BUILDING FOR DEFENSE

THE ARCHITECTURAL FORUM

NOVEMBER 1940

Tonight

THEY'RE REACHING

A DECISION . . .

THEY'LL BE SEEING

THEIR ARCHITECT

Tomorrow

Celotex National Advertising Tells Them

"NOW IS THE TIME TO BUILD."*

THIS is a typical home-loving American couple. For years they have wanted to own a home. They have a little money saved up—enough to build, *with today's easy financing and low interest rates.* They would like to build for the satisfaction there is in it. And they would like to put their savings in a secure investment. Now they have decided, and they're going to act.

These people live right in your community. What has prompted them to act right now? A combination of circumstances, probably—the circumstances which are being mentioned *in every Celotex national advertisement this fall.* At any rate, they have been reading those Celotex advertisements with a lot of interest.

Eight out of ten such people know the Celotex name and quality reputation. When you specify Celotex Guaranteed Insulation, they *know* you're giving them *full protection* against fuel waste—against cold drafts and excessive summer heat. And it's low-cost protection, too, *guaranteed in writing for the life of the building!* (When issued, applies only within Continental United States.)

***NOW IS THE TIME TO BUILD!**

It is a hedge against the future • Financing rates are low • Interest rates are low • Materials cost less than they will later on • Labor is still available.

CELOTEX

REG. U. S. PAT. OFF.

BUILDING PRODUCTS

INSULATING SHEATHING, LATH, INTERIOR FINISHES
ASPHALT SHINGLES, SIDING, ROLL ROOFING
HARD BOARDS • ROCK WOOL BLANKETS, BATTS
GYPSUM PLASTERS, LATH, WALL BOARDS

Sales Distributors Throughout the World

WE FAVOR ADEQUATE PREPAREDNESS FOR NATIONAL DEFENSE

THE CELOTEX CORPORATION AF 11-40
919 N. Michigan Ave., Chicago, Ill.

Please send all the latest information on Celotex Guaranteed Insulation.

Name.....

Address.....

City.....

County.....*State*.....

ARCHITECTURAL FORUM

NOVEMBER 1940

Editor, Howard Myers; *Managing Editor*, Ruth Goodhue; *Associates*, Paul Grotz, Joseph C. Hazen, Jr., C. Theodore Larson, George Nelson, Henry H. Saylor, Henry Wright; *Assistants*, John Beinert, Anna De Cormis, Richard E. Saunders, Madelaine Thatcher, Nadia Williams. THE ARCHITECTURAL FORUM is published by Time Inc., Henry R. Luce, Chairman; Roy E. Larsen, President; Charles L. Stillman, Vice President and Treasurer; Howard Black, Allen Grover, Eric Hodgins, P. I. Prentice, Vice Presidents; David W. Brumbaugh, Secretary. Publication and Subscription Office, Erie Ave., F & G Streets, Philadelphia, Pa. Subscriptions may also be sent to 330 East 22nd Street, Chicago, Illinois. Executive, Editorial and Advertising Offices, Time & Life Building, Rockefeller Center, New York. Business Manager, H. A. Richter. Advertising Manager, George P. Shutt. Address all editorial correspondence to Time & Life Building, Rockefeller Center, New York. Yearly subscription, payable in advance, U. S. and Possessions, Canada, Cuba, Mexico, South America, $4.00. Elsewhere $6.00. Single issues, including Reference Numbers, $1.00. All copies Mailed Flat. Printed in U. S. A.
VOLUME 73—NUMBER FIVE

THE MONTH IN BUILDING

TRENDS. Slumping sharply from recent record levels, nonresidential construction pulled the September volume of total permits down 11 per cent from August (see tabulation, right). The filing of large permits for defense industrial plants during recent months has made the nonresidential total jumpy. Chances are it will bounce up again for October when several multi-million dollar defense projects were permitted. (The nonresidential category also includes institutional, educational and publicly financed building types, the construction of which has dropped markedly during 1940.)

PERMITS (Source: U. S. Department of Labor)

	Monthly Data			First Nine Months	
	Sept. 1940 (millions)	Comparison with Aug. '40	Sept. '39	1940 (millions)	Comparison with 1939
Residential	$124.0	+ 6%	+42	$935.1	+10%
Nonresidential	63.3	—34	+ 6	479.5	+ 5
Additions, repairs	30.9	0	+ 9	263.5	0
TOTAL	218.2	—11	+24	1678.1	+ 7

EFFECT. Besides giving Army, Navy and industrial building one of the biggest forward pushes they have ever received, the national defense program is doing many other things—some good, some bad—to the industry and its vital statistics:

▶Residential building activity, after a rather slow summer, is showing new life. The September volume of permits was up 6 per cent from August, raising the nine-month total 10 per cent above the 1939 level (see tabulation, above). Preliminary estimate is that about 525,000 dwelling units will be produced this year, 50,000 more than last year.

▶Wholesale building material costs have jogged up steadily from 92.4 per cent of the 1926 average in June to 94.6 per cent in September. Year ago the figure was 90.9. Culprit mainly responsible for the rise: lumber (see p. 4, col. 3).

▶Residential rents for October, after climbing slowly but steadily for seventeen months, hit 87.0 per cent of the 1923 average for the first time since May 1938. Year ago rents stood at 86.3 per cent.

▶Average price of twelve stocks of building material and equipment manufacturers rose to 74.6 per cent (preliminary) of the 1926 average in October from a three-year low of 58.1 per cent in June. In October 1939 stock prices averaged 85.0 per cent.

▶Wage rates for both common and skilled building labor have risen to the highest levels in U. S. history. According to *Engineering News-Record*, they now average about 71.1 cents and $1.48 per hour respectively. Year ago: 68.5 cents and $1.44.

BIG ONES. Perhaps never before in U. S. history and certainly never before in the past two decades have so many big jobs been given Building in so short a time. Toward the prompt accomplishment of national defense, the War and Navy Departments alone signed 90 construction contracts totaling $480 million between August 1939 and mid-October. Averaging more than $5 million each, many of them are so large that they are divided between two, three, four and even five contractors. And, more projects, more contractors are being added to the list each week.

Of the 200-odd contractors definitely in the program as of mid-October, No. 1 National Defense Builder is New York City's Turner Construction Company, contractor for such recent landmarks as the $1.5 million Tiffany building in New York, the $2 million Wilmington Hospital in Wilmington, the $2 million New England Life Insurance Co. building in Boston. Participating in more defense construction than any other contractor, Turner's President Henry C. Turner, Sr. has a finger in three separate projects whose combined estimated cost has been officially estimated at $49.4 million.* One of them is the largest project yet contracted for: $30.9 million worth of aviation and fuel storage facilities, buildings, dredging, etc., for Hawaii's Pearl Harbor and other Western Pacific islands. Sharing this record-breaking contract with Turner are Morrison Knudson Co., J. H. Pomeroy & Co., Raymond Concrete Pile Co., and Hawaiian Dredging Co. With the last two firms, Turner is also splitting a $14.6 million 1939 contract for naval air stations on these Pacific Islands. And, all by itself, it is building a $4 million storehouse and accessories for the New York Navy Yard.

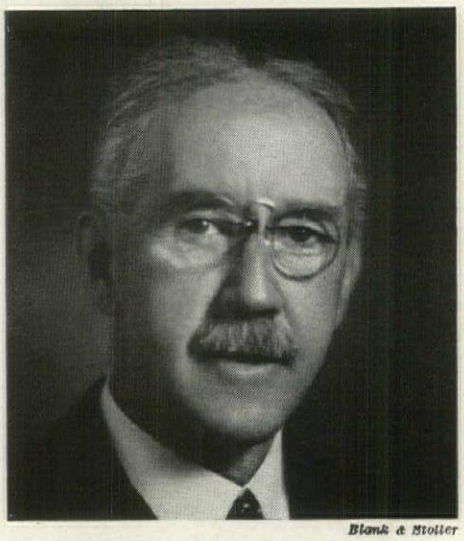
* Since the War and Navy Departments do not disclose the individual participation of each contractor in joint contracts, it is impossible accurately to report each firm's volume of defense business.

Defense Builder No. 2 is Merritt-Chapman & Scott Corp. (contractor for the new $6 million Southland Paper Mills and $3 million Champion Paper & Fiber plants in Texas) who, along with Spencer, White and Prentis, Inc., and Foley Bros., Inc., is erecting $17 million worth of shipbuilding drydocks and accessories at the Norfolk (Va.) and Philadelphia Navy Yards; and, with Geo. A. Fuller Co., $24.2 million worth of aviation shore facilities at the Quonset Pt. (R. I.) Naval Air Station.

Design of most of the Army and Navy construction projects is being handled by their own architects and engineers, but much of it is being given to private firms. While names have not yet been released in connection with some of the larger projects it is safe to say that Detroit's Albert Kahn, Inc., is the No. 1 National Defense Architect. He is known to be designing many of the buildings included in the $45.5 million Pacific Islands contracts and the $24.4 million Quonset Pt. contracts mentioned above, and he is known to be putting into working drawing form many other projects roughed out by the Navy's architectural staff.

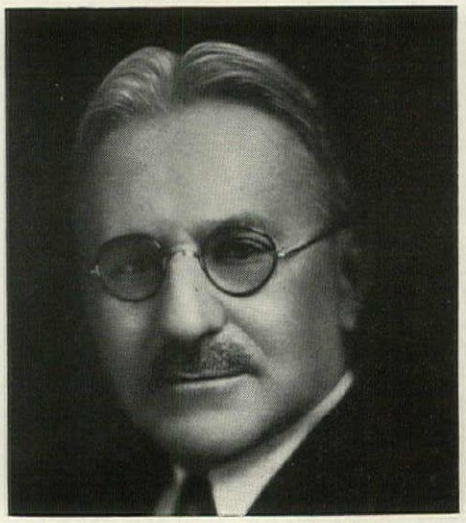
WHY. Less than half the rental dwelling units in the U. S. stay occupied for two or more years at a time. The others see at least one change in tenants within the short two-year period, and their land-

(Continued on page 4)



Blank & Stoller

No. 1 Defenders: Builder Henry C. Turner, Sr.



Architect Albert Kahn

MASONITE PRESDWOOD TEMPRTILE

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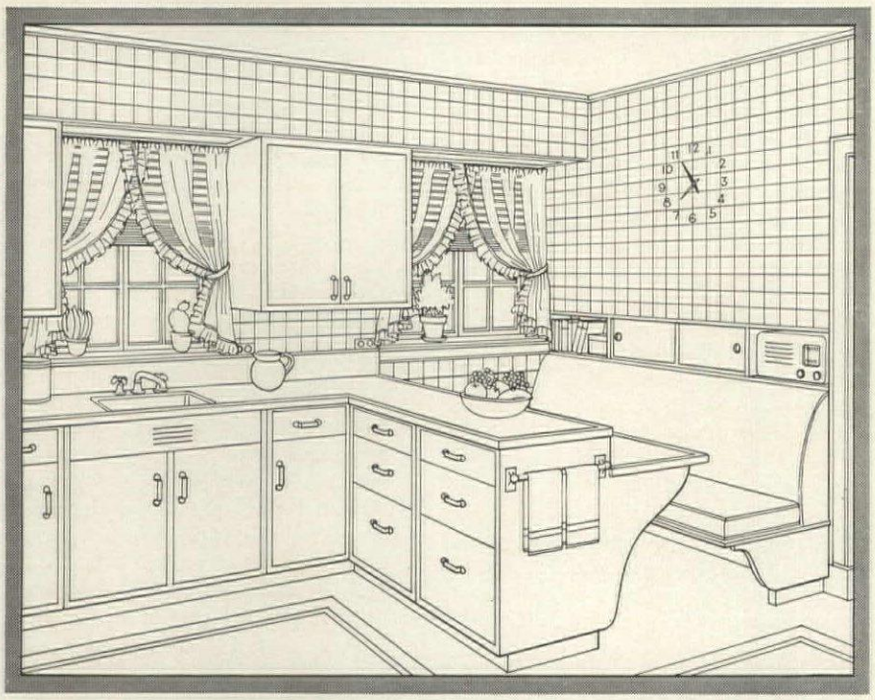
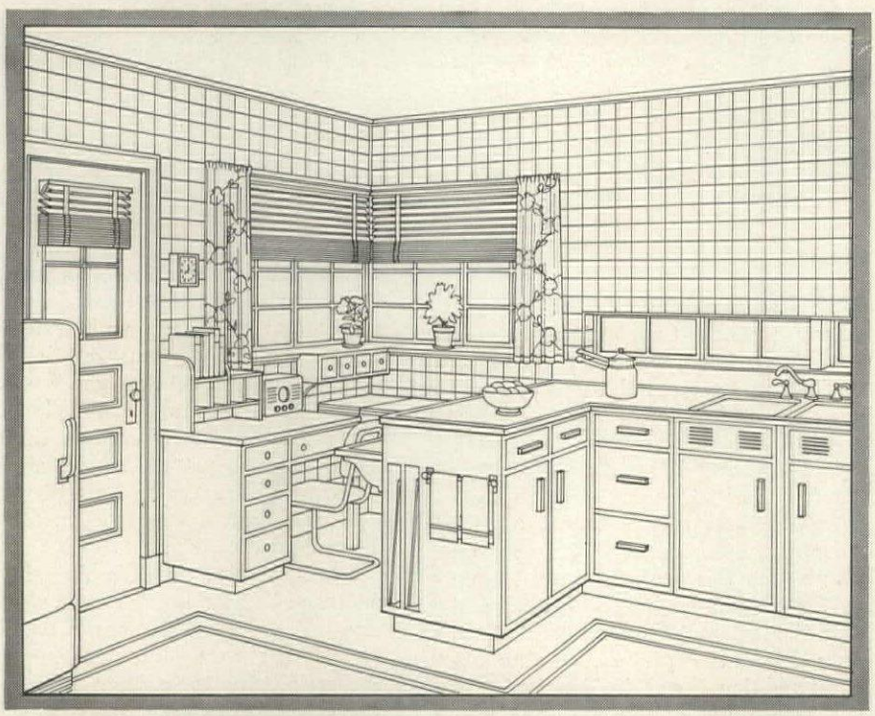


No. 1—THIS PLAN FEATURES a built-in seat for breakfast, behind which are sliding shelves for the electrical equipment, a shelf for cook-books and another for a radio. The counter tops and built-in cabinets are Masonite Tempered Presdwood. The walls are Presdwood Temprtile. Notice the electric clock mounted behind a removable panel of Presdwood Temprtile.



No. 2—HERE'S ANOTHER BRIGHT cheery kitchen with Presdwood Temprtile walls and built-in features of Tempered Presdwood. In the far corner is a sewing nook. Next to the sewing machine is a planning desk with cook-books and radio. Over the sinks and counter top to the right are windows that swing in from the top for ventilation, and also provide plenty of sunlight.

Lots of the "finishing touches" run into lots of money. But you needn't strain the budget to achieve tile-effects these days. Masonite Presdwood Temprtile produces truly beautiful tile-like walls for an exceptionally reasonable price. When you realize what Presdwood Temprtile *is*, you can see the reason why. Because it is a hard, grainless, wood-fiber board that comes in 4 x 12 ft. pieces—already grooved. It can be installed by an ordinary carpenter with ordinary wood-working tools. It can be painted or enameled to suit the client's taste. And—it's *permanent!* Once it's properly applied, it will neither warp, chip, split nor crack, and there's no breakage. Illustrated here are schemes for two interesting kitchen arrangements that can be finished for surprisingly little—using Masonite Presdwood Temprtile for the walls and Tempered Presdwood for built-in features.

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THE WONDER WOOD OF A THOUSAND USES

SOLD BY LUMBER DEALERS EVERYWHERE

If you would like to examine a sample of Masonite Presdwood Temprtile FREE, just fill in and mail this coupon to:

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Dept. AF-11-40
111 W. Washington St., Chicago, Ill.

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*Address*_____

*City*_____

*State*_____

THE ARCHITECTURAL FORUM

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VOLUME 73
Number 5

THE MONTH IN BUILDING

lords' profits are correspondingly shaved by the high rate of turnover. In New York City, close to 600,000 families (34 per cent of the total and about the same number as in the whole of Philadelphia) move each year. For each family the annual mass migration means many dollars for moving and redecoration costs, many hours of apartment hunting and then readjustment to new landlords, neighbors, school teachers and tradesmen. For each landlord it also means dollars for redecoration plus costly allowances for vacancies.

To satisfy its own curiosity and to give local and national realtors some pertinent information, the Citizens' Housing Council of New York City during the winter of 1938-39 analyzed the question: "Why do tenants move?" Last month, the documented but unsurprising answer was announced: most families move in search of lower rents; the second largest group moves in search of improved apartment layout. Basis of these findings is a survey of 1,219 Manhattan and Brooklyn families, a representative cross-section of multiple-dwelling tenants who live in ten well defined city areas and pay monthly rents ranging between $10 and $250.

When asked why they had moved to their present residence, 32 per cent of the Manhattan tenants and 25 per cent of the Brooklynites replied, "Lower rent." Of particular interest to architects should be the fact that 20 per cent of the Manhattan and 26 per cent of the Brooklyn tenants gave improved apartment layout, or room arrangement, as the reason for their latest move. Closely allied to the desire for lower rent is the third most frequent reply to the moving question—a desire for better value, presumably a bigger or better apartment at about the same monthly rental. About 20 per cent of the Manhattan tenants moved for this reason, about 17 per cent of the Brooklyn tenants. Other reasons, in the order of their importance: change in family size, neighborhood conditions, proximity to employment, improved living standards, better light and more ventilation, proximity to friends, to transportation facilities and, finally, to schools.

Answers to other questions posed by the the Citizens Housing Council indicate that New York's tenants are still far from satisfied with their present quarters:

▶ Biggest complaint is against the landlord's redecoration policy, with dissatisfaction expressed by 35 per cent of the Manhattan tenants, by 28 per cent of the Brooklynites.

▶ Almost as important a source of friction is the landlord's tardiness in handling repairs. About 30 per cent of the tenants in both Boroughs are unhappy on this count, and the ratio increases as rents drop.

▶ Between 18 and 27 per cent of the tenants still feel that they are not getting full value for their rent money. Most such complaints come from families in the $20-30 rental bracket.

▶ Between 13 and 19 per cent of those surveyed are convinced that their leases are unfair in that they favor the landlords.

▶ While all of the above complaints indicate that the landlords' services and policies leave much to be desired, tenants appear to hold but small grudge against the landlords themselves. Thus, less than 13 per cent of the respondents registered dissatisfaction as to personal relations with their landlords.

▶ Reflecting the widespread effect of open site planning in Government housing projects and privately financed garden apartment developments, more than half the tenants questioned believe that landlords should provide some community recreation facilities. However, many noted that this was impossible in the crowded city.

▶ Significant is the finding that from 20 to 25 per cent of the families would have remained in their previous apartments "had some positive effort toward readjustment of differences between landlord and tenant been made."

From it two major findings (high rents and dissatisfaction over landlord policies and services underlie the biggest part of the moving day problem) the Citizens' Housing Council comes to two major conclusions. One is a flat, unqualified statement: "Wishful thinking will bring no relief, and the landlord must face the fact that it is futile to shoot wide of the public's ability or willingness to pay." The other is a rhetorical question: "Would the average landlord . . . consider his business in a healthy condition if he knew that one-third of his tenants were dissatisfied with the redecoration (and the repair service) in his house? Would a merchant be concerned if he discovered this degree of dissatisfaction among his customers?"

SHOP LIFTING. Considered a plague by many (notably Congressman Patman whose bill to tax them out of existence was killed in Congress this year), chain stores account for one of Building's biggest modernization markets. Completed fortnight ago, a study by *Chain Store Age* of the habits of 26 leading chains operating 30,000 stores reveals that they will spend a shade more than $130 million on modernization this year, 3 per cent more than the recordbreaking 1939 total and despite the fact that the number of stores decreased about 7 per cent during the year. In addition, the chains' landlords will spend some $25 million on modernization, and an undisclosed amount of warehouse and office modernization kicks the total still higher.

Most important chain as far as modernization expenditures are concerned is the department store with $42.4 million in 1940. Other leaders: groceries, $29.3 million; apparel, $11.1 million; restaurants, $8.5 million; drugs, $8.2 million; shoes, $4.5 million. Of the 30,000 stores surveyed, 16 per cent will have been modernized this year. Average expenditure per store: $9,857.

STAPLES. During World War I building costs more than doubled, unwillfully sabotaging the industrial expansion program and causing practically all privately financed construction activity to evaporate. Logical then is the current fear that another abrupt price rise may sabotage the national defense program by throwing a powerful block against the boomward building trend. Further justifying this fear is the fact that wholesale building material prices have wiggled up each month since national defense got under way. During September they were 94.6 per cent of the 1926 average, up 2.1 points from April and at the highest level reached since 1937's fateful runaway rise. Discouraging but not yet serious, the price trend of Building's staples prompted national defenders in Washington last month to train their hawk-like eyes on the behavior of the index's components. This is what they saw:

Brick and tile, at 90.2, is up only 0.1 from August, is exactly even with April, a shade under the September 1939 level.

Cement, at 90.6, while steady for four consecutive months, has risen 0.3 since April. September 1939: 91.3.

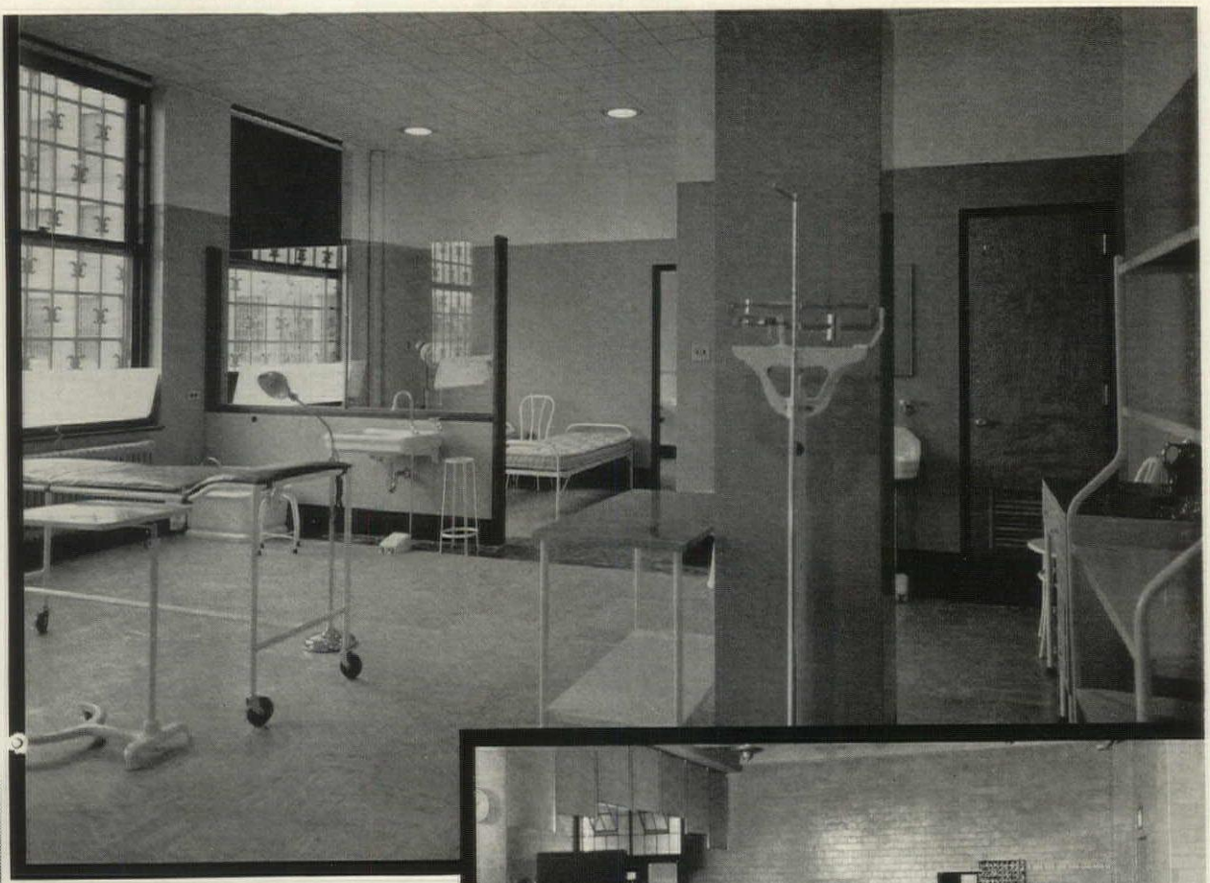
Paint and paint materials have rebelled against the general trend. Combined, they stand at 84.1, a surprising 3.6 below April, 0.6 below September 1939.

Steel, while having remained at the same national average level (107.3) since July 1938, has recently gone up fractionally in a few isolated communities, particularly on the West Coast.

Lumber is the only component of the index whose price rise gives cause for alarm. It stepped steeply up from 93.7 in September 1939 to 96.1 in April 1940 to a post-Depression high of 104.6 in September 1940. Due primarily to orders for Army residential construction (barracks, tent floors and walls, etc.) which have sapped the lumber market in recent months, the August-September advance in wholesale prices amounted to 4.3 points. And, to be reflected in the October index (not yet available), are additional price rises ranging from $1 to $9.50 per 1,000 bd. ft. reported last month from all parts of the country.

Trend-watchers in Washington have not taken this lumber price rise passively. Month ago the Defense Commission warned that it could see nothing in the lumber picture to warrant the upward jog, charged that the Army was being forced to pay higher prices than its civilian competitors. Putting teeth in this warning, the Justice Department's trustbusters immediately indicted five lumber trade associations, 168 lumber companies and 53 officials.

● The picture at the top shows the dispensary at the Baldwin Locomotive Works, Philadelphia. Formica wall paneling specified by Arthur H. Brockie. Below: Formica table tops Municipal Hospital, Indianapolis.



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for Hospital Walls and Dining Room Equipment

Formica combines a smooth, hard, chemically inert surface that is easily cleaned with a wide range of attractive colors. It has a place in the modern hospital where color is appreciated in thoroughly sanitary material.

Walls may be covered with plywood panels covered with Formica veneers, or with Formica wall board where there is no objection to metal moldings over the joints.

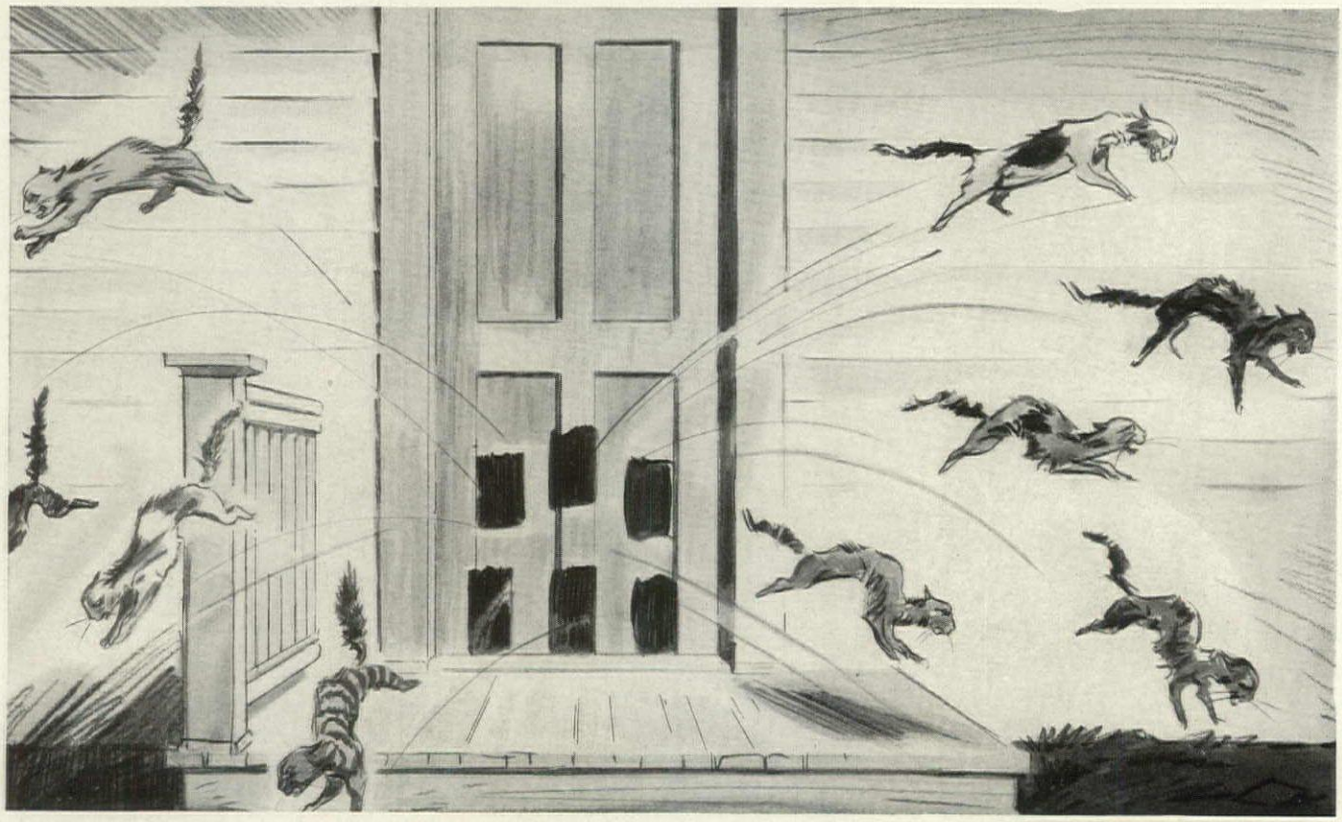
For dining room table tops it combines color with great durability, resistance to spotting by ordinary liquids, or by lighted cigarettes.

