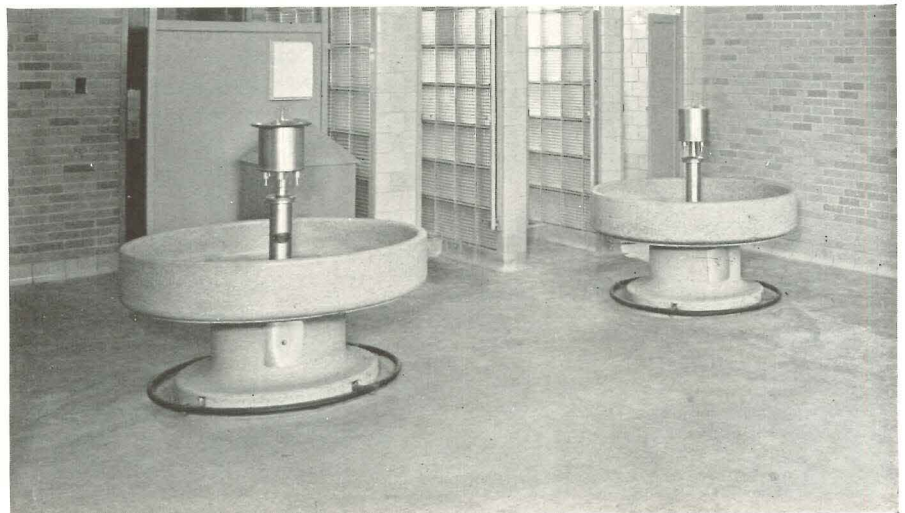
units are used to remove loose rivets, washers, and drill chips from the interior of airplane structures. In other installations valuable metal chips, such as Babbitt, are removed from internal boring operations, and as much as a thousand pounds reclaimed in one day in one plant.

Those industrial hazards which have been materially reduced by installations of vacuum cleaning equipment fall into two classes: 1) those affecting the health and welfare of the worker, and 2) those affecting the safe operation of the plant. In the first class are found the many industrial dusts and fumes which are injurious to health and will seriously impair efficiency if one is exposed to them more or less continually. In the second classification are those dusts which create a serious fire or explosion hazard; such organic dusts as grain, wood, rubber, coal and similar substances as well as inorganic sulphur, aluminum or magnesium powder and other finely divided metals. The removal of welding fumes is another accomplishment of the vacuum cleaner. These fumes consist of finely divided particles of iron oxide and other solids.

In planning industrial type buildings architects would do well to consider the advisability of vacuum cleaning installations relative to production, maintenance, and operation, so that if installation of a stationary type system is indicated the required "built-in" equipment and piping may be made an integral part of the building.



PORTABLE vacuum-cleaning equipment



GROUP WASHING FIXTURES take care of the human side of plant maintenance

# COMMUNICATION SYSTEMS

IN THE OPERATION of a large plant an enormous amount of intra-communication takes place. Instructions, questions and consultations pass between and within departments constantly. On the speed and accuracy with which these messages are transmitted depends, in a large measure, the efficiency of the plant. It is necessary, therefore, that the architect examine the various types of communication systems available.

## SOUND SYSTEMS

ALL sound systems are variants of the simple transmitter-receiver principle familiar in the telephone. In the case of the telephone, the transmission is private and selective in that the mouthpiece allows only close-by sounds to enter; similarly, the receiver is private, since the message is heard only by the person who puts his ear to it. A microphone picks up sound from a much larger area, while speakers permit the message to be heard as widely as desired. Desk speakers, for instance, are relatively small extensions of telephone privacy, while large amplifiers and speakers make it possible to broadcast messages throughout a huge area, and to cut

through or over any local sounds. Each variant has its own peculiar merits, suitable to some special need. First, there is the private *telephone system* of the plant, which allows communication between individuals anywhere in the plant and which may be connected to the outside at will. To relieve this phone system, each department may have its own system, say *desk speakers* with individual switching control to avoid having additional switchboards. Production floor sections may be equipped with a *microphone* and speakers permitting the foreman or supervisor to direct all operations of his crew. The plant as a whole may have a huge system of *speakers* over which general messages, emergency orders, etc., may be broadcast. Whistles, gongs, sirens and alarm bells also have their uses as part of the sound communication system. (See *Time-Saver Standards*, Oct., 1940.)

## VISUAL SYSTEMS

A FAIRLY recent device makes possible the simultaneous reproduction of *written messages* at any number of receiving stations, or at any selected one. According to the nature of the plant,

such a system may prove valuable in eliminating "buck-passing" by clarifying responsibility and in making complex instructions unmistakably specific. The device is two-way.

*Lights* used as signals are performed restricted to transportation activities and to individual machines where the eye of the operator is available without neglect of his work. In all such cases the use of visual systems is recommended, since the sound system is not overlapped, nor is the attention of other workers, for whom the message is not intended, unnecessarily engaged.

*Motion pictures* for safety and operating instructions are being ever more widely used. If the projection equipment is placed in the workers' rest areas, it may also be used on occasion for entertainment purposes. (Incidentally, the aforementioned sound systems and speakers may also be used for the reproduction of *music*, which in certain plants has been found definitely effective in maintaining working tempo.)

Fire fighting equipment and exits may be marked by lights which flash automatically when an alarm is sounded. Similar provision might well be made for bomb shelters, first aid stations and the like.

# EFFICIENCY AND SAFETY

## WHITE FLOORS

A RECENT development contributing to better lighting and consequently an increased safety provision in industrial

plants is the use of a floor topping consisting of a mix of white cement and white silica sand. "Bottom-side" assembly line operations have always re-

quired portable spotlights in addition to the lighting from other sources. With increased general illumination indicated, maximum reflectivity was achieved with a  $\frac{3}{8}$ " white cement mortar floor topping placed monolithically with the structural slab.



The Austin Co., Engineers & Builders

WHITE FLOORS contribute to efficiency of production and safety of workers

## SPRINKLER SYSTEMS

ONE of the common fire-protection devices in modern industrial plants—an automatic sprinkler system—gains added importance in the face of possible air raids. Most fires from raids are started by incendiary bombs, and, where the water supply is not damaged or cut off, according to a recent British survey, sprinkler systems are effective to a high degree in extinguishing—or localizing—these fires. Where special hazards present themselves, or special areas may require total isolation, devices such as a "deluge curtain" or partition of water may be introduced.



# UNIT HEATERS FOR INDUSTRIAL PLANTS

## 1—TYPES, HEAT SOURCES, BOILER CAPACITIES

ARCHITECTURAL RECORD  
TIME-SAVER  
STANDARDS

JUNE, 1942

This Time-Saver Standard sheet contains data on which to base selection of unit type heaters to meet particular heating requirements or conditions.

### DEFINITION

Unit heaters are defined by the ASHVE as consisting of a combination of a heating element and a fan or blower within a common enclosure which is placed within or adjacent to the space to be heated. In general no ducts are employed, although many applications may require equipping the heater with directional outlets, baffles, diffusers, or adjustable louvres.

### TYPES

There are two major types of unit heaters: The centrifugal housed fan type, Fig. 1 (commonly called a "Blower"); and the propeller fan type with the fan mounted directly behind the heating element and blowing air through it as in Fig. 2, or with the fan mounted directly in front of the heating element and drawing air through it as in Fig. 3. When arranged in the latter manner the unit is commonly called a projection heater.

**Centrifugal fan type heaters** deliver heated air at velocities ranging from 1,300 to 3,000 ft. per minute, have rated capacities of 135,000 to 1,300,000 Btu., and may have lengths of throw up to approximately 200 ft.

**Propeller fan type heaters** have outlet velocities from 400 to 1,200 ft. per minute, rated capacities of 18,000 to 340,000 Btu., and maximum throws of almost 80 ft. The vertical delivery type or projection unit heaters may be mounted up to heights of approximately 50 ft.

### SPECIAL TYPES

**The electric type**, used principally only where electric power is abundant and cheap or where other fuels are scarce and expensive, employs an electrical resistance heating element in place of the steam or hot water convactor. These are available in both the horizontal and vertical discharge models, and may be used in conjunction with directional louvres or other air diffusing equipment.

**The direct-fired gas burning unit** is another type. These are of the warm air

type and use fans to force air over the heating surfaces and direct it to the space to be heated. This type is often used where the installation of a steam or hot water plant is not justified and for temporary heat during building construction. For permanent installations it is usually advisable to provide an exhaust duct from the unit to remove combustion products from the occupied space.

**A type employing a steam turbine** to drive the fan is sometimes used where high pressure steam is available. The exhaust steam from the turbine, reduced in pressure, passes through the coil and acts as the heating medium.

### HEAT SOURCE

Low or high pressure steam is generally used as the heating medium. Proper venting of air from the coil must be obtained with all steam pressures, and with high pressure steam it is essential that properly constructed traps and some form of thermostatic air by-pass be used as well as adequate condensing legs.

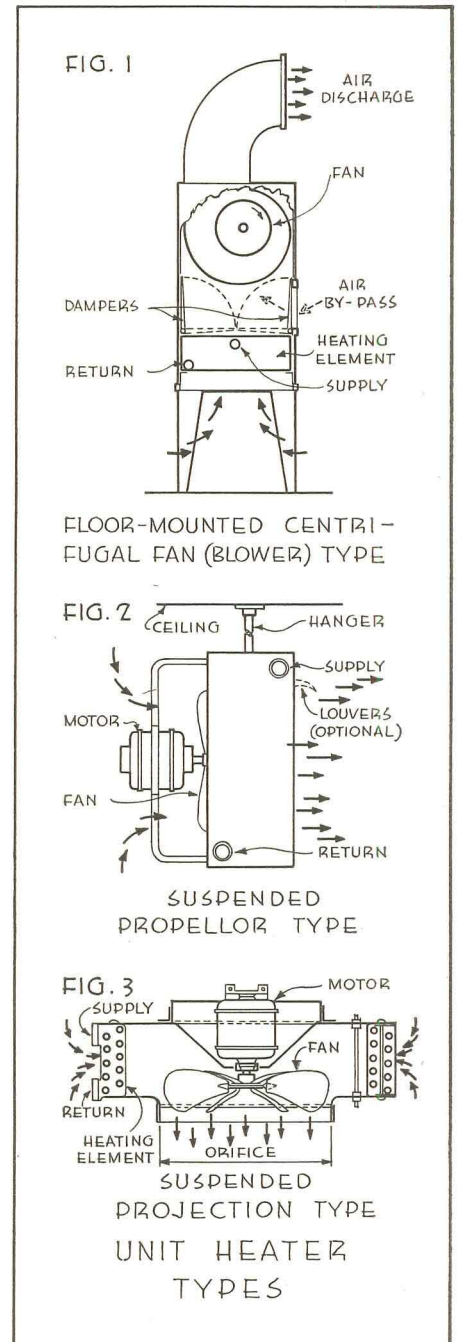
Where low pressure steam is used, it is necessary that proper means be provided for the removal of heavy condensate. The use of vacuum or return pumps and receivers is desirable in all jobs of sufficient size to warrant the use of such equipment. Where gravity systems are employed it is essential that the difference in level between boiler and heater be large enough to compensate for the pressure loss through the convactor at its highest condensation rate.

Only a few manufacturers today make unit heaters for sole use with hot water. Most adapt the more popular steam type. If hot water is used as the heating medium it should be mechanically rather than gravity circulated, and at a rate based upon manufacturer's recommendations for the particular type of heater used.

Normally, the heat output of a heater of a given size and type will be somewhat less if hot water is used rather than steam.

### BOILER CAPACITY

Boiler capacity should be based on rated capacity of the heaters at the lowest entering air temperature likely to occur, plus allowance for losses in lines. The beginning of the heating



period usually marks the lowest temperature for recirculating heaters and is commonly accepted as 40°F. If outside air is brought in the lowest entering temperature will be the extreme expected in the district. Good practice recommends that at least two heating units be used on any boiler. Sudden fluctuations of load that occur under thermostatically controlled units would require more attention than is normally warranted.

# UNIT HEATERS FOR INDUSTRIAL PLANTS 2—CHARACTERISTICS, LOCATIONS

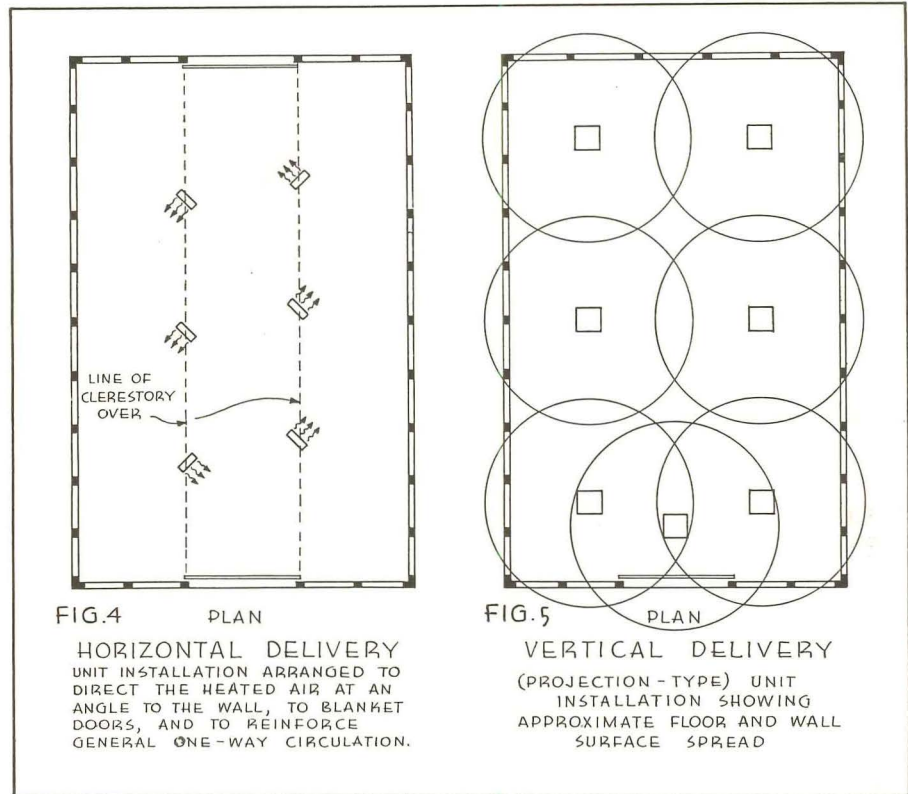
## OPERATING CHARACTERISTICS

In general, centrifugal fan type or blower units discharge heated air at high velocities and are, therefore, indicated where long horizontal distances of throw are necessary or where heat must be concentrated to overcome heavy loads due to infiltration, such as at frequently opened doors. This type is also effective for operation against resistance where duct work is used. Slow speed blower type units are indicated when quiet operation is a prerequisite because of the inherent quietness of the blower type fan.

Horizontal delivery propeller type heaters are best used in those applications where blower type units would be eliminated through economic reasons or where a positive directional throw toward or along an exposed surface is necessary to exert a mixing effect with cool air. Vertical delivery or projection type unit heaters are used to advantage in those applications where exceptionally high ceilings are encountered and where ceiling construction is such that reservoirs of waste heat gather at the ceiling. They are to be recommended wherever conditions call for a more directly downward delivery of air than is provided by horizontal delivery units.

Unit heater systems properly installed should:

1. Provide quick heat where it is needed.
2. Reduce temperature differentials between floor and ceiling.
3. Provide rapid circulation of air without objectionable draft.
4. So direct heated air that uniform temperature distribution will prevail in the space heated.
5. Eliminate cold air stratum usually at floor level.
6. Reduce piping because of fewer heating elements required.
7. Save valuable floor space due to flex-



ibility of mounting on floor, wall or ceiling.

**Location with respect to height** above the floor and direction and length or spread of throw is an important factor in the application of unit heaters. Most manufacturers give the recommended maximum mounting height and maximum and minimum length of throw for each unit model and for each fan speed. In most cases the distances given, particularly those referring to the length of throw, are approximate only and must be regarded as representative for the average.

**Centrifugal fan or blower type** units in general may be floor, wall, or ceiling mounted. Floor mounted types draw cold air from the floor and discharge heated air immediately above head level. They are particularly adapted to closely occupied quarters.

**Horizontal delivery propeller fan type** heaters are most effective in spaces with ceiling heights of 20 ft. or less. Suspended, they should be located as close to the working zone as possible without directly discharging heated air on room occupants. This and the blower types should be arranged to blow toward or along exposed surfaces, pre-

ferably striking the wall at a slight angle so the heated air will mix with cool air along the wall. They should also be so arranged that the resulting air circulation will be rotational, reinforcing one another rather than resisting.

**Vertical delivery or projection type** units should be installed as close to the ceiling as practical in order to overcome stratification of air at high points. If units are not near exposed walls, they may be placed as evenly as practical to produce only slight overlapping of heat circles based on manufacturers' ratings of heat spread over floor areas.

## SELECTION DATA

The performance of unit heaters is greatly affected by the care used in their selection and application. Of first importance is the unit heater capacity in Btu., which must be in all cases at least equivalent to the total heat load. Standard practice is to rate the units in Btu. per hour at a steam pressure of 2 lbs. and entering air temperature of 60°F. Many manufacturers give as well the number of cubic feet of air at a given temperature which the unit will deliver when operating at a given speed. Since the capacity of a unit increases

# UNIT HEATERS FOR INDUSTRIAL PLANTS

## 3—SELECTION DATA, CAPACITIES

as the steam pressure increases, and decreases as the entering air temperature increases, tables of constants\* have been established for determining the capacity for any condition of steam pressure and entering air temperatures. To determine capacity, multiply constant from table by rated capacity at 60°F entering air and 2 lbs. pressure. Table I is used for the blow-through type heaters, and Table II for the draw-through type units.

Entering-air temperatures will be higher for suspended type units than for floor mounted units, and this difference should be taken into account in determining the effective capacity of the units. Common practice allows 1½° increase in entering air temperature per foot of height the unit suspended above the 5-ft. level.

Other factors upon which selection should be based are air quantity and distribution and final temperature. Good practice is to circulate the air at a rate not less than three air changes per hour based on room volume, and to avoid final temperatures in excess of 135°.

\*ASHVE

**TABLE I—CONSTANTS FOR DETERMINING THE CAPACITY OF BLOW-THROUGH TYPE UNIT HEATERS FOR VARIOUS STEAM PRESSURES AND TEMPERATURES OF ENTERING AIR**

Based on Steam at 2 Lbs. Gauge and 60° Entering Air

Steam Pressure Lb. per Sq. In.	Temperature of Entering Air											
	-10°	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°
0	1.538	1.446	1.369	1.273	1.191	1.110	1.034	0.956	0.881	0.809	0.739	0.671
2	1.585	1.495	1.405	1.320	1.237	1.155	1.078	1.000	0.926	0.853	0.782	0.713
5	1.640	1.550	1.456	1.370	1.289	1.206	1.127	1.050	0.974	0.901	0.829	0.760
10	1.730	1.639	1.545	1.460	1.375	1.290	1.211	1.131	1.056	0.982	0.908	0.838
15	1.799	1.708	1.614	1.525	1.441	1.335	1.275	1.194	1.117	1.043	0.970	0.897
20	1.861	1.769	1.675	1.584	1.498	1.416	1.333	1.251	1.174	1.097	1.024	0.952
30	1.966	1.871	1.775	1.684	1.597	1.509	1.429	1.346	1.266	1.190	1.115	1.042
40	2.058	1.959	1.862	1.771	1.683	1.596	1.511	1.430	1.349	1.270	1.194	1.119
50	2.134	2.035	1.936	1.845	1.755	1.666	1.582	1.498	1.416	1.338	1.262	1.187
60	2.196	2.094	1.997	1.902	1.811	1.725	1.640	1.555	1.472	1.393	1.314	1.239
70	2.256	2.157	2.057	1.961	1.872	1.782	1.696	1.610	1.527	1.447	1.368	1.293
75	2.283	2.183	2.085	1.990	1.896	1.808	1.721	1.635	1.552	1.472	1.392	1.316
80	2.312	2.211	2.112	2.015	1.925	1.836	1.748	1.660	1.577	1.497	1.418	1.342
90	2.361	2.258	2.159	2.063	1.968	1.880	1.792	1.705	1.621	1.541	1.461	1.383
100	2.409	2.307	2.204	2.108	2.015	1.927	1.836	1.749	1.663	1.581	1.502	1.424

**TABLE 2—CONSTANTS FOR DETERMINING CAPACITY OF DRAW-THROUGH TYPE UNIT HEATERS FOR VARIOUS STEAM PRESSURES AND ENTERING-AIR TEMPERATURES**

Based on Steam at 2 Lbs. Gauge and 60° Entering Air

Steam Pressure Lb. Per Sq. In.	Temperature of Entering Air																				
	Gauge	-10°	0°	10°	20°	30°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	100°	120°	150°	175°
0	1.483	1.405	1.329	1.253	1.178	1.105	1.070	1.032	.997	.962	.926	.892	.858	.822	.788	.754	.688	.556	.368	.218	.070
2	1.520	1.442	1.363	1.290	1.215	1.141	1.105	1.069	1.035	1.000	.965	.930	.895	.861	.825	.792	.728	.598	.407	.255	.108
5	1.565	1.485	1.410	1.334	1.260	1.187	1.150	1.114	1.080	1.045	1.010	.975	.940	.906	.872	.838	.771	.641	.452	.302	.155
10	1.637	1.558	1.480	1.403	1.328	1.253	1.219	1.182	1.148	1.112	1.078	1.042	1.008	.973	.938	.903	.838	.708	.518	.368	.223
15	1.688	1.610	1.533	1.458	1.382	1.310	1.274	1.239	1.204	1.168	1.133	1.099	1.063	1.028	.993	.960	.895	.763	.572	.422	.276
20	1.728	1.649	1.572	1.498	1.421	1.350	1.313	1.278	1.243	1.208	1.172	1.138	1.104	1.070	1.035	1.002	.936	.807	.620	.468	.322
30	1.803	1.725	1.648	1.572	1.497	1.423	1.387	1.352	1.318	1.281	1.247	1.212	1.179	1.145	1.112	1.078	1.010	.882	.698	.547	.403
40	1.864	1.787	1.710	1.637	1.563	1.491	1.455	1.420	1.385	1.350	1.318	1.282	1.249	1.215	1.181	1.148	1.081	.952	.767	.615	.470
50	1.927	1.850	1.773	1.700	1.628	1.554	1.520	1.483	1.450	1.416	1.382	1.347	1.312	1.278	1.245	1.211	1.145	1.015	.828	.676	.528
60	1.973	1.897	1.820	1.748	1.673	1.601	1.565	1.531	1.500	1.463	1.430	1.394	1.360	1.325	1.293	1.260	1.194	1.065	.878	.725	.578
70	2.018	1.943	1.869	1.795	1.722	1.651	1.617	1.582	1.548	1.512	1.478	1.443	1.410	1.377	1.343	1.310	1.243	1.113	.925	.772	.625
75	2.043	1.970	1.895	1.822	1.750	1.680	1.645	1.609	1.573	1.540	1.505	1.471	1.438	1.402	1.369	1.333	1.268	1.138	.950	.798	.650
80	2.064	1.988	1.914	1.841	1.770	1.698	1.663	1.629	1.595	1.560	1.525	1.491	1.458	1.422	1.389	1.354	1.288	1.158	.970	.818	.670
90	2.102	2.028	1.951	1.878	1.804	1.732	1.697	1.661	1.625	1.590	1.557	1.523	1.490	1.457	1.421	1.387	1.321	1.189	1.000	.848	.698
100	2.150	2.071	1.994	1.919	1.845	1.770	1.735	1.700	1.665	1.630	1.595	1.560	1.527	1.492	1.460	1.425	1.359	1.227	1.038	.885	.738
125	2.213	2.137	2.061	1.985	1.911	1.840	1.805	1.770	1.734	1.700	1.663	1.629	1.593	1.560	1.528	1.493	1.428	1.297	1.105	.955	.808
150	2.277	2.200	2.125	2.050	1.978	1.906	1.870	1.835	1.801	1.768	1.733	1.698	1.662	1.630	1.599	1.564	1.497	1.364	1.175	1.022	.873
175	2.336	2.259	2.183	2.108	2.037	1.967	1.931	1.895	1.860	1.824	1.790	1.757	1.723	1.690	1.656	1.622	1.555	1.423	1.232	1.082	.932
200	2.389	2.311	2.237	2.163	2.090	2.018	1.981	1.947	1.913	1.880	1.845	1.810	1.775	1.742	1.709	1.675	1.609	1.477	1.287	1.132	.982

# UNIT HEATERS FOR INDUSTRIAL PLANTS 4—CONTROLS, FRESH AIR CONNECTIONS

### USEFUL DATA

Btu  
 ————— = sq. ft. of Radiation  
 240

Sq. ft. of Radiation  
 ————— = Lbs. of water  
 4 per hr.

Btu  
 ————— = Lbs. of water  
 966 (Latent Heat)\* per hr.

\* See Table 3—"Temperature and latent heat of steam at various pressures."

TABLE 3—TEMPERATURE AND LATENT HEAT OF STEAM AT VARIOUS PRESSURES

Approx. Gauge Pressure	Temperature Deg. F.	Latent Heat	Approx. Gauge Pressure	Temperature Deg. F.	Latent Heat	Approx. Gauge Pressure	Temperature Deg. F.	Latent Heat
0	212	970.4	25	267	933.5	90	331	885.5
2	219	965.9	30	274	928.6	100	338	879.9
3	222	963.9	35	281	923.5	110	344	875.1
5	227	960.7	40	287	919.1	120	350	870.1
6	230	958.7	45	292	915.4	130	356	865.2
8	235	955.4	50	298	911.0	140	361	861.0
10	239	952.8	60	307	904.2	150	366	856.8
15	250	945.3	70	316	897.3	175	377	847.3
20	259	939.1	80	324	891.0	200	388	837.9

### CONTROLS AND WIRING

Most manufacturers supply a range of manual, magnetic, and thermostatic temperature controls to meet any condition. Wiring diagrams are usually furnished with each unit and should be followed carefully to avoid blown fuses or damaged motors. Motors and all controls are of standard manufacture in almost all cases.

### FRESH AIR CONNECTIONS

Although unit heaters are designed primarily to handle all recirculated air, they may be installed to handle either partial or total outdoor air. In such cases there will be some reduction in

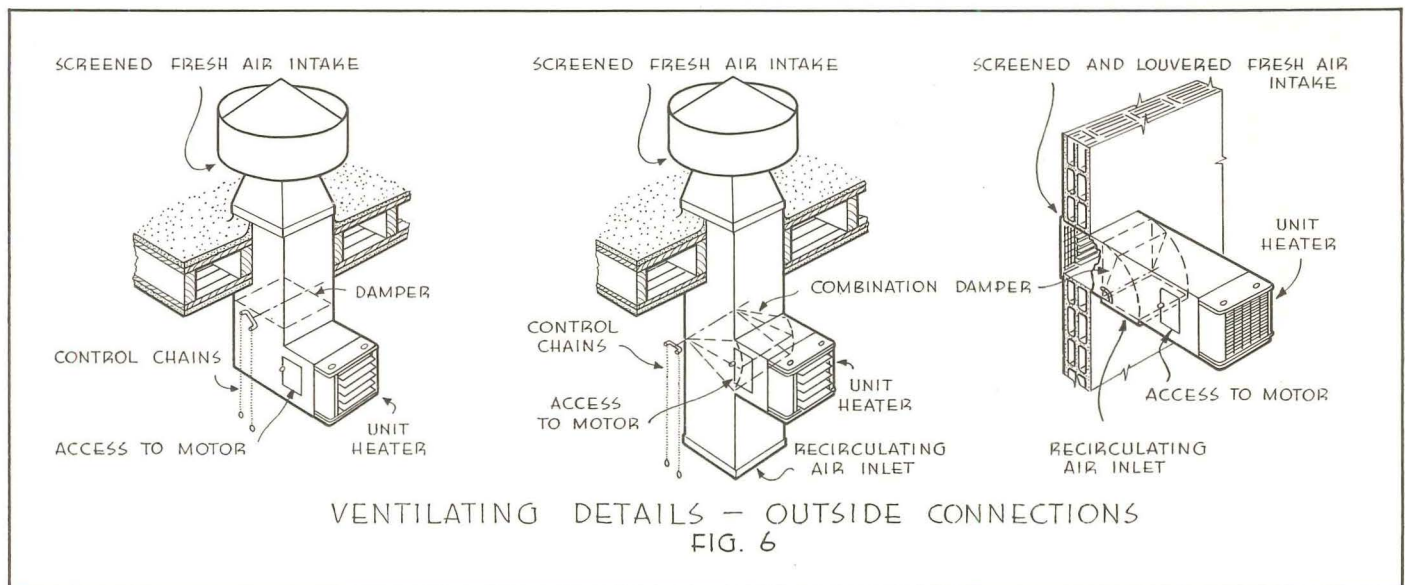
the volume of air handled and in the Btu. capacity of the unit due to resistance of the ductwork. Fig. 6 shows details of outside ventilating connections. The proportion of fresh air to recirculated air can be regulated to suit almost any condition by simple damper control.

Where ventilators admit air at temperatures below freezing, as is sometimes provided in northern climates, a minimum steam pressure of five lbs. must be maintained on the heating surfaces to prevent freezing of condensate in the tubes.

### PIPING CONNECTIONS

Piping for unit heaters must conform to the system requirements, at the same

time allowing the units to serve as intended. Especially during heating-up periods rapid condensation of steam is characteristic of this type of equipment. Piping should be planned to accommodate this sudden condensation; at the same time be ample in supply to carry adequate steam to the surfaces to replace that condensed. Sufficient pipe size is, therefore, essential to all heating surfaces over which air is forced to flow. This is especially important where the fan operates under start-and-stop control and where air handled may consist either wholly or partly of cold air from outside. Condensation rate may vary rapidly in such installations and the need for ample pipe capacity be acute.



# UNIT HEATERS FOR INDUSTRIAL PLANTS

## 5—PIPE CONNECTIONS

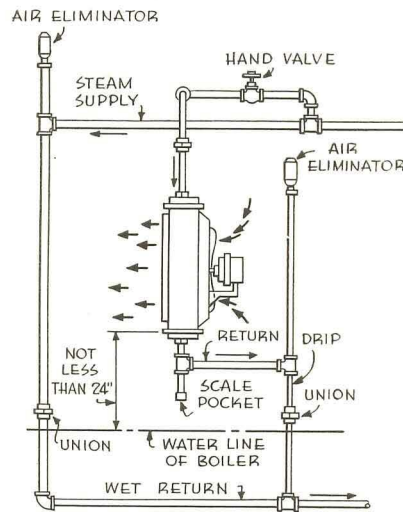
**Pipe connections** for a one-pipe gravity system are shown in Fig. 7. When the unit is connected to a dry instead of a wet return it is necessary to provide a water pocket or loop about 5 ft. in depth to prevent steam passing into the return and thus into other equipment.

**In Fig. 8,** a system with wet and dry returns, the condensate and the drip from the supply main drop by gravity to the wet return. The air passes upward to the dry return and is vented from the system at any convenient location.

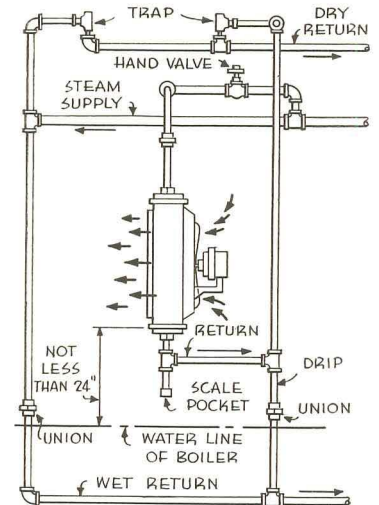
**Fig. 9** illustrates connections where there is a dry return through which both air and condensate pass to be handled by such means as a condensate pump and receiver. The return is not subjected to vacuum and consequently the connections must facilitate gravity flow of the condensate toward the receiver. To keep the return piping only partially full of water, traps must pass air and condensate rapidly.

**In Fig. 10,** a high pressure system, the condensate and air reach the return overhead through traps, with check valves located in the return.

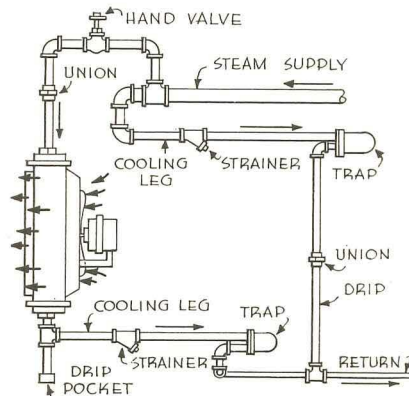
**Figs. 11, 12, 13,** illustrate the three standard piping connections for centrifugal fan or blower type unit heaters, and cover the majority of applications. For vacuum systems a pitch of 1 in. in 40 ft. is recommended, but with gravity returns, for either high or low pressure, the pitch should be increased to 1 in. in 20 ft.



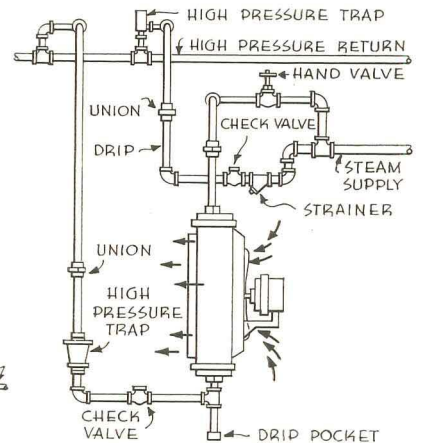
**FIG. 7**  
 UNIT HEATER CONNECTION  
 TO ONE-PIPE GRAVITY  
 STEAM SYSTEM



**FIG. 8**  
 UNIT HEATER CONNECTION  
 TO GRAVITY SYSTEM  
 WITH WET AND DRY RETURNS

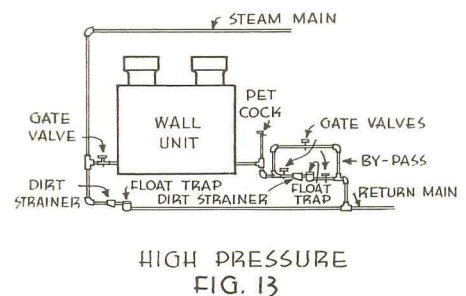
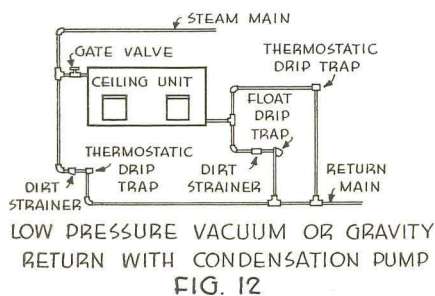
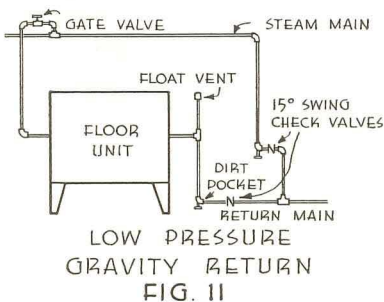


**FIG. 9**  
 UNIT HEATER CONNECTION  
 FOR VACUUM OR VAPOR SYSTEM  
 DISCHARGING CONDENSATION  
 INTO DRY RETURN



**FIG. 10**  
 METHOD OF CONNECTING  
 UNIT HEATER TO  
 HIGH PRESSURE RETURN

*These drawings are used with the permission of Heating, Ventilating, Air Conditioning Guide 1942*



# UNIT HEATERS FOR INDUSTRIAL PLANTS 6—LOUVRES, GRILLES & DEFLECTORS

## DIRECTIONAL LOUVRES, GRILLES AND DEFLECTORS

Heated air to do an effective job must be directed.

Practically all types of unit heaters employ some means to direct the air as it leaves the unit. These outlet air directional devices range from the simple louvre type, Fig. 14, to the three-way multiple deflectors on triple nozzle blower units, in Fig. 24. Between these extremes is found the variety of standard and special purpose outlet controls illustrated here.

**Fig. 14** shows standard equipment individually adjustable louvres, designed to direct high-velocity heated air down to the working zones and floor areas.

**Fig. 15** illustrates a "splitter duct" attached to the heater outlet. Type "A" divides the air equally between the two outlets, directing it at a 45° horizontal angle, and giving a 10 per cent adjustment of the air by means of a damper. Type "B" is similar except for unequal delivery; 30 per cent on one outlet and 70 per cent on the other.

**Fig. 16** shows a 90° high velocity nozzle attachment. With this the air can be directed vertically when the unit is installed at an unusual height.

**Fig. 17** shows a variation of the standard horizontal delivery model placed in an inverted position with four-way diffusers.

**Fig. 18.** A projection type heater equipped with cone diffuser, recommended for applications where low ceiling mounting is encountered.

**Fig. 19** shows a louvre arrangement suggested in cases where it is desirable to direct the air stream toward one general area.

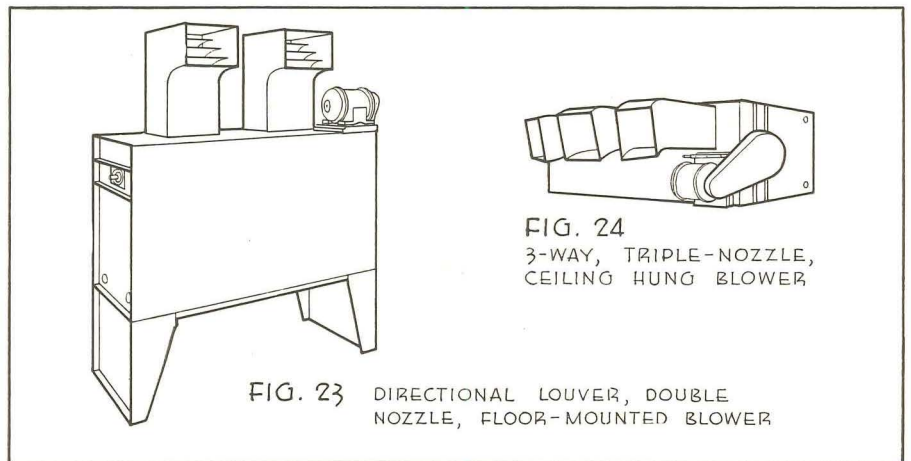
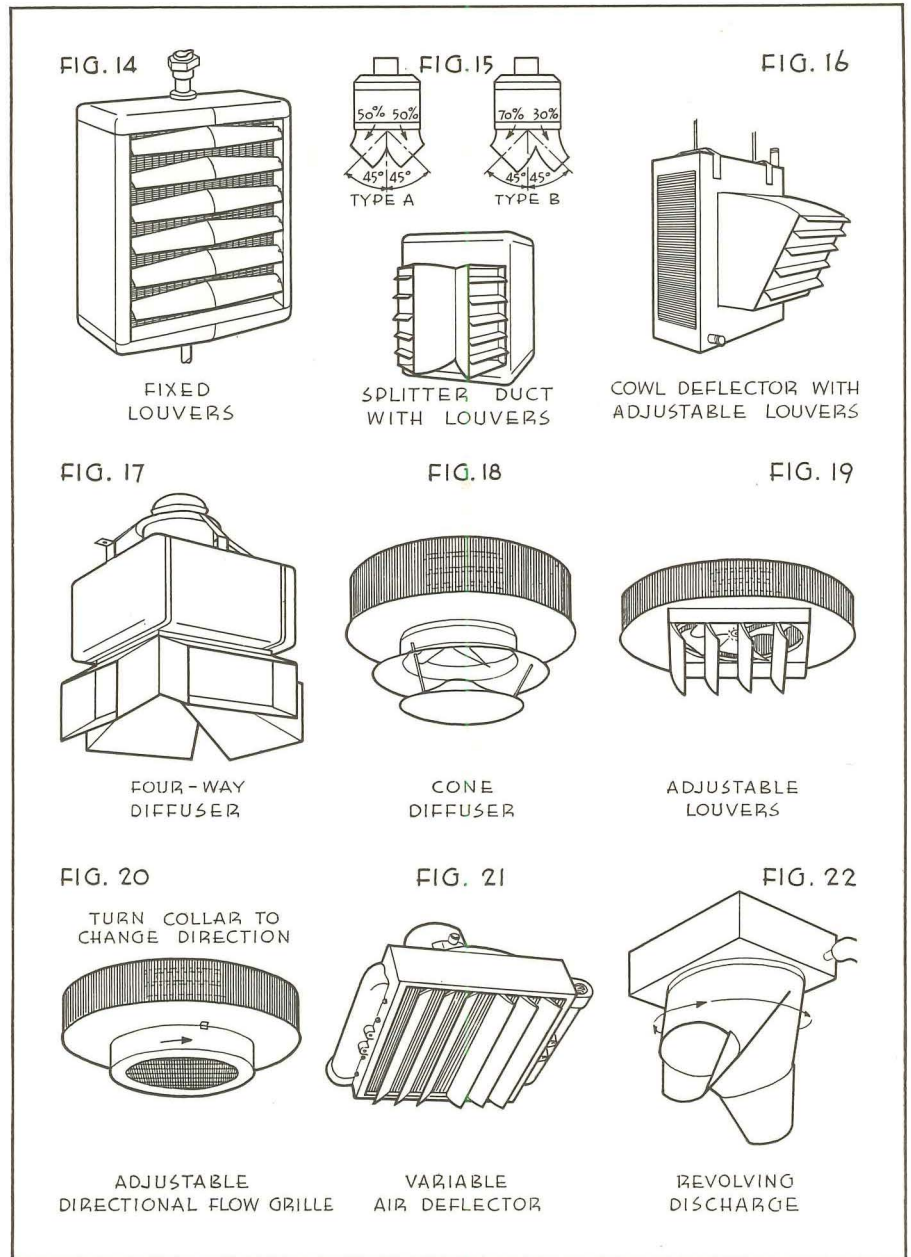
**Fig. 20** illustrates a projection type heater provided with a combination of angle and vertical deflectors. Grille may be swung on track to direct air stream, thus eliminating necessity of turning or relocating unit.