Literature on request.

The Formica Insulation Co., 4620 Spring Grove Ave. . . . Cincinnati, Ohio

FORMICA

FOR FURNITURE, FIXTURES AND BUILDING PURPOSES



Remember the One About the Darky and His Cats?

It always seemed silly to one member of a famous blackface vaudeville team that the other should cut several holes in the kitchen door just to let a lot of cats out. But as the other pointedly explained: "When I say scat, I mean SCAT!!!"

You, too, may have wished at times that your office had several exits to expedite the departure of electrical equipment salesmen. Well, as far as Westinghouse is concerned, you are going to have no more worries on that score.

We've simplified the whole business of contacting architects and builders so that too frequent calling on the part of our representatives is well-nigh eliminated. What we've done is to assign to your office a man whose job is to keep you fully informed regarding Westinghouse products, services and supplies.

For instance, the Westinghouse man whom you'll see regularly may be a specialist on lighting equipment, elevator equipment, kitchen planning, or what not. During one of his visits it may develop that you need additional data on motors, wiring devices or air conditioning equipment. He relays your requirements to the Westinghouse Clearing House and immediately all the working material you need is rounded up for you.

Though in operation only a few weeks, architects and builders have heartily approved this new arrangement. They find that it saves them a lot of interviewing time when nothing's up. Yet it provides them quickly with all the information they need when things start popping.

If you want to get a true line on this Clearing House Service just phone your nearest local Westinghouse district office.

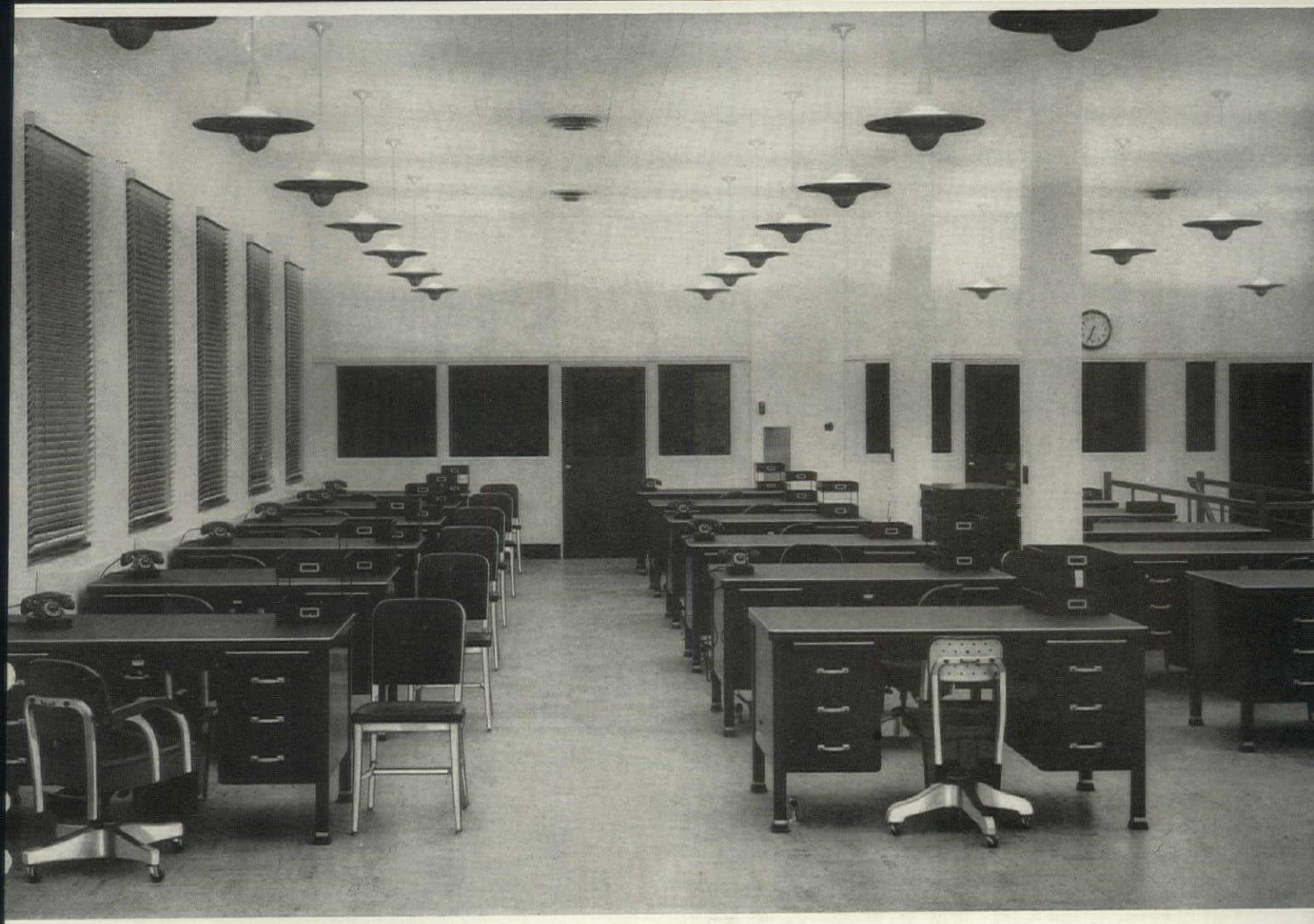
Westinghouse

CLEARING HOUSE SERVICE

FOR ARCHITECTS AND BUILDERS

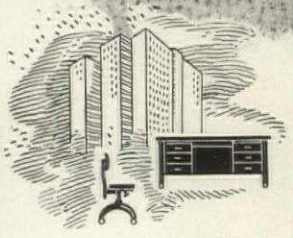
W WESTINGHOUSE ELECTRIC

LAN THE DUTIES OF THE BUILDING BEFORE PLANNING THE BUILDING



Study first what is needed in modern efficient

METAL OFFICE EQUIPMENT



There can be only one reason for any building ever being built . . . to house something. An office building houses working tools of those who conduct business . . . those who make and execute decisions upon a multitude of varied subjects. It is the thinking that is done in the office that makes any building or plant pay dividends.

In planning a building, first consideration should be given to what is to be housed in the building. In planning an office building, first consideration should be given to the type, style, design, duties and arrangement of desks, chairs, filing cabinets and all other items of office equipment that it will be called upon to house.

An engineer, trained in all matters pertaining to the use and arrangement of Metal Office Furniture, is available to aid you in this phase of your modernization program.

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"Now let's get this straight," you say. "Do you mean that a paint job can have a trade-in value like a car—or an electric refrigerator?"

"Yes sir," answers the Dutch Boy. "You 'turn in' your old paint when you repaint on top of it. Then, whatever it saves you on the cost of the new work is exactly the same as a trade-in allowance."

Generous "trades" are the rule when the previous painting was done with Dutch Boy White-Lead. This fine paint cuts down the cost of the new job in two ways:

1. ***No old paint to be removed.*** Dutch Boy does not crack and scale. There are no scaly surfaces that have to be burned and scraped off (that's slow, costly work) before they can be repainted.

2. ***No new priming coat.*** Since the old film is smooth and unbroken, it is not necessary to reprime the surface before applying the new Dutch Boy coats.

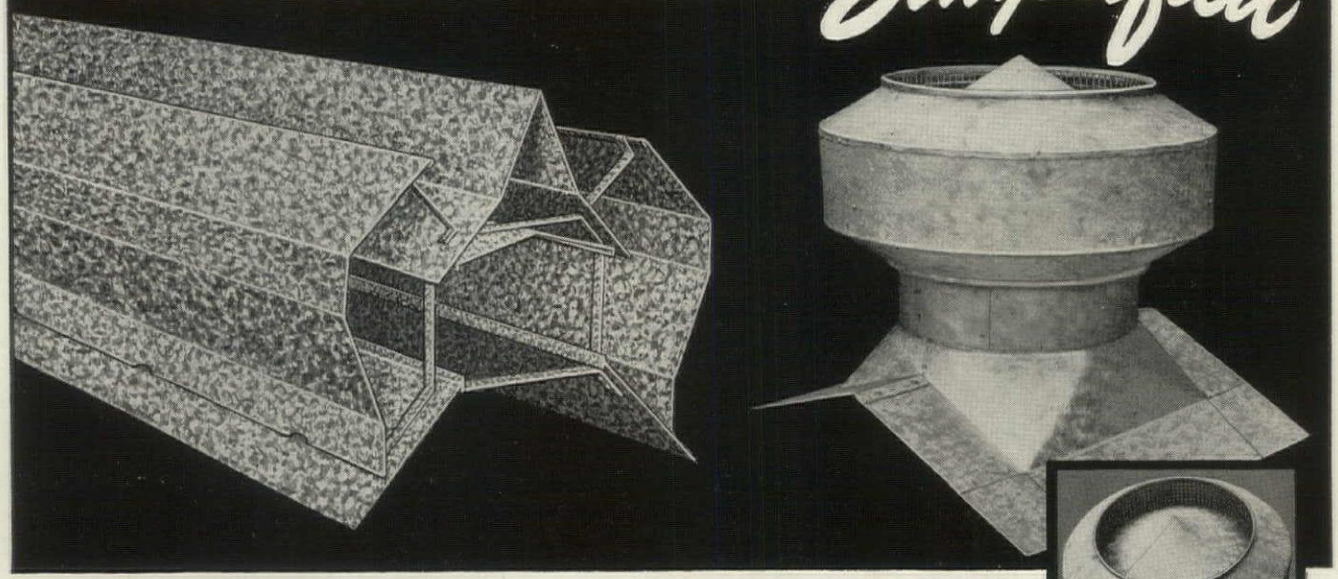
Make sure that your clients get paint with this high trade-in value. Plus long wear. Plus beauty. Specify Dutch Boy White-Lead.

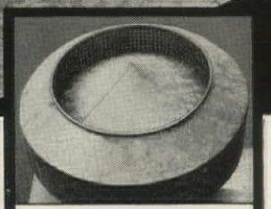
NATIONAL LEAD COMPANY

111 Broadway, New York; 116 Oak Street, Buffalo; 900 West 18th Street, Chicago; 659 Freeman Avenue, Cincinnati; 1213 West Third Street, Cleveland; 722 Chestnut Street, St. Louis; 2210 24th Street, San Francisco; National-Boston Lead Co., 800 Albany Street, Boston; National Lead & Oil Co. of Penna., 1376 River Avenue, Pittsburgh; John T. Lewis & Bros. Co., Widener Building, Philadelphia.

This is the slogan of the national advertising campaign on white-lead now being conducted by the Lead Industries Association. The purpose of this campaign is to promote a wider understanding of the advantages of white-lead paint.

Ventilation Needs *Simplified*





Removable screen is installed in outlet and in throat as desired.

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The Swartwout-Dexter Heat Valve for Industrial and Government Buildings

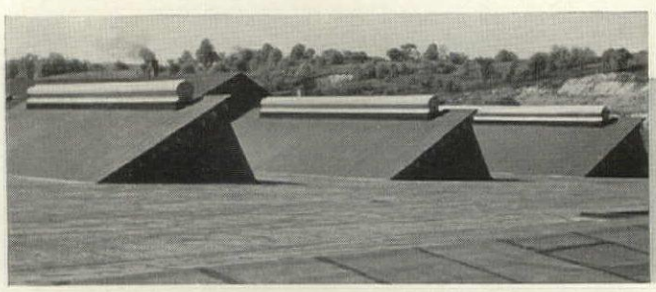
CONTINUOUS ventilators have been specified by the War Department, Bureau of Yards and Docks, and other governmental departments on a large proportion of new construction during the past several years. • Swartwout-Dexter Heat Valve, either galvanized steel or copper, meets the specifications in every way. Many miles of this continuous roof ventilator are in use all over this country and in the Canal Zone. • Your plans are complete when you specify Swartwout-Dexter Heat Valve. Immediate acceptance and approval is assured — quick delivery can be made — full satisfaction with the completed installation — economy in cost — and highest efficiency in operation — all of which makes the Swartwout-Dexter Heat Valve most desirable for this type of construction.

The Swartwout Round Unit Ventilator for Emergency Defense Buildings . . .

THOUSANDS of these ventilators are being installed. They meet standard specifications of government departments for the emergency construction. Made in required sizes, of materials to meet individual needs, the Swartwout Round Unit Ventilator combines low cost with unusual efficiency. And where delivery is a very essential factor, shipment can be had in quantity almost over-night. • It's the ventilator especially designed to meet the current need for fast quantity production. Simplify your work by specifying the Swartwout Round Unit Ventilator — and let us do the rest.

Write, wire or telephone for complete information and detail data. Representatives in all principal cities are at your immediate service.

THE SWARTWOUT CO.
18617 Euclid Ave.
Cleveland . . Ohio



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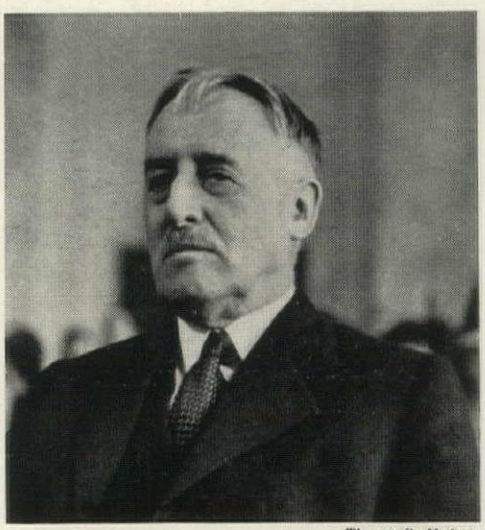
Associated Press

NATIONAL DEFENSE BIGWIGS . . . their faces and functions

Charged with guiding and coordinating Industry's part of the $13 billion U. S. rearmament program, the Advisory Commission of the Council of National Defense was formed last June when President Roosevelt tapped the shoulders of these private enterprisers (standing, left to right, above): Chicago, Burlington & Quincy R. R. Chairman Ralph Budd, transportation; ex-U. S. Steel Chairman Edward R. Stettinius, raw materials; ex-General Motors President William S. Knudsen, production; University of North Carolina Dean Harriet Elliott, consumer protection; SEC member Leon Henderson, price stabilization; Federal Reserve Board Member, Chester C. Davis, agriculture; William C. McReynolds, secretary. Seated: Franklin D. Roosevelt, acting chairman. Absent when picture was taken: Amalgamated Clothing Workers President Sidney Hillman, labor.

Below and right are the men most interested in what the Advisory Commission accomplishes, and originators of the Army and Navy construction projects.



Thomas D. McAvoy

Secretary of War Henry L. Stimson

Wide World

Secretary of the Navy Col. Frank Knox

Associated Press

Chairman, new Navy board, Rear Adm. J. W. Greenslade

Associated Press

Assistant Secretary of War Robert P. Patterson

WAR DEPARTMENT

By the middle of last month, the Army had under contract almost $300 million worth of defense building construction. The men on this page are those who are chiefly responsible—the Construction Division of the Office of the Quartermaster General for handling general construction, the Corps of Engineers for building fortifications and other structures of strategic importance. Also shown on this page are the heads of the Bureau of Reclamation, which is responsible for Federal power developments that are now assuming special importance due to the need for new power sources.

Harris & Ewing

Quartermaster General
Maj. Gen. E. B. Gregory

DiJoseph

Chief of Construction Division
Brig. Gen. Chas. D. Hartman

DiJoseph

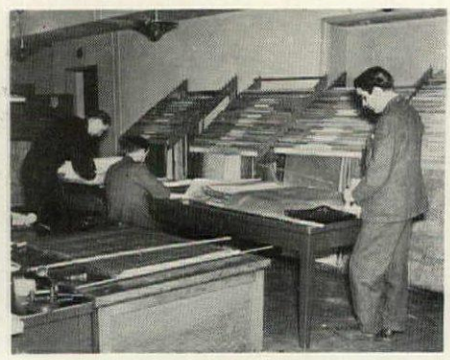
Supervising Architect, L. M. Leisenring; Assistant (left) F. F. Drischler; Chief Draftsman J. Stimson (right)

Chief of Engineering Branch, F. E. Lamphere; Assistant, Maj. E. J. Walters; and clerical force

All photos, D

Chiefs of an Army Design Group, and Drafting Room. Seated, Major R. B. Field. Standing, F. E. Warner, chief specification section; H. R. Woodward, architect-group-chief; Choy G. Wy, chief designer; Gosta Sjolin, architect-group-chief

Chief, Lump Sum Branch
Maj. Andre L. Violante



Contractors examining plans

DiJoseph

Construction Advisory Section
F. J. C. Dresser, Maj. F. S. Harvey, chairman, Francis Blossom

CORPS OF ENGINEERS

Harris & Ewing

Acme

Chief, U. S. Army Engineers, Col. Julian L. Schley. (left) Chief, Fortifications & Construction Section, Brig. Gen. Thomas M. Robins

BUREAU OF RECLAMATION

Commissioner
John C. Page

Associated Press

Chief Engineer
S. O. Harper

NAVY DEPARTMENT

Prime news to the building industry is the fact that the Navy is contracting for even more construction than the Army, by mid-October well over $400 million worth. Recent Navy building, shown in this issue, is surprisingly well designed, and it is the personnel of the Bureau of Yards and Docks, shown on this page, which is responsible for this new high in Government architecture. Also shown are the heads of two peace-time departments which are feeling the effects of the defense program: the U. S. Coast Guard and the Civil Aeronautics Authority. The latter advises municipalities on bringing civilian airports into line with defense needs.

DiJoseph

Chief, Bureau of Yards & Docks
Rear Admiral Ben Moreell

Harris & Ewing

Huddle in Design Division
J. T. Maguire, chief draftsman; Lieutenant H. H. Bagley, asst. to design manager, for aviation activities; Commander C. A. Trexel, design manager; A. F. Macdonald, architect; Commander J. C. Gebhard, assistant design manager; H. C. Sullivan, senior architect.

D Joseph

Part of Design Division at work.

Harris & Ewing

Rear Admiral B. Moreell, Chief of Bureau; Commander L. B. Combs, assistant; Wm. M. Smith, special assistant; Commander J. J. Manning, project manager Fleet Facilities Section

Harris & Ewing

Blueprinting plans at rate of about 14 feet per minute

Harris & Ewing

r. Bennett, asst. to the head of the pecification section, examining lans with contractor

DiJoseph

Head, Contact & Liaison Section
Lt. Comdr. E. J. Spaulding

U. S. COAST GUARD

Harris & Ewing

Commandant
Rear Adm. R. R. Waesche

CIVIL AERONAUTICS AUTHORITY

Harris & Ewing

Administrator
Donald H. Connolly

Wide World

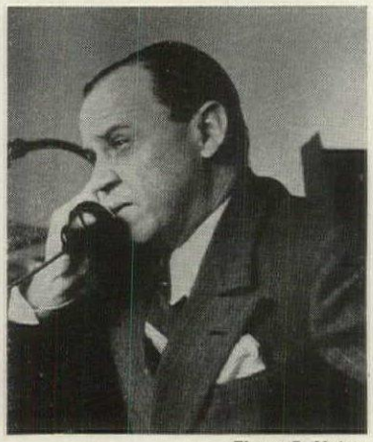
Chief, Airport Section
Maj. A. B. McMullen

FEDERAL WORKS AGENCY

In a double-barreled effort to provide immediate housing for the families of national defenders, Congress has given the Army and Navy $100 million, the Federal Works Agency, $150 million more (see p. 437 et. seq.). The Navy will spend its own share of the former appropriation, the Army has already added its cash to the FWA fund, the expenditure of which will be guided by the men pictured below. All but one are king pins in FWA and its operating sub-agencies. The exception: Administrator Will W. Alexander of the Agriculture Department's Farm Security Administration (lower right) which may be called into the program to provide rural or prefabricated defense housing.

Associated Press

Administrator
John M. Carmody



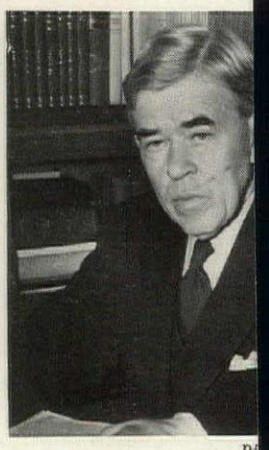
Thomas D. McAvoy

Assistant
Col. Lawrence Westbrook

PBA—Administrative Office

DiJoseph

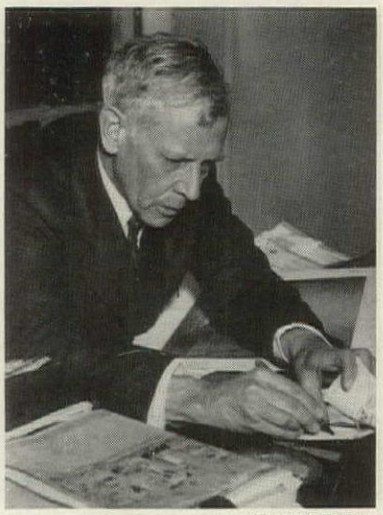
Commissioner of Public Buildings
W. E. Reynolds



DiJoseph

Assistant to the Commissi
N. Max Dunning, Archite

PBA—Office of Supervising Architect



Harris & Ewing

Supervising Architect
Louis A. Simon

DiJoseph

Section of drafting room

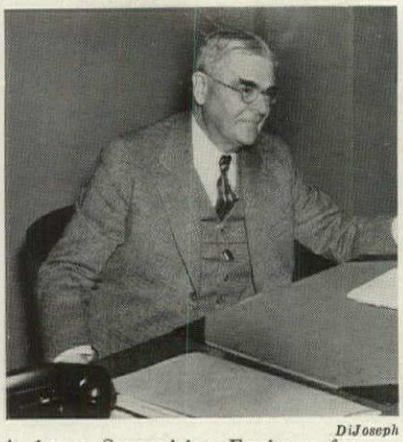
DiJoseph

Consultant Architect for emergency construction: Gilbert S. Underwood

PBA—Office of Supervising Engineer

DiJoseph

Supervising Engineer
Neal A. Melick



DiJoseph

Assistant Supervising Engineer for emergency construction: J. R. Davis

USHA

Otto Hagel

Administrator
Nathan Straus

FSA

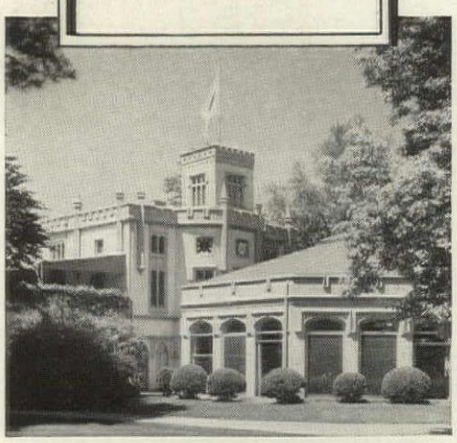
Wide World

Administrator
Will W. Alexander

● Note detail of mouldings; ornamented battlements, pinnacles and window mullions—all faithfully preserved in line and detail by portland cement stucco made with Atlas White cement.

Born Tudor-Gothic

...KEPT ALIVE FOR TOMORROW BY STUCCO



● Turf and Field Club, Belmont Park, Long Island. Engineer, C. V. Boyle, also supervisor of Belmont Track. Contractor, Frank Hawkins, New York. Stucco manufacturer, Artstone Rocor Corp., Brooklyn.

FACTORY-PREPARED STUCCO IS PREFERABLE

How the architectural style of a century ago is preserved in line and decoration at Turf and Field Club, Belmont Park, L. I.

MORE than a century ago residential Tudor-Gothic was in vogue in and around New York. The famous Belmont Turf and Field Club on Long Island is a classic example. Originally of frame, the building was resurfaced recently with Artstone Stucco, made with Atlas White cement. This steel and concrete overcoating now preserves the original lines, decoration and color from foundation to highest pinnacle.

Architects are consistently proving the versatility and adaptability of portland cement stucco as a medium of expression in designing new buildings or modernizing old ones. They find that it blends well with wood, stone and brick, and gives permanence to design and durable protection. Fire- and weather-resistant, its first cost is moderate, and upkeep is practically nil.

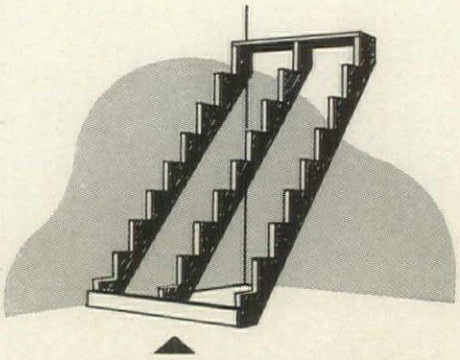
Consider the lasting good appearance and relatively low cost of portland cement stucco, made with Atlas White cement, in connection with your next job. Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, New York.

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

AF-S-20

ATLAS WHITE CEMENT

A UNIVERSAL ATLAS PRODUCT

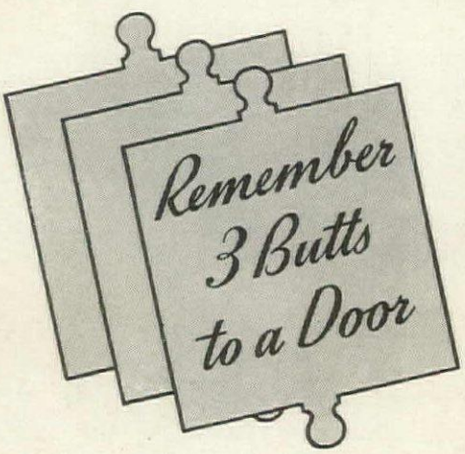


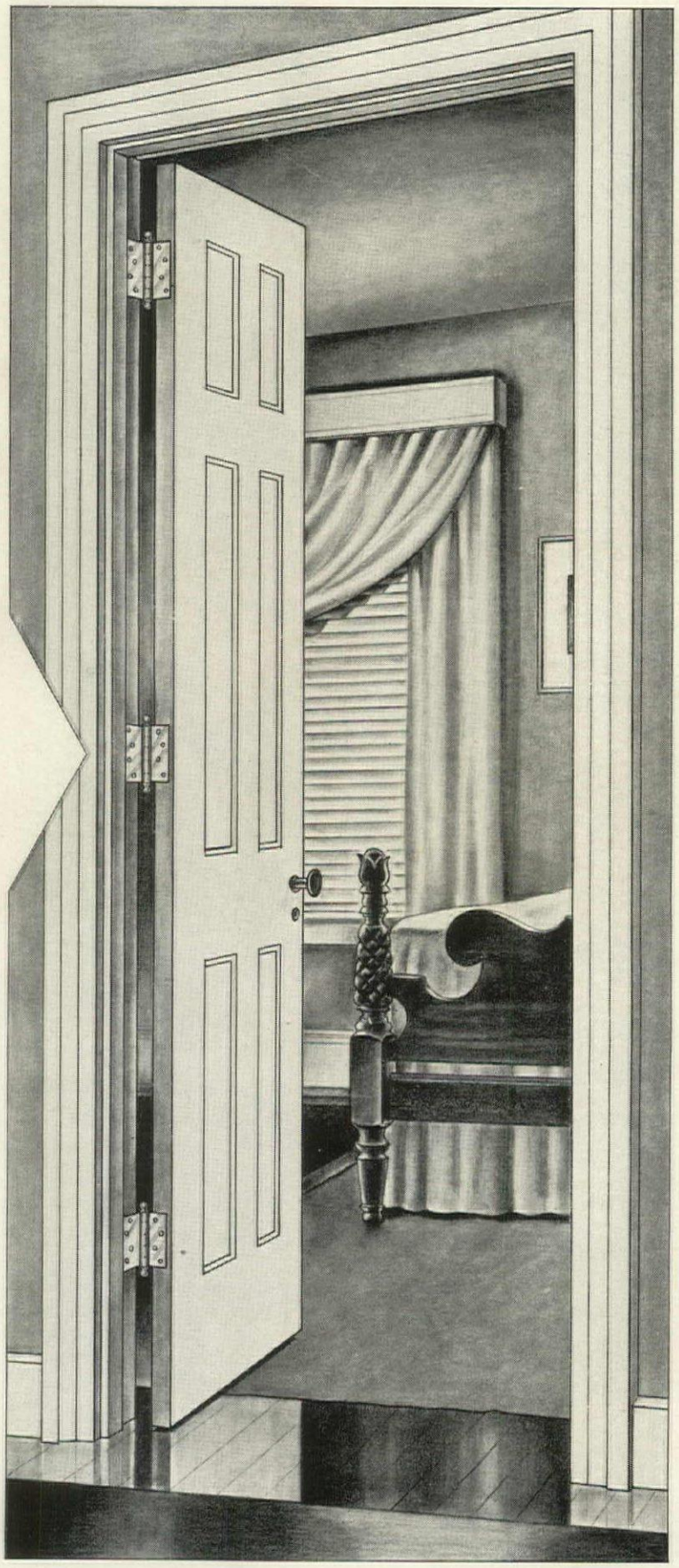
THE CENTER STRINGER MAKES A STAIRWAY SOUND . . .

The stairway with a center stringer is firm under your step...The treads don't sag or warp...squeaks are out.

THE CENTER BUTT Keeps The Door Hanging Straight And True

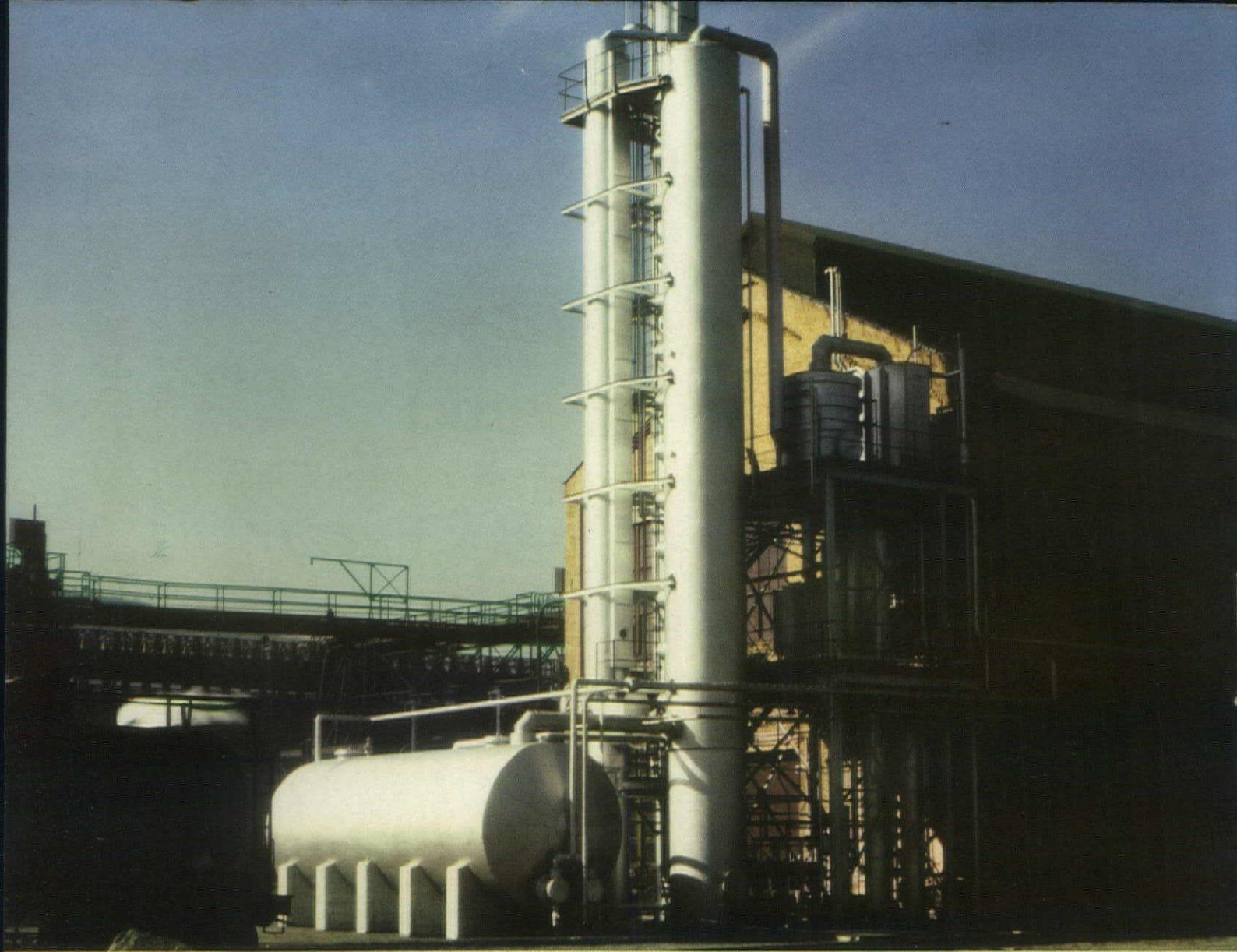
Where's there a wood door that's not prone to warp? You can correct this situation, if you put the third butt on every door in the house. It holds the door in line, keeps the latch and lock clicking to a perfect fit. Remember, thin doors are more apt to warp than thick doors! And it may cost more to repair a single warped door than to put the third butt on every door in the house. Your clients will thank you later if you *figure every job* "three butts to a door." The Stanley Works, New Britain, Connecticut.





STANLEY

TRADE MARK



Light oil refining plants like this, and many other plants built by Koppers, are producing materials essential to the national defense.

for Industrial Preparedness

KOPPERS ENGINEERING

KOPPERS CONSTRUCTION

KOPPERS ROOFING

KOPPERS PRESSURE-TREATED TIMBER

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KOPPERS COAL

KOPPERS COKE

KOPPERS GAS

KOPPERS COKE OVENS

KOPPERS PISTON RINGS

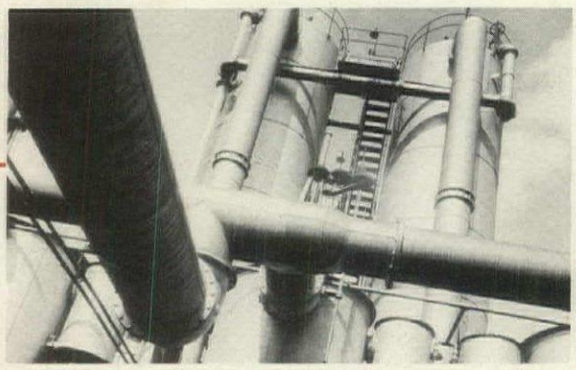
KOPPERS COUPLINGS

ETC.

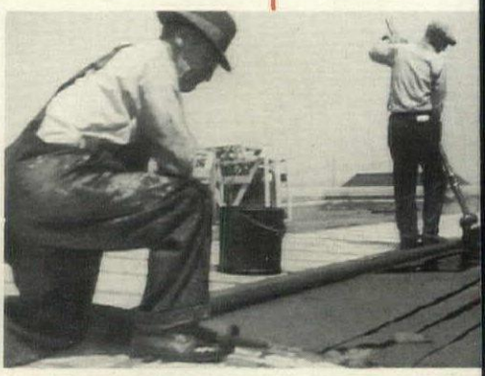
How Koppers AIDS NATIONAL DEFENSE

America's ability to build and produce . . . quickly, efficiently and in vast volume . . . has suddenly become a matter of life or death in the minds of most Americans, and with it has come a new and mounting appreciation of the importance of the industries that design and construct.

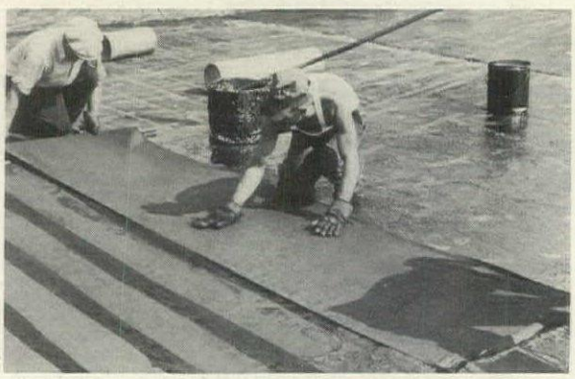
To these industries . . . as to most industries in America . . . Koppers is a skilled and trusted aid, a dependable supplier of materials, a prolific source of new ideas and technical improvements.



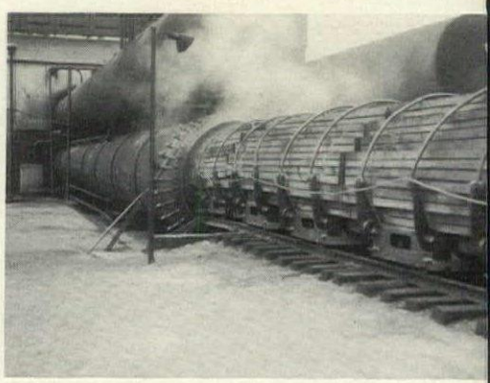
Koppers is in perhaps a better position than any other company to act as a consultant on the highly-technical plant construction so vital to America's safety. It maintains an engineering staff . . . experienced in the invention and development of new processes and machinery.



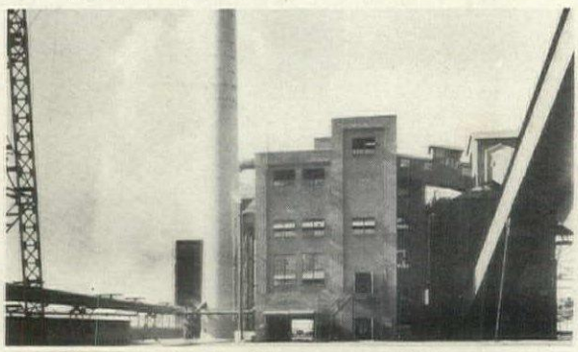
Koppers is an important factor in the roofi business. It produces coal tar pitch, the ty of roof which has made the long-time recor for leak-free life. It pioneered the water-cool roof which is an important factor in air cond tioning and in the control of humidity.



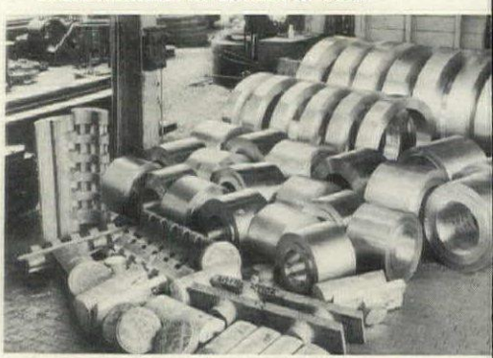
Koppers has contributed much of the current experience on protecting concrete and masonry with waterproofing and dampproofing treatments. Its engineers are glad to work with architects and engineers on this specialized problem.



Koppers operates a nation-wide group treating plants in which timber products a pressure treated with creosote and other pr servatives to prevent destruction by termite decay or other wood destroyers which annuall cause millions of dollars of loss.



Koppers has a department which acts as consultant on industrial power plants, boiler systems, industrial electrical engineering installations, power surveys, and valuations. Koppers may be retained to prepare complete estimates on boilers and electrical installations or to carry out actual installations.



Koppers has extensive foundry, forge an machine shops . . . it manufactures specialize machinery and equipment, including Fast' Self-aligning Couplings; D-H-S Bronze, a re markable non-ferrous alloy; American Ham mered Piston Rings. It produces Tarmac fo paving roads, walks, parking areas, etc.

SEND FOR THESE TECHNICAL INFORMATION FOLDERS

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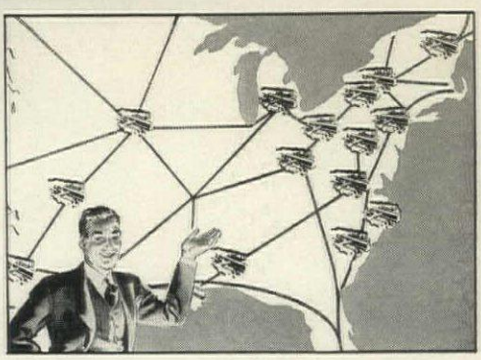
National Gypsum's New $4,000,000 New York Plant now Ready to Supply the Defense Program with an Unlimited Supply of the World's Finest Gypsum Products.

Today, when planned expansion is the keynote of national defense, National Gypsum's 14 year program is of particular interest. Back in 1926, National had one plant, three salesmen. Today, it operates 16 modern mills from Canada to the Gulf—sells 149 related wall and ceiling products through over 10,000 dealer outlets!

This background has prepared National Gypsum ideally for an important role in national defense—without sacrifice of service to private contractors, dealers, home-owners! Plants are strategically located to give Uncle Sam vital building materials on short notice. To date over 10,000,000 feet of Gold Bond wallboard, for example, has been purchased or is on order for army encampments.

Whether you are building an army cantonment, a private dwelling or an office building, it will pay you to consult the National Gypsum Company, America's foremost wall and ceiling specialists. National's famed research helps solve your problems. National Gypsum Company, Buffalo, New York.



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WALL & CEILING PRODUCTS

GYPSUM PRODUCTS
A complete line including famous Gold Bond wallboard, gypsum sheathing board, gypsum lath, gypsum plaster, special finishes and patented systems of erection.

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A product to meet every insulation problem! Fibre insulation board, insulation lath. Foil board, Foil lath, Rock Wool, Dry Fill. Decorative plank and insulation tile.

METAL LATH
Fine metal products manufactured in America's most modern metal lath plant. Including metal studs, new ideas in corner bead, patented base and partition systems.

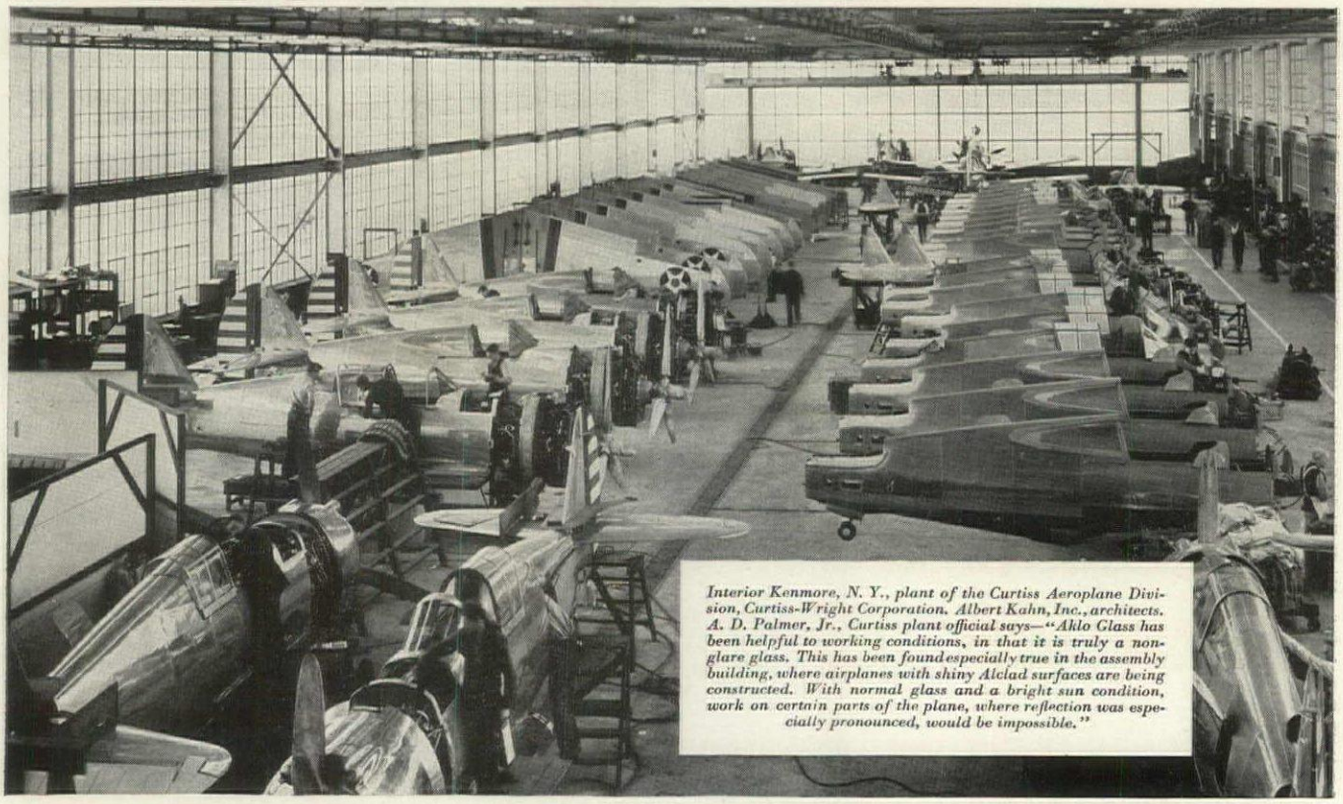
PAINT PRODUCTS
For economy, speed—texture Finishes and Sunflex Casein paints.

LIME PRODUCTS
Including top-quality Finish lime, Mason's lime, Agricultural lime.

ACOUSTICAL PRODUCTS
Tile, plaster, board and accessories to meet every sound control need.

WHEN YOU BUILD FOR

INVESTIGATE THE PROGRESS AND CHANGES HAS MADE IN FACTORY



Interior Kenmore, N. Y., plant of the Curtiss Aeroplane Division, Curtiss-Wright Corporation. Albert Kahn, Inc., architects. A. D. Palmer, Jr., Curtiss plant official says—"Aklo Glass has been helpful to working conditions, in that it is truly a non-glare glass. This has been found especially true in the assembly building, where airplanes with shiny Alclad surfaces are being constructed. With normal glass and a bright sun condition, work on certain parts of the plane, where reflection was especially pronounced, would be impossible."

● Times have changed since America last manufactured armaments on a vast scale. Tremendous progress, changes and improvements have been made in factory layout and construction. Not the least of these has been the introduction of improved types of glass and glass usage in industrial design.

It is now possible to control the distribution of light to meet all sorts of conditions. A wide range of glass is available from which to make selections for all factory building purposes. Because most defense work is a precision job where solar heat often affects accuracy of machining, Aklo Heat Excluding Glass is used effectively. Again, this same glass greatly reduces glare from highly reflective machined surfaces. And in so doing, Aklo increases worker efficiency—speeds production.

Because of this better understanding of glass usage and the availability of improved and specialized glass products, defense construction need not evolve into cavernous, expensive types of construction where both air and light are supplied artificially. Then too, every kilowatt of power that is saved by natural lighting in daytime is a kilowatt available to turn defense manufacturing machinery.

We want you to know all about this specialized use of glass as it applies to industrial buildings. The facts can be explained and demonstrated in your office. We would like to explain them to you at your convenience. Call your nearest L·O·F Distributor or Branch Office or write us direct. Libbey·Owens·Ford Glass Company, Toledo, Ohio.

LIBBEY·OWENS·FORD QUALITY

THERMOPANE . . . AKLO PLATE GLASS . . . THERMOLUX . . . SAFETY GLASS . . . TUF-FLEX TEMPERED PLATE GLASS . . . Distributors of BLUE RIDGE FIGURED AND WIRE GLASS . . . BLUE RIDGE AKLO HEAT-ABSORBING AND GLARE-REDUCING GLASS

DEFENSE

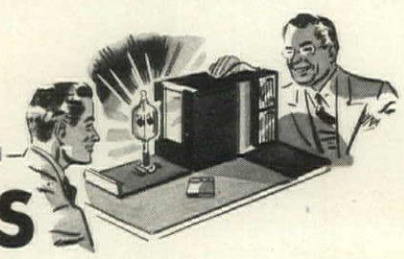
THAT GLASS CONSTRUCTION

PROPER GLASS USAGE MAKES POSSIBLE EFFICIENT CONTROL OF LIGHT DISTRIBUTION—EXCLUSION OF SOLAR HEAT—REDUCTION OF GLARE—INCREASES EFFICIENCY—SPEEDS PRODUCTION.

A section of the plant of the General Machinery Corporation at Hamilton, Ohio. AKLO frosted finish, Heat-Absorbing and Glare-Reducing Glass is used here to reduce specular reflection from surfaces of machined parts and to make working conditions more comfortable by lowering the amount of solar heat transmitted into the building. In air-conditioned plants Aklo effects worth-while savings in the cost of operating refrigeration equipment.

AKLO Hammered Glass is used in both the office and factory windows of the Druggist Cooperative Ice Cream Co., Inc., Atlanta, Ga.; Jiroud Jones & Co., General Contractor. In the office windows, only the upper half is glazed with AKLO Frosted Finish, permitting an unobstructed view through the lower half which is glazed with L·O·F Quality Glass. The factory windows are glazed throughout with AKLO.

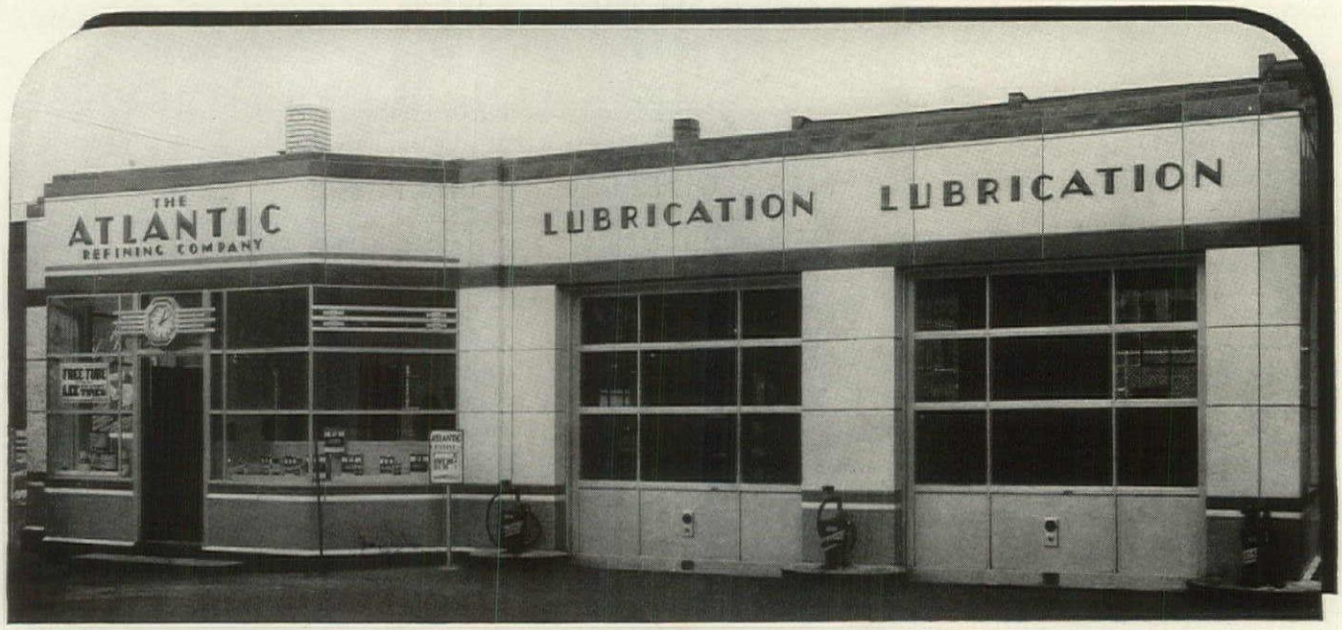
The plant of the Hydraulix Press Mfg. Co., Mt. Gilead, Ohio. Window and monitor areas are glazed with AKLO Hammered. Where large areas are exposed to the sun, AKLO greatly reduces heat infiltration.



The unusual heat absorption qualities of AKLO are accurately and dramatically demonstrated with this highly sensitive Radiometer. We would like you to see this demonstration in your office. No obligation.

GLASS PRODUCTS

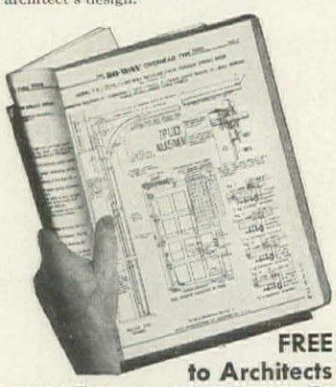
L·O·F



Modernistic Service Station. Note the slender vertical lines with horizontal lines emphasized to conform to architect's requirements.

Modern Residence with attached Garage, equipped with Ro-Way "Two-Car" Overhead Type Door.

U. S. Government Inspection Station. Note all Ro-Way Doors have arch segment tops, to conform to architect's design.



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Skyward

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STRAIGHT up for more than 1000 feet, the slim spire of the Chrysler Building pierces the sky like the point of a huge bright needle. People the world over know this building for its height, its graceful design, and the engineering that made it possible.

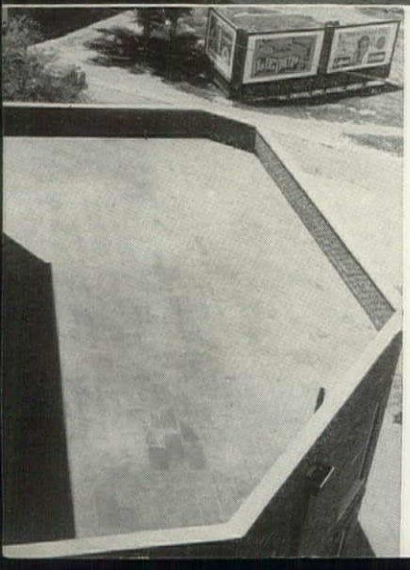
We feel, therefore, that the use of Bethlehem Elevator Cable in the Chrysler Building speaks, in itself, for the quality of the product.

The new Bethlehem Elevator Cable is a quality product in every detail: designed by wire rope experts, made of selected steel on new machines, scientifically lubricated and fitted together as accurately as a fine watch. It can be specified with complete confidence for any type of elevator system.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

(Right) Southern California Gas Co. Los Angeles, Calif.



(Above) Hampton Beach Bath House, Hampton Beach, N. H.

(Left) General Hospital, Wichita Falls, Texas.

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WITH IMPROVED Carey Elastite ASPHALT TIL

Those roof areas that are so valuable for sun decks, roof gardens, recr tional activities—give them a tough, durable, fire-and-weather resistant s facing with CAREY Elastite Asphalt Tile.

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This improved tile is a compound of asphalt and mineral filler, reinforc with asbestos fibres, densely compressed and die cut to size. CAREY Elast Asphalt Tile is approved by the Underwriters' Laboratories for "Class built-up roofing, when applied in accordance with their instructions, on slop up to and including 1" to the horizontal foot.

CAREY Elastite Asphalt Tile has a smoother and more attractive surface— highly resistant to compressive loads—quiet and dustless under traffic. Wh relatively hard, it is resilient—comfortable under foot.

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CAREY Elastite Asphalt Tile is another important development of CARE research . . . backed by more than a half century's manufacturing experienc Write for complete details. Address Dept. 20.

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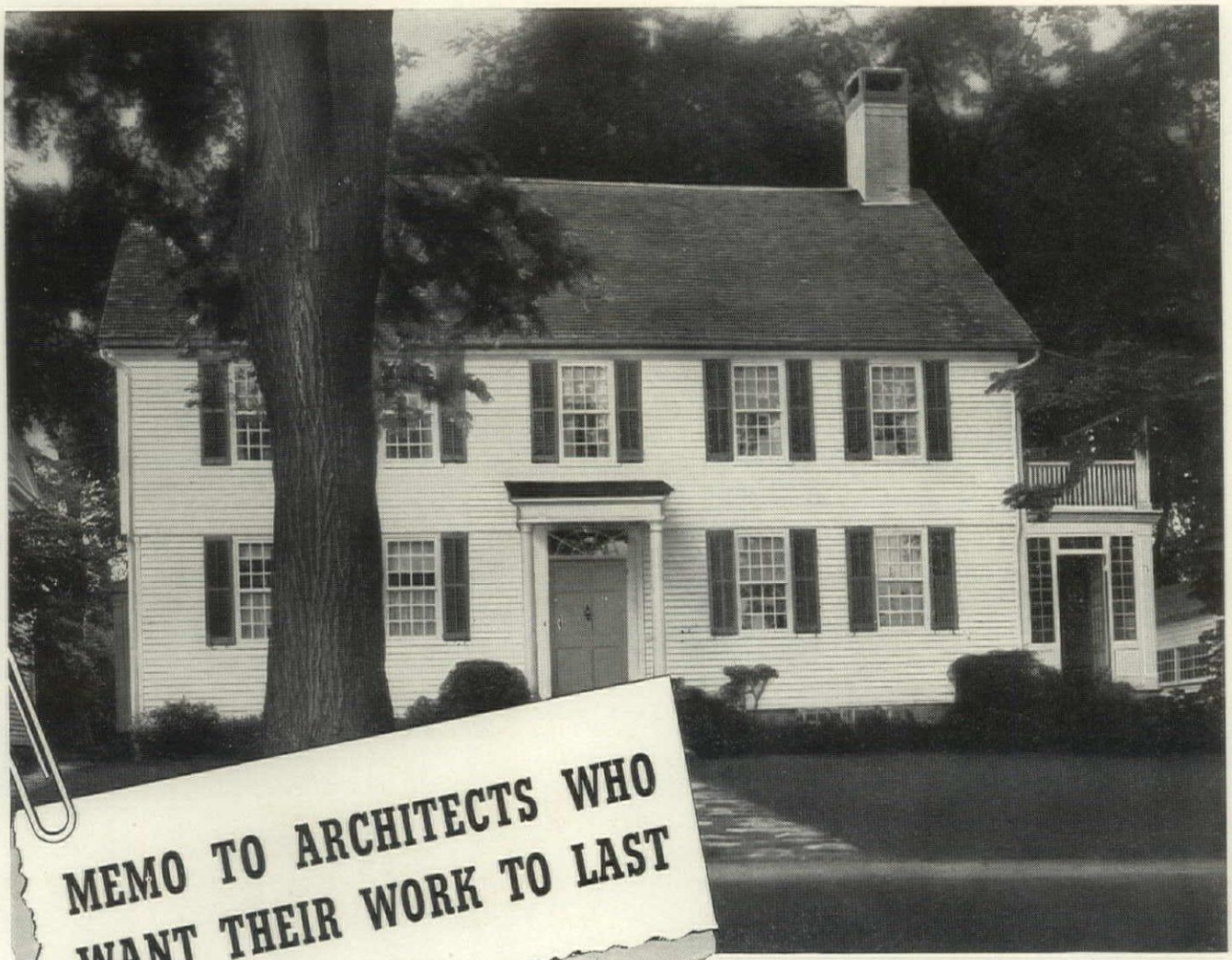

MEMO TO ARCHITECTS WHO WANT THEIR WORK TO LAST

BUILT IN 1782, this sturdy Connecticut home is far from looking its age. Pure white lead paint protects it from weather's ravages.

ISN'T it significant that so many of the early colonial buildings that still stand staunch and sound today have been painted through the years with pure white lead paint?

Isn't that the best proof that white lead paint forms an enduring weatherproof seal that better safeguards construction?

White lead of course is made from lead, one of the most enduring of metals. And like the metal, white lead also has high weather-resisting qualities.

That's why white lead paint lasts longer — why it looks better. Moreover this time-proven paint does not crack and scale but wears away slowly and evenly.

Yet white lead paint costs no more than others when you consider its economical, high spreading-rate, ease of application and longer life. And its velvet-smooth finish sets off your work to best advantage.

That's why most architects say it's a good idea in specifying paint to make sure how much white lead it contains. And it's pretty safe to say: *the higher the lead content, the better the paint.* You can't, for example, get a more durable paint than one containing a hundred per cent white lead. This is the kind good painters mix from lead-in-oil. It can also be bought in many places today in prepared, ready-to-use form—in white and colors.