**Fig. 21.** Vertical type unit deflectors, individually adjustable, making it possible to spread the air stream and increase the area of distribution, or to concentrate it on a given spot.

**Fig. 22.** Revolving type unit heater with adjustable deflectors at bottom of discharge outlets. Each deflector should be adjusted to a different angle so that the air discharged will scribe two concentric circles.

**Fig. 23.** Louvres in the nozzle type outlets of a blower model heater.

**Fig. 24.** Directional, 3-way triple nozzle for blower type units.





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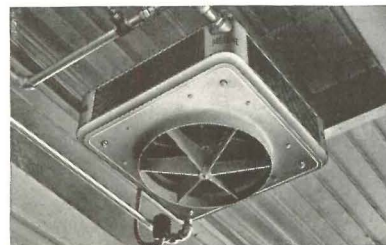
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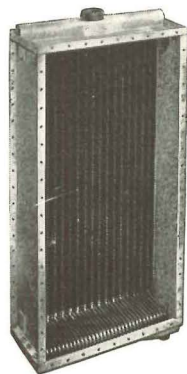
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Horizontal Delivery Model



Vertical Delivery Model



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# REQUIRED READING

By ELISABETH COIT, AIA

**HISTORIC HOUSES OF THE HUDSON RIVER VALLEY.** By Harold Donaldson Eberlein and Cortlandt Van Dyke Hubbard. New York, Architectural Book Publishing Co., 1942. 208 pp., 9¼ by 12¼ in., illus., \$10.00

AS DOES many another of his popularizations of regional architectures, this work, commissioned by the Hudson Valley Conservation Society, shows Mr. Eberlein's gift for seeing his subject from his public's viewpoint, and in cooperation with a skilled and sensitive photographer making a book at once informing and beautiful.

An architect will regret the absence of measured drawings and plans. Historians, on the other hand, may wish that the text had been extended even at the expense of some of the photographs.

But this book is not intended for the specialist. It is an interpretation, in terms of houses, of the social and economic history of a region intensively developed during 333 years; and it is all to the good that the region is varied and beautiful, providing fine sites and fine materials, that its climate, its manorial system and the traditions of the colonists combined to produce fine houses, great and small, that so many survive in a good state of preservation.

Maps on stout end papers give the position of 98 of these, indicating which are open to the public. The well-told story is arranged by county, reference is made from text to photograph and from that to the map, type and arrangement are pleasing.

**IN THE NATURE OF MATERIALS.** By Henry-Russell Hitchcock. New York, Duell, Sloan and Pearce, 1942. 142 pp., plus 413 illus. 8 by 8 in., \$5.00

THIS WORK, though complete in itself and well justifying its sub-title, "The Buildings of Frank Lloyd Wright, 1887-1941," is one of three forming a whole, and the reader seeking Wright's abundant explanation of his ideas and intentions must go back to Frederick Gutheim's recent compilation "Frank Lloyd Wright on Architecture" (ARCHITECTURAL RECORD, June, 1941, p. 28) and forward to the promised new edition of the Autobiography.

In the present work 400 illustrations and a masterly introduction and

commentary present projects and designs as well as over a hundred executed buildings. The richness and variety achieved in arranging the illustrations on a page only eight inches square is amazing: page after page of photographs, drawings, sketches, so laid out that no two spreads are alike, the irregular spaces available being happily used for explanatory notes to complement the captions. The arrangement is chronological as is that of the introduction. Throughout Professor Hitchcock has had Mr. Wright's close cooperation.

Probably no architect has offered so much material for interpretation; surely none has been so fortunate in his interpreter.

**A SHORT HISTORY OF JAPANESE ARCHITECTURE.** By A. L. Sadler. Sydney and London, Angus and Robertson, 1941. 140 pp. plus 122 plates, 7¾ by 10⅞ in., \$6.00

THE AUTHOR, professor of oriental studies at the University of Sydney, from his six years' residence at Oxford and ten in Japan, understands what the Western mind wants to know about Japanese society as recorded in its architecture. Where he got his ability to compress the narrative part of 25 centuries' architectural history

into a hundred pages is perhaps nobody's business; but he has done it.

The other half of this attractive quarto is devoted to: A comparative table of dates for China, Korea, and Japan; a glossary including ideograph as well as phonetic transliteration and explanation; 122 plates containing from one to over thirty well captioned figures; a full index; and, for the serious student unable to read Japanese, the page numbers and list of plates in Professor Amanuma's "Illustrations of Japanese Architecture" which provides a comprehensive list of historic buildings.

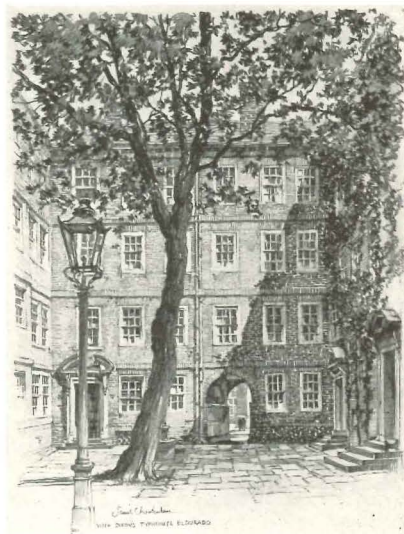
The book, sponsored by the Carnegie Corporation of New York, will survive possible differences of opinion on the part of orientalists, as well as our own discovery of a slight mathematical error on plate 43. The modern-minded architect may regret an opportunity lost to underline the modular principle. But all readers will enjoy this human account of a matter of interest from many viewpoints to the western mind; and those who have not even a tepid interest in Japanese architecture will grasp the philosophy of the bath, the privy, the kitchen, and the architect.

**TOWN AND DAVIS, ARCHITECTS . . .**  
By Roger Hale Newton. New York, Columbia University Press, 1942. 334 pp., 6 by 9½ in., illus., \$4.00

WERE IT NOT for the title-page motto, ". . . yet more willing to have others go beyond me" one might conclude that Mr. Newton meant at some future time to follow up many of his surmises and theories. It is to be hoped that, after others have duly gone beyond him, the author may issue a revised edition of this study, resolving for us many questions raised, and taking that occasion to facilitate distinction between projects and works executed, to reduce the number of repetitious undescriptive phrases, and to eliminate most of the exclamation points.

Meanwhile here is a thoughtful, sympathetic, illustrated study, written in the first person singular, of one of the most "modern" of architectural partnerships—though founded over a century ago—members of which have,

(continued on page 84)



One in a series of drawings of historic English landmarks demolished in World War II, done by Samuel Chamberlain for the Joseph Dixon Crucible Company and available from them in a small brochure



# NO "TIME-OUTS" FOR BLACKOUTS

in today's air conditioned factories . . .

**T**HERE'S no precious time lost in the plant with its own "indoor weather." Production goes on, regardless of outside conditions. And it's *better* production—better in *quality* and in *quantity*.

Here, for example, are but a few of the ways that Carrier Air Conditioning is serving war industries as a production tool—in the specially constructed "blackout" plant—and in existing plants converted to "blackout" operation.

**1. PRECISION WORK** such as machining, tooling and finishing is accomplished more quickly, more accurately with Carrier Air Conditioning. Reasons: Controlled

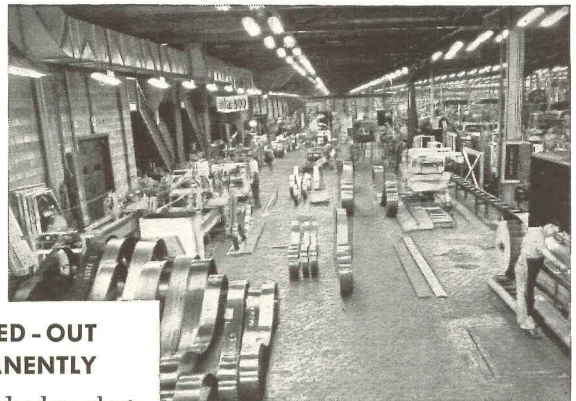
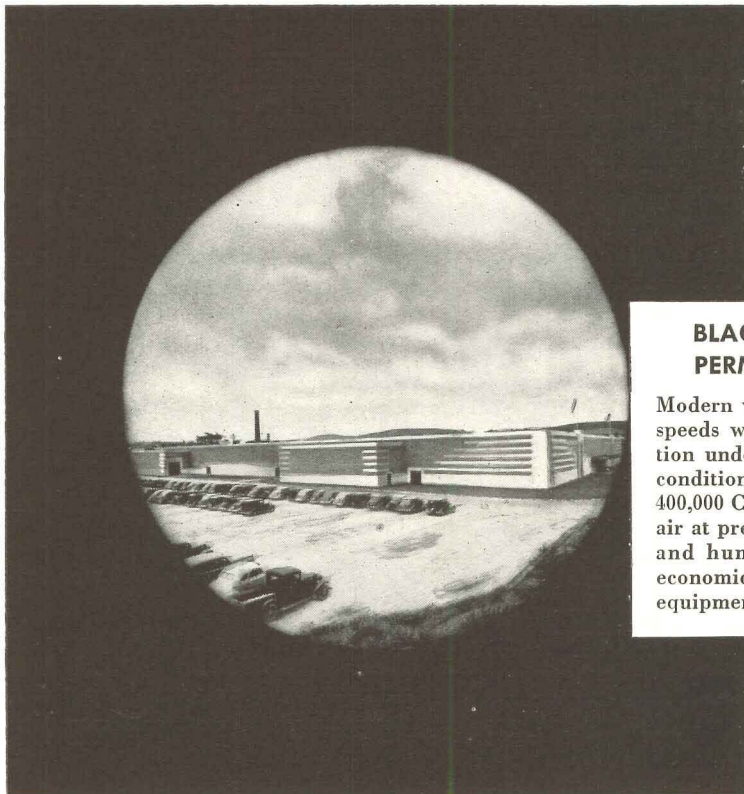
temperature prevents expansion or contraction. Controlled humidity prevents corrosion and rusting. Air cleanliness prevents damage to delicate parts from dust and grit.

**2. PROCESSING** of hygroscopic products or products affected by change in temperature is a simple matter with Carrier Air Conditioning. Absolute control of temperature and humidity keeps the product safe—through processing, inspecting, packaging and storage.

**3. EMPLOYEE EFFICIENCY** goes up, absence due to illness goes down. By controlling air temperature and humidity and by keeping air clean and wholesome, Carrier Air Conditioning provides ideal working conditions . . . reduces fatigue . . . helps to prevent minor illness.

**4. FOOD PRESERVATION** is a big problem where thousands of workers are to be fed daily. Carrier Air Conditioning and Refrigeration solves the problem—with equipment to meet every need—efficiently, economically and dependably.

Uninterrupted, continuous production can be controlled by the proper temperature, humidity and air cleanliness conditions that make your manufacturing processes independent of changes in weather. To help insure this production goal, Carrier engineers bring to architects and consulting engineers experience gained in both peacetime and wartime industries.



## BLACKED - OUT PERMANENTLY

Modern windowless plant speeds war work production under ideal working conditions 24 hours a day. 400,000 CFM of controlled air at proper temperature and humidity supplied economically by Carrier equipment.



*The Navy "E", one of the U. S. Navy's most coveted honors, has been awarded to the Carrier Corporation for excellence in war production.*



CARRIER CORPORATION, Syracuse, N. Y. Desk F28  
"Weather Makers to the World"

Please send complete information regarding Carrier Air Conditioning and Refrigeration equipment as applied to operation of "blackout" plants.

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Company.....  
Address.....  
City.....

## URGE TO DEVELOP

"THE VAST RESEARCH facilities of all manufacturers have been put to work overtime to produce new materials and new uses of old materials," according to J. W. Follin, Managing Director of the Producers' Council. "On every hand is an urge to develop and create," he declared, and cited as interesting developments from the manufacturing angle the simplification of structural shapes and acceptance of higher working stresses for steel; a return to timber trussing, facilitated by advances in timber engineering; new design and construction techniques in structural clay manufacturing; substitution of asbestos-cement pipe for cast iron pipe, and of iron for brass and even clay for iron in the plumbing industry.

A clearing house for information has been established by the Producers' Council, Mr. Follin reported, in collaboration with a committee of AIA, for determining from designers necessary changes in design techniques, and from manufacturers what is being done and can be done to develop acceptable alternates or substitutes.

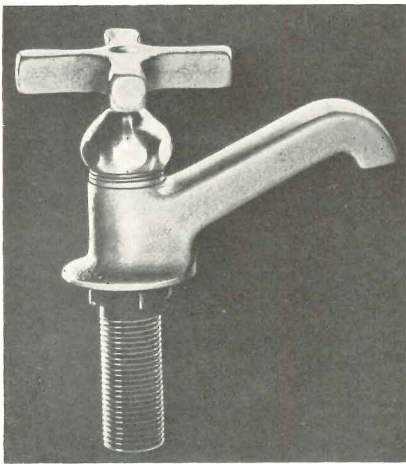


FIGURE 1

## CAST IRON PLUMBING FIXTURES

A LARGE plumbing manufacturer has done an outstanding job of redesigning bathroom and kitchen fixtures in cast iron to save hundreds of thousands of pounds of brass. By substituting iron parts for brass approximately 1.14 lbs. of brass and chromium have been saved in a new lavatory faucet (figure 1). An even greater saving has been achieved in

substituting cast iron for the 2.1 lbs. of brass that was formerly used in a sink trap. Only brass part used in this trap is the 1-oz. cleanout plug. All interior and exterior cast iron parts are coated with protective black non-metallic baked-on finish. Other new products include tank floats of plastic, glass, china or lacquered steel; towel bars and soap dish in plastic; wooden kitchen cabinets; spud, with lock nut, of malleable iron; shower head that saves 97 per cent of the brass used in the former type; ceramic grease trap. Crane Co., 836 S. Michigan Ave., Chicago, Ill.

## WOOD SASH

WITH THE GOVERNMENT requesting the use of wood sash in industrial buildings, a timely new product is a wood sash which has been developed by a member of the firm of Albert Kahn Associated Architects & Engineers, Inc., of Detroit. It is claimed this sash will serve quite as well as the standard steel. The designer and the Kahn organization have waived all patent rights, and blue prints describing the new sash are available to the entire war production building industry. The sash is said to be ideal for use in factory or office partitions. It has sufficient strength to extend to extreme ceiling heights without reinforcing, and is of sufficient thickness to accommodate doors.

## BOMB PROTECTION

INSTALLATIONS of a new bomb-protection material are now being made, it is announced, in two large industrial plants on the East coast. This material is a combination of hair felt, waterproof cement and reinforced mesh. It is said not only to provide an excellent blackout blanket, but to prevent penetration of flying glass fragments and missiles. The material is applied separately to the ventilating sash panels, so that ventilation is the same as before the installation of the blanket. The material has been subjected to smashing with a sledge hammer, revolver and shotgun, and T.N.T. With every test the glass broke but did not spread, scatter or pierce the protective mat. Brown & Matthews, Inc., 122 E. 42nd St., New York City.



FIGURE 2

## GLASS BLOCK

SPECIFICATIONS for installing glass block virtually without critical materials have been issued by one manufacturer. Accessory steel members have been supplanted by masonry and wood chases. In addition, recent tests show that in panels not more than 50 sq. ft. in area and 10 ft. in width it is not necessary to use wall tie reinforcing. These surfaces, combined with the use of mortar and metal-free glass blocks are said to effect an average saving of from two to three lbs. to the sq. ft. over metal sash. Owens-Illinois Glass Company, Insulux Products Division, Toledo, Ohio. (See figure 2.)

## REPORT ON SCARCE MATERIALS

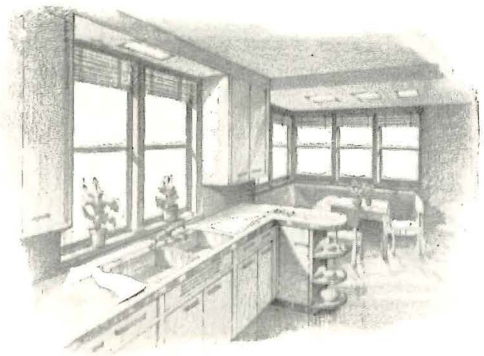
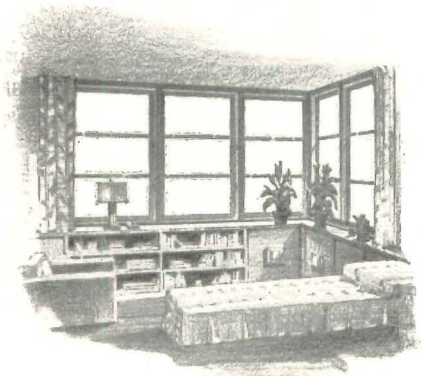
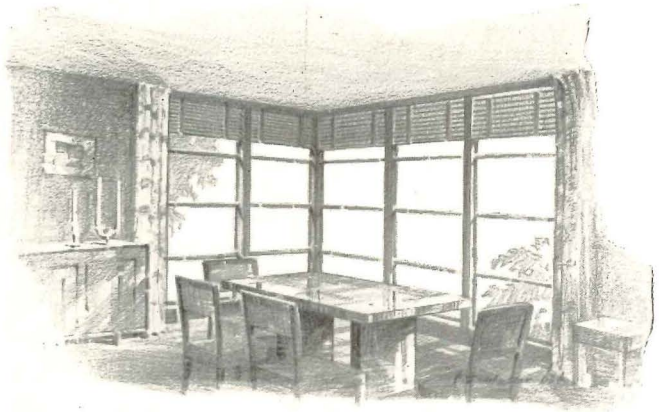
THE SECOND in a series of provisional reports on the relative scarcity of certain materials, prepared by the Conservation and Substitution Branch of the Bureau of Industrial Conservation, has been made public. Major addition to the list is in materials for building construction. Under Conservation Order L-41, effective April 9, a halt was called to non-essential construction except in strictly limited categories. The major purpose of the Conservation and Substitution Branch in drafting the current list is to call attention to the non-metallic materials available for construction and equipment. The complete list may be obtained by writing to the Bureau of Industrial Conservation, War Production Board, Washington, for Release WPB-921.

(continued on page 88)

LIGHTEN THE CORNERS



BRIGHTEN THE HOME



Mark of the more cheerful home, be it large or small, is the *corner window*. Upstairs and downstairs, in the bedroom, dining room, living room, kitchen or den, the corner window opens any room to lightness and spaciousness that make living more enjoyable.

The fact that glass is thoroughly in keeping with present architectural trends is another important point to keep in

mind. Moreover, the ready availability of practically all types of Libbey-Owens-Ford flat glass is a vital consideration. No priority headaches.

Have you sent for your complimentary copy of "Practical Glass Ideas for Today's Homes"? We will gladly forward this colorful new book to you. Just write Libbey-Owens-Ford Glass Company, 1223 Nicholas Building, Toledo, Ohio.



**LIBBEY · OWENS · FORD**  
Quality *Flat Glass* Products

# REQUIRED READING

(continued from page 80)

among other things, designed an epoch-making bridge truss (the Town Lattice truss) and collected rich royalties from it, traveled widely, accumulated for their own and the general good a great architectural library, designed in four freshly revived styles public and private buildings over an extremely wide area, and helped to lay the foundations for the AIA.

**POSTWAR PLANNING IN THE UNITED STATES.** By George B. Galloway. New York, Twentieth Century Fund, 1942. 158 pp., 6 by 9 in., \$0.60

OF SEVERAL HUNDRED canvassed, 79 public and 33 private organizations have reported some activity either under way or projected to help solve America's social and economic after-war problems. Dr. Galloway's digest

of these reports is arranged alphabetically by the names of the agencies reporting, and includes the names of the respective officers to whom inquiries should be addressed; there is a classification of agencies under 63 fields of planning; and the 30-page bibliography includes background references prior to 1940.

**STANDARDS FOR DEFENSE HOUSING: Lanham Act Projects.** Washington, D. C. Federal Public Housing Authority, 1942. Unpagged, 8 by 10 1/4 in., mimeo., illus.

REVISION of the USHA standards of last year to meet requirements of the Lanham Act amendments of January, with suggestions as to making housing salable as well as "safe, comfortable and economical"; substitutes for critical materials; roofing for low night-visibility; and other points dictated by the total war effort.

**THE FIRST FIVE YEARS.** By Marian Greenberg. New York, Citizens' Housing Council of N.Y., 1942, 24 pp., 6 by 9 in.

AN INSPIRING OUTLINE of CHCNY's work in creating an informed opinion as to economic and spiritual advantages of planned housing. The Council's surveys and reports on old housing, new housing, rehabilitation, tenants' discontents, etc., have been achieved by volunteer work of experts and other skilled workers coordinated by a small, efficient headquarters staff working on a small budget.

## PERIODICAL LITERATURE

**ARCHITECTURE IN NEW ZEALAND.** By H. Courtney Archer. Architectural Review, Cheam, England, March, 1942, pp., 53-58, illus.

SYSTEMATIC colonization started in the 1830's. Almost all buildings are of wood, even the pompous four-story Government Building completed in 1877 at Wellington—said to be the world's largest timber building. The frank timber style of the earliest days succumbed to a wave of European historicism; but it is now being rediscovered. Unusual, possibly unique, is the church designed by Turnbull and

(continued on page 86)



**H**ERMAN NELSON Unit Ventilators have been installed in U. S. O. Buildings throughout the country. The one located at Waukegan, Illinois, is illustrated above.

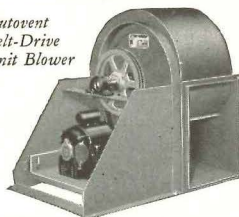
Herman Nelson Unit Ventilators are designed to provide comfortable, healthful air conditions in crowded spaces. They have solved many ventilating problems in various types of Army and Navy Projects.

In addition, hundreds of buildings at Air Bases, Navy Yards, Arsenals, Camps and Forts are heated with Herman Nelson hiJet Heaters. The complete line of hiJet Heaters includes Horizontal Shaft Propeller-Fan, Vertical Shaft Propeller-Fan, Blower-Fan and De Luxe Types.

### AUTOVENT FANS AND BLOWERS

have also been installed in many Government Projects. The Autovent Fan and Blower Division of The Herman Nelson Corporation manufactures a complete line of quality fans and blowers. All Autovent Products are tested and rated in accordance with the Standard Test Code as established by the National Association of Fan Manufacturers and the American Society of Heating and Ventilating Engineers.

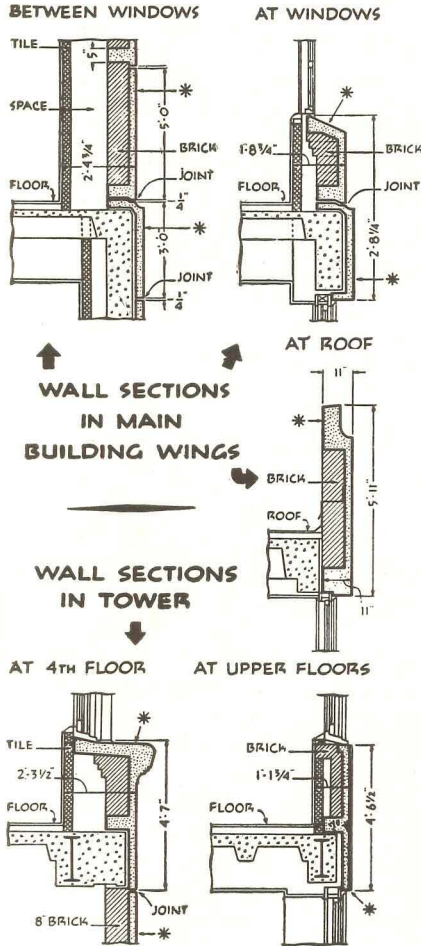
Autovent Belt-Drive Unit Blower



**THE HERMAN NELSON CORPORATION**  
MOLINE, ILLINOIS

MANUFACTURERS OF QUALITY HEATING, VENTILATING AND AIR CONDITIONING PRODUCTS

# 500 DIFFERENT SHAPES OF ARCHITECTURAL CONCRETE SLABS face buildings of U. S. Naval Medical Center



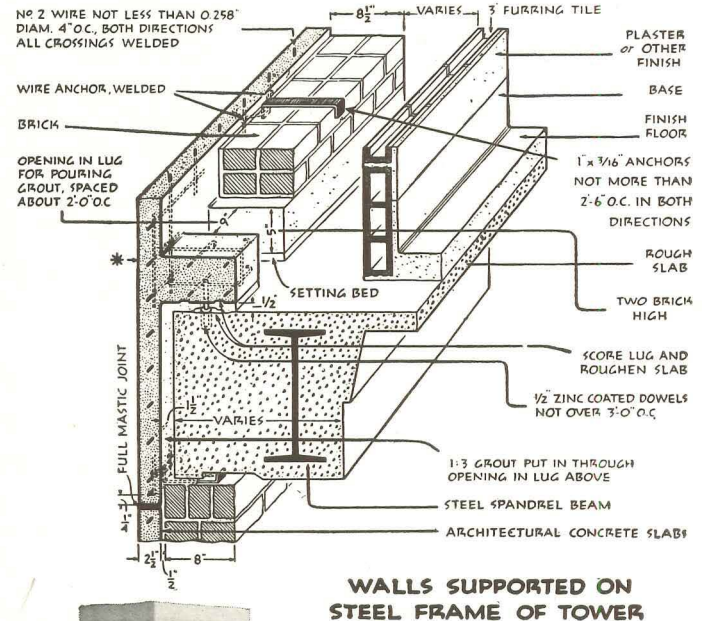
OVER 400,000 square feet of thin, pre-cast, exposed-aggregate, Architectural Concrete Slabs, 2 1/2" thick, provide exterior walls for the various buildings comprising the Navy's new medical center. The use of thin Slabs in some 500 different shapes shows the versatility and adaptability of this new material and the almost unlimited opportunity for architectural and structural design.

Architectural Concrete Slabs are "wrapped around" corners, window reveals, sills and parapet copings. Lugs are formed to anchor and interlock the slabs to the backup material, and to receive steel windows, door bucks and other materials. In multi-storied buildings, spandrels extending from and including window head below to sill above may be

made in one piece, thus reducing joints, flashing and danger of leakage. With thin, pre-cast, Architectural Concrete Slabs you get the dignity, character and permanence of large-scale units and control the size, shape, strength, color, pattern, and texture. In modernization, the thinness of precast Slabs provides unusual advantages.

For details of the Naval Medical Center job and other typical installations, write for the new book, "Architectural Concrete Slabs." **USE THE COUPON.** Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg. N. Y. C.

**OFFICES:** New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.



● 20-story Administration Building is the central unit of the U. S. Naval Medical Center. This and all the service buildings are faced with Architectural Concrete Slabs. Consulting Architect, Paul P. Cret, Philadelphia; Contractor, John McShain, Inc., Philadelphia; Slabs by Federal Seaboard Terra Cotta Corporation, New York.

## ARCHITECTURAL CONCRETE SLABS

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Chrysler Bldg., New York City

Please send me a free copy of your new booklet showing uses, detailed drawings and typical installations of thin, pre-cast, "Architectural Concrete Slabs."

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City \_\_\_\_\_ State \_\_\_\_\_

# REQUIRED READING

(continued from page 84)

Rule for Waiho, Westland, where the congregation looks past the altar cross to Franz Joseph Glacier.

**AGENDA.** London, San Francisco, Walla Walla. Current.

TO THE QUESTION ASKED US: What and where is *Agenda*? the answer seems to be that *Agenda* are at least these: (1) the semi-annual published since 1934 by inmates of a prison at Walla Walla, Wash.; (2) the quarterly devoted to Reconstruction, estab-

lished last winter and published by Humphrey Milford for the London School of Economics (V. 1 No. 1, Jan., 1942, 95 pp., 6/3); and (3) the illustrated journal launched in April, 1941, by the California Housing and Planning Association (Howard Moise, AIA, president, Catherine Bauer, secretary, Edward Howden, executive director, \$2.00 a year). Six numbers have appeared. Most of them have had some special emphasis: rural, legislative, city planning, etc.; but a wide

range of subjects is included in the interests of CHPA and its affiliates (Telesis, and seven California housing and planning councils) as well as those of the Western States Housing Authorities Association.

## THE CAROLINGIAN REVIVAL OF EARLY CHRISTIAN ARCHITECTURE.

By Richard Krautheimer. *Art Bulletin*, New York, March, 1942, pp. 1-28, 28 illus., 1 chart

UNTIL some thirty years ago the T-type basilica was thought to have spread from Italy over the rest of Europe and developed until in the 11th Century Romanesque architecture evolved from it. Discoveries on Mediterranean shores and in the Near East from Syria to Armenia show this type to be but one of quite many different solutions; also that African and Asiatic elements had found their way into France, England, and Lombardy, during the pre-Romanesque period. This paper deals with the part played by the Roman type basilica up to about 900 A.D.

## PITCH IS THE BEST EXTINGUISHER FOR MAGNESIUM INCENDIARY BOMBS.

American Roofer, New York, April, 1942. p. 29

PITCH MELTS at about 300 degrees F. and forms an airtight blanket. On metal or concrete surfaces use a long-handled shovel to spread—not throw—a layer of granulated or flaked pitch on the bomb, following this up with a second application if the flame persists. On wooden floors first spread a layer of pitch to stop heat and glare nearby, rake the bomb into this layer and spread more over the bomb. The U. S. Bureau of Mines suggests 25-50 lbs. of pitch as a family supply.

## BEWARE DISCOLORATION.

California Plasterer, May, 1942, p. 15. illus.

TESTS SHOW that with good material and workmanship discoloration of exterior plaster never occurred when the work was done during warm or dry weather; that, in instances where an entire small house was finish-coated within the same day, only the side completed late in the afternoon when cold was setting in developed discoloration.

## Use them in your high priority jobs



• PORCELAIN enameled shower cabinets mean much to the comfort and convenience of war workers. And these cabinets are backed by a long record of satisfactory service.

• As you probably know, glossy, flint-hard porcelain enamel is as practical as it is attractive. It is durable, and easy to clean and keep clean.

• The metal base is important, too. This is why many manufacturers use highly refined ARMCO Ingot Iron for their cabinets. The first enameling iron developed, it is now recognized as the "world's

standard" for this and other fine porcelain enameled products.

• Shower cabinets porcelain enameled on ARMCO Ingot Iron are approved in the latest defense housing critical list. Shall we ask the manufacturers to send you complete information? The American Rolling Mill Company, 1671 Curtis Street, Middletown, Ohio.



# ANNOUNCING

## *A new series of studies on windowless buildings*



*Reports, by the makers of "Freon,"\* on windowless buildings  
... as seen by those who build and use them*

**ELEVEN YEARS AGO** construction started on the world's first windowless factory—the Simonds Saw and Steel Company's plant at Fitchburg, Mass. Five years later, the Hershey Chocolate Company opened its unique windowless office building in the foothills of the Alleghenies—in a location where sunlight and fresh air were and still are abundant.

Thus a radically new idea in building construction passed dramatically from theory into the reality of stone, concrete and steel. People worked for the first time under the best man-made conditions of air and light. And industrialists, engineers, doctors, psychologists and others found a stimulating new topic for discussion.

Today "blackout" plants bring windowless construction into new prominence, and the Simonds, Hershey and other windowless buildings previously erected have

long since passed their "shake-down" tests and built up a record worthy of examination.

To you as an architect, windowless construction undoubtedly represents a building trend of real interest. To us as makers of "Freon" refrigerants such construction is also of vital concern—as an application where air conditioning and refrigerants are put to a rigorous test.

Thus it seems logical that facts be obtained at this time on windowless buildings, old and new, as seen through the eyes of those who build and use them. To the best of our ability—and subject to the limitations of wartime censorship—we plan to obtain such facts.

Our reports will appear in the pages of "Architectural Record" during the coming months in the form of a series of advertisements. You are invited to share in our findings by reading this new "Freon" series.



\*"Freon" is Kinetic's registered trade mark for its fluorine refrigerants.

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE

(continued from page 82)

## INSULATION FOR COLD STORAGE

A MINERAL WOOL BOARD type of insulation for cold storage rooms and equipment has been introduced. A non-priority material, it is said to be available for all kinds of installations. The new board has a thermal conductivity, as determined by tests, of 0.31

to 0.33 at 90 degrees F. It has structural strength for satisfactory handling in erection. Other qualities listed: self-supporting, without sagging, settling, shrinking, swelling or warping; free from odor and any liability to rot, mold or harbor vermin. Board size 12 by 36 in. 1, 1½, 2, 3, 4-in. thicknesses. Armstrong Cork Company, Lancaster, Pa.

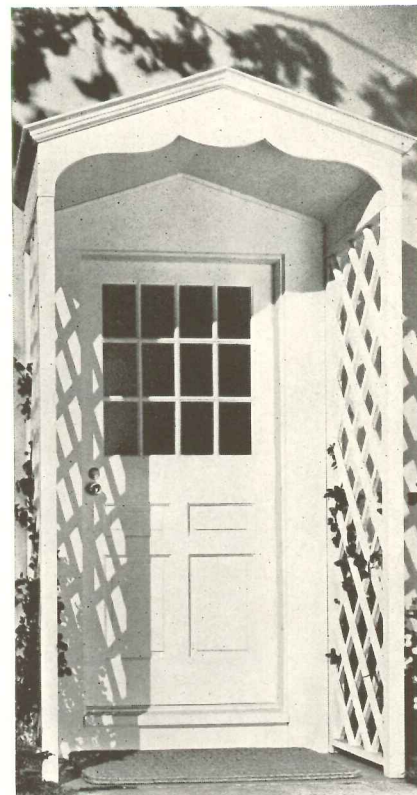


FIGURE 3

## LOW COST WOODWORK

STOCK WOODWORK for low cost homes, designed by architects H. Roy Kelley of Los Angeles, Cameron Clark of New York and Willis Irwin of Augusta, has been added to a well-known line. The designs include well-detailed entrance frames, mantels and china cases. Curtis Companies Incorporated, Clinton, Ia. (See figure 3.)

## FLOOR COVERINGS TESTED

A PERFORMANCE TEST was recently conducted in the floor-testing chamber of the National Bureau of Standards on a fourth series of 40 different installations involving 26 floor coverings. Some of the general conclusions: Where trucking is to be done, equipping truck with rubber-tired rather than steel-tired wheels would increase durability of all types of floor coverings. Use of felt, or preferably plywood, underlays with thin floor coverings over strip-wood subfloors is desirable. Of the types of coverings tested, maple, pecan, oak, ½-in. rock-elm plywood, ⅛-in. rubber, ⅛-in. linoleum and the magnesium oxychloride monolithic floor with an aggregate of

(continued on page 90)

**Here's "Automatic" CONCRETE CURING**  
For airports, factories, roads, defense housing and all essential war construction, SISALKRAFT curing is known for its speed, efficiency and economy.

**JUST ROLL OUT SISALKRAFT**  
Laid over the freshly set slab, this tough, waterproof paper seals in the natural water of the mix — assures hard, dense concrete. It's quickly, easily applied. No sand, straw, burlap, etc. to handle.

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Rugged SISALKRAFT protects the surface from debris and spill. Saves grinding. Permits succeeding trades to work efficiently without injuring the floor.

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WRITE for complete data on use of SISALKRAFT for concrete curing.



# WHAT PART HAS *Pipe* IN THE WAR PROGRAM?

**Y**OU'LL probably be surprised. For example: A bed for one of Uncle Sam's soldiers takes twelve feet of pipe. A water line for just one cantonment is many miles long. A single demolition bomb starts from more than a thousand pounds of steel tube. The boilers of our newest battleships contain tons and tons of seamless boiler tubes. An army bomber may require a thousand pounds or more of mechanical tubing. Uncounted numbers of shells, tank parts, cannon mounts, machine gun rests, etc., all take an enormous quantity of pipe and tubes. We wish you could see the ceaseless activity going on

within NATIONAL Tube Company mills, the speeding up of production facilities, the improvements through tireless research. Then you would share our confidence that whatever the call for tubular products for war requirements, NATIONAL Tube will be ready to do its full part. We are glad that in this emergency we have been able to render our country quick, vital and quantity aid. We're all in the same boat, pulling to the same end—mill, factory, distributor, and consumer. It's a journey none of us wanted to take, but having embarked on it, we Americans shall see it through.

## NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, Pacific Coast Distributors

United States Steel Export Company, New York



# UNITED STATES STEEL



TRENCH MORTARS stand firmly on supports of SHELBY Tubes.