• • •

HOW MANY COATS DO YOU NEED WITH WHITE LEAD? You'll find the answer to this and many other valuable painting tips in informative booklet "WHAT TO EXPECT FROM WHITE LEAD PAINT." Send postcard for your free copy.

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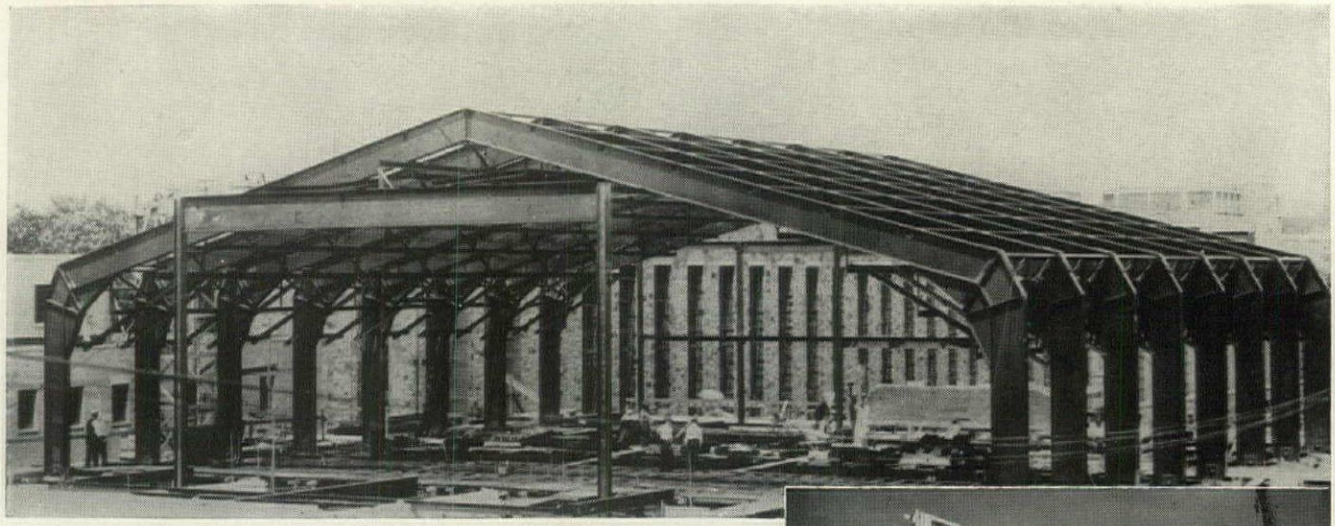

Welded Rigid Frames. *(Photo courtesy of Schieve Construction Co., Buffalo)*

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SPEEDS UP CONSTRUCTION...SAVES TIME, STEEL, WEIGHT AND MONEY

For RAPID, STURDY AND ECONOMICAL construction of shops, warehouses, factories, armories, hangars, bridges and other defense structures, WELDED STEEL CONSTRUCTION is the answer. Outstanding records for speedy fabrication and erection have been established for welded buildings of the types involved in national defense construction and related industrial expansion.

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Rigid frames and arch bents, particularly adapted to welded construction because of their rigidity, require little additional steel for wind and crane loads and to resist explosion forces.

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The smooth surfaces of welded structures are easily cleaned and painted and present less area exposed to corrosion.

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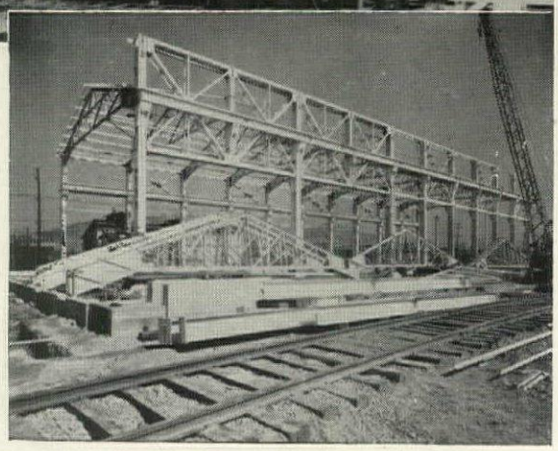
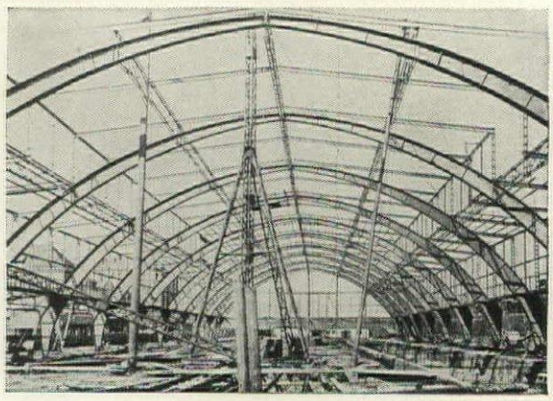
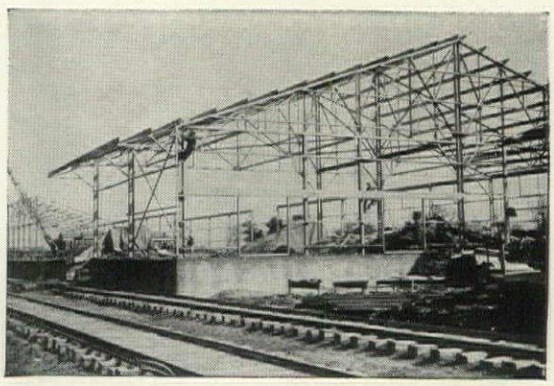


Welded Truss-Bents. *(Photo courtesy of Dravo Corporation)*



Welded Steel Arch Ribs



Welded Light Trusses. *(Photo courtesy of Schieve Co., Buffalo)*

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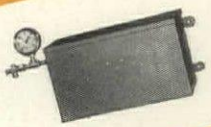

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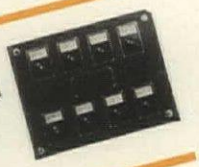

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MINNEAPOLIS HONEYWELL *Gradutrol System*

HOW *Fenestra* CAN HELP YOU

WILL AMERICA BE NEXT?

Above, two great storehouses of the U. S. Navy Base, Brooklyn, N. Y., equipped with 243,370 square feet of Fenestra Windows during the World War; Turner Construction Co., contractors. In this period, Fenestra windows, literally ACRES in area, were installed in many buildings for the Army, at New Orleans, Charleston, Norfolk, Philadelphia, Boston, etc.; and for the Navy, at Pearl Harbor, Hawaii; San Francisco, Norfolk, Portsmouth, Bremerton, Boston, etc. The Army and Navy Office Buildings, Washington, D. C., used 396,000 square feet of Fenestra Steel Windows.

Above, the huge new plant addition of Pratt & Whitney Aircraft, East Hartford, Conn., equipped with Fenestra Windows; Albert Kahn, Inc., architects; Turner Construction Co., contractors . . . Besides numerous orders from private manufacturers, recent Fenestra orders from the U. S. Navy include: Windows and Doors for hangars, storehouses, garages, overhaul shops, officers' quarters, barracks, mess halls, etc., in Alameda, Jacksonville, Squantum, Quonset Point, Melbourne, Key West, Green Cove Springs, Norfolk; Cuba, Porto Rico, Hawaiian Islands; etc.

Fenestra

MAKE AMERICA STRONGEST-QUICKLY

AGAIN Fenestra is in action for a national emergency—this time to help you make America strongest, quickly: all ready to speed the construction of many kinds of defense buildings. For quick shipment, Fenestra has available many styles of *Standard Prefabricated* Steel Windows and Doors, in wide ranges of types and sizes, for use in military and naval buildings, in industrial, transportation and utility buildings, and in housing . . . Where desired, entire walls of ready-built windows may be substituted for masonry walls, effecting large savings in erection time, labor and materials, and in over-all cost . . . Observe how Fenestra can serve you *faster and better*—

1 You get *rush delivery* of Standard Fenestra Prefabricated Steel Windows and Doors from factories in Detroit, Michigan, and Oakland, California, and from factory warehouses strategically located to make overnight deliveries.

2 You *save installation time, labor, materials:* Prefabricated Fenestra products are delivered to your jobs already fitted, assembled, even Bonderized and prime-painted—COMPLETE.

3 You get *top quality*—quality that for years has met the exacting specifications of the U. S. Army and Navy; materials fabricated by craftsmen using specialized machinery.

4 *Protected from rust* by Parker Rust-Proof Company's Bonderizing process, Fenestra materials are durable. They cannot rot, warp, shrink, swell or splinter; they are proof against termites and other vermin.

5 Fenestra products afford practically *100% salvageability:* easy and quick transfer from temporary to permanent construction, for example. Sizes are standard; identical sizes are perfectly interchangeable, even to the smaller hardware parts. Frames are integral, and an entire window or door assembly may be removed and reinstalled as a unit, intact.

6 Standard Prefabricated Fenestra Steel Windows and Doors afford *maximum savings* in first cost, the result of maximum manufacturing economies in the shops of America's oldest and largest manufacturer of solid section steel windows.

. . . For the latest complete catalog information, mail the coupon below. For quick catalog information, see the Fenestra Blue Book in SWEET'S (31st consecutive year) . . . Fenestra offices are located in 200 principal cities—for immediate, personal service, call a local Fenestra engineer; or telephone Detroit—Madison 7680.

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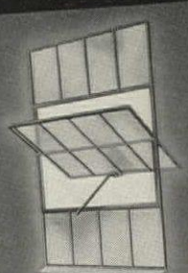

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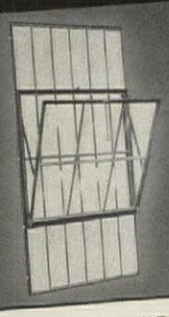
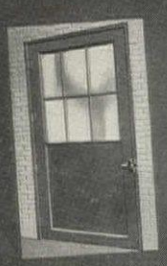
Standard equipment for many years, in all types of industrial and commercial buildings. They provide maximum daylight and fresh air; improve working conditions; help increase output. Quickly joined by mullions to form Window-Walls.



SECURITY WINDOW
Gives break-in protection without sacrificing daylight and fresh air, and without spoiling appearance with unsightly bars over windows. The Security Window is a fixed steel grille, with an open-in steel ventilator superimposed on the inside.



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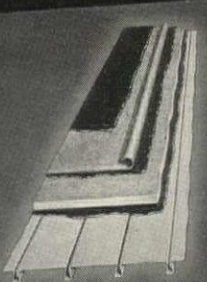
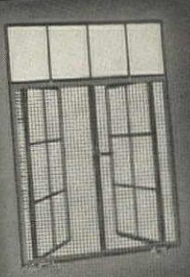
Used in industrial and commercial buildings, apartments, hotels, public buildings, for employees' entrances, storerooms, furnace and boiler rooms, fire exits, etc. Swing or slide, single or double. One of many types of Fenestra Steel Doors.



HOLORIB ROOF DECK
A rigid, extremely lightweight steel deck, self-reinforced by triangular ribs. Combined with insulation and waterproofing, it forms an unusually durable, fire-resisting, leak-proof roof. Especially adapted to Winter building—100% "dry construction."



RESIDENCE CASEMENT
Many kinds, types and sizes for various housing needs. Provides more daylight, better ventilation, easy opening, safe washing, extraordinary weather-tightness, better screens, fire-safety, lower maintenance cost. Quickly, easily installed.

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STEEL WINDOWS AND DOORS
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STOP HIM WITH MODINES

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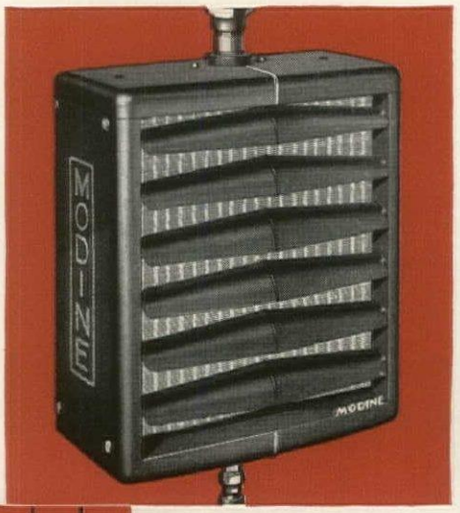
Modines warm up faster; keep temperatures even; prevent cold weather shutdowns; insure employee comfort and efficiency. Fuel savings are larger; maintenance is lower. Modines mean *precision heating—proved* by years of satisfactory performance in thousands of installations; backed by Modine — the greatest name in unit heater heating.

Time is all-important in your building expansion program. Modine is prepared to make *prompt deliveries*. And the *Modine-patented* direct-from-branch-supply-pipe suspension means *speedier*, easier installation at less cost to you.



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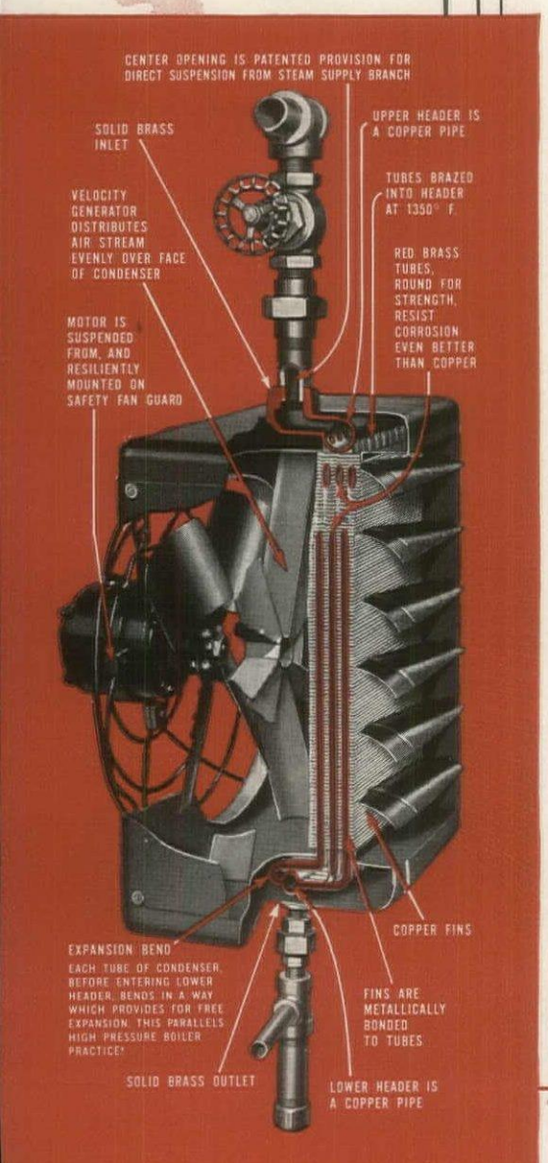

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A DEFENSE PROGRAM FOR INDUSTRY'S FLOORS

Note the great depth of metallic aggregate in this section of a Masterplate floor.

INSTALL MASTERPLATE METALLIC-CONCRETE FLOORS!

GOVERNMENT FINDINGS ON THIS TYPE OF FLOOR

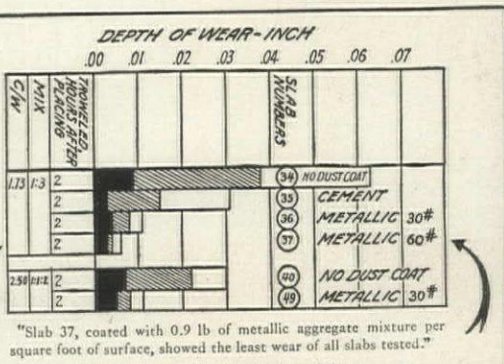
U. S. Department of Commerce — National Bureau of Standards

RESEARCH PAPER RP1252

Part of Journal of Research of the National Bureau of Standards, Volume 23, November 1939

A PORTABLE APPARATUS FOR DETERMINING THE RELATIVE WEAR RESISTANCE OF CONCRETE FLOORS

By Louis Schuman and John Tucker, Jr.



"Slab 37, coated with 0.9 lb of metallic aggregate mixture per square foot of surface, showed the least wear of all slabs tested."

This is the Masterplate type of floor.

FLOORS DEMAND AND GET HEAVIER ARMAMENT!

YEARS ago wooden ships with no metal armament sailed the seas to fight the battles of nations. Today, armor-plate grows increasingly thicker and tougher as modern day methods create severer demands.

Years ago plain concrete floors were considered "good enough" for industrial buildings. Today the speed and severity of industry demand the most durable metallic-concrete floor, Masterplate.

Heavier armament applies to floors as well as to battleships. Floors are designed and built with the same care as machine tools are built because the floor is an essential part of "the machine".

Since 1935 leading industries and railroads have been incorporating in floors up to 120 pounds of metal per 100 square feet by the Master Builders' exclusive Masterplate method to provide the durability needed.

Masterplate is Master Builders' pure water-absorbent, graded Metallic Hardener combined with Master Builders' exclusive water reducing agent... By the Master Builders' method 2 to 4 times more metal is incorporated in the concrete and up to 500% longer life is created in the floor. This thick "built-in" armored surface outwears plain concrete floors 4 to 6 times.

Earlier practise of installing 30 to 40 pounds of metal while good "as far as it goes" is inadequate for today's high speed, heavy duty industrial traffic.

Full information on Masterplate will be sent to you at your request. Write for "Masterplate Method" No. 3886. Refer also to Sweet's.

THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO — TORONTO, CANADA

THESE OUTSTANDING INDUSTRIALS

have found the Masterbuilt Metallic-Concrete Floor the economical, efficient floor for today's needs.

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MASTER BUILDERS

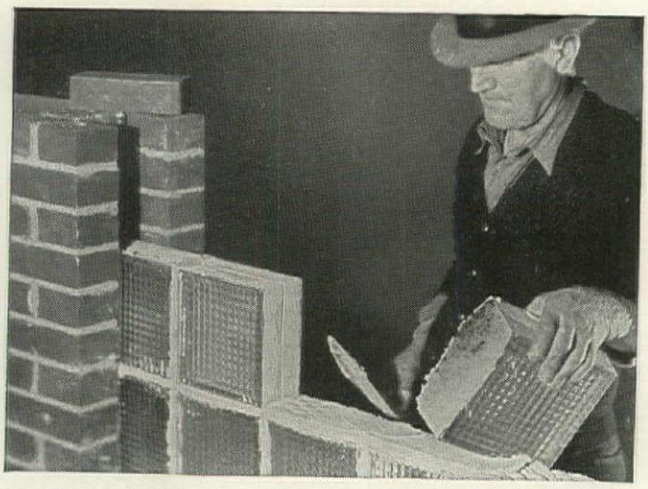
INSULUX Gives "FULL SPEED AHEAD" to Jobs Marked RUSH!

With defense orders piling up, industry needs new plant facilities—needs them quick! You can help your clients build quicker, build better by planning with Insulux Glass Block. Here's why:

1. YOU CAN GET IMMEDIATE DELIVERY ON INSULUX GLASS BLOCK, IN ANY QUANTITY, FROM DISTRIBUTORS ANYWHERE IN THE COUNTRY!
2. Insulux speeds up new construction and remodeling of old buildings. Insulux panels can be installed by any bricklayer on your job.
3. Insulux gives ample quantities of well distributed light that ups production efficiency.
4. Insulux gives better insulation . . . better control of temperature levels . . . more usable floor space.

Insulux Glass Block will help you hit your construction schedule squarely on the nose! Owens-Illinois Glass Company, Insulux Division, Toledo, Ohio.

NO FIFTH COLUMN prying or peeping when Insulux Glass Block protect the privacy of industrial plants. Solid Insulux panels guard against entry and theft.



NO HOLD-UPS on Insulux jobs. Block are immediately available—construction is rapid—panels are laid up easily by any good bricklayer.

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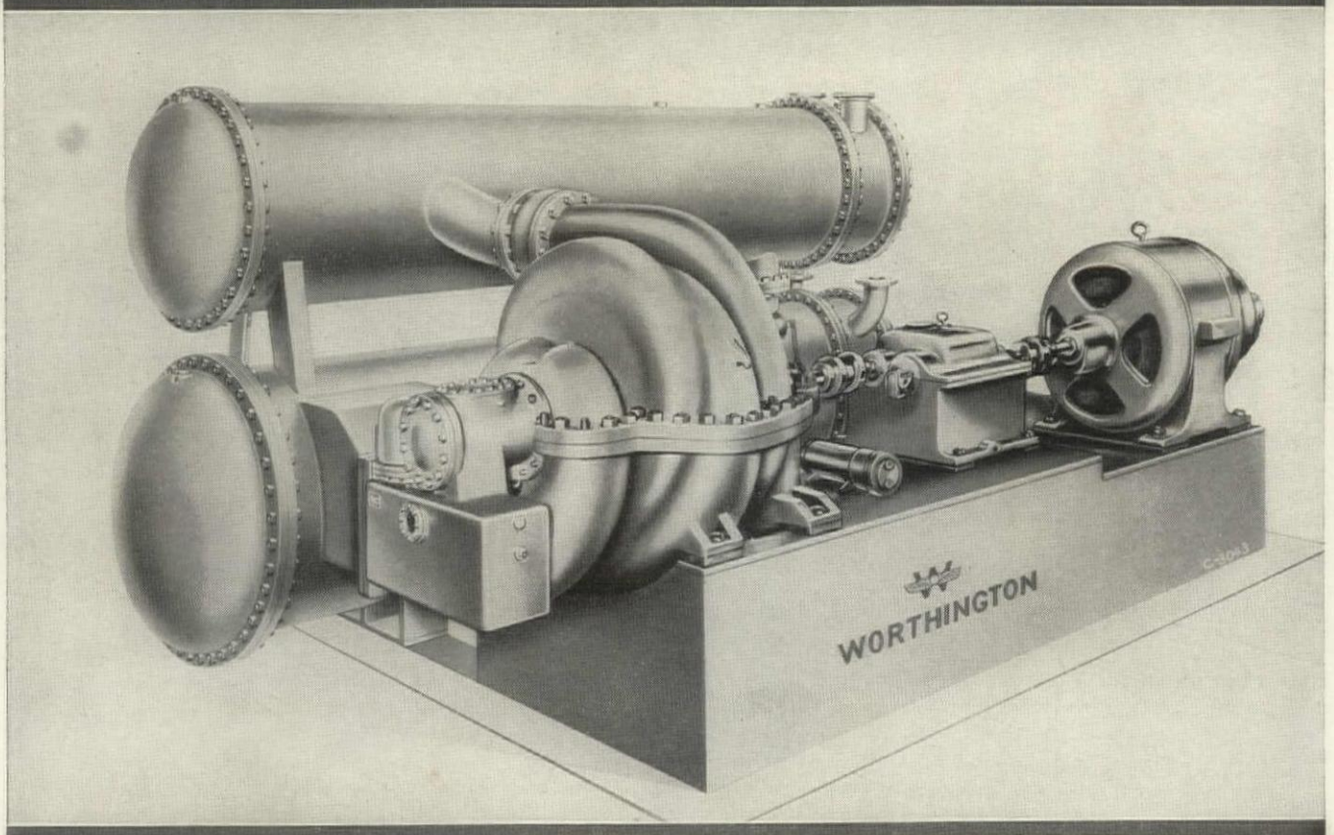
INSULUX *Glass Block*

THERE ARE PLACES IN EVERY BUILDING THAT *NEED* INSULUX

READY to speed up production of many vital elements of the Defense Program

WORTHINGTON *CENTRIFUGAL* COMPRESSORS



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LETTERS

Design Decade

Forum:

Your Design Decade number of THE ARCHITECTURAL FORUM is a joy to my blurring eyesight.

It is a very inspirational job from cover to cover, and must have been a gigantic task to gather, assemble, and organize this material for presentation to your readers. You should be congratulated for your earnest effort to present such a wide range of endeavor so comprehensively.

I was especially proud that you picked my Cameo Dictaphone and placed it among such distinguished company, and the fact that you omitted my name as designer means that I am not meant for posterity. If I am any judge of reader interest, the October, 1940 number is going to be around for a long time, which means that I'll have a lot of explaining to do for a longer time.

As a subscriber who applauds loudly, many thanks for your October number—it is worth many years' subscriptions.

WILLIAM O'NEIL

New York, N. Y.

For omission, an apology; for Cameo Dictaphone, renewed cheers; for posterity, subscriber William O'Neil.—ED.

Forum:

. . . I read with fascination your splendid review of a Design Decade. I was somewhat disturbed, however, by the inference to be gained from the pages about houses that the developments pictured were as typical as those dealing with electric fans, automobiles, factories, and airplanes.

Sunday, still brooding on the subject, I went through the real estate pages of the New York and Washington papers to see how well FORUM's review squared with current offerings of operative builders. I found a complete lack of correspondence. In neither city (this was October 20, 1940) was one house of an identifiably modern character advertised. There was not even a modernistic one. All that were exhibited were Colonialistic, Normanistic, or some other reflection of a traditional concept of design. In other words, those builders whose survival supposedly depends upon their accurate interpretation of public demand saw no such acceptance of modernism in houses as is granted in industrial products generally.

I am not rising in defense of traditionalism; but I wonder if the evidence is such as to warrant an interpretation of design trends in terms of the unalloyed modernism which exists in other fields. Where are the modern houses? How many of them are there? In what price classes do they fall? Are they built on order or on speculation? What is the increase in volume from year to year? I know how hard it is to provide accurate answers to such questions, but I would like to get this kind of information if it exists.

My own impression is that while there is widespread evidence of improved taste and an increase in simplicity of treatment, any real breaking away from tradition is still too rare to be illustrative of the main trend. You have, I hope, proof to the contrary. I seek enlightment.

MILES L. COLEAN

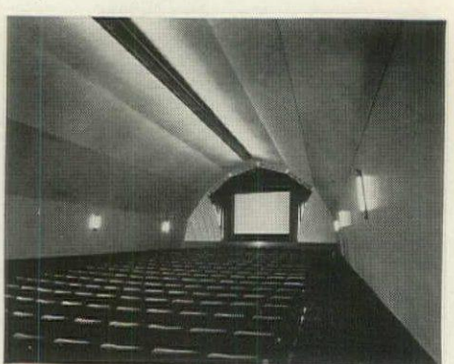
Washington, D. C.

Subscriber Colean should read before he looks—or at least, after. In introducing its Home Section in October, emphasized THE FORUM *"With modern clearly intrenched wherever building has to pay a return, domestic architecture still shows stout resistance. But today every city and many towns can point to their modern houses, and many of the new "traditional" houses show greater openness and flexibility, some use of new materials and always the new equipment. An uninhibited generation of home buyers is beginning to question the resale value of the old copybook designs ten years from now. The modern house, which opened the decade as a completely intellectualized importation in the International manner, now shifts to indigenous forms and materials with wider appeal. More and more of these houses will be built, eventually acquiring the same sentimental aura now attached to the houses modern will replace."*

As to breaking away from tradition, FORUM offers in evidence not the Sunday real estate section but its own pages every month.—ED.

Forum:

On reviewing your October issue I noticed an error on page 246.



F. S. Lincoln

The Pix Theater in White Plains, N. Y., was designed not by B. Schlanger, but by Bianculli & Ghiani, Architects. Mr. Schlanger was consultant only for the floor construction. . . .

PIERO GHIANI

New York, N. Y.

To TVA Architect Bianculli, and Architect Ghiani, apologies for a stupid error.—ED.

Forum:

This last number of THE ARCHITECTURAL FORUM—Design Decade—I think is about the best number you have ever published in that it illustrates the uniform tendency of design in the shapes of everything from bridges to ladies. It is a little encouraging, too, in that it shows that we have all of us been made to think by some force outside of ourselves which may be called, I suppose, the spirit of the age. Perhaps we are getting somewhere. I wouldn't be surprised.

AYMAR EMBURY, II

New York, N. Y.

Forum:

Looking through Design Decade, one thinks of the opportunity missed to tell of the fine accomplishments of designers during the past decade.

There must have been some lack of understanding in presenting material selected with a photographic reproduction value, rather than the laborious and complicated efforts of designs which are sold to millions.

If it was the intention to show only the finest examples of the respective groups such as furniture, rugs and machines, then this issue is an incompetent picture of what was accomplished. If on the other hand, items were picked at random to illustrate the groups, then it was terribly unfair to designers by not showing a complete picture for the layman to understand.

I must protest in the name of the American Designers Institute. As Chairman of the Executive Committee of the New York Chapter, I feel that the material presented does not do justice to the effort of the many designers who have been included, and it presents a wrong picture of the efforts which were not shown, probably due to lack of space.

There is a danger in an issue heralded as a "Design Decade" and sponsored by stores and Museums that due to the fact of some designers having been omitted or their work not well presented that these designers will feel damaged as their work may have been an important contribution.

I am quite sure that all this happened accidentally as design efforts of over ten years cannot be concentrated in just a few pages and I believe the greatest mistake lies in the fact that it is not clearly stated that THE ARCHITECTURAL FORUM did not try to be a jury or edit the objects according to their design excellence. No doubt an explanation of this type would have been a great help to understand that this was not a summary of talent or design.

(Continued on page 68)

They've Kept the Home Fires Burning During 4 American Wars

PIERCE BOILERS

Embracing 101 Years of Experience in Boiler Design and Construction

In 1846 . . . again in 1861, in 1898 and in 1917, Pierce Boilers kept the home fires burning. Four times in 101 years, they have helped to heat the barracks, recreation halls and hospitals of American soldiers, taking the field in a national emergency. They have warmed the public buildings and workers' projects used for war. And they have brought cozy comfort to the homes, apartments and schools of the wives and children left behind.