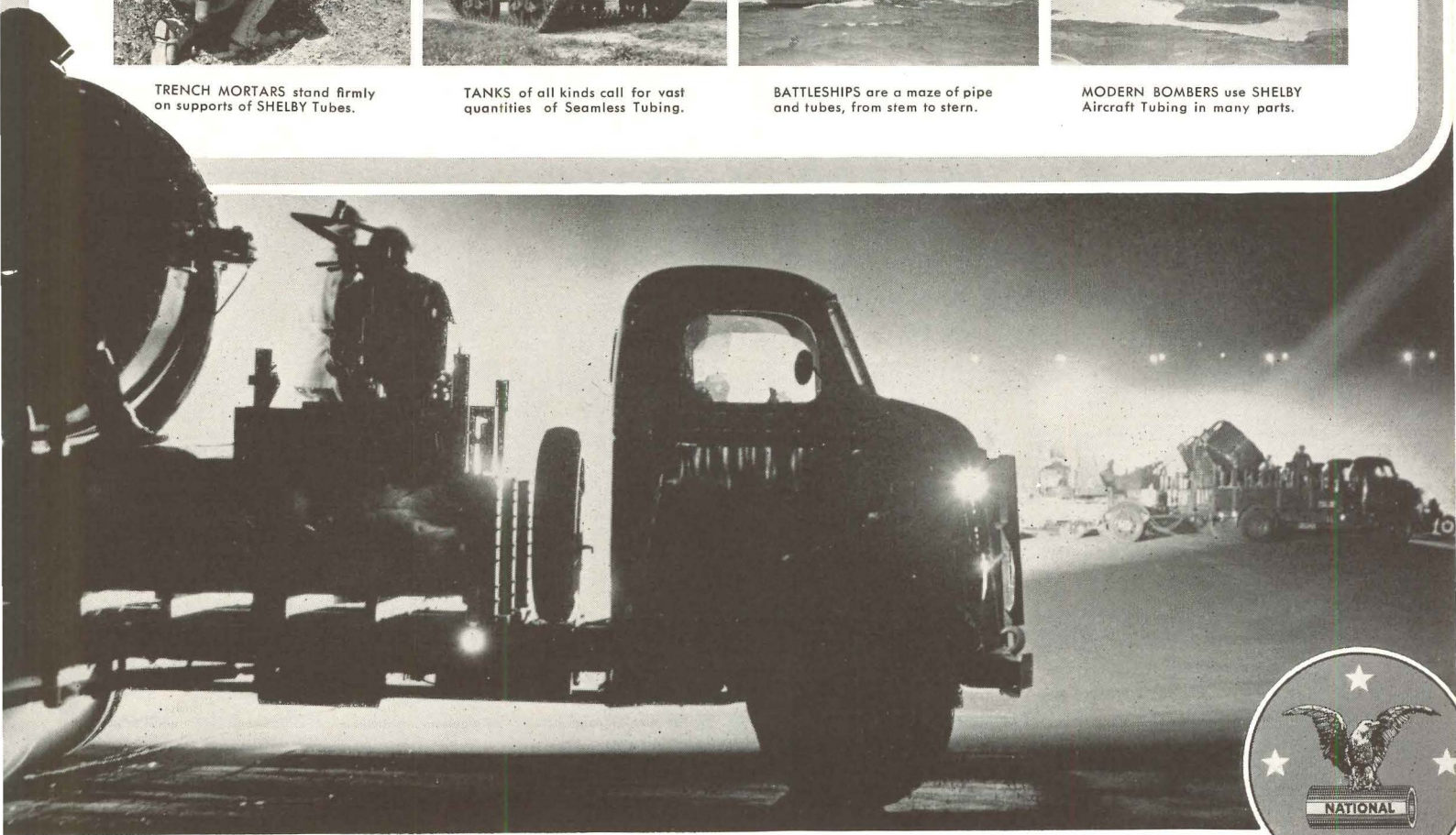
TANKS of all kinds call for vast quantities of Seamless Tubing.



BATTLESHIPS are a maze of pipe and tubes, from stem to stern.



MODERN BOMBERS use SHELBY Aircraft Tubing in many parts.



AMERICA'S STANDARD WROUGHT PIPE

(continued from page 88)

granite chips and granite dust are durable floor coverings even under severe service. Address Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. for "Building Materials and Structure Report BMS80." Price \$.15.

## BLACKOUT

A FORMULA designed for the com-

plete blacking out of windows, skylights and other glazed openings in industrial buildings has just been announced. The features claimed are non-reflective surface, high degree of shatter resistance and ease of application. The formula consists of a first application of a 1/16-in. layer of plastic cement over the outside area of each pane. Over this a sheet of satur-

ated asbestos felt, cut slightly larger than the pane, is applied, and the felt is then covered with another layer of plastic cement applied with a trowel. Within three or four days it is claimed, the surface becomes a dull black that is completely non-reflective. Ruberoid Co., 500 Fifth Ave., New York City.

## SMALL HOUSE OIL BURNER

A CAST IRON oil heating boiler for small homes is announced. Features are water-backed base, replaceable combustion chamber lining of standard fire bricks, turbulator baffles, fin-studded staggered heating surfaces. The outer jacket is steel finished in green and black. Columbia Radiator Company, McKeesport, Pa.

## AIR DIFFUSER

FORMERLY fabricated of spun aluminum, an adjustable ceiling air diffuser is now made of steel. The entire inner cone assembly of the diffuser may be raised or lowered to vary air direction from vertical to horizontal. Available with built-in direct or indirect lighting. Dorex Division, W. B. Connor Engineering Corp., 114 E. 32nd St., New York City.

## INDUSTRIAL FLUORESCENT UNIT

FOR INDUSTRIAL lighting is a new fluorescent fixture featuring a porcelain enamel reflector of one-piece seamless non-welded construction. Two models, with two 40-watt bulbs and three 40-watt bulbs. 13 1/2 degree cut-off is said to eliminate glare from all normal viewing angles. Reflector is detached by removing two wing nuts. Mitchell Manufacturing Company, 2525 Clybourn Avenue, Chicago, Ill.

## BLACKOUT WINDOW SHADES

A BLACKOUT window shade, custom-built for a specified opening, is made of pebble-grain cloth in two layers united and coated. The cloth is claimed to be crack-proof and pliable under all climatic conditions. Metal braces protect against wind pressure and a bronze spring holds the shade in position. Higgin Products Inc., Newport, Ky.



## WHEREVER WHEELS TURN There's need for SPENCER VACUUM

The wheels of industry are producing mountains of waste and acres of dust these days, with less idle time for cleaning and fewer men to do the work.

### HERE'S HOW SPENCER VACUUM CLEANING SAVES MEN . . . SAVES TIME . . . SAVES MATERIALS

**Removes debris** during working hours with smaller cleaning force.

**Removes dust**—underfoot or from walls, pipes and overhead.

**Cleans machinery**—inside and out, without scattering dust.

**Reclaims valuable metals,** powders, chemicals.

**Improves working conditions**—health, safety, fire, explosions.

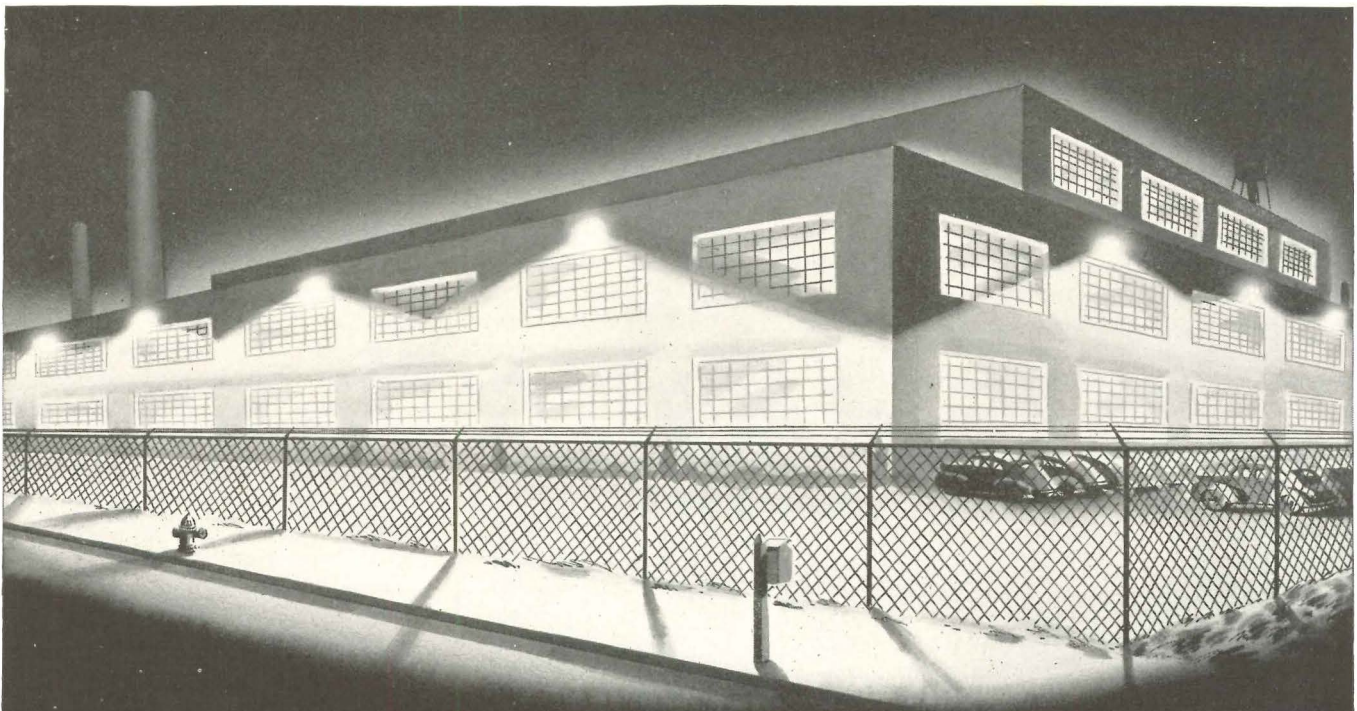
**Cleans finished goods,** cartons, trucks and freight cars.

Ask for Bulletin 102R on Portables or 125R on Spenser Stationary Vacuum Cleaning Systems.

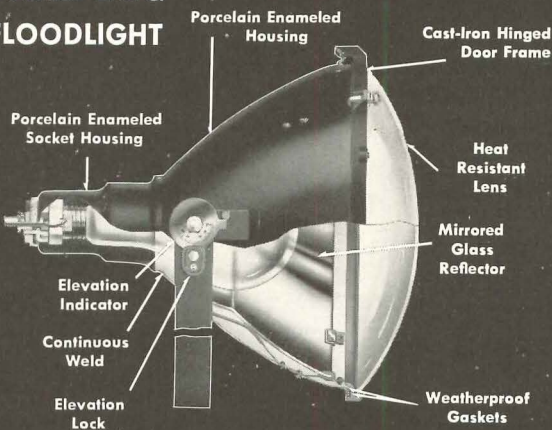
**THE SPENCER TURBINE COMPANY, HARTFORD, CONN.**  
PORTABLE CLEANERS 3/4 TO 7 1/2 H.P.; STATIONARY SYSTEMS UP TO 100 H.P.

# SPENCER VACUUM

S-228A



## New EHG FLOODLIGHT



## NIGHT LIFE-U.S.A.

For the safety of America's new night life, we've designed a line of all-purpose floodlights which have industry-wide applications for protecting fence lines, plant buildings and outdoor production. Lightweight and weatherproof, these new units range in size from eight inches to eighteen inches.

Westinghouse Types EHG, with universal burning lamp, and VEG, with vertical burning lamp, are constructed of sheet iron. A choice of narrow beam reflector (metal-backed glass) or wide beam reflector (porcelain enameled) with various lens and lamp combinations provides a complete range of beam spreads. Both types of floodlights have graduated, locking adjustments to facilitate aiming and relamping.

Producing these floodlights and providing complete application engineering service are all-out war jobs at Westinghouse today. The nearest Westinghouse Lighting Specialist will gladly help answer your protective lighting problems, or you may write for a new *Protection With Light Planning Book*, B-2280-A. Westinghouse Electric & Manufacturing Co., Edgewater Park, Cleveland, Ohio.

## New VEG FLOODLIGHT



# Westinghouse



*Lighting Equipment*

(continued from page 30)

## Housing near factories

The scale of the housing in the second instance was much bigger. Here living accommodation was required for a large community of female labour in isolated locations, and the job went to a group of private architects who had as their leader Professor William Holford, young architect of South African origin who has lately been

closely associated with the initial stages of the National Plan for reconstruction. The scheme devised amounted to the building of village communities sited within easy reach of the factories, each village consisting of dormitory units for sleeping and privacy, and a social welfare centre comprising assembly hall, lounge with writing rooms, games rooms, dining

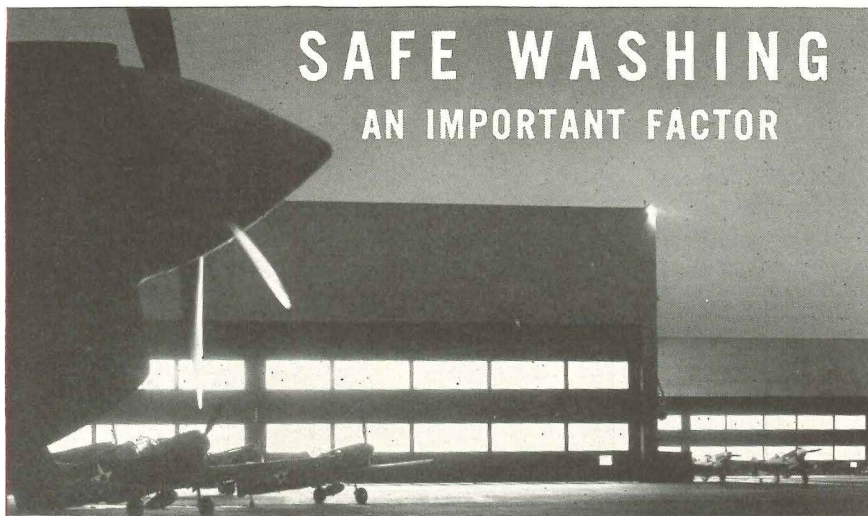
hall, kitchen and administrative block.

On the scheme a staff of 200 worked, 60 of whom were qualified architects, and here let me digress for a moment to say that the stepping stone Holford and forty of his colleagues mounted on their way to landing this job was to line up with other consultants, such as road engineers, heating engineers and drainage experts, on the building of ordnance factories running into several millions of pounds. A firm of civil engineers was responsible to the Government for this job, and the architects' responsibility ended with the building work above ground. For the hostels, however, entire responsibility was delegated to the architects, and they coordinated the services of the specialists in the usual way. I mention this to show the strange journey some architects had to take to re-enter their rightful preserve after being blasted out of it by the events of war.

## Standardized units

Very briefly the outstanding features of the scheme are: Prefabrication used to a surprisingly minor degree, the sleeping portions of the dormitories in one or two villages only having it. Architects used common materials and labour found locally, thereby avoiding possibility of serious hold-up which might have resulted if materials (such as prefabricated units) had been brought from a distance over transport routes likely to be bombed and put out of action. Other factors deciding the type of construction adopted were: Minimum use of timber and steel, general economy in materials, shortage of labour (especially brick-layers) and rapid completion of the work. To meet these factors the whole of the scheme was planned in standardized units which could easily be adapted to suit special requirements (the sizes of the buildings differed from village to village and depended on the number of girls to be accommodated).

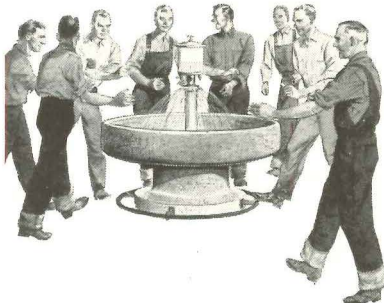
The layout of the villages took an informal shape, and not only was this helpful in screening them against enemy attack, but it helped to create a pleasant, carefree atmosphere that was just the right antidote to the long, grinding hours the girls must spend in those war factories that are close at hand.



Another airplane plant equipped with Bradley Washfountains

Architect: Albert Kahn, Inc.

## REDUCES MAN-HOUR LOSSES IN WAR PRODUCTION PLANTS



Architects, engineers—builders of the great plants turning out our war machines well know that the maximum production can only be attained if man-hour losses are kept in check.

In this sense, the washroom facilities are as important as the machine tools. Physicians experienced in industrial work have found that Dermatitis—skin affection—is a known factor in causing man-hour losses and recommend regular sanitary washing as an important preventive measure.

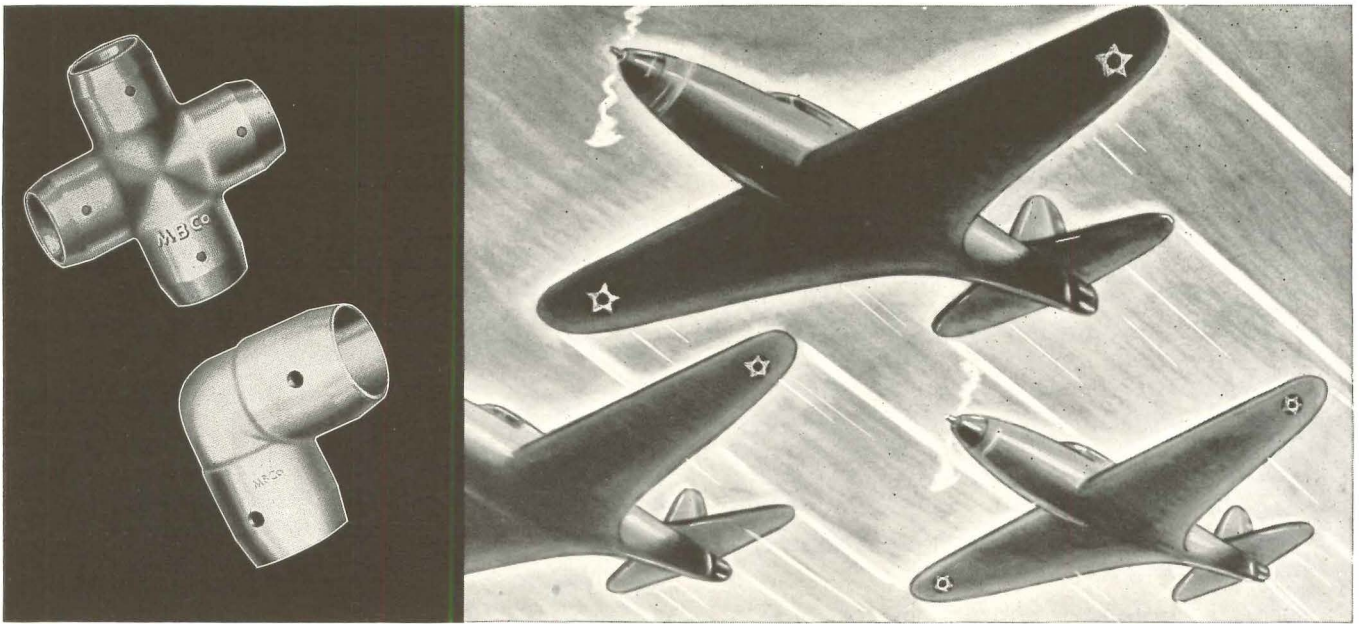
Recognizing this fact leading architectural, engineering and building firms invariably make provision for Bradley Washfountains in washrooms to insure the utmost in sanitary washing facilities . . .  
BRADLEY WASHFOUNTAIN CO., 2227 W. Michigan Street, Milwaukee, Wisconsin.

### SAVE CRITICAL MATERIALS

The deep bowls and pedestals of Bradleys are made of precast stone or marble, conserving critical metals. Each Bradley serves 8 to 10 persons simultaneously—taking the place of 8 to 10 conventional single-person wash basins, which require 24 piping connections (hot water, cold and drain) in place of only 3 needed for the Bradley,—again saving important metals.

Water from a central spray-head provides clean running water to each person—and the self-flushing bowls carry the water away without chance of contamination. Used water cannot flow back into the system supply.

**BRADLEY**  
*Washfountains*



# Copper :- TOPS FOR PLUMBING PIPING ...YET MORE VITAL STILL TO "Keep 'Em Flying!"



WINNERS OF NAVY "E" AWARD

● Up until a few short months ago STREAMLINE copper pipe and bronze solder type fittings were installed in thousands of buildings where a permanently reliable plumbing or heating system was essential. They were used for air conditioning, for water service piping from main to building—for sewage disposal systems and a thousand other uses where dependability and long service life were of prime importance. They were, and still are, universally considered the finest materials that money can buy.

But today copper, bronze and brass have more vitally essential uses in the manufacture of munitions for our Army, Navy and Air Force—and today, too, the skill of the men and women of the Mueller Brass Co. plant and the full capacity of its productive machinery are now engaged 100% in doing their full share on this most important and gigantic task of our nation's history.

Today copper, brass and bronze are safeguarding the very life of the nation, but in happier days to come, they will again protect the health and promote the comfort and prosperity of its people in the form of STREAMLINE copper pipe and fittings. Our jobbers will stock them; our salesmen will sell them and our master plumbers will again install them.