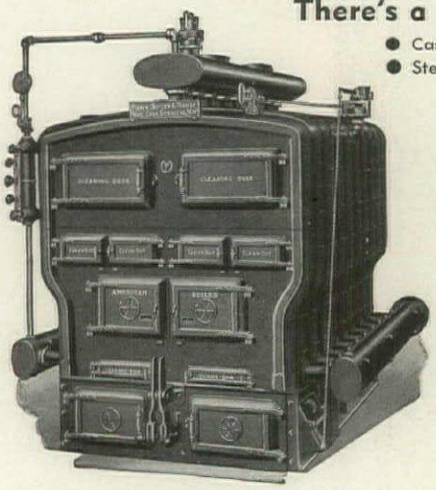
Pierce Gold Seal Boiler A moderate-priced, small home boiler built in 4 sizes for coal, oil or gas.

There's a Pierce Boiler for Every Need—

- Cast Iron and Steel Boilers for Home Heating
- Steel and Cast Iron Boilers for Large Buildings
- Domestic Hot Water Boilers

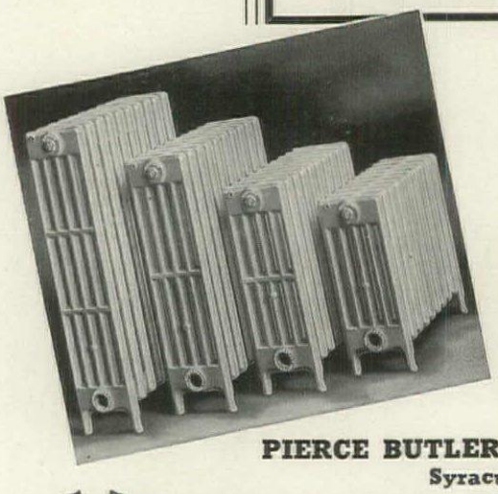
From the new, high-efficiency Pierce "Gold Seal"—especially designed for modern homes—on up to large-size Pierce "American" and steel boilers for large installations, there's a Pierce boiler for every need. You can choose from boilers that were engineered especially for oil or gas fuels, boilers that were engineered for hand-fired or stoker-fired coal, and boilers that were engineered for water, steam or vapor systems.

For efficiency, for economy, for prompt delivery and the assurance of a proved product and trusted name, investigate Pierce before you specify.

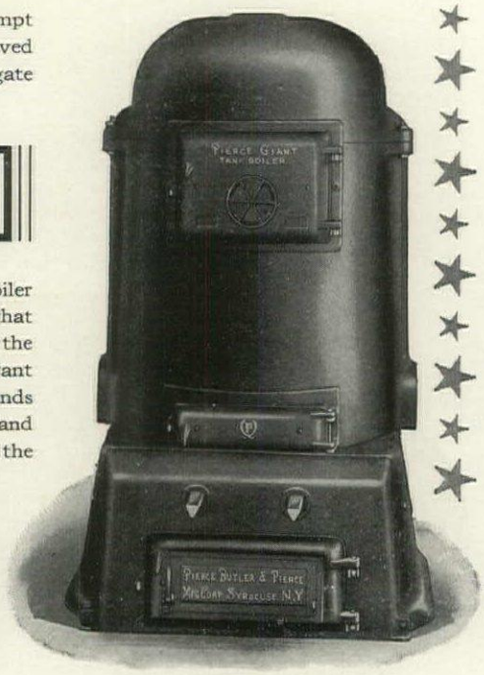


Pierce American Boiler for oil, gas or coal firing. Suitable for large buildings and barracks.

Pierce Radiators



Here's the crowning touch to boiler efficiency—a series of radiators that concentrate the heating effect in the "living zone" of the rooms you want to heat. And behind each unit stands the thorough scientific research and long engineering experience of the Pierce organization—factors that will underwrite the economy, safety and satisfaction of your installations. Ask for detailed information.



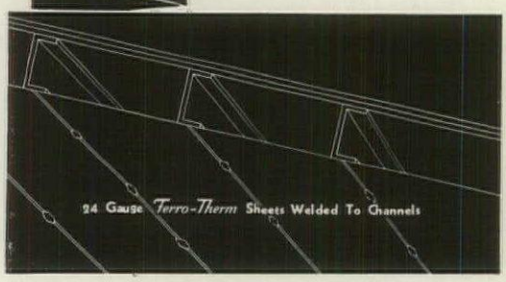
Pierce Hot Water Supply Boiler. Sizes to supply from 85 to 1200 gallons of domestic hot water per hour.

PIERCE BUTLER RADIATOR CORP.
Syracuse, N. Y.

Cambridge, Mass. Glendale, L. I., N. Y. Newark, N. J. New London, Conn.
New York City Philadelphia, Pa. Pittsburg, Pa. Richmond, Va. Roanoke, Va.

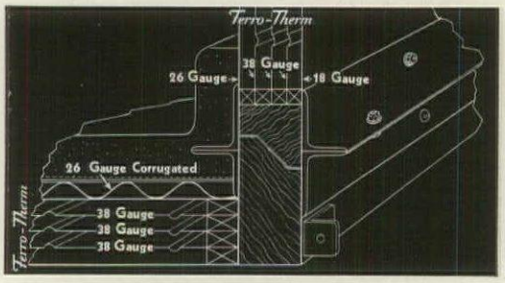
PIERCE *Boilers*

U.S. NAVY SAVES WEIGHT, SPACE, MONEY by using new *heavy-gauge* FERRO-THERM METAL INSULATION



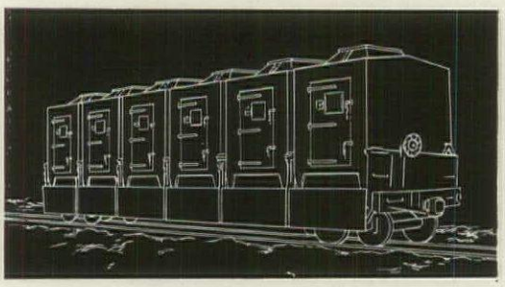
COVERED LIGHTERS TO HAVE FERRO-THERM INSULATION WELDED ON ROOF—SAVES TON IN WEIGHT, INCREASES EFFICIENCY

The Navy's new all-steel Covered Lighters, which will be used for transportation of men and supplies, will have a permanent roof insulation of Ferro-Therm. As shown at the left, sheets of Ferro-Therm will be tack-welded under the roof channels. This provides a moisture-proof, fire-proof insulation that reflects 95% of all radiated heat and will last as long as the ship itself. The sheets of Ferro-Therm are equivalent in efficiency to about 1½-inches of ordinary board insulation—but very much lighter. The saving in weight—¾ lbs. per square foot, about one ton in each lighter—effects a corresponding increase in carrying capacity.



PORTABLE COLD STORAGE ROOMS DESIGNED WITH WEIGHT-SAVING, VERMIN-PROOF, FIRE-PROOF FERRO-THERM PANELS

The illustration at the left shows a section of one of the new Portable Cold Storage Rooms designed for U. S. Naval Bases. These rooms are assembled from pre-fabricated panels composed of two sheets of heavy-gauge Ferro-Therm enclosing three sheets of light-gauge Ferro-Therm. The panels, 35-inches wide and 8-feet high, are *only 2-inches thick*, yet are equivalent in insulating value to 5-inch standard cold storage insulation, and save 40% in weight. The panels can be quickly bolted together into permanent cold storage rooms of any size, which are 100% salvageable, and completely moisture-proof, vermin-proof and fire-proof.



FERRO-THERM SAVES 800 LBS., INCREASES CAPACITY, IN FABRICATION OF PORTABLE SELF-CONTAINED REFRIGERATION UNITS

At the left is shown the type of Portable Self-Contained Refrigerator Units which will play a vital part in the transportation of food to Naval Bases. These units can be fabricated from heavy-gauge Ferro-Therm sheets combined with light-gauge Ferro-Therm sheets in a structure similar to that used in the Portable Cold Storage Rooms described above. With standard insulation and construction, these units would have 4-inch walls and would weigh about 3000 lbs. With Ferro-Therm panels, they are only 2-inches thick and weigh about 2200 lbs. As a result, the capacity for additional supplies is increased 800 lbs., and the units possess the great strength and lightness required for handling by overhead cranes.

Has the STRUCTURAL ADVANTAGES of any heavy-gauge coated steel sheet *plus* the added advantage of EFFICIENT INSULATION

Heavy-gauge Ferro-Therm has all the advantages of light-gauge Ferro-Therm—recognized by architects, builders and industrial engineers all over the country as the most effective metal insulation. It has the same high insulating value, with a *reflectivity of 95% of all radiated* heat. Yet, gauge for gauge, it has all the structural advantages of any coated steel sheet, and the same high resistance to corrosion. For army barracks, warehouses, cold storage rooms, refrigerators—wherever it is planned to install corrosion-resisting steel sheets, and where insulation is an advantage—it pays to install Ferro-Therm. Ferro-Therm can be welded, bolted or fabricated to conform to any specifications, and is available in corrugated sheets. Plan now to obtain the *plus value* of Ferro-Therm.

Write for complete information and prices.

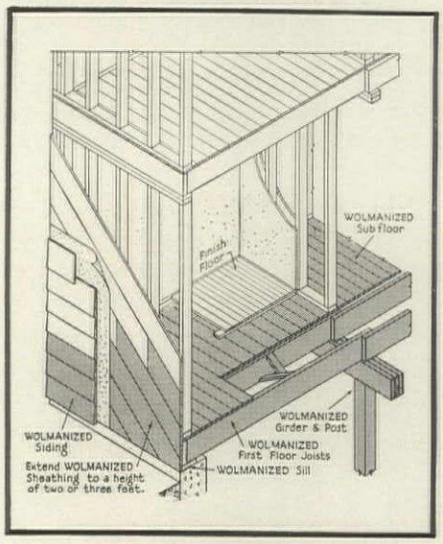
AMERICAN FLANGE & MANUFACTURING CO. INC., 30 ROCKEFELLER PLAZA, NEW YORK
Hogan & Company, National Distributors, 383 Madison Avenue, New York

NEW HEAVY-GAUGE *Ferro-Therm* METAL INSULATION

BUILD THE

LIFE LINE

TO LAST LONG



This diagram shows how Wolmanized Lumber is used in one popular type of frame construction. Ask us to send the folder (A.I.A. indexed) which gives diagrams and data for various types of construction.

Weak points, the parts of a structure which are first to fail, and so limit its usefulness, form a *life line* in every building. Wolmanized Lumber* enables you to strengthen those *life line* points where decay and termite damage occur. You add years of usefulness at surprisingly little expense.

In frame dwelling construction, sills, joists, and subfloor are life line points. Building them of Wolmanized Lumber protects the whole structure, at less than 2% addition to total cost. In other types of construction, it is well worth while to use Wolmanized Lumber for roof decking, sleepers, nailing strips, and other parts exposed to moisture. This is a convenient solution to the problem of condensation resulting from effective insulation and air conditioning.

Put "Wolmanized Lumber" in the specification. It is the only material of its kind which is always pressure treated according to one standard set of specifications, and sold under one brand, from coast to coast. The name means dependability. AMERICAN LUMBER & TREATING COMPANY, 1647 McCormick Building, Chicago.

*Registered Trade-Mark

WOLMANIZED LUMBER

LUMBER FOR ENDURING, ECONOMICAL CONSTRUCTION

ARCHITECTURAL WOODWORK

IN *Stock* FOR YOU

● Curtis Dealers from coast to coast can make your specification writing easy. They handle *Curtis Architectural Woodwork.* And it comes right out of STOCK! There's no delay for you in designing, or to the owner or contractor in delivery.

Many architects use Curtis Woodwork on all their work, even in their own homes. Its true architectural beauty, its high quality of construction, its wide selection of designs help it fit jobs of all sizes and styles.

Some of the biggest names in architecture have helped design Curtis entrances, mantels, stairways, china cases, doors and cabinet work. These men have been glad to help make correct architectural woodwork available to all. And today even low-cost homes can have the advantage of authentic woodwork of good design. For Curtis quantity production lowers the cost.

Your Curtis dealer will furnish you with the Curtis Catalog and architect's details of Curtis Woodwork. He'll also tell you about the famous Silentite "Insulated" Window family. *Mail the coupon* for literature and full information. If you live in Canada, write to W. C. Edwards & Co., Limited, 991 Somerset Street West, Ottawa, Canada.

1866

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KEEN-EYED INSPECTORS CANNOT FIND "WAVINESS" OR DISTORTION IN THIS NEW LUSTRAGLASS

Baffling new product looks like plate glass but sells at window glass prices

WHAT IS IT?

Who ever saw a window glass without an obvious distorting waviness? Who ever heard of a plate-like product selling at window glass prices? Well, now it's happened. This amazing new Lustraglass just defies ordinary classification. The uniformity of its perfection has definitely set a new and infinitely higher standard of quality. The ultra-violet rays of sunlight it transmits and the great tensile strength it displays make it the world's most efficient glass for windows. Lustraglass is lighter in color (freer from that greenish cast characteristic of both window and plate glass) than any other glass used for regular glazing.

Add to these advantages its jewel-like luster and you have a product that architects and builders agree is really a new species . . . That's today's Lustraglass and if it isn't window glass and it isn't plate glass—what is it?

THE SHADOWGRAPH TELLS THE STORY
by amplifying distortion and defects 20 times

(1) This is high quality cylinder drawn window glass. The bent and twisted lines shown by the shadowgraph testing device indicate the presence of considerable distortion. This glass became obsolete in 1928.

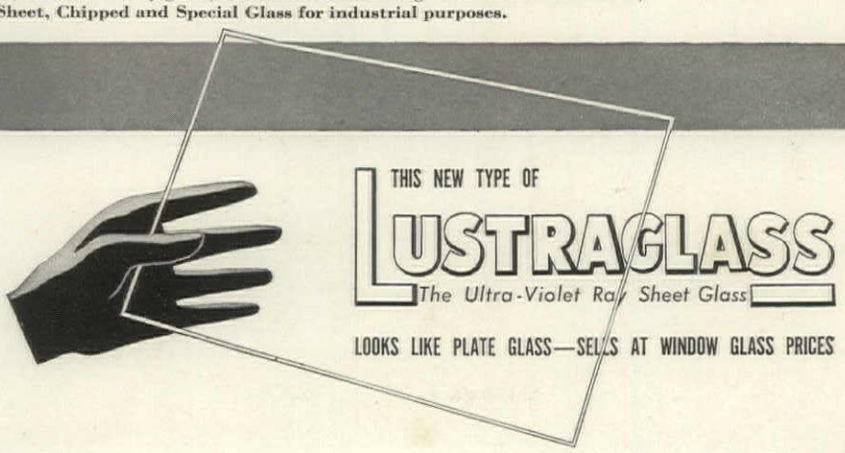
(2) Here is what most manufacturers offer today as top quality window glass . . . Made by the sheet drawn process, it shows a characteristic distortion in the waviness of the black lines.

(3) Now look at this "shadowgraphed" sample of the new Lustraglass. Obviously an important improvement. The lines are straight, showing relatively perfect vision—relative freedom from distortion.

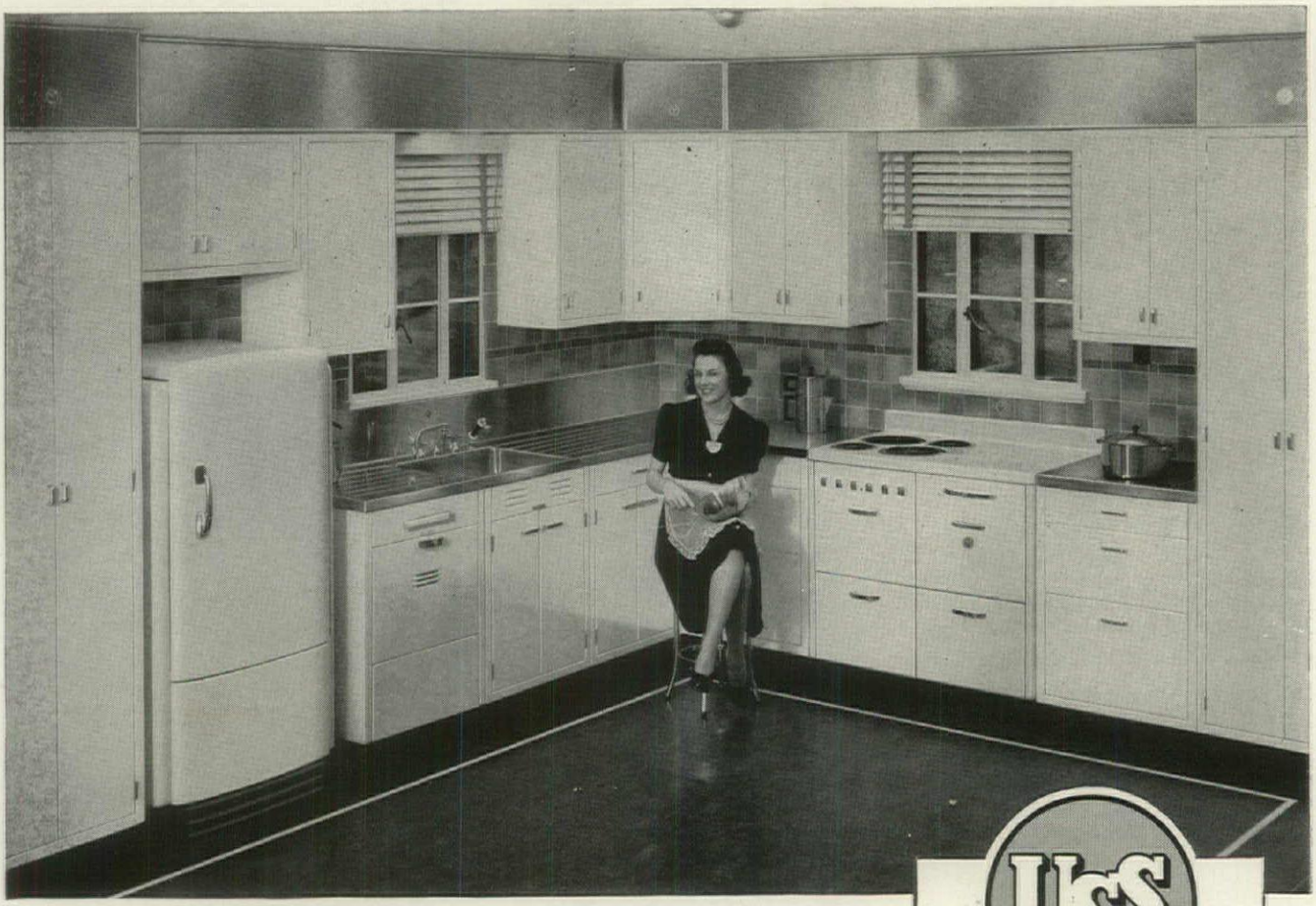
★ Write for the new Windowgraph Slide Rule Chart and a sample of the new Lustraglass. Examine both—then tell us what you think.

AMERICAN WINDOW GLASS CO., PITTSBURGH, PA.

Manufacturers of **Plexite, the safer safety glass; Lustrablu and Lustragold for ornamental uses; Crystal Sheet, Chipped and Special Glass for industrial purposes.**



FOR LIFETIME BEAUTY AND CLEANLINESS



...THE *All steel* KITCHEN

WHAT does a housewife demand you give her in a modern kitchen?

Beauty, of course, distinctive design, and convenience. She wants a clean, sanitary workshop—that will stay that way with a minimum of effort. A room that will be a pleasure to work in, that will serve her every purpose most efficiently—not make her a slave to its care.

And you can give her all that by using steel—a material she knows and trusts.

The attractiveness and durability of porcelain enameled steel stoves, table tops and refrigerators are well known. Now you can supply the same material for walls at moderate cost. Easily applied porcelain enameled tiles make permanent, colorful walls that can be wiped clean with a damp cloth. Porcelain or stainless steel sinks, splashboards and work surfaces are impervious to ordinary abuse, assure lifetime cleanliness, retain their sparkling beauty indefinitely.

Steel cabinets can be made to fit any arrangement or design. They are insulated to assure quiet operation, they won't warp or sag, and their baked enamel finish is enduring and color-fast. Steel casements let in more light, require less care. And to complete the picture, steel venetian blinds last longer and are easier to keep clean. Even the valence boards may be had in steel.

To assure permanent client satisfaction, specify an *all*-steel kitchen. And to make certain of quality require that products be marked with the U·S·S label. It is your assurance that the manufacturer has used the best steel for its purpose.

Write today for your copy of the new booklet, "Steel for Modern Living." You'll find its colorful pages an excellent help in selling the advantages of steel.

USS

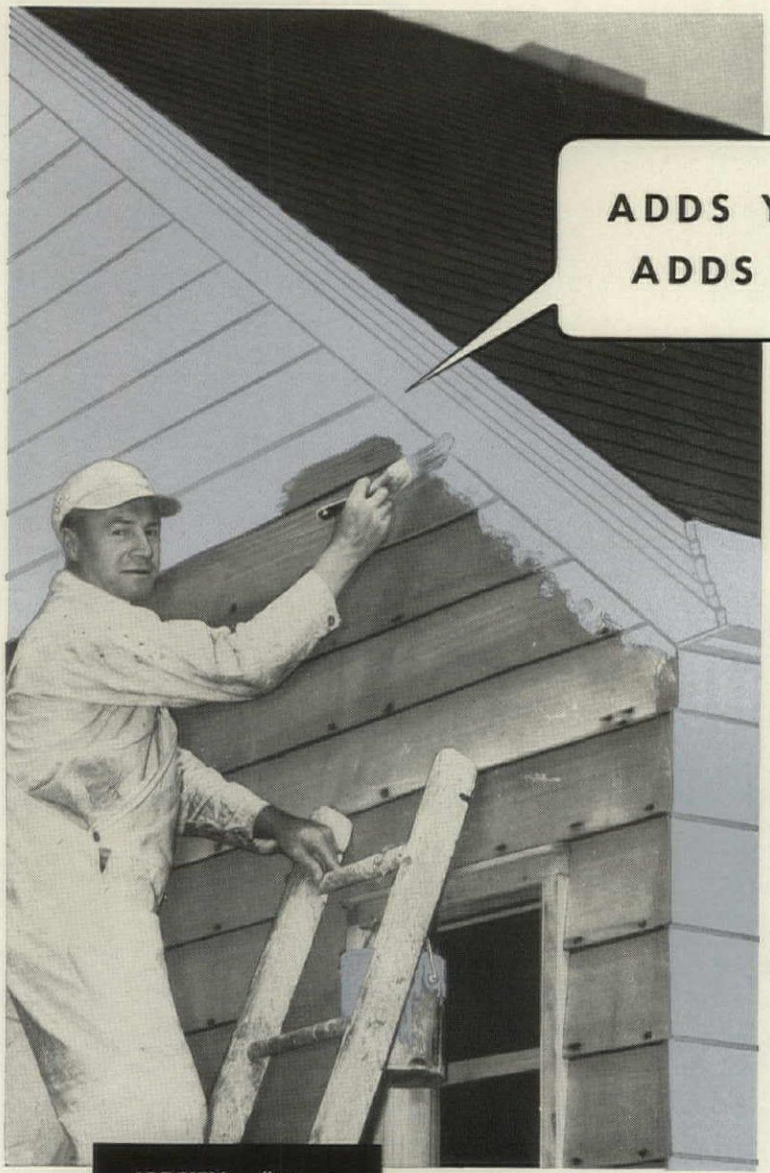
Look for the

U·S·S LABEL

It assures your client that the manufacturer has used the best steel for the purpose.

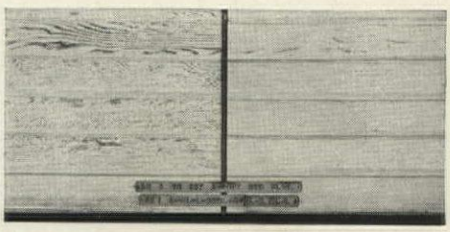
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
Scully Steel Products Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL



ADDS YEARS TO PAINT LIFE
ADDS NOTHING TO COST!

An Aluminum First Coater makes topcoats last longer



At the U. S. Forest Products Laboratory, Madison, Wis., these two sections of Douglas Fir siding were painted exactly the same except for the first coat. On the left, the ordinary type of oil paint priming was used. On the right, an Aluminum first coat. Both sides then got the same two white topcoats. After 6 years exposure to sun and moisture, the Aluminum primed section was in far better condition as you can plainly see.

SPECIFY . . "Aluminum *House* Paint", made specially for priming wood. Sold by many well known paint companies and labeled with this Aluminum disc and wood background. Names on request.

There are two reasons why a first coat of Aluminum House Paint lengthens the life of topcoats:

First, the Aluminum undercoat allows very little oil from the topcoats to soak through into the wood; that keeps the topcoats more elastic and durable. Second, it allows less moisture to penetrate into the wood to cause rapid swelling; thus there is less strain on the paint. It weathers evenly, chalks slowly, does not check or crack so soon.

Aluminum House Paint isn't needed when it's time to repaint; just two topcoats of regular oil paint. The benefits of the original Aluminum first coater extend through many repaintings.

The small extra cost of Aluminum House Paint is more than offset by greater coverage per gallon of topcoat. As a result, the job runs no higher with Aluminum priming than it does on customary 3-coat painting.

For complete technical data on Aluminum House Paint, write PAINT SERVICE BUREAU, ALUMINUM COMPANY OF AMERICA, 1947 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

ALBRON *Pigments for*

ALUMINUM HOUSE PAINT

FIRST COATER FOR WOOD

Steel—FIRST LINE

Republic produces the most complete line of steels and steel building products made by a single manufacturer

● In round numbers, 55,000 typical American men who know steel are daily doing their share—working in Republic plants, mines, offices and warehouses in 35 states—to turn out huge quantities of steel products that the building industry in this crisis may have the sturdy materials with which to fashion homes, stores, schools and hospitals for the country's workers, and buildings of every type in which industry may increase its tempo of production *with steel—first line of national defense.*

For your convenience, many pages of Sweet's Catalog are devoted to information on Republic's diversified line of building products—some under the name of Republic—others under the names of the divisions and subsidiaries shown below. Refer to these pages or write for a copy of Booklet No. 196.

ELECTRUNITE Steeltubes

REPUBLIC STEEL — DEFENSE FOR AMERICA

GULFSTEEL

BERLOY

REPUBLIC STEEL CORPORATION
CLEVELAND, OHIO

Berger Manufacturing Division • Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company

*Reg. U. S. Pat. Off.

Enduro* Stainless Steel
Toncan* Iron Sheets
Steel and Copper-Bearing Steel Sheets
Toncan Iron Roofing Products

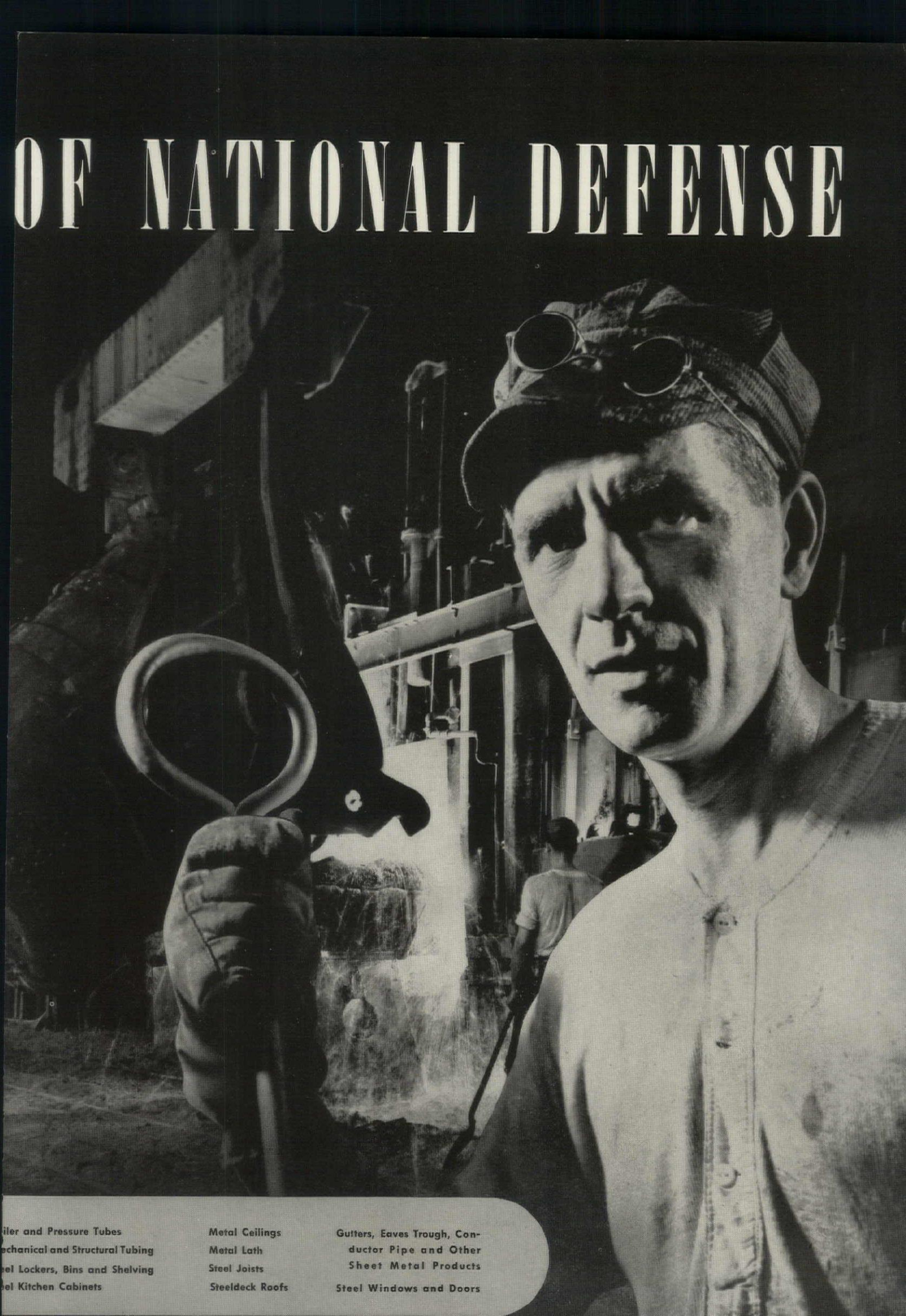
Steel and Copper-Bearing Steel Roofing Products
Taylor Roofing Ternes
Tin Plate
Toncan Iron Enameling Sheets

Toncan Iron Pipe
Steel and Copper-Bearing Steel Pipe
Wire Nails, Spikes and Staples

Electric Weld Pipe for Foundation Piling
Concrete Reinforcing Bars and Welded Steel Fabric

Bolts, Nuts and Rivets
Corrugated Pipe, Sectional Plate Pipe and Arches
Electrical Conduit

OF NATIONAL DEFENSE



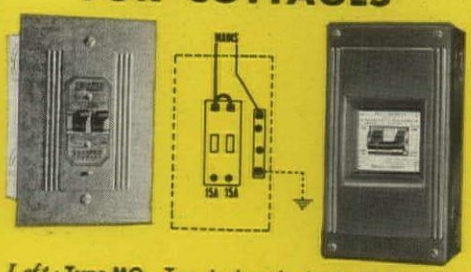
iler and Pressure Tubes
echanical and Structural Tubing
el Lockers, Bins and Shelving
el Kitchen Cabinets

Metal Ceilings
Metal Lath
Steel Joists
Steeldeck Roofs

Gutters, Eaves Trough, Conductor Pipe and Other Sheet Metal Products
Steel Windows and Doors

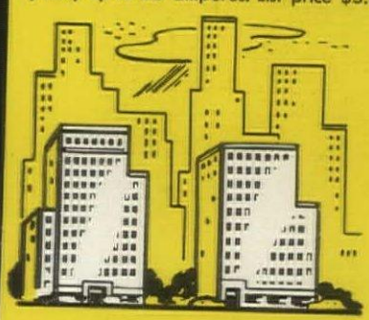
THERE'S A SQUARE D MULTI-BREAKER FOR HOMES OF EVERY SIZE

FOR COTTAGES

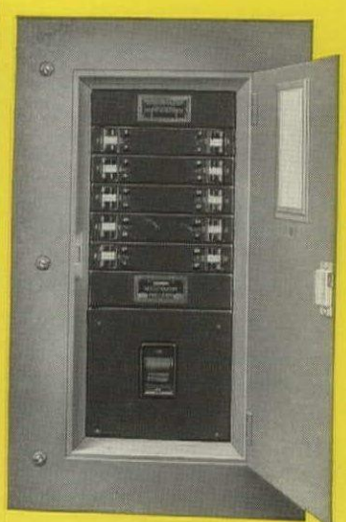


Left · **Type MO**—Two single pole circuits, 15, 20 or 25 amperes; no main switch or breaker required. List price $2.15 to $2.80.