**STREAMLINE**  
PIPE AND FITTINGS DIVISION  
**MUELLER BRASS CO.**  
PORT HURON, MICHIGAN

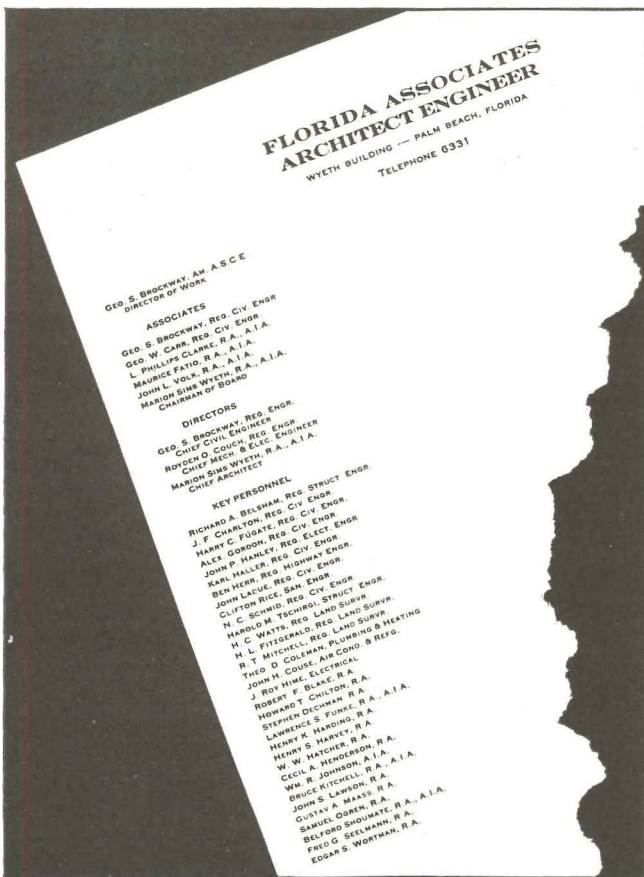
Warren, Ellingwood and Wilson. This organization has handled Navy work costing up to \$30,000,000.

"All of the above associations have functioned extremely harmoniously," writes Mr. Wilson. "In all instances one member was appointed as general manager or chief, and he in turn delegated parts of the work to other members and was responsible for proper execution. . . ."

"In the organization of the Allied Engineers, Inc., a chief architect, chief structural engineer, chief mechanical engineer, and a chief marine engineer were appointed and they functioned under the direction of a general manager. . . . The variety of engineering services performed was extensive. Allied Engineers, Inc., maintained an average drafting organization of approximately 75 expert engineering technicians over a period of two years."

Another group notable for its large aggregation of architects and engineers is the Florida Associates—Architect Engineer, of Palm Beach, Florida. It includes 20 architects, 14 engineers, three land surveyors, and three other technical and mechanical specialists.

With so many design specialists, the organization was not all finally accomplished at the first attempt. The letterhead of the group—reproduced last month in the RECORD—showed the first personnel alignment. Since then this pre-organization body has been more completely integrated, and the new letterhead indicates the set-up.



Experience of this large group, as indicated by this revised letterhead, illustrates the need for a concentration of authority in combinations for war work. Six "associates" form the responsible, or "contracting," body; others are "key personnel"

Marion S. Wyeth, chief architect and chairman of the board, explains how the final organization was arrived at:

"It will be of interest to note the changes in our final organization set-up as compared with our earlier ideas. We had originally carried the organizers of the group as Directors and all others as Associates. This was found to be unwieldy and not a workable plan for the type of contracts which the Government services make with Architect-Engineer groups.

"Accordingly a full organization meeting was held and six men became the Associates or contracting body, the balance Key Personnel. There were also added changes in personnel and a great many more Engineers. . . ."

Not all the stories had a happy ending. Here is a report from an eastern firm of architects, which is probably typical of many others that could be developed for organizations who got "favorable reactions" but little business.

"About a year ago it became apparent to us that Washington agencies who had the distribution of so-called "defense work" could hardly be expected to know all the applicants for architectural work, the personnel of their offices, or certainly the ramifications leading to professional consultants. We had already filed with these several agencies replies to their questionnaires without result. After investigation, the answer seemed comparatively simple, because for a good many years we have been doing work more complicated, if not as large in size, as the average job coming out of Washington.

"After a few preliminary attempts to establish a corporate organization which should embrace all fields, it became more apparent that the sensible procedure was to make association with one other architectural firm congenial to our own and fall back on our customary architectural practice covering engineering consultants.

"We were really surprised at the impressiveness of the straightforward representation of the personnel and achievements of this combined group when issued in the form which apparently told the story desired by the Government agencies. The centralization of authority desired by Washington had never bothered us in our previous practice and in most cases it was not hard to show that this was the normal result anyway. So, after all, about all we have done is to write up our usual method of practice in such terms as could be readily understood by a board who had previously known nothing about us or our practice.

"A success story would be entirely presumptuous at this time, since all we have yet received is favorable reactions which, in several instances, have had minor results, have been partially sidetracked or are simply looking good."

It would be interesting to speculate on the future results of the union of architects and engineers. Is the union permanent or is it just a trial marriage? Perhaps that question will be answered only when peace brings its promised building boom. For the present, suffice it to say that the two are living together to speed the war effort. And they are now collaborating to turn out building jobs that stagger the imagination, and doing it with a fury that bodes no good for the Axis.

# Carey

## BUILDING PRODUCTS

DEVELOPED FOR THRIFTY PEACE-TIME SERVICE  
EFFECTIVELY MEET TODAY'S WAR-HOUSING NEEDS

Through years of scientific research and modern, precision-controlled manufacturing methods, CAREY Products have been developed to give the maximum of dependable, low-cost service. They have abundantly demonstrated their durability and low maintenance in peace-time housing. Economical construction suggests their use in war housing projects throughout the country.



### CAREYSTONE STRIP SHINGLES IN BEAUTIFUL "TRI-TONE" BLENDS

impart architectural beauty at reasonable cost. Made possible because these shingles are furnished in four types of five-panel strips. Even without special supervision, there can be neither bunching of tones nor patterning.

*Napier Home Extension*



### CAREY ASPHALT SHINGLES

Manufactured by the patented ASQU process, the felt base of these shingles is filled with asphalt to not less than 98½% of its maximum capacity, assuring longer life. Available in various types and in a wide range of colors.

*Elinore Park*



### CAREYSTONE ASBESTOS-CEMENT SIDING

is fireproof; will not rot, decay, rust or wear away. This duo-edge unit may be applied to give the effect of individual shingles laid with staggered butts and random widths; or by exposing the other edge, a pleasing waveline appearance is secured.

*Lockland F.W.A. Housing Project*



### CAREY ROCK WOOL INSULATION

offers the maximum resistance to the passage of heat and its quality and uniformity are rigidly maintained by laboratory control. Available in Bats, Loose Wool, Granulated, and in Sealed Roll Blankets.

*Smithfield Housing Project*



### CAREY BUILT-UP ROOFS

wear longer and cost less per year—a fact known to industry. Today these roofs are giving the same faithful service on housing projects. Carey Built-Up Roof specifications cover every type of construction.

*Washington Manor*

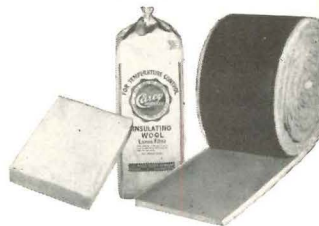
You may specify CAREY Prod for War Housing Projects with assurance that even in emergency jobs they will maintain your reputation for combining quality construction and good design. These products are promptly available. Write or wire for details. Add Dept. 21.

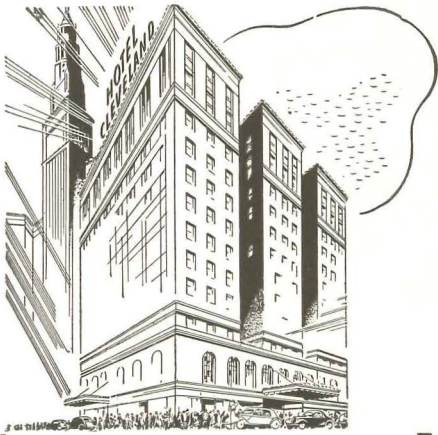
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*What is Cleveland's  
Most Convenient Hotel?*

## HOTEL CLEVELAND OF COURSE

*And where is  
Hotel Cleveland?*

On the Public Square, and connected by covered passage to the Union Terminal and Terminal Garage . . . close to stores, theatres, office buildings, Federal buildings, piers, Public Auditorium, Stadium, sporting events.

*Is Hotel Cleveland  
Modern?*

Yes, indeed! Most of its rooms have been recently modernized . . . its restaurants are air-conditioned, and one of them, the Bronze Room, has become famous—it always has a "big name" band playing for dancing.

*Hotel Cleveland is comfortable, too, and has a cheerful welcome for all who come within its friendly doors. Let us prove our hospitality on your next trip here. We'll enjoy it, and we think you will, too.*

**HOTEL CLEVELAND**  
*Cleveland, Ohio*

## SHELTER TO SPEED WAR WORK

(continued from page 36)

These new self-contained dormitories are planned for a two-fold purpose—(1) to promote the worker's productive efficiency and increase the output of war industry plants, and (2) reduce the use of critical war materials to a minimum and provide a solution to the growing transportation shortage resulting from the restrictions on tires, gasoline and automobiles.

Essentials for the comfort and efficiency of the worker to be provided in these dormitories include:

1. Proper food to maintain physical and mental capacity.
2. Quiet sleeping rooms for complete rest.
3. Medical examination and care.
4. Healthful recreational activities.

The sleeping rooms of the dormitories are designed for restful quiet. They are separated from all other activities.

Planned particularly for round-the-clock, three-shifts-a-day plant schedules, these rooms are planned with a view to avoid all disturbing noises.

Special effort is being made by FPHA planners to make ceilings, walls and floor coverings muffle noise. Space is cut to a minimum through careful placing of the few essential pieces of furniture for these rooms which are used only for sleeping.

Each dormitory is composed of from two to four sleeping wings, with a sanitary center with lavatories and showers. In the basement of the sanitary unit will be located the central heating system for the dormitory. Short passageways connect the sleeping wings with the other parts of the dormitory.

Dining facilities are provided in one hall for the entire dormitory block. Like the rest of the dormitory, the dining facilities are adapted to the 24-hour-a-day operation of the plants, with breakfasts for workers going on shift and dinners for those finishing their shifts.

The principal recreational facilities are located in a central building. This area will provide: 1. A lounge. 2. Library and writing room. 3. Indoor games room. 4. Combination gymnasium-auditorium for multiple community use. Each dormitory will also have an infirmary.

## BOOKS FOR WAR-TIME REFERENCE

The books listed below are especially helpful for architects and engineers in solving their many technical problems, including those pertaining to war-time construction and the protection of the civilian population.

1. **PLANNED A.R.P.**, by Tecton, Architects. 138 pages—extensively illustrated with photographs, diagrams and maps—Price \$2.50.
2. **CIVIL AIR DEFENSE**, by Lt. Col. Augustin M. Prentiss, U.S.A. A 334-page illustrated treatise on the protection of the civil population against air attack—Price \$2.75.
3. **BOMBS AND BOMBING**, by Willy Ley. 124 pages—A brisk, popular survey explaining how the several kinds of bombs are made and their probable effect on buildings of different types and on air raid shelters—Price \$1.25.
4. **CIVIL DEFENSE**, by C. W. Glover. Over 900 pages—fully illustrated, revised and enlarged. The most complete and authoritative book on the subject. This volume discusses in detail the precautions necessary for the protection of the civilian population—Price \$16.50.
5. **ARCHITECTURAL SPECIFICATIONS**, by Harold Reeve Sleeper, A.I.A. 822 pages—Price \$10.00.
6. **ARCHITECTURAL GRAPHIC STANDARDS**, by Charles G. Ramsey and Harold R. Sleeper, 3rd Edition—344 pages, 9¾ x 9½ in.—Price \$6.00.
7. **ARCHITECTS' AND BUILDERS' HANDBOOK**, by Frank E. Kidder and Harry Parker, 18th edition—2,315 pages—4½ x 7 in.—Price \$8.00.
8. **SIMPLIFIED ENGINEERING FOR ARCHITECTS AND BUILDERS**, by Harry Parker. 214 pages—96 illustrations—5 x 7¾ in.—Price \$2.75.

ARCHITECTURAL RECORD  
119 West 40th Street, New York, N. Y.

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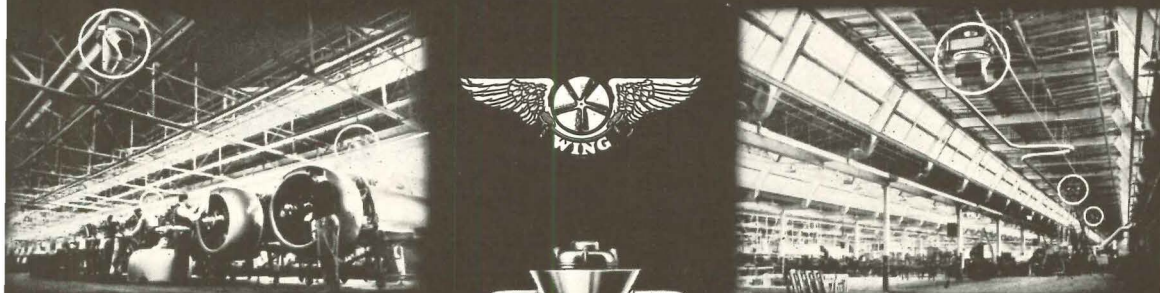
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*Why Revolving?*

1. The moving streams of heated air sweep slowly around a complete circle, reaching walls and remote corners and around obstructions. *NOTE: the discharge outlets do not whirl. Revolving slowly, they gently spread the warmed air to every part of the working level.*
2. No individual worker or group of workers can be subjected to a continuous, energy-sapping blast of heated air.
3. The gentle air motion and the thorough coverage bring a sensation of fresh, live, invigorating warmth to all workers.

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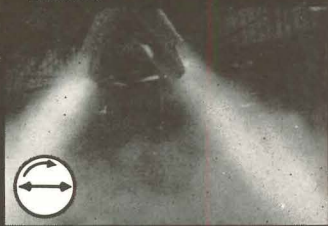
• The result of all this is higher heating efficiency and maximum worker comfort—important always, but especially important now, when ideal working conditions mean so much in speeding War production.

★ *May we have the privilege of sending you the complete story of WING Revolving Unit Heaters?*

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*Specialists in the Design and Manufacture of Air Handling Equipment for Over 60 Years*



The series of photographs below are from continuous exposures made during a "smoke bomb" demonstration of Revolving Heaters.



1 Start. Smoke from bomb at top of heater is drawn through heating element and is discharged in slowly moving streams to the working level.



2 Note how the streams of heated air flow gently even to remote corners of the room and around obstructions.



3 The discharge outlets have slowly revolved through 180°, building up a blanket of uniformly warmed air.



4 Still turning through 270° the streams of heated air are covering every part of the working level.



5 The discharge outlets have completed one revolution, demonstrating conclusively the thorough coverage of the WING



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*Equipped*

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**KOH-I-NOOR**

Every American soldier who "goes over" will be the best equipped fighting man in the world. Good equipment is one of the necessary essentials of the modern army and we are grateful that our boys will use the best.

Way back of the lines, in the drafting rooms of the plants producing war materials, experts have found that it also pays to provide workers with quality equipment. That is why Koh-I-Noor is so often chosen by men who know pencils best. You too, can gain advantage in the use of Koh-I-Noor Drawing Pencils; 17 degrees of unvarying, smooth, free-working perfection.

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PENCIL COMPANY INC.  
373 FOURTH AVENUE • NEW YORK

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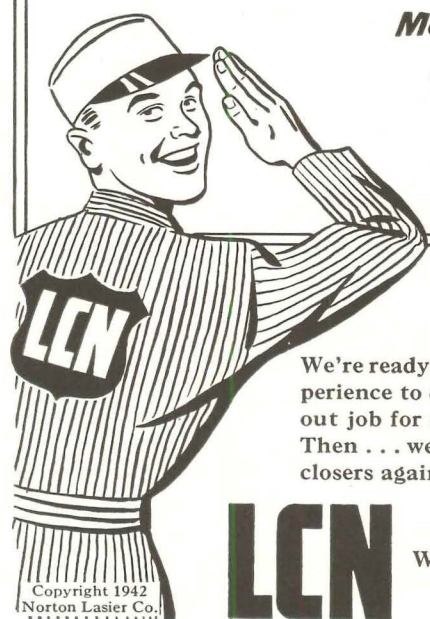


# WAR PRODUCTION ONLY



**U.S.A.**  
May 5, 1942

W.P.B. Order  
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We're ready...with skill and experience to do an exacting, all-out job for as long as it takes. Then...we'll be making door closers again, better than ever.

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# "An Engineer Emphasizes the



flexibility and efficiency of

## OIL BURNING SYSTEMS."

Alonzo B. Reed is among New England's foremost engineers and is particularly familiar with present conditions in our war construction program. Mr. Reed has these comments to make about Petro equipment and the part it plays in war building:

"We are pleased to know that the many Petro Systems which we have installed in industrial plants can now be shifted to a full war-time job. The sturdy construction of Petro equipment makes this conversion possible without sacrificing its firing efficiency.

"To do the necessary all-out job, it also gives us satisfaction to know that a reliable organization such as Petro is in the position to service their clients on all problems of repair and maintenance. Such assistance is needed now more than ever before and will result in the wisest use of oil."

### *Petro Oil Burning Systems*

are available only—"for duration", on orders carrying high preference ratings.

BUT—

Petro service, parts for necessary maintenance, and engineering consultation and services, are still fully available.

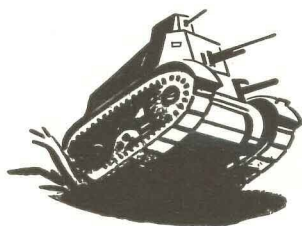
AND—

hundreds of Petro Oil Burning Systems are meeting unprecedented steam demands in war production plants everywhere;

—24 hour operation, far above normal ratings, day after day, week after week;

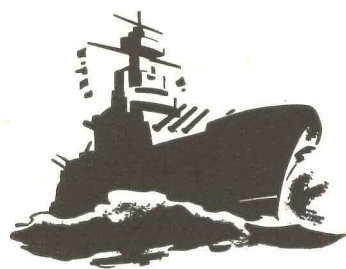
—a "break down" test on a gigantic scale which Petro equipment is meeting efficiently, economically, reliably, and without breaking down because ample reserve strength and wear has always been built into Petro.

In addition to being proud of such performance, we think it is a good thing for specifiers to remember against the time when conditions again permit the free selection and installation of normal industrial and commercial firing equipment.



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# PETRO

*Cuts Steam Costs*



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## Why take 3 quarts when you can have a gallon?



Some floors give you two—some floors give you three—but Nairn linoleum alone brings you *all four* of these basic specifications for a truly modern floor:

**1. EYE APPEAL**—Unequaled beauty and wide variety of color offer unlimited freedom in planning decorative effects. Patterns that are Color Correlated—with each other and with other furnishings and decorative materials.

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—No dirt-catching cracks on joints . . .

maintenance time and cost reduced to a minimum. Positive germicidal properties. No splinters. No "dusting."

*In these times* it's more important than ever to get the utmost for your clients' linoleum dollars. Specify Nairn linoleum and get "all four" of the basic floor requirements—100% for every cent expended!

**VALUABLE "EXTRAS" IN NAIRN WALL LINOLEUM, TOO!** It lasts as long as the building! Never fades, cracks, discolors, stains or dents. Offers wide range of patterns—all Color Correlated with Nairn Floors. Both Nairn wall and floor linoleum are fully guaranteed when installed according to specifications.

FREE-200 PAGE BOOK of installation aids and specifications—for architects, contractors, builders. Write on your letter-head to Congoleum-Nairn Inc., Kearny, N. J.



Doors, counter-tops, table-top and baseboard as well as walls and floor are covered with Color Correlated Nairn Linoleum. Note how windows are "framed" with contrasting Nairn feature strips, eliminating wood trim.

**NAIRN** LINOLEUM  
FLOORS AND WALLS  
REG. U. S. PAT. OFF.

## SHUT OUT DUST, DIRT, AND NOISE (An After-the-War Suggestion)



HORN & HARDART (New York) rely upon modern Revolving Doors to insure greater cleanliness and comfort for their famous "Automats." Even the tables next to the entrance are free from the annoyance of street dust, dirt and noise.

★ There's no priority on planning! Get started—now—on plans for after-the-war improvements of your clients' business places.

Find out how much Revolving Doors can add to the comfort and convenience of banks, office buildings, restaurants, hotels, and stores. They'll shut out dust, dirt and noise. They'll keep out blasts of hot summer air—improve ventilation control—and save your clients many dollars on the initial cost and operating cost of air conditioning.

We can't furnish Revolving Doors of any kind now, because the entire facilities of our plant are needed for vital war production. But—we can help you *plan* Revolving Doors now for prompt delivery at the end of the war.

Phone your local Revolving Door representative for full technical data. Or write to the factory for a free A. I. A. Data Folder, containing photographs and illustrations of new installations.



### 5 Ways a Revolving Door Plays for Itself

- 1—Cuts heating and cooling costs.
- 2—Increases usable floor space.
- 3—Reduces damage from dust and dirt.
- 4—Assures customers' comfort.
- 5—Safeguards employees' health.

# Revolving Door

DIVISION of

★ INTERNATIONAL  
★ VAN KANNEL  
★ ATCHISON

INTERNATIONAL  
STEEL COMPANY

EVANSVILLE  
INDIANA

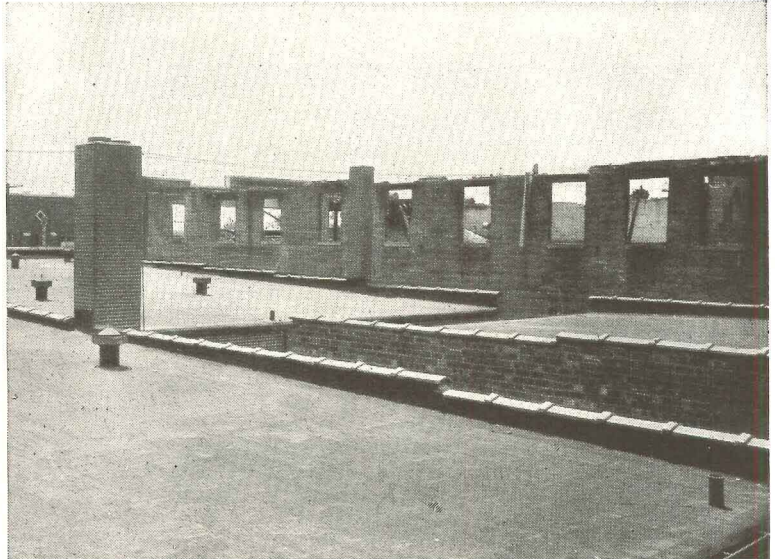


# Here's **DOUBLE** Fire Protection!

**Two more striking examples of the way buildings can be safeguarded against destruction . . . of the way fires can be prevented from spreading . . . with a Johns-Manville ASBESTOS Built-Up Roof**

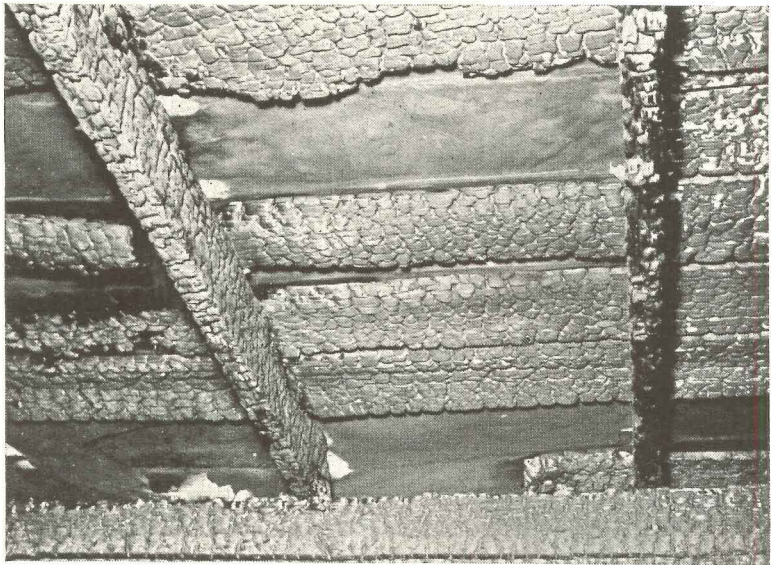
## **Against Outside Fires!** →

When fire broke out in a two-story laundry in a large midwestern city, the building was completely destroyed, as you can see from the ruins in the background of the photograph at the right. The building next door in the foreground of the photograph, a bank, was subjected to intense heat and burning embers from the blaze. Under the shower of burning brands, the tile coping on the bank's roof was cracked. But the flaming embers that fell on the roof flickered out harmlessly . . . *unable to pass the barrier of the Johns-Manville ASBESTOS Roof!*



## **Against the Spread of Inside Fires!** →

In areas where combustible buildings are located, J-M ASBESTOS Roofs do another important job. They help confine *inside* fires. The photograph at right provides a graphic example. When fire broke out in this garage, it was of terrific intensity because the building housed cars filled with gasoline. Note that the wood deck was completely burned through in places, exposing the roofing felts. Yet the 28-year old J-M ASBESTOS Roof remained intact . . . prevented the fire from spreading to nearby buildings and simplified the job of bringing it under control!



★ ★ ★

These two cases are representative of scores where J-M ASBESTOS Roofs have meant the difference between safety and destruction. And J-M Roofs offer other vital advantages. Because asbestos has the durability of stone—sun, rain and weather have little or no effect on these durable roofs. They are rotproof, need no periodic coating, require little maintenance throughout their long life.

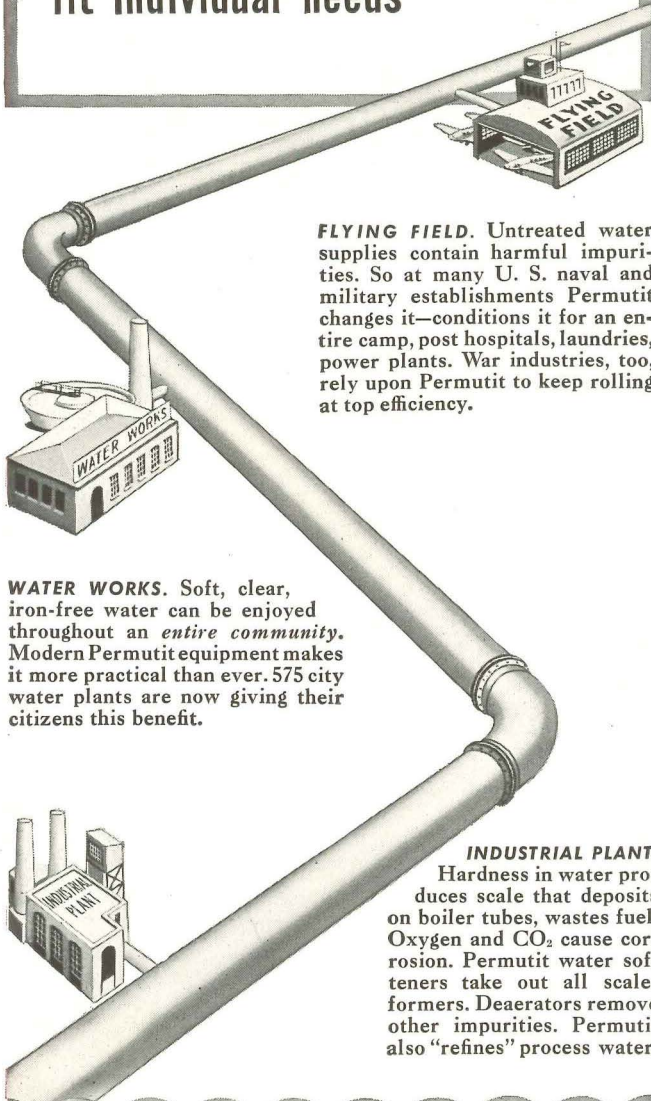
For complete details and specifications, write Johns-Manville, 22 East 40th Street, New York, N. Y.

## **Johns-Manville** *Asbestos* **Built-Up Roofs**



# ALL KINDS OF WATER FROM A SINGLE MAIN—

Permutit\* makes water supply fit individual needs



**FLYING FIELD.** Untreated water supplies contain harmful impurities. So at many U. S. naval and military establishments Permutit changes it—conditions it for an entire camp, post hospitals, laundries, power plants. War industries, too, rely upon Permutit to keep rolling at top efficiency.

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In Canada: Permutit Company of Canada, Ltd.  
Montreal . . . Toronto . . . Winnipeg . . . Calgary  
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## NORTON DOOR CLOSER

Now, and for years to come, the saving of time, money and materials on building maintenance will be a necessity. The dependable quality and special engineering features built into every Norton Door Closer are your assurance of years of efficient service at minimum expense.

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Division of The Yale & Towne Mfg. Company  
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AIRPLANE  
PLANT**  
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America

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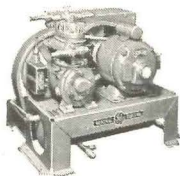
hundreds on which General Electric is collaborating with architects and engineers in the planning of refrigeration and air conditioning equipment for war uses.

Why not draw upon this fund of knowledge and experience to help solve your heat transfer problems in war production?



# GENERAL ELECTRIC

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*G-E Condensing Units* ("Scotch Giant"), water or air cooled, are available from 1/4 to 125 hp. May be used in multiple when a larger cooling effect is required.



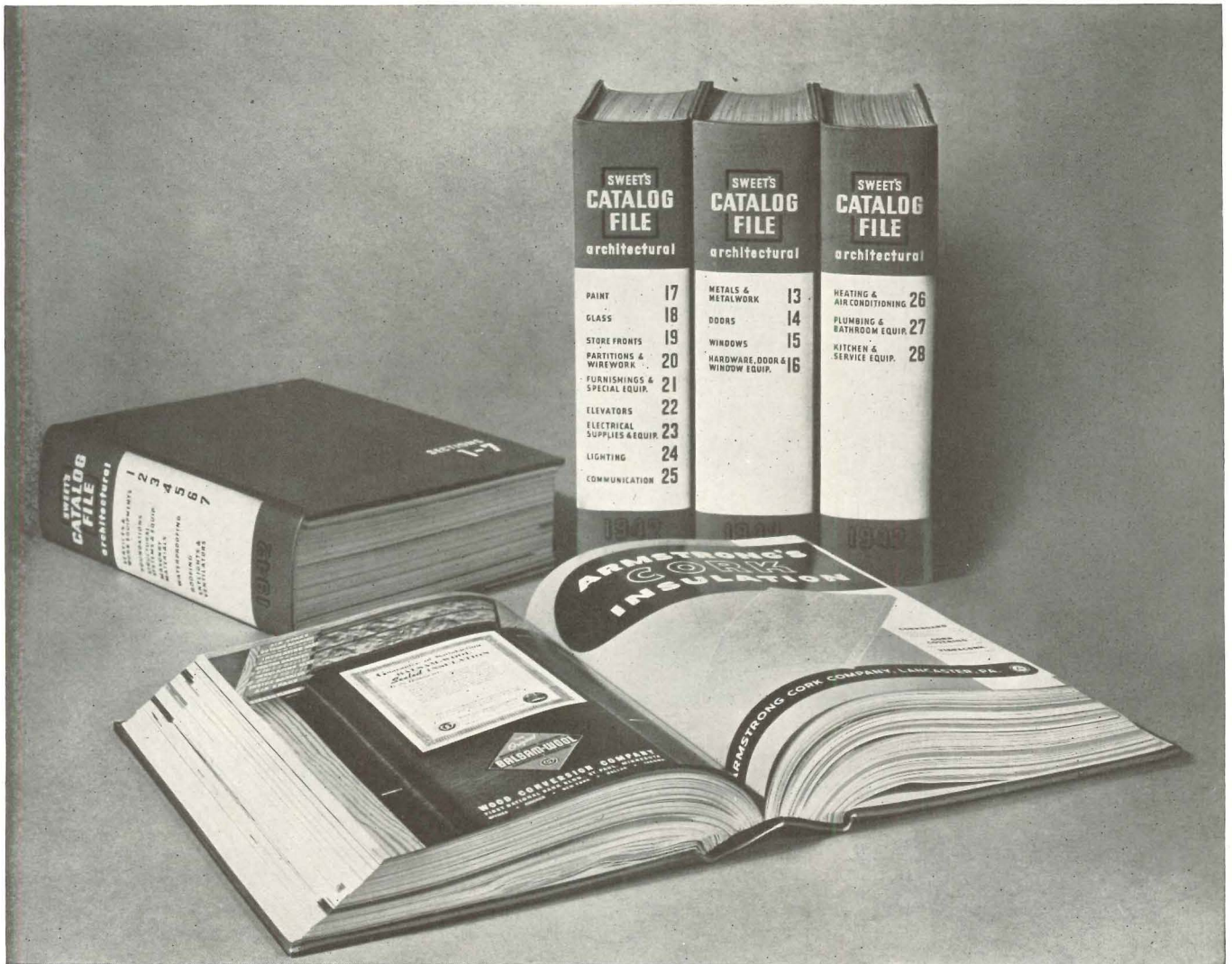
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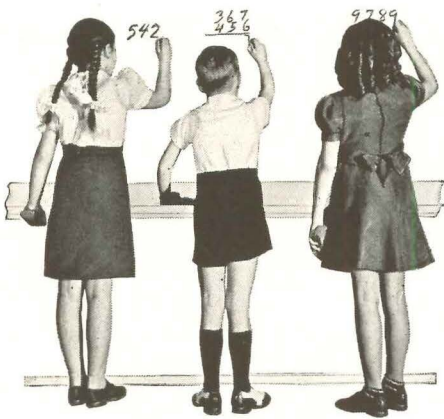
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# DESIGNING A SCHOOL?



## Make it fire-safe by using Bethlehem Open-Web Joists

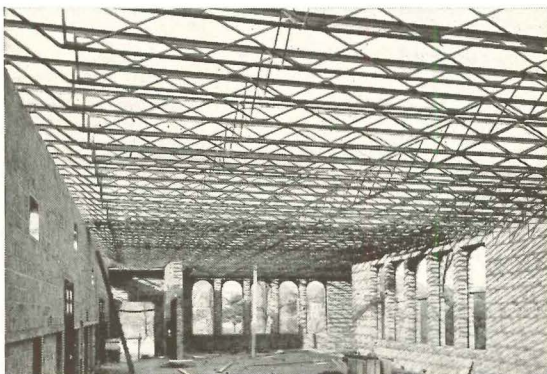
When you are designing an essential school for a war-production area, or some other type of light-occupancy building needed in connection with the war effort, provide fire-safety and other advantages, as well as faster construction, by

specifying Bethlehem Open-Web Steel Joists.

Light in weight but strong, these popular joists support a surprisingly heavy load—with an ample margin of safety, too. Because they don't warp or shrink, they cut down the chances for cracks, open baseboards, and squeaky floors. In addition, Bethlehem Open-Web Joists, when combined with a concrete floor slab and a plaster ceiling, provide good sound-resistance and as much as two and one-half-hour fire safety.

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*First floor of Christ the King School, Cincinnati, constructed with Bethlehem Open-Web Joists. Architect: E. J. Schulte; Contractor: E. Honnert.*



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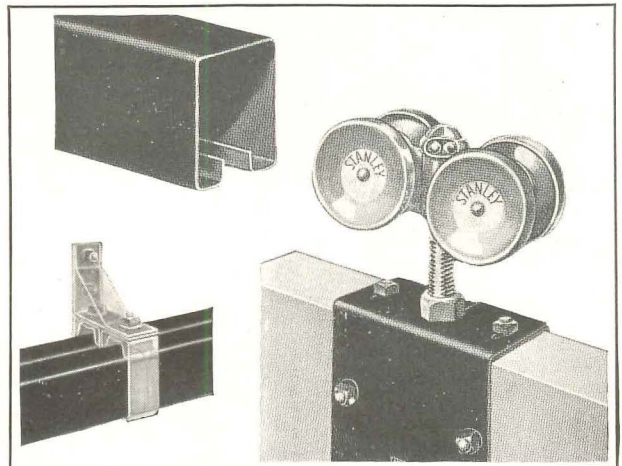
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**3 Sizes meet all needs  
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HARDWARE FOR CAREFREE DOORS

**cool  
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24 HOURS A DAY

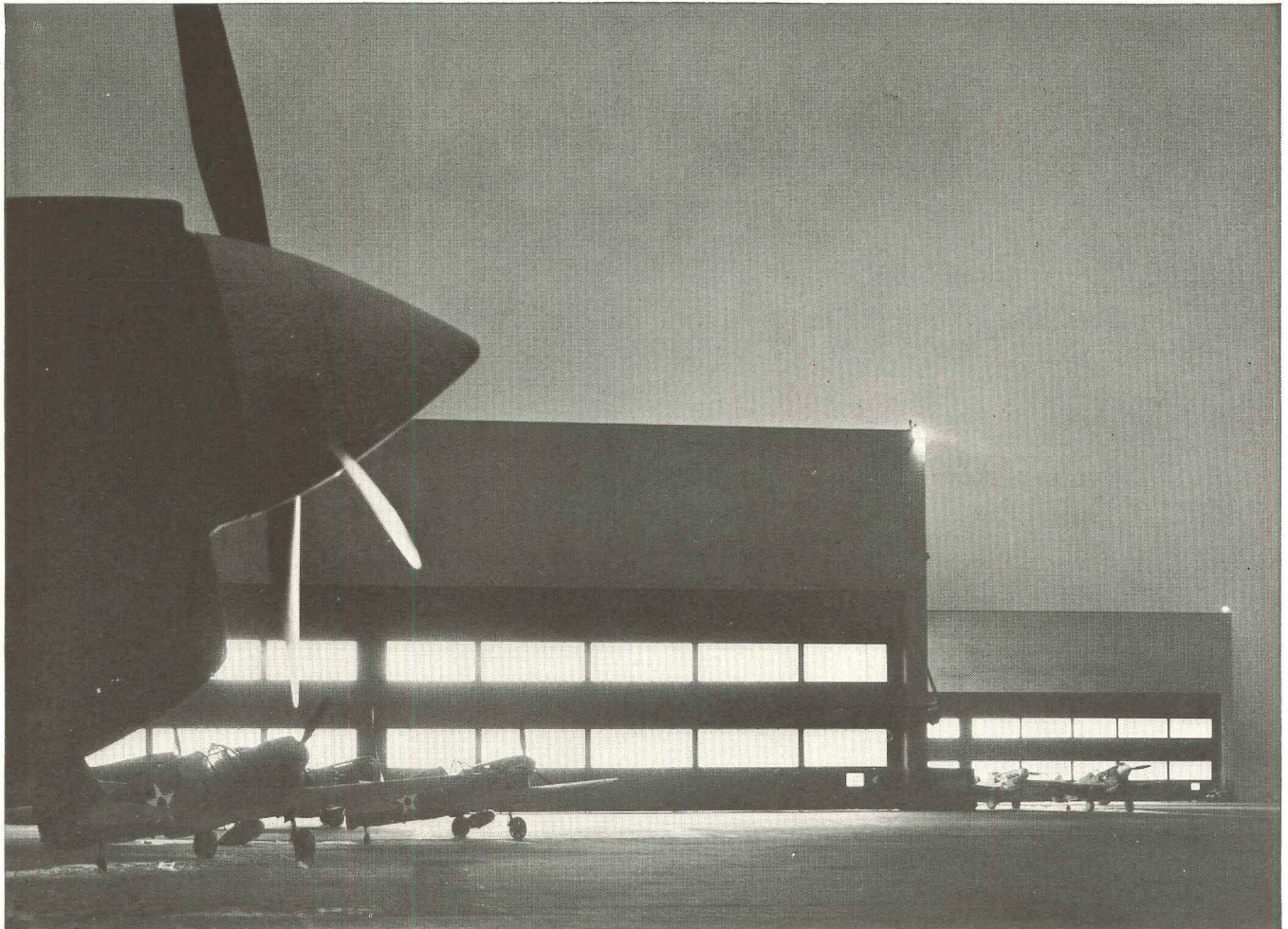
Six floors of perfectly air-conditioned sleeping rooms. Also the Bombay-Black Mirror Room, the King Cole Room and the Amber Room Coffee Shop. All in the fashion of the 1950's.