Right · **Type M1**—Similar to Type MO but with capacity up to 50 amperes. List price $5.00 to $6.30.

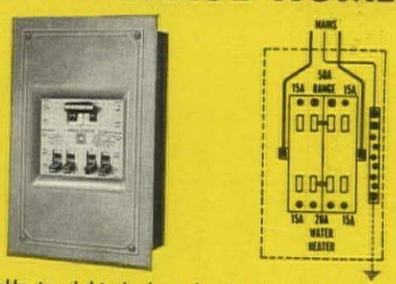


FOR APARTMENTS, SCHOOLS, STORES, COMMERCIAL BUILDINGS

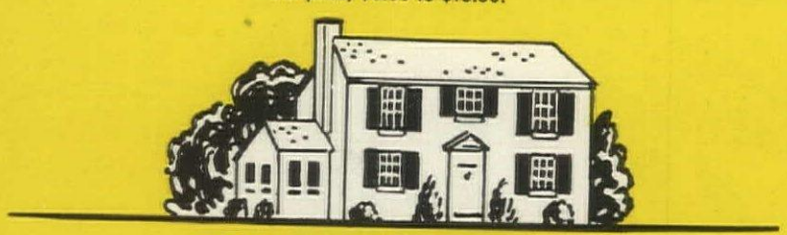


Multi-breakeR Lighting Panelboards in all combinations up to 42 breaker poles.

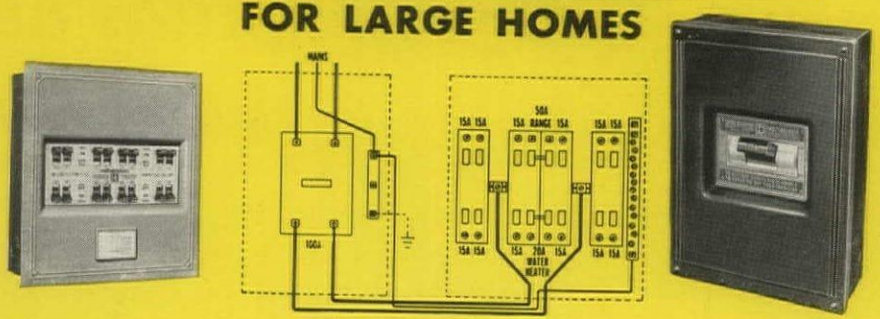
FOR AVERAGE HOMES



Type MB—Up to eight single pole circuits or the equivalent in single and double pole circuits; 15 to 50 amperes capacity. No main switch or breaker required when there are six or less circuits. List price, $6.00 to $13.80.



FOR LARGE HOMES



Type MB Load Center—Up to sixteen single pole circuits or the equivalent in single and double pole circuits. 15 to 50 amperes capacity. List price $27 to $37. Often used with Type M2, 100 ampere main breaker (at right). List price, $15 to $18.50.

CIRCUIT BREAKER PROTECTION AND CONVENIENCE AT LOW COST!

Compared with the total cost of even the smallest home, the price of a Square D Multi-breakeR is infinitesimal. In fact, the Multi-breakeR seldom costs more than the switch and fuses it replaces . . . often actually less. But clients are quick to appreciate the added protection and convenience it affords. They appreciate the elimination of fuses and the annoyance and expense of replacing them . . . the satisfaction of knowing that they have a truly modern home.

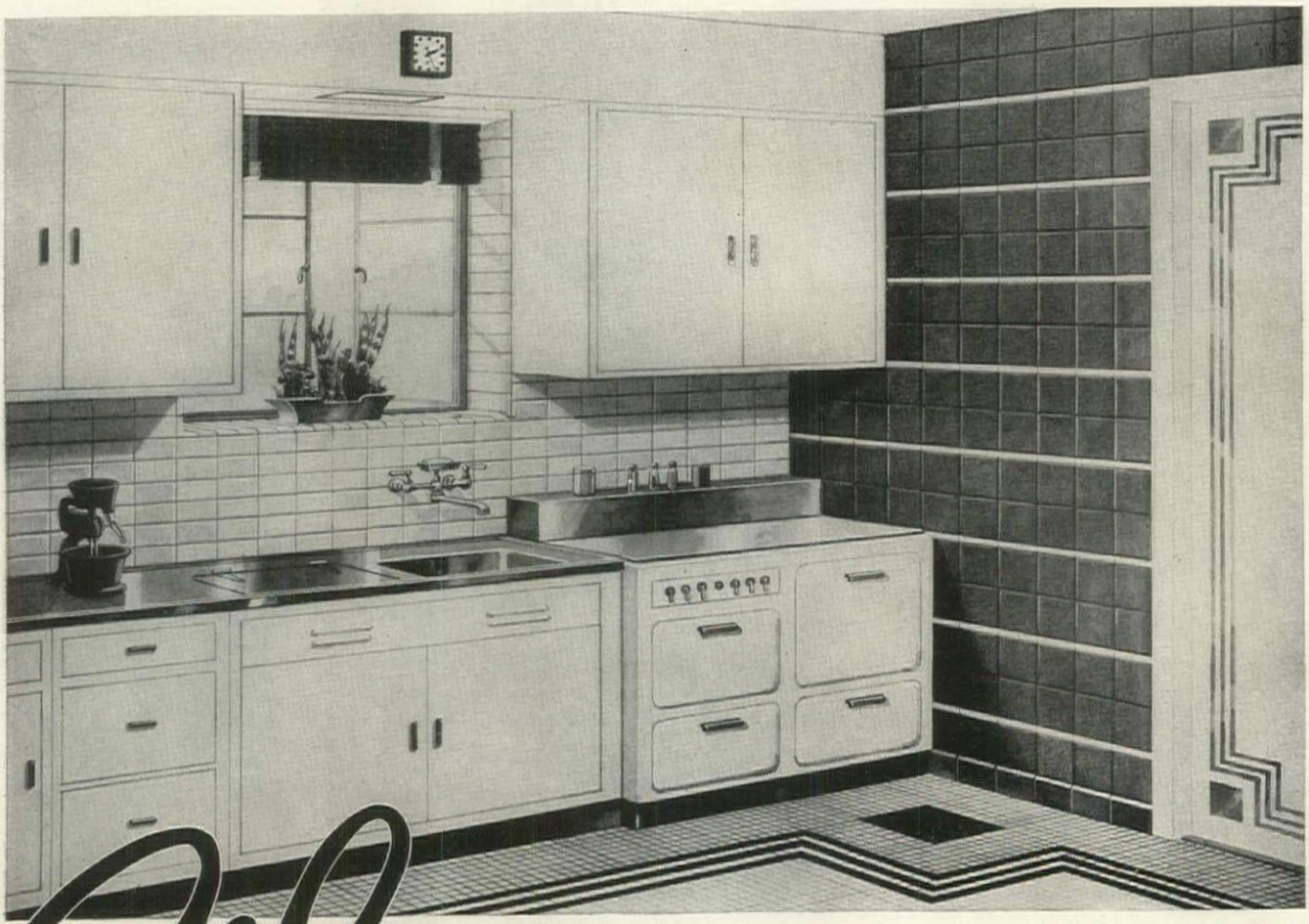
Your electrical contractor has the complete story of the Multi-breakeR. Or write for Bulletin CA-4000. Learn why it pays to specify Square D Multi-breakeRs.

CALL IN A SQUARE D MAN

SQUARE D COMPANY

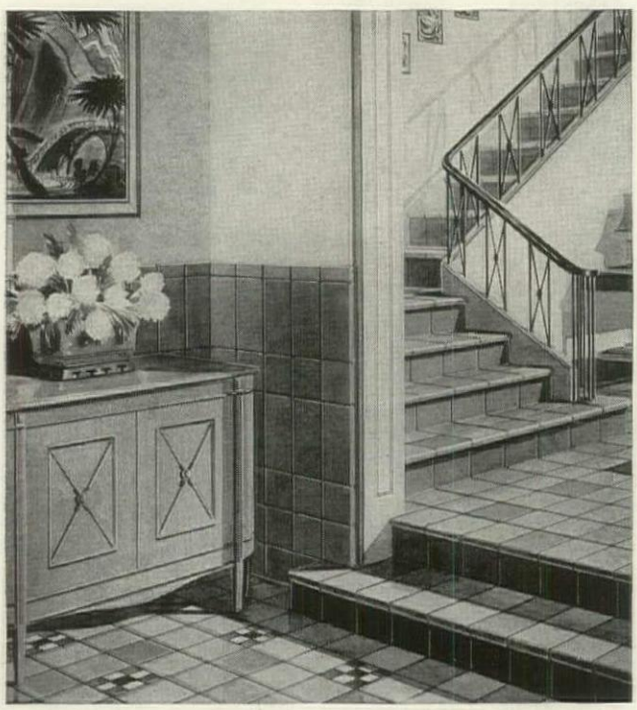
DETROIT - MILWAUKEE - LOS ANGELES

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO



A smart, modern tiled kitchen . . . easy to clean, and to keep clean . . . a truly charming workshop.

Tile commands attention . . . but requires little!



Colorful TILE *expresses a warm welcome . . . wet or muddy feet will not harm the surface . . . an investment in permanent satisfaction.*

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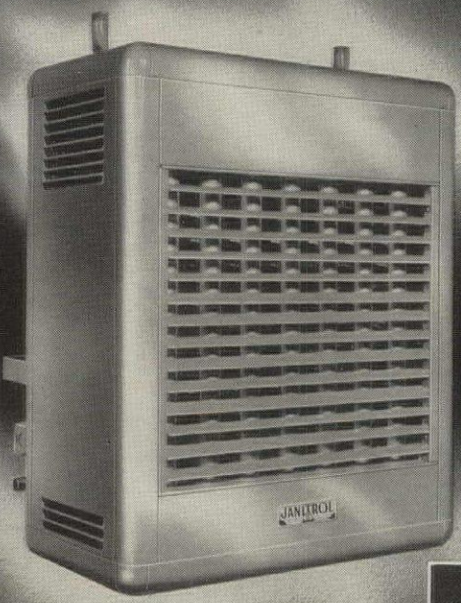

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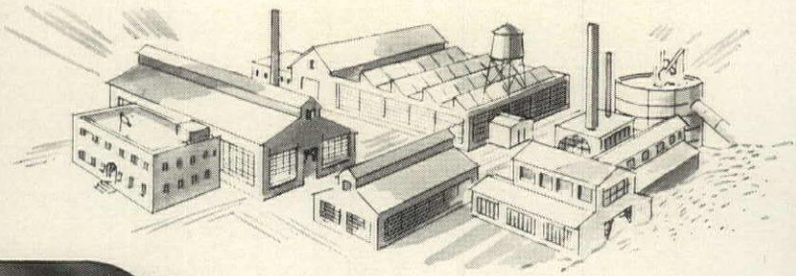

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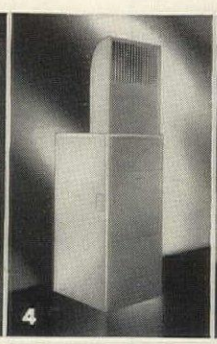

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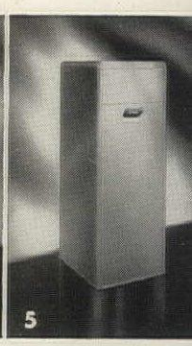

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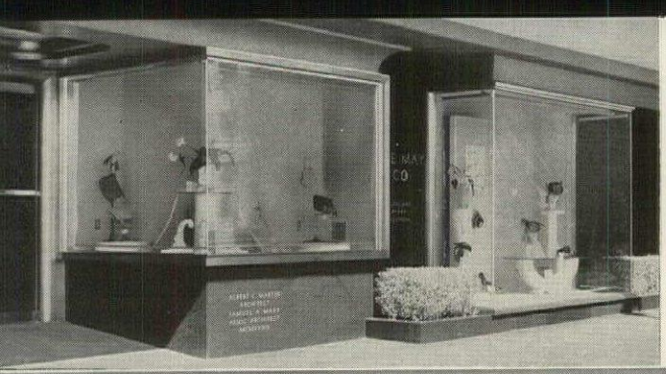

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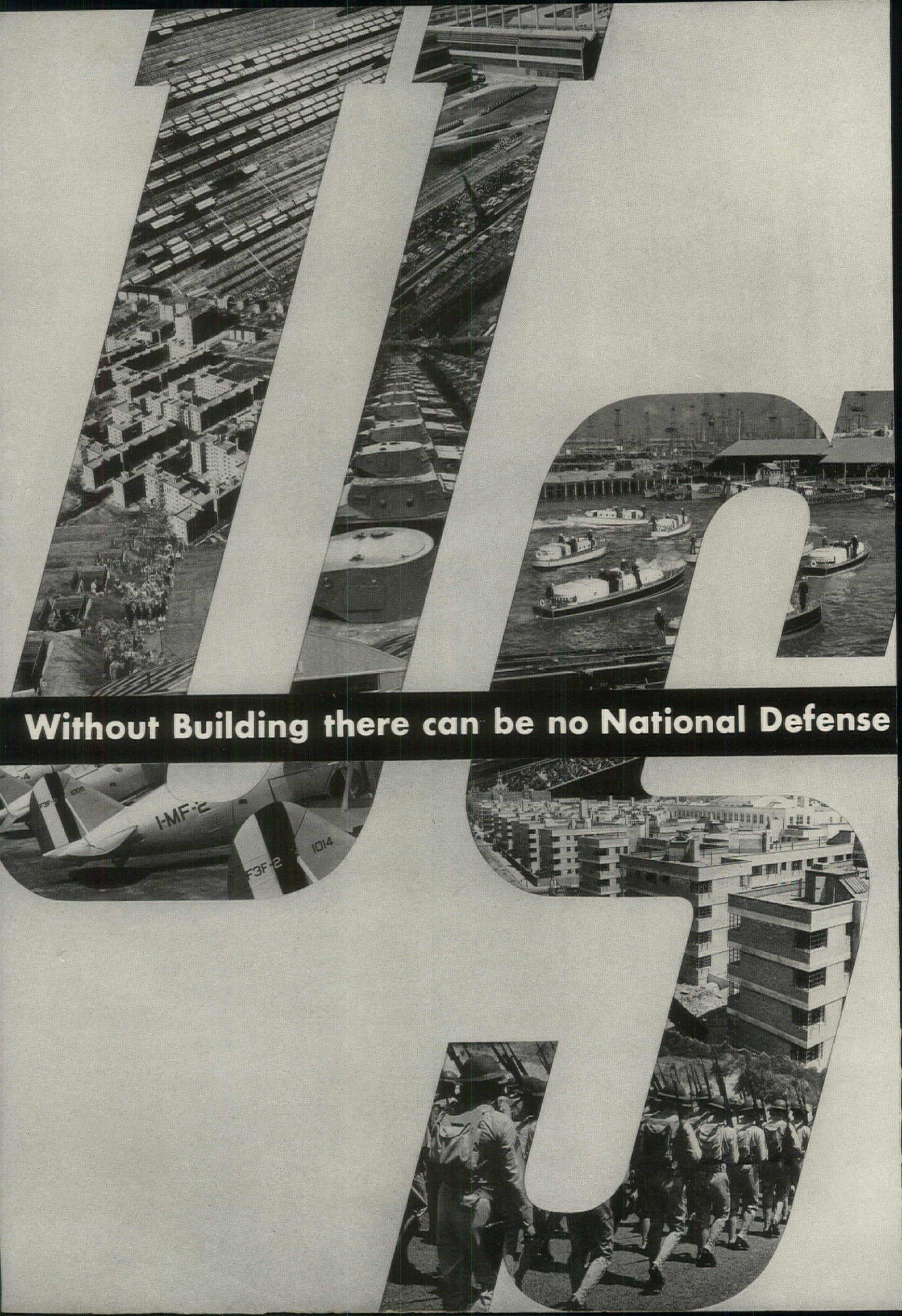
BUILDING FOR NATIONAL DEFENSE

Were Building a tightly knit, completely industrialized business there would be less need for this issue of THE FORUM. But Building, with its complex and almost wholly local mechanism does not move as a unit on a national front. Defense means above all, speed, and speed means above all, coordination. Whatever coordination Defense brings to Building will be vastly aided if Building can at least *think* as a unit. So that Building may be informed as a unit, and so in greater degree plan and work as a unit, this issue of THE FORUM appears as the Defense program begins to take form. It has been designed to state in broad outline and in specific detail Building's part in solving the problem of National Defense. —THE EDITORS

FORUM readers will be kept informed regularly of major defense developments in a new department which opens next month.


Without Building there can be no National Defense
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AFTER TWENTY YEARS of uneasy peace, of small wars, invasions and rebellions, World War has again broken out, and for the second time in a generation the U. S. faces a national emergency. Already the first measures have been taken: the Army is being expanded from an ill-equipped handful to a mechanized million; the Navy is increasing its tonnage by 70 per cent, preparing to extend its domination to two oceans; planes are rolling off the assembly lines and new factories are building. World War II is a total war, in defense as in aggression. If armies formerly traveled on their bellies, they now also move on refineries, blast furnaces, rubber plantations, power plants, strip mills. National Defense includes, to an unprecedented degree, all the resources of Building.

Military needs mean expansion of old plants and the building of new. Air defense demands protected locations, often in formerly undeveloped areas. Mass population shifts will unquestionably occur, and preceding them there must be industrial construction, housing construction, commercial construction. There can be a planned building program, unparalleled for its speed and effectiveness—or there can be the destructive expansion and costly waste of 1917.

Responsibility for the general plan of National Defense belongs in Washington, since nowhere else can the varying potentialities and conflicting desires of the States and regions be brought into order. But the plan cannot work solely from above: all down the line is required the closest collaboration between Government and private enterprise. The basic requirement is a clear and widespread understanding of objectives.

Out of the nation's rich resources, we can create the essentials of defense. Our economic potentials were well tested in World War I, when we trained and armed 4,000,000 men, and each month filled $500,000,000 worth of orders for the Allies. But the techniques of war have changed radically since 1918. Preparing America for defense is a vastly more complex task in 1940.

Basically, planning for national defense can have no fixed time limits. It is impossible to say how long the present emergency will last. Attacking armies can set a precise timetable of specific areas to be seized, simplify their military preparations accordingly. Defending forces cannot: they must be ready to meet any contingency which may arise at any time or at any place.

In modern warfare exact needs are not known until they arise—and, as shown by England's experience, the ravages may be unexpectedly severe and widespread. Evacu-

ation of whole populations and the demands born of large scale property destruction must be anticipated and planned for. Industrial facilities must be developed to a point sufficient to meet unforeseen needs on short notice. Thus, wrapped round the immediate problem of enlarging U. S. armed forces, there is the larger problem of planning for America's permanent defense.

As a pattern for Building's own development, what does this mean?

Broadly, it signifies accelerated Building and preparation for the all-out tactics of total war. More specifically it implies:

Greater protection of the physical plant. Steadily extending their cruising radius and power of destruction, bombers have demonstrated that even the remotest hamlets are not immune to air attack, challenge the ingenuity of American designers to devise new safeguards for local workshops and homes. Fire resistant materials, blackout mechanisms, camouflage, structural forms affording reduced visibility from the air, bombproof shelters—all these should be given special study. Firetraps, abandoned structures, and other potential hazards to the nation's defenders should be cleared away wherever feasible.

Greater flexibility in use. New construction should be designed with an eye alert for possible military advantages and easy conversion to wartime use. Conversely, there is the possibility of turning strictly military structures to practical peacetime use: some English underground shelters, for example, have been designed to serve ultimately as basements for flats, as first-aid stations, as public garages.

Greater decentralization of services and utilities. Blessing in disguise for Londoners is fact that the metropolis' various communities have developed independently their own systems of water pipes and reservoirs. Result: German bombs damaging one section do not affect the water supply for other districts. Similarly advantageous in war time are buildings designed for self-sufficiency, with independent power sources, capable of being operated even when breakdowns occur in surrounding areas.

Greater mobility of structural units. Whole cities may have to be evacuated, but unless the populations can be quickly housed elsewhere, disastrous confusion will ensue. Large scale rebuilding of damaged areas may become urgent. In such emergencies the conventional construction methods would consume too much precious time. Here, clearly, is an opportunity for inventive design abilities to produce new structural forms—units capable of quick fabrication in quantity, quick transportation, quick assembly for use.

This issue is primarily a detailed survey of the scope of the immediate U. S. defense program in all fields which demand the cooperation of Building. But before launching into this examination of the roles of Government and Building there are two indispensable preliminaries: The history of what happened during World War I, and a glimpse of what is now happening in England. If ever there was a time when object lessons, past and present, were important, that time is the present.

International News

ARMY BARRACKS HURRIEDLY ASSEMBLED AT YAPHANK, N. Y., IN 1917

BACKDROP: WORLD WAR I. Tucked away in the archives for two full decades, dusty, almost forgotten—but more sharply significant than ever in light of current happenings—Government reports picture vividly the enormous tasks suddenly tossed on Building's shoulders in the early summer of 1917. Overnight the U.S. became one of the world's greatest builders. Military cantonments—each a small city in itself—had to be erected before an army could be trained. Immediate expansion of industry was demanded. And, as behind-the-lines production stepped up, so too did the cry for housing for the workers who swarmed to ship-building and munitions centers.

Even by ordinary peacetime standards, Building's war assignment would have seemed vast. Confronted with shortages in labor and materials, a breakdown in transportation, plus an ever-increasing demand for speed, the emergency tasks appeared wellnigh insurmountable. Traditional policies and procedures had to be scrapped. Under stress it mattered little how much the projects cost. As the official reports point out repeatedly, one question was everywhere paramount: Could the specified work be done—and done within the specified time? Much hinged on Building's answer.

ARMY HOUSING

First, largest and perhaps most important single performance of the 1917 construction program was the provision of shelter for the new troops. With the first contingent of draftees scheduled to arrive in camp early in September, less than 90 days were available for surveying sites, drawing plans, preparing specifications, selecting contractors, mobilizing field forces, building and equipping barracks. The demand ran up to a prodigious total: sixteen National Army cantonments, each housing some 40,000 men and 10,000 livestock; sixteen National Guard camps to house 460,000 more men; two embarkation camps to take care of another 43,000 men; a quartermasters' training camp for 18,000 men; also, additions to Regular Army barracks for another 100,000 men—all told, accommodations for 1,250,000 men (subsequently boosted to more than 1,600,000).

The magnitude of this job, next to the Panama Canal the largest ever undertaken by U. S. engineers, appears still greater when it is recalled that the cantonments and camps had to be built on raw tracts of land. Each site presented its own problems: roads, water supply, sewage disposal, the various utilities all had to be supplied. In some instances inadequate railroad facilities had to be extended. Where sites were remote from labor markets, workmen had first to be imported, housed and fed before construction on the Army housing could proceed.

Normally planning alone would have taken as many weeks as could be allowed for completing an entire project. But there was no time to sit and plan. Construction work began even before contracts were legally executed or sites officially approved.

Undeniably the emphasis on speed was the cause of much waste and inefficiency. Proper supervision was lacking. To take full advantage of favorable weather and deliveries, it was necessary to keep large forces always on hand. If men were laid off when materials were not at hand, they could not be gotten later when supplies arrived. To catch up with unavoidable delays, overtime at extra cost was authorized. With rising prices and a surplus of labor on the payrolls, it is small wonder that unit costs soared as the output per man hour dropped.

Lagging construction was accelerated by taking on more workers. It is reported that the contractor on one cantonment stated he could increase his production 25 per cent but only by doubling his working force—he was ordered to do so. In less than a month construction forces on each cantonment expanded from a few men up to 8,000 or more. During August and September of 1917 they frequently numbered 10,000 on a project, reached 14,000 in several instances. Had the supply been available, more would have been hired. There was no attempt to select men for their skill. Hurriedly assembled, large numbers worked as carpenters who had not been trained in the trade, but it is questionable whether the work would have progressed any faster if they had been. Many foremen were strangers to each other, to their crews, even to the contractors for whom they worked.

High costs were the price paid for speed. Compared to similar prewar construction, the sixteen National Army cantonments were expensive undertakings, kiting to more than double the original estimates of $5 million each. Wages shot up as Government departments competed for labor, material prices skyrocketed. Principally

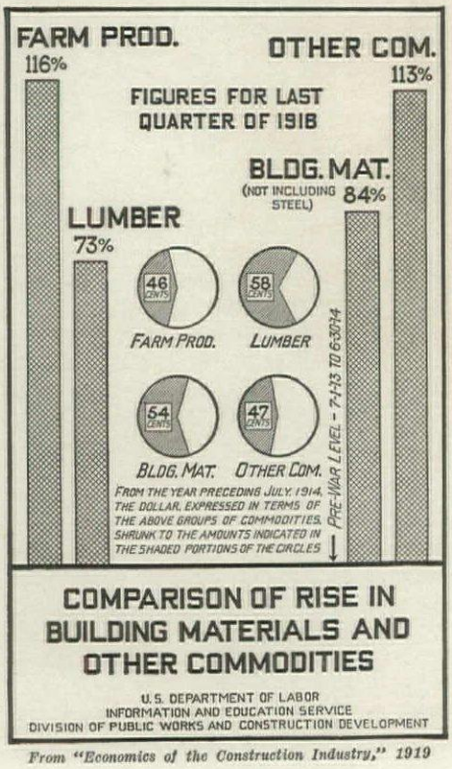
For additional references on World War I see Bibliography pages 2, 3, 4.

responsible for increased costs were delays and changes in plans, many of which were not decided on until the contractors had practically finished their original jobs. Construction began even before the Army found it advisable to modify the general scheme of military organization: barracks built to house 150-men companies had to be revamped at the last minute to accommodate units of 250 men. More time for planning undoubtedly would have obviated such waste.

Less expensive were the sixteen National Guard camps, located in southern States where troops could be for the most part mobilized under canvas. Nevertheless, many wood buildings and structures had to be built, and the important problems of water supply, sewage, and hospital facilities required substantially the same consideration as that given the National Army.

By war's end the total cost of cantonments and camps stood at almost $273 million. In evaluating this figure, however, the time factor must also be taken into reckoning. Considered as a single undertaking, the 32 projects cost about 55 per cent of the money spent on the Panama Canal—but they were built in about 5 per cent of the time. As observed by the War Department's Construction Review Board, a civilian committee appointed after the Armistice to postmortem war building, an unprecedented amount of construction was performed in a minimum of time: "It is a fact that, by the methods adopted, the cantonments were completed in time for the troops, and no other method is known by which this result could have been accomplished."

Whitewashing the high costs, the Review Board adds that if construction had not been pushed at maximum speed, cold weather would have interfered with the housing work, the training of soldiers would have been delayed, the war's issue seriously influenced. The average daily cost of the war to the U. S. was about $30 million. "If," continues the Board, "the completion of these cantonments and camps in time to receive the Army in September 1917 and to house it during the extreme winter of 1917-18 shortened the war by only one week, their total cost was saved. If it shortened the war by one or two days, the total excess costs paid for speed were saved."



From "Economics of the Construction Industry," 1919

Organization. It would have been impossible to build the cantonments and camps within the specified time if the Government had purchased its own materials and hired its own labor. Officials had all they could do in expanding staff bureaus to meet war demands without simultaneously trying to collect and operate a large number of construction crews. Projects were too numerous and too widely scattered to permit elaborate bureaucratic routine. Civilian planners and seasoned contractors were needed; private enterprise had to be mobilized for the emergency.

At the same time it was desirable that the Government should administer and retain full control of construction. Various War Department bureaus already had their own building organizations in the field. As these began to compete for materials and labor, Army heads quickly decided to consolidate all military construction under a single agency. Following consultations with the General Munitions Board (later the National Defense Council's War Industries Board), it was agreed that the Engineer Corps using troop labor, would handle all overseas work, while the Quartermaster Corps' construction and repair branch should be expanded into a separate Construction Division (first christened the Cantonment Division) to be responsible for all building at home.

Centralization of control pointed the way to greater efficiency and economy in the Government's dealings with private organizations. Some Army bureaus persisted in handling their own projects, but eventually most of them turned the work over to the Construction Division. Result: all-round improvement. But, despite its obvious advantages in preventing detrimental competition between Government agencies for labor and materials, the Division never was called on to handle work for other major departments.

If the war had continued, doubtless the Government would have consolidated further its building set-up. As the Construction Review Board sagely comments in its formal report: "This unifying process could have been continued until a single bureau was charged with the administration of and control over all war construction in the U. S. This bureau would have . . . utilized more efficiently the construction organizations of the country; stopped competition among the major departments of the Government if it had been backed by full Federal authority; and left little opportunity for contractors to deal independently with departments and play them against each other in an effort to get the largest fees or to take the easiest or most profitable work instead of that for which they were best fitted. Such full consolidation of construction authority would also have provided effective means for conscripting and efficiently utilizing all the construction materials, ability and labor of the nation."

Procedure. Declaration of war caught the War Department unprepared. Plans for many barracks had been partly developed, but many special structures, such as hospitals and depots, had not been designed nor their requirements even determined. Planning had to proceed without much knowledge of the sites being selected for the new cantonments and camps. Complicating the problem still further was the fact that any plans developed would almost certainly have to be changed to comply with the Army's changing needs.

Under these circumstances, the Government's venerable procedure of advertising for lump-sum competitive bids and then awarding contracts to lowest bidders was impractical. A more flexible type of contract which would permit construction and design to proceed concurrently was needed. There emerged a standard form, labeled the Contract for Emergency Work, based on cost plus a stipulated fee.

Criticized for encouraging excessive overtime and reducing efficiency on the job, the standard contract nevertheless left the Government in full control of operations, free to order changes or to expedite work as it deemed best. Most important, construction could start immediately while drawings and specifications were still being prepared. Nor does its sliding schedule of fees seem exorbitant: average for cantonment contractors was less than 3 per cent. Unlike the cost-plus contracts used in other Government departments, the Army's standard form set a maximum fee limit, a feature estimated to have saved the Government about $5 million in fees otherwise payable on the sixteen cantonments alone.

While the standard contract was still under discussion, a committee on emergency construction began compiling a list of qualified contractors. Questionnaires dispatched to leading architects, engineers and large corporations brought in 1,400 names, to whom other questionnaires were sent in quest of facts on individual work experience. Information thus obtained was cross-indexed geographically so that suitable contractors would be spotted quickly in any part of the country.

Each project built by the Construction Division was supervised by a resident constructing quartermaster, usually recruited from civilian building work. Armed with wide discretionary powers, he was actually in general charge, cooperating with the contractor in thinking up production methods, designing structures, selecting equipment, developing time schedules, making cost estimates, all in addition to

writing the usual inspection reports. Primary task was to get the job pushed to completion as rapidly as possible. With authority thus vested in a single competent individual directly on the site, red tape was slashed and many bogdowns averted.

Vigilance against graft was notable; the Construction Review Board found surprisingly little evidence of dishonesty. Chief losses to the Government came rather from inadequate production methods and the employment of men not qualified for the construction tasks thrust on them. U. S. Building may be guilty of waste and inefficiency, but it did its war assignment speedily and honestly—a fact in which it can take great pride.

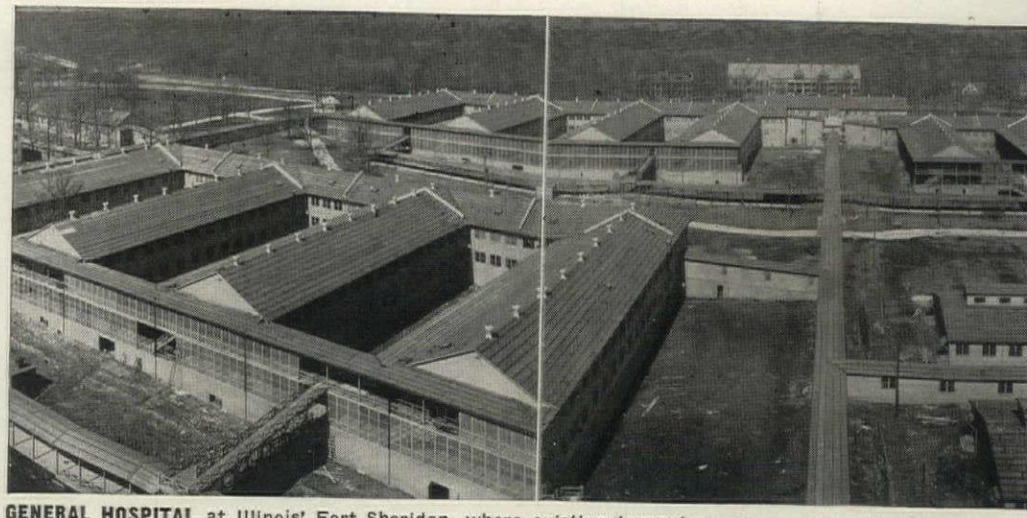
Labor Shortage. Highly unsatisfactory was the original method of allowing each contractor to assemble his own forces by any possible means. Some contractors began to entice men away from other cantonments, offering concessions such as excessive overtime, free transportation, free food and lodging. This led to competitive bidding for labor. Wage scales shot up; where they did not, there was unrest.

An agreement between the Secretary of War and the AFL President Samuel Gompers, establishing union wage-hour scales and calling for arbitration of labor disputes, served to minimize the threat of strikes. Nevertheless, labor inefficiency and a dearth of competent foremen combined to decrease daily output. Overtime beyond the basic 8-hour day was unavoidable; was the greatest single cause of high unit labor costs. A vicious cycle could be observed: workmen, wearied with overtime efforts, slackened their pace, created a need for still more overtime or for more hiring. By Armistice, according to opinions garnered by the Construction Review Board, labor was delivering not more than one-half to two-thirds of its prewar output.

A plan for coping with this problem did not evolve until after sixteen war months had passed. Then the U. S. Employment Service was called into action, established community labor boards with jurisdiction over the recruiting and distribution of unskilled labor in each locality. By this time approximately 300,000 unskilled laborers were needed. The Employment Service reported that the country's common labor supply was exhausted, began importing workers from Puerto Rico and the West Indies. About 18,000 men were obtained in this manner. If the war had continued, probably 100,000 more would have been imported.

Various schemes were used to whoop up workers' morale and increase efficiency. In localities where Italians predominated patriotic parades and public entertainments were given; for Negro laborers in the South, camp meetings and religious songs were used. Different communities, it was discovered, required uplift at varying intervals: 14 or 15 days in Virginia; 22 days in Boston.

The U. S. Employment Service did not operate long enough under war conditions to prove its worth. One mistake worth noting, however, was the Government's failure to utilize more fully the private employment agencies with which workmen were accustomed to deal.



GENERAL HOSPITAL at Illinois' Fort Sheridan, where existing barracks were remodeled in 1918 to accommodate about 2,000 patients and new buildings erected to provide 2,500 more beds.

Materials needed in building the cantonments fortunately could be obtained in ample quantities at the start. Most items were purchased direct from competitive bidders; one bill served to place orders for all cantonments. An exception was lumber, the largest single construction item. Alert to the new needs, the lumber manufacturers formed an organization with offices in Washington, cooperated with Government representatives in fixing prices (lower than the prevailing market), allotted orders to local dealers able to make deliveries. Plumbing equipment manufacturers likewise established a Washington office, nominated one of their number to handle and allot orders.

A time-saver, this system set a pattern followed later by the War Industries Board when it took over the allotment and price-fixing of essential materials. Conflicts between requisitions were minimized. Priorities could be established. Thus, not only the Army's Construction Division but also U. S. Shipping Board and U. S. Housing Corp. were able to procure needed items as shortages developed. About three-quarters of the principal construction materials were bought in this manner, averaging nearly $1 million daily during the summer of 1918. Remainder was secured locally by contractors at prices approved by the Construction Division.

Design. The Army cantonments could hardly be called photogenic. However, as the Construction Review Board concludes: "All facilities that were important and reasonably warranted were furnished. The general health, comfort, and convenience, and the physical, mental and social welfare of the troops were provided for as fully as was practicable." Moreover, and most significant, "they were built with remarkable speed."

HOSPITALS

Bottlenecked for time, World War I building operations could not always follow a logical sequence. Roads and rail extensions were often constructed last instead of first. Signal boner, however, was the failure to build hospitals until after troops arrived in camp. Lack of medical facilities caused much hardship and needless suffering. Concludes the Army's Construction Review Board: "Hospitals should always be constructed in advance of or along with the troop quarters."

Base hospitals were designed by the Surgeon General's office, became part of the construction work of each cantonment and camp. Typical layouts show a symmetrical arrangement of one-story frame buildings —56 units for a 1,000-bed hospital, including single wards, double wards, quarters for officers and nurses, lavatories, operating pavilion, mortuary, chapel, laundry, garage, and such. Principal units were usually connected by enclosed passageways for protection against weather. Total capacities provided: approximately 52,000 beds.

General hospitals to receive sick and wounded soldiers returning from abroad were needed almost immediately after completion of the cantonments and camps. First to go up was a group of knockdown frame buildings on a site near Williamsbridge in New York. Originally constructed by Columbia University for reassembly in France, these buildings (capacity: 500 patients) were taken over by the War Department and frame structures of a more permanent character added.

By November 1917 the Surgeon General's office had developed plans for a complete group of standardized buildings. These were then turned over to the fast-stepping Construction Division's hospital section (headed by Architect L. H. Lewis), served as a general pattern for all subsequent work. Early buildings were one-story wood with compo-board lining, but experience gradually led to two-story units

Hughes Co.

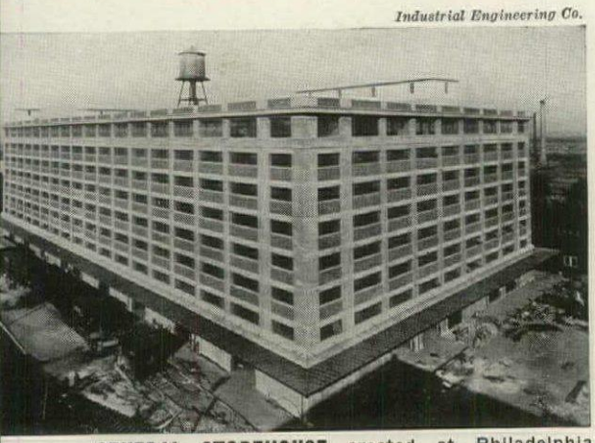
TYPICAL PAVILION used in the Army's general hospitals. Arranged to fit each site's topography, these standardized units were joined to main service buildings by long covered passageways.

and the use of plasterboard lining, metal lath and cement stucco exteriors. Some were built with hollow tile exterior walls. Finally there evolved a standard design consisting of a principal utility building, oriented east-west and connected by service corridors with parallel ward pavilions extending south. One side of each pavilion had an open porch for patients. To the north of this group were placed the administration, surgical, laboratory and recreation buildings; beyond these, quarters for nurses, officers, and enlisted men. This type of hospital provided a total of over 19,000 beds.

Heavy casualty lists indicated by September 1918 that existing hospital accommodations would be inadequate if the war should continue. Growing shortages of labor and materials also indicated the necessity of buying or leasing buildings which could be converted into hospitals with a minimum of alterations. To place wounded men as near their homes as possible, the country was divided into districts approximating the draft districts. Two commissions then traveled about, selecting suitable buildings and converting them into general hospitals without delay. Plans called for a total of 38,500 beds to be provided within six months at a total cost not exceeding $15.4 million. When the Armistice was signed, hospitals of this type totaling approximately 27,000 beds were under construction.

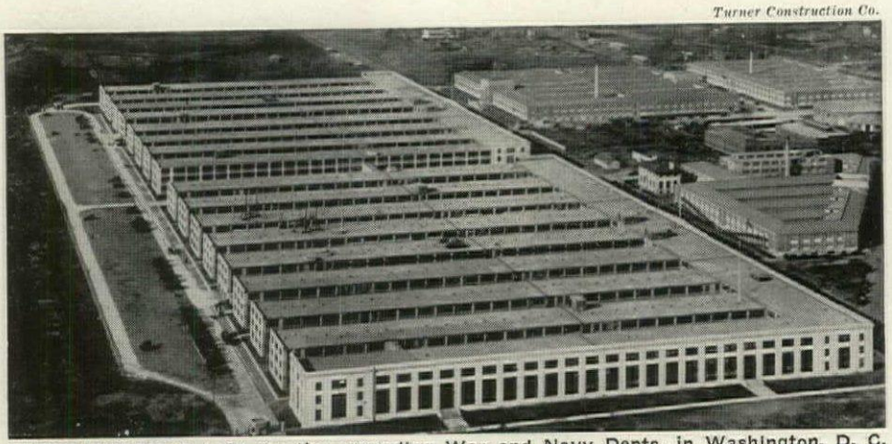
Significant were the average costs per hospital bed—$961 for new buildings, $99 for leased buildings.

Industrial Engineering Co.



GENERAL STOREHOUSE erected at Philadelphia Navy Yard in 1918. Cost: $1,500,000.

Turner Construction Co.



OFFICE BUILDINGS built for the expanding War and Navy Depts. in Washington, D. C. Floor area: approximately 42 acres. Cost: $7,250,000.

INDUSTRIAL

Although the Army's 32 cantonments and camps take top billing as the biggest and most spectacular single performance in the War Department's building repertoire, they were hardly more important in a military sense than the production and transportation structures needed to supply men overseas with food and munitions. At war's break the country was short on these. Faced with the task of making up the deficiency, both Industry and Government began immediately to construct new factories, terminals, storage depots and warehouses so urgently demanded all over the country.

Factories. Most Government spending for new manufacturing facilities consisted of advances to producers who had to expand their plants if they were to turn out munitions and war stuffs in sufficient quantity. Included in the contracts as plant facilities, such expenditures were added to the cost of war materials. Usually the manufacturer let the job to a building contractor for cost plus 10 per cent, then received payments from the Government on presenting vouchers covering labor and material, an upset price being fixed on the work's estimated cost.

On this basis a large amount of construction had already been undertaken by the Ordnance Department before the order was issued in October 1917 that all Army building should be handled by the Construction Division. Of the $319 million spent by the Ordnance Department—covering barracks, arsenals, proving grounds, storage depots, as well as plants for manufacturing acids, nitrates, explosives, gas, shells, guns—only $87 million were for contracts supervised by the Construction Division. Altogether, some 230 factories were developed as expanded plant facilities for manufacturers.

For unknown reasons the Ordnance Department did not use the standard contract for emergency work. Fees were much higher than those paid by the Construction Division. "It is evident from reading these contracts," summarizes the Construction Review Board, "that the attention of the Ordnance Department was so focused upon the one object of obtaining war materials at the earliest possible time that the matter of cost of increased facilities was treated as an incident, and the fact that the Government would have a large investment in such increased facilities was not considered of great importance."

Real Estate. Less easily explained is fact that many plant expansions paid for by the Ordnance Department were on sites which the Government did not own or control. At war's close this left the Government with three highly embarrassing alternatives: 1) to buy the site at the owner's price; 2) to sell the buildings, also at the site owner's price; 3) to remove the buildings—an impractical procedure since costs of demolition and restoring the site would probably exceed any salvage.

As the Construction Review Board postmortems: "It is difficult to understand why the officials drawing the contracts under which these plants or extensions were built did not protect the Government's interests by agreement, option, or purchase of sites." Net conclusion: construction work and purchase of real estate should be handled by a single organization.

Record. Lumped together—National Army cantonments, National Guard camps, special training camps, embarkation camps, hospitals, armories, factories, airfields, quarantine stations, temporary office buildings and such—the nearly 600 projects handled by the Construction Division make an impressive volume of work. Erected in hundreds of communities throughout the country, they touched every State except Nevada, rang up a grand total of over $1 billion on Building's cash register.

CIVILIAN HOUSING

Most disturbing feature of Building's role in World War I is fact that all the while Government was spending millions on cantonments and plants to house the machinery of war, not one red cent went into housing for the industrial workers who were expected to keep the machinery running full blast. More than a year went by after America's entry into the European conflict before effective action was taken on this problem—turbulent months in which the task of obtaining labor for the shipyards and munitions factories, concentrated in a relatively small number of communities, became increasingly difficult as the shortage of suitable living quarters grew more and more acute. Action finally came, but too late to prevent the congestion which proper planning could have anticipated and forestalled. The war was over—won, fortunately—before many dwellings had been built.

Building's war housing record is clouded even beyond a tardy start: operations were too slow, too inefficient, too costly. But, without past experience to serve as a guide, the Government agencies saddled with this problem had to grope their way toward a solution. Their pioneering blazed a trail which has since pointed the way for slum clearance and USHA's low rental housing.

Private enterprise. Much scattered private building took place in the early war days, but the residential volume declined continuously as the war stretched on. New dwellings were no longer being added at a rate sufficient to offset losses through fire and obsolescence or to meet the normal increase in families. Reasons: 1) skyrocketing costs (up about 68 per cent between 1913 and 1918) discouraged investors who feared deflation of values with war's end; 2) demand for labor and materials for cantonments and other urgent war construction became overwhelming; 3) private capital was more interested in nursing war babies.

At the same time population shifts caused by the armaments program magnified the nation's growing shortage of houses into intolerable proportions in war industry centers spotted along the Atlantic seaboard and in the North Central States. In cities like Bridgeport, New London and Erie, where huge war orders had been placed, the influx of labor quickly absorbed all available housing. Still more serious were conditions in smaller, more remote communities where proving grounds, bag-loading plants and other dangerous undertakings had to be located perforce—here there was no housing at all to spare.

Even though paid high wages, workers had to live in slums, share rooms with two to ten others, in already overcrowded private dwellings, or snatch space in flimsy bunkhouses. Rents rose rapidly. So too did the ill health, discontent and inefficiency of workers. Labor turnover became enormous: unable to find satisfactory living quarters, men worked a few days, then left town. Married workers, usually the most skilled and most needed, had to live apart from their families, became also the most difficult to retain on the job.

With private enterprise unable alone to cope with this situation, steadily growing worse, the Government at last was forced to take long-postponed action.

Government policies. Forewarned by England's experience with production-hampering housing shortages, the National Defense Council's Committee on Labor had set up a section on housing as soon as America entered war. Little was done, however, until questionnaires and a tour of the country revealed acute congestion in many centers although expansion of war industries had only just begun. The committee concluded private capital could not meet the growing demands, stated the Government would be forced to make housing funds available, argued the desirability of building brick houses before snowfall. (Labor note: in spite of the abnormal demand for carpenters, there was serious unemployment among bricklayers.)

More hearings were held, more recommendations advanced. Then finally the National Defense Council appointed a "Ten Day Committee" headed by Builder Otto M. Eidlitz to examine the housing problem, determine its extent and relation to the war program, suggest remedies. Late in October 1917 this committee submitted its report: earlier findings by the Housing Section were confirmed.

Ten localities — Bethlehem, Chester, Bristol and Hog Island in Pennsylvania; Bridgeport; Quincy and Squantum in Massachusetts; Wilmington; Newport News in Virginia; Rock Island in Illinois —were already restricting output because of inadequate housing facilities, faced the critical task of accommodating 75,000 more workers before June 1918. Typical of the lack of coordination in war planning were conditions in Bridgeport. In the preceding seven years the town's families had increased at a pace double that of new house construction, but despite the lack of living quarters the Government was now financing a new plant. By the first of the year nearly 10,000 more men would have to be housed if plants with war orders were to run at full capacity.

In the meantime Congress had adjourned. Another precious three months slipped by before a bill requesting $50 million for workers' housing could be introduced in line with the committee's recommendations.

Quite independently of the National Defense Council's investigations, U. S. Shipping Board had also become aware of a growing housing shortage. Located in small communities or in suburbs of such cities as Baltimore and Philadelphia, shipyards were hamstrung for lack of labor because of bad housing conditions. An annual turnover of 500 to 1000 per cent was reported.

Through its Emergency Fleet Corporation, the Shipping Board was helping to build new shipyards. Ship builders, however, were too busy to do much about housing.

(*Continued on page 70*)

MILL GREEN HOUSING PROJECT AT BRIDGEPORT, CONN.

Samuel H. Gottscho Photos

R. Clipston Sturgis, Architect. A. A. Shurtleff, Town Planner.

SEASIDE VILLAGE, ALSO AT BRIDGEPORT

R. Clipston Sturgis, Architect. A. H. Hepburn, Associate.

A MESSAGE TO AMERICANS

from the President of the Royal Institute of British Architects

It is perhaps unusual for a letter of fraternal greeting from the President of the Royal Institute of British Architects to the Architectural Profession in the U. S. of America to be written in an Air Raid Shelter, but such is actually the case. As I write I hear the familiar drone of the heavy German Bombers overhead and the continuous barking of the anti-aircraft guns. From time to time as these lull there is the welcome rising note of anger as the Spitfires swoop to the kill. This is but a tiny village set in cherry orchards and hop gardens, but on my lawn is a jagged hole and at my gates police notices saying "Unexploded bomb. Keep clear." There are no military objectives here—only the peaceful tile-hung cottages, and the gray church where simple folk have worshipped for 600 years in freedom and dignity. These however, second perhaps to the hospitals and the thickly clustered homes of the workers, are the new objectives of the German command. We are not dismayed, but our anger, too, is on a rising note and the end is not yet.

In the years before the war the architectural profession in Great Britain was changing owing to the increase of Architects Departments of Ministries, City Corporations, Municipal, County and Education Authorities. Although these Official Architects, as they are called, do not compare in numbers with the private practitioners, they were ever increasing in skill and importance.

Such buildings as Schools, Post Offices, State Hospitals and Housing schemes which formerly were mainly designed by private architects, are now largely carried out by official staffs. The opportunities thus created of continued sequences of planning have resulted in many excellent buildings of modern character, particularly the schools.

The vast amount of private buildings, universities, hospital centers and the greater civic and commercial buildings remained in the hands of the private architect.

When war appeared to be a possible happening, the R.I.B.A. at once formed a strong Committee to investigate problems of defense against air raids and conferences were held. The conclusions were of great value in the later compilation of the Building Code of the Civil Defense Act.

At the outbreak of war there was a sudden and almost complete stoppage of building which was felt most of all by those in private practice.

This Institute at once offered its services to the Government in the task of carrying out the huge national program of temporary camps, hospitals, munition factories and defense works, which was then inaugurated.

Our profession, trained in planning and design, in judgment of sites and supervision of work, has a vitally important part to play and a very definite helpful contribution to make to the national effort.

There was in the first instance some reluctance to employ architects by many Government Departments owing to the old wrong idea that they, the architects, were only concerned with the addition of architectural trimmings to otherwise plain buildings. Had it but been realized, the modern architect is far more likely to be the man to omit the trimmings.

The modern education of architectural students is more scientific than was once the case and in its earlier stages is akin to that of engineers but combines also in the subjects of planning and design two all important matters in which engineers as such appear not unduly to concern themselves.

Recently there has been far more cooperation between the authorities and the architects. In the formation of air raid shelters in certain towns the qualified architects formed themselves into panels and were responsible for the design and the carrying out of the whole shelter program. The work was shared, fees were pooled, cooperation was loyal and the result was beneficial alike to the town and the architects.

Our young architects are in the fighting forces and our brilliant students are winning fresh laurels for themselves. For many, alas, the victor's crown has also become the bay leaves of the heroic dead. The older men, most of whom fought in the last war, are enrolled in A.R.P. and fire fighting services and in the Home Guard.

The insensate shattering of London buildings now proceeding will need much technical skill for its present control, while the future reconstruction will demand all the powers of town planners and architects alike. Out of this evil good may eventually come.

You will, I am sure, forgive my returning to the subject of the war because this is clamant and insistent. Nothing else matters in England now. We are fighting for the freedom of men's souls against a monstrous tyranny that would enslave both body and soul, and I assure you that the knowledge of your sympathy is of immense help to us.

The art of architecture may be clouded but it cannot die. The spirit of the free laic masons of the mediaeval years who, refusing to be dominated either by King or Abbot, produced some of the finest of the world's buildings, still lives in the architects of today whether British or American, and for that freedom we shall fight to the end. It is difficult to believe that America can ever be subjected to the strain we are undergoing now. For one thing that would assume that some queer things had happened to the British Empire and its fighting forces. Those things are not going to happen, but if I may presume to advise I would recommend action that will be useful to you in both war and peace.

Make your government and your nation architect-conscious at the earliest possible date. Prove to them that the national development in all directions, particularly in those affecting the planning of the environment of your people, will be all the better if at the very beginning it is realized that the architectural profession is by training and experience the rightful one to be consulted early, not to remedy mistakes, but to prevent them, and that the same thing applies to all the vast program of air raid shelter, industrial and defense works which war entails.

In conclusion I give to the architectural profession in America the warmest greetings of the Royal Institute of British Architects. God speed the right.

W H Ansell
President R. I. B. A

BUILDING'S SHARE

Since the President's first declaration of the national emergency, Congress has appropriated a total of $12,249,500,000 for defense. By mid-September, six-and-a-half billions of these appropriations had reached the stage of actual contracts or definite allocations —enough to afford a rudimentary idea of the pattern of defense spending, enough to establish the approximate relative magnitude of Building's share in the defense job.

As of September 15, five of the six-and-a-half billions had been assigned to shipbuilding, one to aircraft and supplies, and a half-billion to building (chart, right). And, in addition to this half-billion for direct Federal construction, Army and Navy grants and RFC loans to private manufacturers for plant expansion totaled another quarter-billion, at least a third of which is being used for new industrial buildings.

Thus, by rough calculation, 11½ per cent of the defense money allocated by September 15 went into building construction. As time goes on, this percentage of building dollars to defense dollars will undoubtedly tend to increase. Contracts let by mid-September included but 30 millions for defense housing, although a quarter-billion has been appropriated for this purpose—but encompassed almost the whole of the naval expansion program, which will take until 1946 to complete. While Army and Navy building was well under way, the necessity to prepare detailed plans and specifications for each building project naturally meant that this part of the program did not get started as rapidly as some of the others, reducing still further its proportion to the total figure. Despite the start which has been made in this respect, it is certain that Building will figure more importantly in future defense contracts than it has in the past.

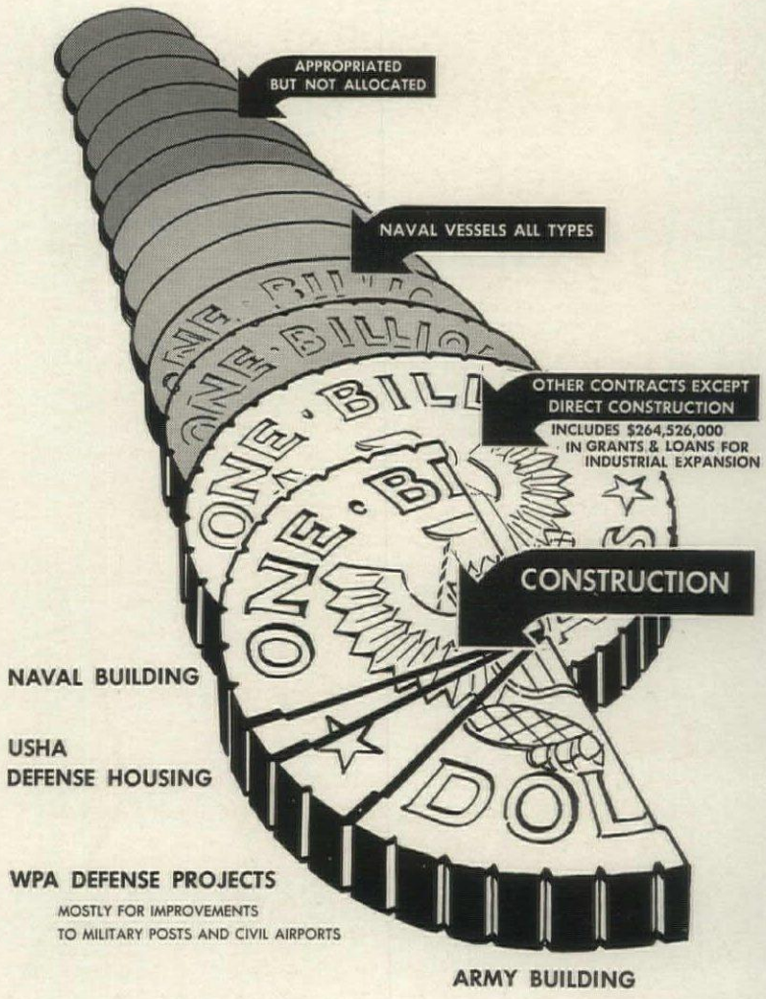
Current plans for defense building total more than a billion dollars for fiscal 1940-41 in the military and naval classification alone. To this must be added another quarter-billion for defense housing and an undetermined, but probably large amount in government grants for industrial plant expansion, as well as an allowance for the impetus which the program will give to private housing, other industrial construction, and the miscellaneous building types.