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about an RCA Sound System.

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Company .....

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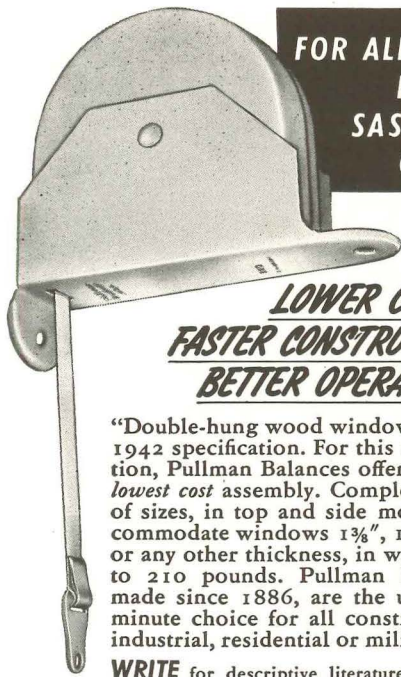
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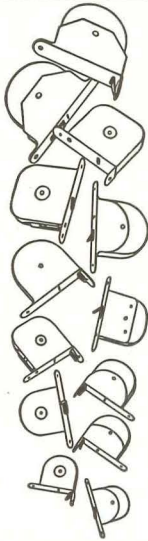


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OFFER . . .**

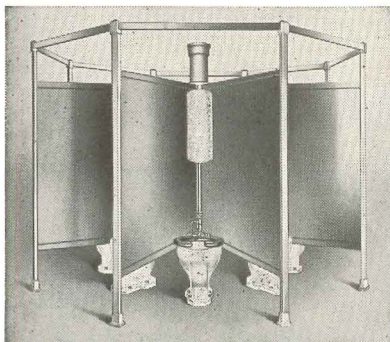
**LOWER COST  
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BETTER OPERATION**

"Double-hung wood windows" is the 1942 specification. For this construction, Pullman Balances offer *quickest, lowest cost* assembly. Complete range of sizes, in top and side models, accommodate windows 1 3/8", 1 3/4", 2 1/4", or any other thickness, in weights up to 210 pounds. Pullman Balances, made since 1886, are the up-to-the-minute choice for all construction—industrial, residential or military.

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*Specify Window Units with*  
**PULLMAN**  
*Sash Balances*

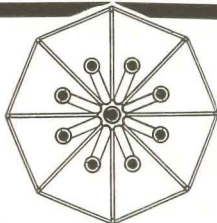


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300 Men  
Installed  
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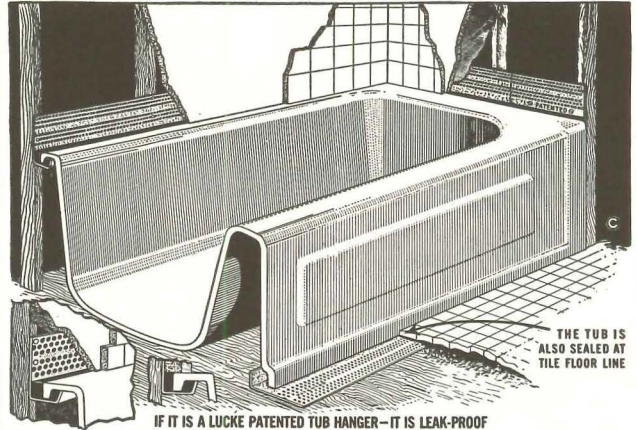
Milwaukee, Wisconsin

*In New Construction  
or Remodeling . . .*

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**The Modern LEAK-PROOF TUB HANGER**

*Used in USG  
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in this issue*



IF IT IS A LUCKE PATENTED TUB HANGER—IT IS LEAK-PROOF

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Patented and Manufactured by

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Use Powers thermostatic water mixing valves for Group Showers, Wash Sinks, Hot Water Line Control and Industrial Processes. Capacities up to 2,650 g.p.m. Write for Circular 3017. THE POWERS REGULATOR COMPANY, 2752 Greenview Avenue, CHICAGO—Offices in 47 Cities. 52

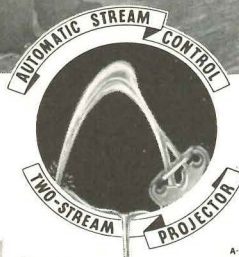
**POWERS** WATER TEMPERATURE CONTROL



*As Modern as Aviation*

IN ITS new terminal at Chicago, United Air Lines selected Halsey Taylor Cooler Fountains. As with all Halsey Taylor wall, pedestal or recess types, modern design and health-safety features combined to make these coolers the logical choice! Halsey Taylor is the only make offering practical automatic stream control plus exclusive two-stream projector with protective safety guard! Ask for catalog.

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Warren, O.



**Halsey Taylor**  
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*A Short Cut to Your*

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Many thousands of these Williamsburg reprints have been sold but the demand continues unabated.

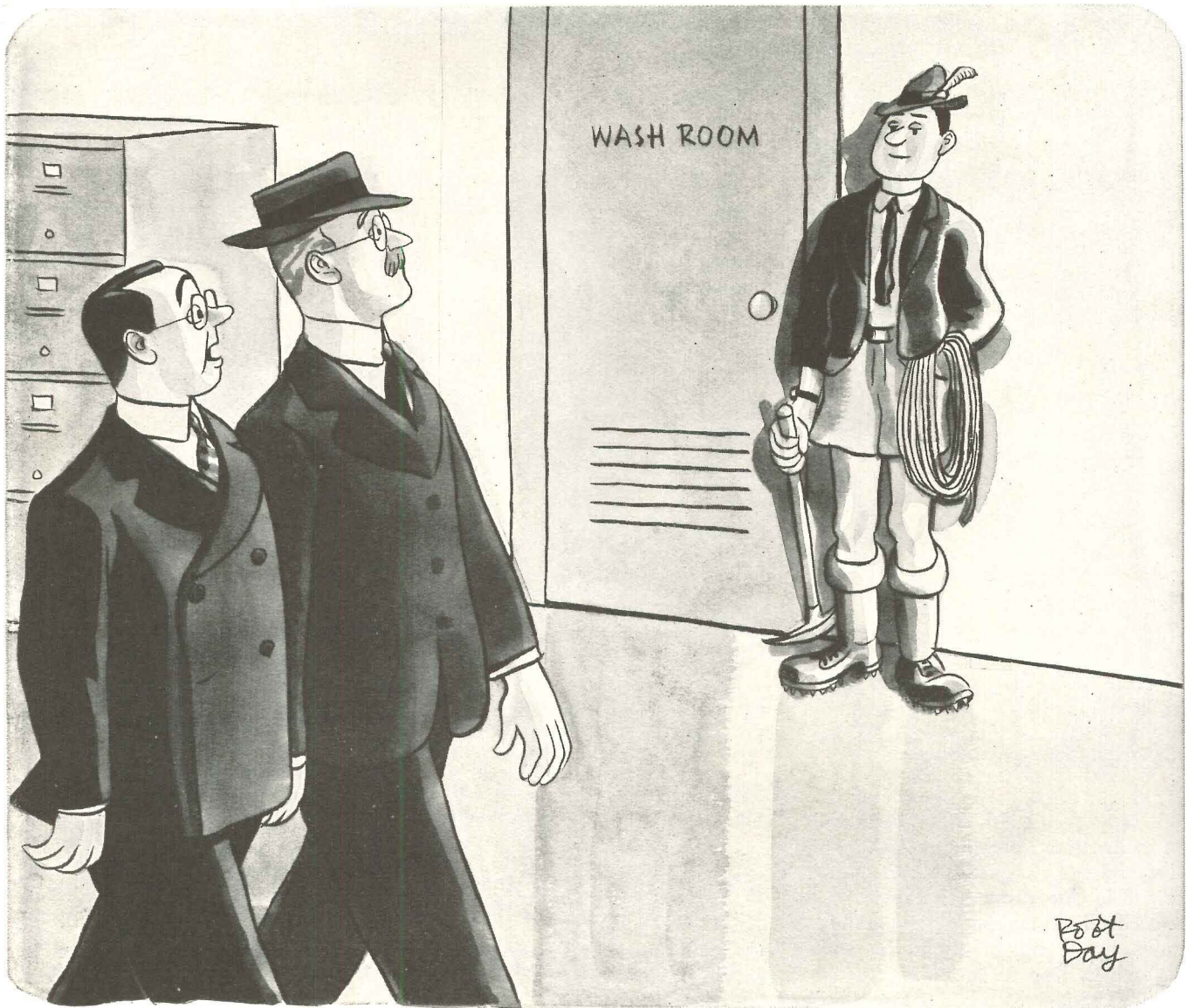
ARCHITECTURAL RECORD  
119 W. 40th St., New York, N. Y.

Enclosed is \$..... for which send ..... copies of your reprint, *The Restoration of Colonial Williamsburg*, bound in cloth, at \$1.50 per copy.

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City and State ..... A. R. 6-42



*"We need him to get around to the fixtures and things"*

The case above is a little on the extreme side, of course.

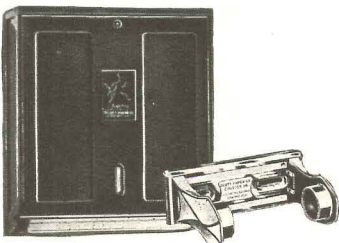
But it's a fact that many washrooms, particularly the larger ones, aren't arranged for the convenience and comfort of the user, or for economical maintenance.

That's where the Scott Washroom Advisory Service can be of definite help.

Whatever your washroom-planning problems—fixture arrangement, traffic flow, sanitary needs—this free service provides technical data for planning. Trained staff members are always available for consultation. You'll find this assistance invaluable in designing washrooms that combine maximum efficiency and economy in use.

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See our listing in  
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Trade Marks "Soft-Tuff," "ScotTissue," "Washroom Advisory Service" Reg. U. S. Pat. Off.

## SCOTT WASHROOM ADVISORY SERVICE

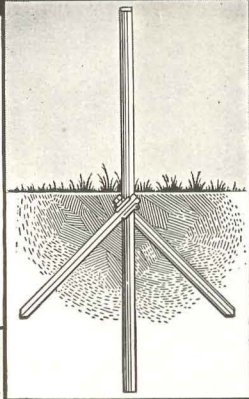
offered by the makers of the famous  
new "Soft-Tuff" ScotTissue Towel and ScotTissue Service Roll

# Why ANCHOR FENCE Stands Rigid in Any Soil

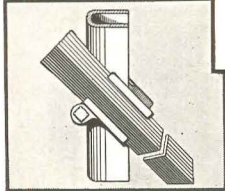
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### "DRIVE-ANCHORS"

driven deep into the *sub-soil* hold posts permanently erect. The angle-shaped "anchors" extend at right angles to the fence-line, and are clamped to the posts to form a three-point "tree-root" anchorage. Strain severe enough to bend the posts will not shift the anchorage below the ground.



**Anchor Post Clamps**  
(left) hold the "anchors" firmly in position, yet permit them to be withdrawn and re-used if the fence is moved.

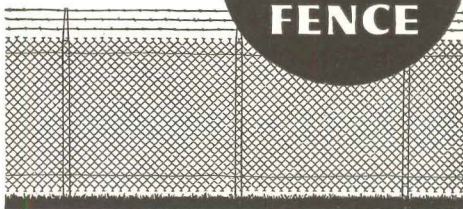


THE first chain link fence in America, installed in 1907 with "drive-anchor" post foundations, is still erect and in line, despite the years. You can specify drive anchors with complete confidence that they will keep the fence erect and in line in any soil, in any weather. The fence can be installed with drive Anchors even in frozen ground and can be moved without loss in case of plant expansion. Get the facts about "Drive Anchors" and other Anchor Fence features. See how Anchor Fence gives extra protection, longer life, lower maintenance costs. Write for Anchor Protective Fence Catalog, and name of nearest Anchor Fence Engineer. Address: Anchor Post Fence Co., 6600 Eastern Avenue, Baltimore, Maryland.

**1892-1942 Fifty Years of Service**

Nation-Wide  
Sales  
and Erecting  
Service

**ANCHOR  
FENCE**



## INDEX TO ADVERTISEMENTS

Catalogs of concerns marked (s) are filed in Sweet's Catalog File (1942)

	Page		Page
(s) ALUMINUM COMPANY OF AMERICA.....	24	(s) LCN DOOR CLOSERS.....	98
Agency: Fuller, Smith & Ross, Inc.		Agency: J. R. Hamilton Adv. Agency	
(s) AMERICAN AIR FILTER COMPANY, INC....	19	(s) LIBBEY-OWENS-FORD GLASS COMPANY...15-83	
Agency: Farson & Huff Advtg.		Agency: Fuller, Smith & Ross, Inc.	
AMERICAN ROLLING MILL COMPANY.....	86	(s) LOUISVILLE CEMENT COMPANY, INC. ....	9
Agency: N. W. Ayer & Son, Inc.		Agency: Doe-Andersen Advertising Agency	
ANACONDA WIRE & CABLE COMPANY.....	17	(s) LUCKE, WILLIAM B., INC. ....	108
Agency: Ivey & Ellington, Inc.			
(s) ANCHOR POST FENCE CO.....	112	(s) MAHON, R. C., COMPANY.....	29
Agency: Van Sant Dugdale & Company		Agency: Anderson, Inc.	
(s) BETHLEHEM STEEL COMPANY .....	105	(s) MILLER COMPANY .....	2nd Cover
(s) BLUE RIDGE SALES DIVISION .....	15	Agency: J. M. Hickerson, Inc.	
Agency: Fuller Smith & Ross, Inc.		(s) MILWAUKEE STAMPING COMPANY.....	108
BOECKH, E. H., & ASSOCIATES.....	110	Agency: Morrison Advertising Agency	
(s) BRADLEY WASHFOUNTAIN CO. ....	92	(s) MODINE MANUFACTURING COMPANY.....	79
Agency: Kirkgasser-Drew Advtg.		Agency: Cramer-Krasselt Company	
(s) BYERS, A. M., COMPANY.....	4	(s) MUELLER BRASS CO.....	93
Agency: Ketchum, MacLeod & Grove, Inc.			
(s) CAREY, PHILIP MFG. CO.....	95	(s) NATIONAL TUBE COMPANY.....	89
Agency: S. C. Baer Company		Agency: Batten, Barton, Durstine & Osborn	
(s) CARNEGIE-ILLINOIS STEEL CORPORATION. 34		NELSON, HERMAN, CORPORATION.....	84
Agency: Batten, Barton, Durstine & Osborn, Inc.		Agency: L. W. Ramsey Co.	
(s) CARRIER CORPORATION .....	81	(s) NORTON DOOR CLOSER COMPANY.....	102
Agency: Charles Dallas Reach Company		Agency: K. E. Shepard	
CLEAVER-BROOKS COMPANY .....	4th Cover	(s) OWENS-ILLINOIS GLASS COMPANY .....	26-27
Agency: Klau Van Pietersom-Dunlap Associates		Agency: D'Arcy Advertising Company	
(s) CONGOLEUM-NAIRN, INC. ....	100	(s) PERMUTIT COMPANY .....	102
Agency: McCann Erickson, Inc.		Agency: Newell-Emmett Company	
CORONADO HOTEL .....	102	(s) PETROLEUM HEAT & POWER COMPANY... 99	
Agency: Lane, Benson, McClure, Inc.		(s) PITTSBURGH PLATE GLASS COMPANY... 23	
DE WITT OPERATED HOTEL.....	108	Agency: Batten, Barton, Durstine & Osborn, Inc.	
Agency: Swafford & Koehl, Inc.		(s) POWERS REGULATOR COMPANY .....	110
(s) DODGE REPORTS .....	109	PROMETHEUS ELECTRIC CORP. ....	106
		Agency: Columbia Advertising Co.	
FABER, A. W., INC. ....	3rd Cover	(s) PRO-TECT-U AWNING SHUTTER COMPANY 16	
Agency: Advertising Associates		Agency: La Porte & Austin	
(s) FITZGIBBONS BOILER COMPANY, INC....	22	(s) PULLMAN MANUFACTURING CORPORATION 108	
Agency: Peterson & Kempner, Inc.		Agency: Ed. Wolff & Associates	
(s) GENERAL ELECTRIC COMPANY—AIR CONDITIONING .....	103	RCA MANUFACTURING COMPANY, INC. ... 107	
Agency: Newell-Emmett, Company, Inc.		Agency: Lord & Thomas	
HAZARD INSULATED WIRE WORKS.....	18	(s) REYNOLDS METALS COMPANY.....	2
Agency: Doyle, Kitchen & McCormick, Inc.		Agency: James Birnie, Jr., Inc.	
(s) HOFFMAN SPECIALTY COMPANY.....	33	(s) ROBERTSON, H. H., COMPANY.....10-11	
Agency: Perrin-Paus Company		Agency: Fuller, Smith, Ross Inc.	
(s) HOLOPHANE COMPANY, INC. ....	20	(s) SCOTT PAPER COMPANY.....	111
Agency: William G. Seidenbaum		Agency: J. Walter Thompson Co.	
(s) HOLTZER-CABOT ELECTRIC COMPANY .....	28	(s) SISALKRAFT CO. ....	88
Agency: Frank T. Day, Incorporated		Agency: Klau-Van Pietersom Dunlap Associates	
HOTEL CLEVELAND .....	96	(s) SLOAN VALVE COMPANY.....	32
Agency: Griswold-Eshleman Co.		Agency: Reincke, Ellis, Youngreen & Finn	
HOTEL FONTENELLE .....	106	(s) SPENCER TURBINE COMPANY.....	90
Agency: Harry Atkinson, Inc.		Agency: W. L. Towne	
(s) HOME OWNERS' CATALOGS.....	114	(s) STANLEY WORKS .....	106
(s) HYGRADE SYLVANIA CORPORATION.....	31	Agency: Horton-Noyes Company	
Agency: Arthur Kudner, Inc.		(s) SWEET'S CATALOG SERVICE.....	104
(s) IMPERIAL BRASS MFG. CO.....	113	(s) TAYLOR, HALSEY W., CO.....	110
Agency: Kreicker & Meloan, Inc.		Agency: William Cohen	
(s) INTERNATIONAL STEEL COMPANY.....	100	TIMBER ENGINEERING COMPANY.....	30
Agency: Keller-Crescent Company		Agency: Campbell-Ewald Company	
JENKINS BROS. ....	21	TODD COMBUSTION EQUIPMENT, INC.....	25
Agency: Horton-Noyes Company		Agency: Wendell P. Colton Company	
(s) JOHNS-MANVILLE .....	8-101	(s) UNITED STATES STEEL CORPORATION SUBSIDIARIES .....	34-85-89
Agency: J. Walter Thompson Co.		Agency: Batten, Barton, Durstine & Osborn, Inc.	
(s) KEASBEY & MATTISON COMPANY.....	3	(s) UNIVERSAL ATLAS CEMENT CO. ....	85
Agency: Geare-Marston, Inc.		Agency: Batten, Barton, Durstine & Osborn, Inc.	
(s) KENNEDY, DAVID E., INC.....	1	(s) WALLACE & TIERNAN COMPANY, INC .... 106	
Agency: Gerald Lesser Advertising		Agency: G. M. Basford Company	
KINETIC CHEMICALS, INC. ....	87	(s) WEBSTER, WARREN, & COMPANY.....	13
Agency: Batten, Barton, Durstine & Osborn		Agency: William Jenkins Advertising	
KOH-I-NOOR PENCIL COMPANY, INC.....	98	(s) WESTINGHOUSE ELECTRIC & MFG. CO. .... 91	
Agency: Roeding & Arnold		Agency: Fuller Smith & Ross, Inc.	
		(s) WING, L. J., MFG. CO.....	97
		Agency: Willard G. Myers Adv. Agency	
		(s) YORK ICE MACHINERY CORPORATION .... 6	
		Agency: J. M. Mathes, Inc.	

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