The significance of these figures to the building industry can be evaluated only in relation to pre-defense building volume. Last year's expenditure for buildings of *all* types—public and private —totaled barely four billion. Next year's will certainly total six. Biggest increase, of course, will be in the military and naval classification, where 1939-40's 125 million leaps to '40-41's billion plus—an increase of almost ten times which has no precedent in past building statistics except the experience of World War I. The increase in industrial construction to a 1941 forecast of 725 million, while not nearly so great proportionately, is equally unprecedented—topping all previous peacetime years, including even the 1926-29 average of 640 million. The 1941 housing demand, forecast at two-and-a-half billion, while tremendous in absolute volume, should be compared to the 1939 depression-high of two billions and the '26-'29 average of four billions.

All of the figures quoted above (and shown in the charts at the right) are necessarily rough but reasonable approximations. They are sufficient to indicate, however, that Building's number one job is military and naval construction, followed by industrial expansion and defense housing. In the major sections which follow (arranged in this order of importance) the nature of these tasks is indicated in greater detail. Foremost fact to be gleaned therefrom is that the defense building job includes every conceivable building type, small and large, temporary and permanent, simple and complex. And, for those who like mouth-filling figures, they also show a 1940-41 defense construction program which adds up to at least two billion building dollars.

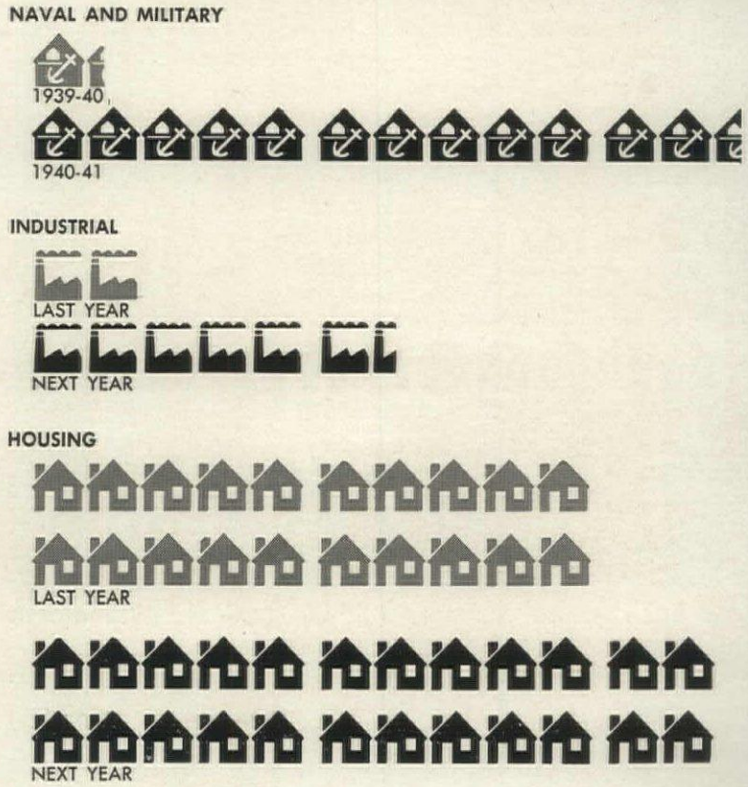
For additional references see pertinent sections of the Bibliography.

DIRECT DEFENSE EXPENDITURES
JUNE 16 TO SEPT. 15

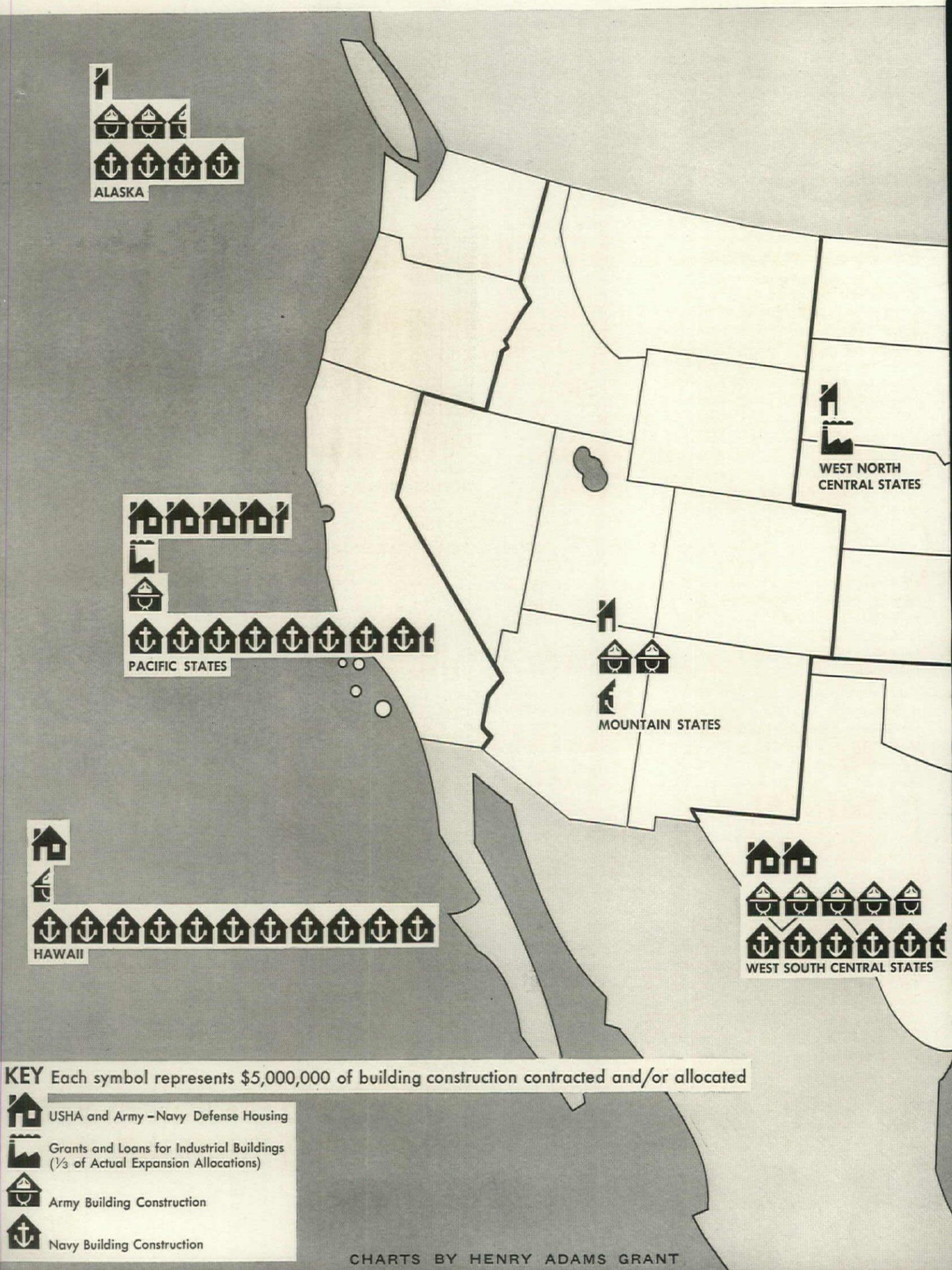


Each division on edge of coin represents $25,000,000

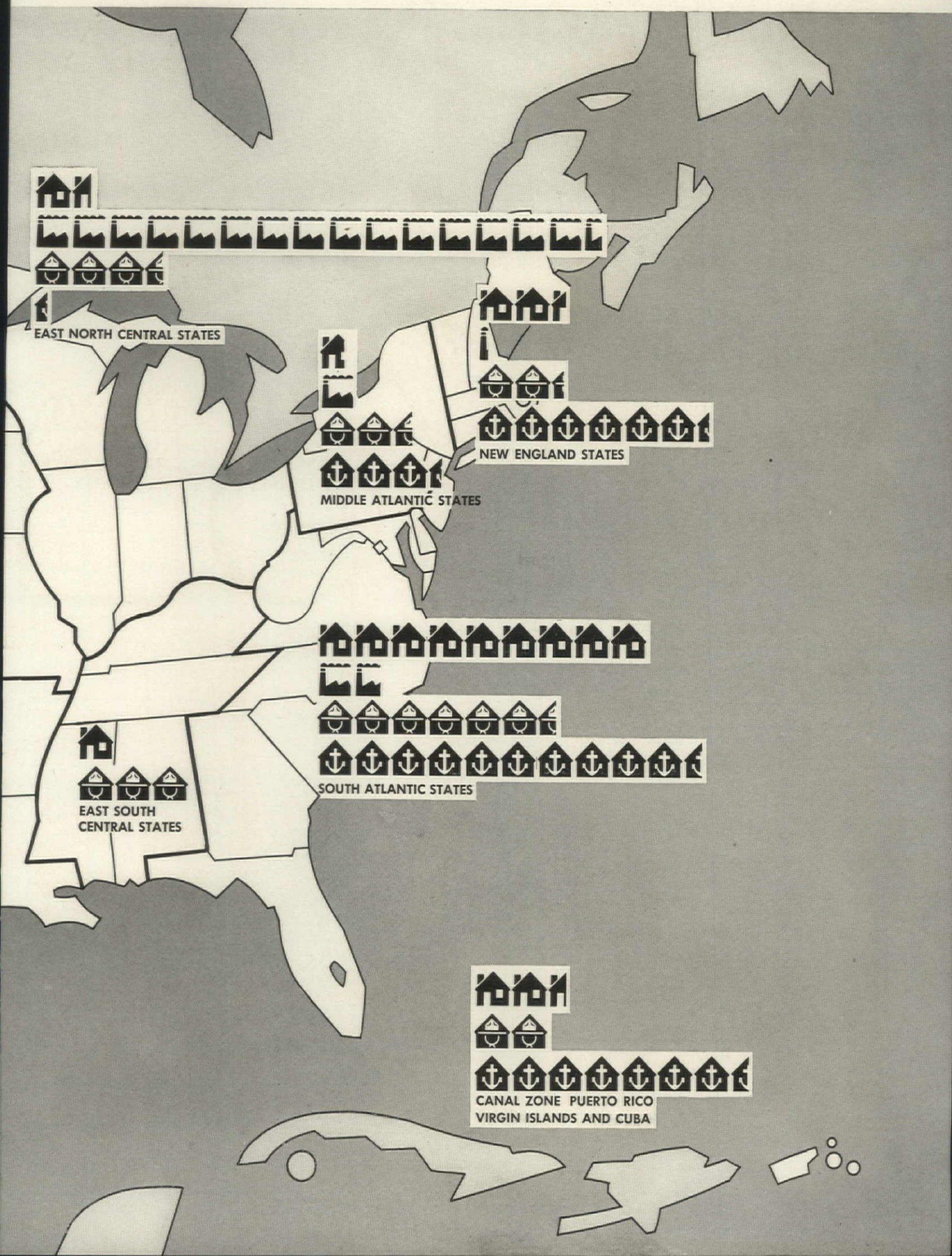
ESTIMATED CONSTRUCTION VOLUME
Each symbol = 100 million building dollars

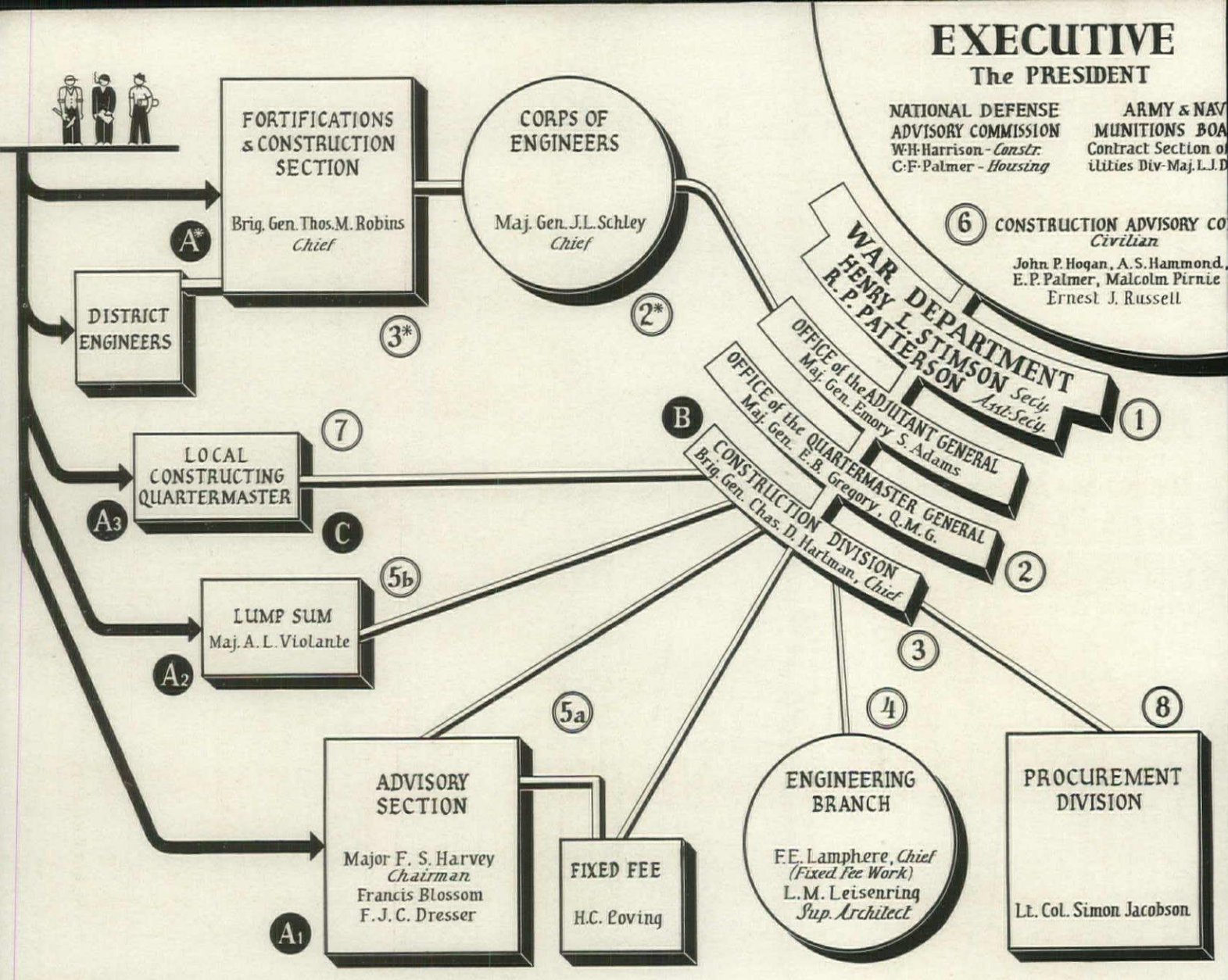


WHERE defense building dollars are going .



the picture on October 1.





ARMY BUILDING ORGANIZATION

QUARTERMASTER (General Construction)

PROFESSIONALS', CONTRACTORS' PROCEDURE

A1. For work on cost-plus-fixed fee basis, architect, engineer, contractor leave names and qualifications with Advisory Committee in Washington. A personal interview is best; and the more illustrative data on his work, the better.

A2. For competitive-bid work, contractor prepares bid in reply to advertisement. Consults plans in Lump Sum Office in Washington, at local Army post, or obtains plans from Washington under bond. Bids are sealed, opened on appointed day and at public hearing, contracts awarded to lowest bidder.

A3. For fixed fee work architect, engineer, and contractor may also leave name and qualifications with local constructing quartermaster. This is only additional to (A1) but a recommendation from the local officer is a factor in selection of firms. Landscape architect should leave his name and qualifications with local constructing quartermaster who hires him direct.

B. After receiving questionnaire regarding specific fixed-fee project, architect, engineer, or contractor appears before chief of Construction Division and his assistants. Contract awarded by Chief of Construction Division on basis of questionnaire and above interview.

C. Contractor's work is supervised on job by local constructing quartermaster and/or the private architect-engineer engaged on the job.

PROJECT PROCEDURE

1. Construction projects which are part of a general program originate in the office of the Secretary of War in conjunction with the Chief of Staff after advisements from Chiefs of the various branches.
Construction projects arising from apparent need originate in the office of the Post Commander, go through the Corps Area Commander to the War Department.

2. Project is turned over to the office of the Quartermaster General for execution.

3. Method by which work is to be let is determined by the Chief of Construction Division who then assigns it to proper section in Engineering Branch.

4. Drawings and specifications are prepared by the Engineering Branch.
The Office of the Quartermaster General, when it finds it expeditious, designates private organization to prepare drawings and specifications.

5a. If contract is to be let by cost-plus-fixed fee method, Advisory Committee selects names to be gone over by a special committee. Three or four firms are then sent questionnaires and asked to come to Washington for interview by the Chief of Construction Division and his assistants, who make the award, subject to approval of (6).

5b. If contract is by competitive bid, Lump Sum Division advertises bids, and awards to lowest bidder, subject to approval of:

6. National Defense Advisory Commission; The Assistant Secretary of War; and in some cases, the Joint Army and Navy Munitions Boards (see note opposite page).

7. Supervision of the contractor's work is by the local Constructing Quartermaster, and/or the private architect-engineer engaged for the job.

8. If materials specified are not readily available, the Procurement Division is consulted.

CORPS OF ENGINEERS (Fortifications)

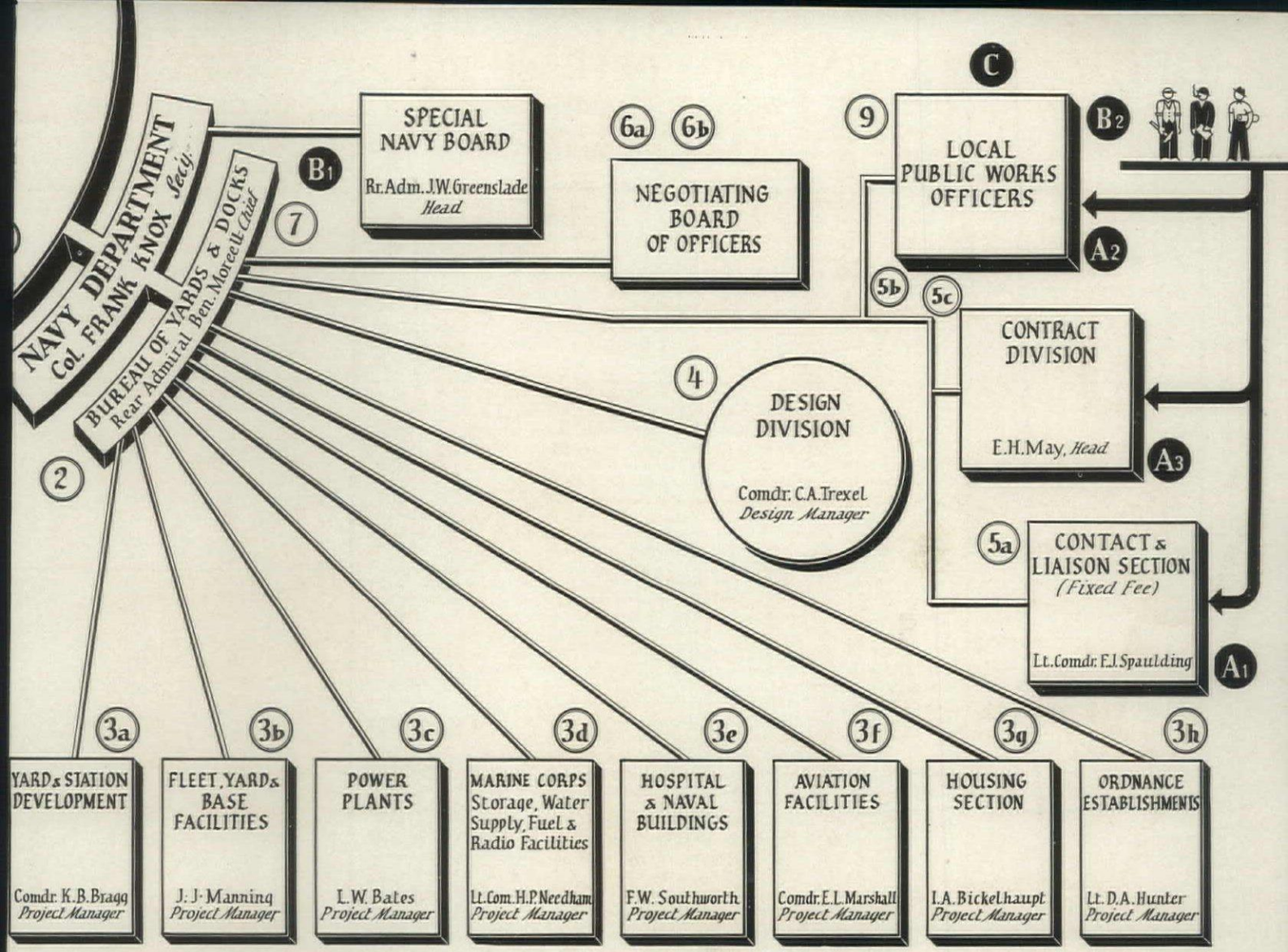
PROFESSIONALS', CONTRACTORS' PROCEDURE

A* Contractors may leave names with District Engineer or with Fortifications & Construction Section, Corps of Engineers.

PROJECT PROCEDURE

2* Office of Corps of Engineers executes fortification projects.

3* Its Fortifications & Construction Section designs the work, often aided by consulting architects and engineers. The District Engineer lets contract, selecting firm on recommendation of Fortifications & Construction Section.



NAVY BUILDING ORGANIZATION

BUREAU OF YARDS & DOCKS

PROFESSIONALS', CONTRACTORS' PROCEDURE

A1. For work on cost-plus-fixed-fee basis architect, engineer, contractor leave names and qualifications with the Contact & Liaison Section in Washington. List of projects open for consideration may be obtained in this Section. A personal interview is best; and the more illustrative data presented, the better. Photographs of work constructed in past, recommendations by clients, etc., are helpful.

A2. Architect, engineer, and contractor may also leave names and qualifications with District Public Works Officer.

A3. For competitive contracts, contractor prepares bid in reply to advertisement. Consults plans in Lump Sum Office in Washington, at office of District Public Works Officer as specified in advertisement, or obtains plans from Washington under bond. Bids are sealed, opened on appointed day, and at public hearing, contracts are awarded to the lowest bidder.

B1. For fixed-fee contracts, after receiving questionnaire regarding specific project, architect, engineer, or contractor appears before the special Negotiating Board of Officers in Washington. Contact awarded by Chief of Bureau.

B2. On smaller contracts, the contractor appears before District Public Works Officer who negotiates with him direct, and awards contract.

C. Work supervised by District Public Works Officer.

NOTE

All construction contracts to be let or negotiated must have the approval of the National Defense Advisory Commission which studies their relation to and effect on the rest of the defense program.

The Army and Navy Munitions Board passes on all those jobs which overlap both Army and Navy. A Construction Advisory Committee has been appointed by the Army and Navy Munitions Board to advise on construction planning.

PROJECT PROCEDURE

1. Construction projects which are part of a general program originate in the Office of the Secretary of the Navy. The special Navy Board also advises on new construction work. Construction projects arising out of evident need originate from the Commandant of Naval District and the Commandant of the local yard and are then sent to the Secretary.

2. Project is turned over to Bureau of Yards & Docks for execution.

3. It is then assigned to the appropriate project manager. He is responsible for seeing that plans and specifications are prepared, and the contract let.

4. Drawings and specifications are prepared by Design Division. Architect and engineering firms are also being employed to draw up working drawings and supervise construction to relieve pressure on Design Division.

Procedure then varies according to type of contract:

5a. If by cost-plus-fixed fee, on large projects the project manager turns to Contact & Liaison Section for names of all local and national contractors and engineers eligible for work.

6a. The names selected by Contact & Liaison Section are then reviewed by a Negotiation Board of Officers. At least three who appear best qualified for the project are designated. A special questionnaire is forwarded to them for detailed information covering this specific project, and the contractors are directed to appear before the Board.

5b. If for smaller contracts, cost-plus-fixed fee, the project manager turns to the District Public Works Officer (Civil Engineering Corps) in charge of construction at naval station or base. He selects three or more concerns who appear best qualified for work under consideration, issues questionnaires, and carries on negotiations and hearings.

6b. Following negotiations by District Public Works Officer, complete records are submitted to the Bureau Negotiation Board, who review all data.

5c. If by competitive bid, the job is turned over to the Contract Division, which advertises bids and awards the contract to lowest bidder, subject to approval (8).

7. All recommendations by the Negotiation Board of Officers are forwarded to Chief of Bureau who awards contract, subject to approval of:

8. National Advisory Defense Commission; Secretary of the Navy; and in some cases, joint Army & Navy Munitions Board (see note to left).

9. Supervision of contractor's work is by District Public Works Officer.

GUIDE TO WASHINGTON'S DEFENSE BUILDING AGENCIES

		OFFICE OF THE QUARTERMASTER GENERAL CONSTRUCTION DIVISION, Brig. Gen. C. D. Hartman, Chief Designs and constructs all Army structures, except fortifications.	CORPS OF ENGINEERS, Maj. Gen. Julian L. Schley, Chief Builds fortifications and some other defense construction.
ARCHITECTS AND ENGINEERS	*To what extent are professional services used?*	Architects and engineers are employed on salary basis in the Engineering Branch of the Construction Division. These must be on the Civil Service register or have a Civil Service status. Architects and engineers are also occasionally employed on fixed fee basis to prepare drawings and specifications for special projects when Office of Quartermaster General finds it most expeditious. The majority of private architects and engineers, however, are employed on fixed fee basis for supervision of Army-designed construction. On almost every Army job, a private architect-engineer is employed to lay out utilities and supervise construction according to plans prepared by Engineering Branch in conjunction with local constructing quartermaster.	Architects and engineers are employed on salary basis as part of the design and engineering force. These must have Civil Service status or be on Civil Service register. Architects and engineers are also employed as consultants on fee basis.
	Whom to contact and what to submit—	For contracts on fee basis, architects and consulting engineers should apply to The Quartermaster General, Washington, D. C. Applications are filed with the Construction Advisory Section. Personal interviews with this Section (F. S. Harvey, F. Blossom, F. J. C. Dresser) are advisable. No one is summoned for personal interview, but the Advisory Section interviews each one who applies and will help in making sure his qualificatons are properly set forth. Submit by letter or interview (1) full experience record indicating clients by name, location and type of project, and money value; (2) organization available with view to rapid completion of plans and specifications; (3) list of projects designed for Federal agencies. Photographic illustrations of completed work are helpful.	Application for fee work should be filed with the Fortifications & Construction Section (Gen. Thomas M. Robins, Chief). This may be by letter or personal interview.
	How is selection made?	Architects and engineers are classified by the type of work they do, and by the size of job they are able to handle. This is determined on basis of work done in past, firm's own estimate, and board's judgment based on staff and equipment. The names are also classified by States. It is the general policy to make awards to qualified firms in the geographical area in which the work is to be performed, but on jobs running to more than $5,000,000, this may be ignored. For each project, the Advisory Section Board draws from its files the names of twenty or thirty firms appearing eligible on basis of type, size and location. Using the application and their own knowledge of the industry, a special committee reduces this list to three or four. Usually all three firms are called in to discuss the project, before one is selected. An award of more than one contract to any one firm is not contemplated unless the interests of the Government dictate such action.	
	What is nature of work? How are payments made?	Architect-engineer contract provides for him to: (a) Organize field office for design, etc., headed by either a partner or approved representative; (b) make preliminary surveys, preliminary studies, cost estimates, bills of materials, designs, plans, specifications, and progress schedules; (c) supervise construction, obtain necessary permits, check shop drawings, and make field tests; (d) consult as required on questions of construction. While the Government will: (a) Furnish such preliminary data as are available; (b) furnish field office equipment complete; (c) pay the architect or engineer: (1) a fixed fee which is sole pay for profit and overhead, (2) actual salaries and wages of staff in field office and in home office as they apply to project, (3) all travel, telephone, telegraph, blueprinting, typing, etc., and (5) reimbursement of any special or unusual technical assistant; (d) make payments every two weeks or monthly.	
CONTRACTORS	*Whom to contact and what to submit—*	For large contracts on fee basis, contractors should apply to The Quartermaster General, Washington, D. C. Applications are filed with the Construction Advisory Section. Personal interviews with this section (Forrest Harvey, F. Blossom, F. J. C. Dresser) are advisable. No one is summoned for personal interview, but the Advisory Section interviews each one who applies and will help in making sure his qualifications are properly set forth. Submit by letter or interview (1) experience on fee construction; (2) experience in competitive bid construction; (3) organization available—including architectural and engineering; (4) equipment available; (5) financial resources. Under items 1 and 2 list types of projects, place and cost. It is also well to apply to the local Constructing Quartermaster. On small jobs, he may negotiate contract direct. His recommendation is also of considerable importance in connection with contracts negotiated in Washington.	Applications for contracts on fixed fee basis should be filed with Fortifications & Construction Section (Gen. Thomas M. Robins, Chief). This may be by letter or by personal interview. Submit descriptive information similar to that submitted to Quartermaster General's office. Competitive bid work is handled through regular channels—advertising either through District Engineers or Fortifications Section. Awards to lowest bidder.
	How is the firm selected?	Contractors are classified by the type of work they do, and by the size of job they are able to handle. This is determined on basis of work done in past, firm's own estimate, and board's judgment based on his equipment and staff. The names are also classified by States. It is the general policy to make awards to qualified firms in the geographical area in which the work is to be performed, but on jobs running to more than $5,000,000, this may be ignored. The Advisory Section draws from files names of twenty or so firms appearing eligible for specific project on basis of type, size and location; reduces this list to three or four. Usually all three firms are called in to discuss the project or to fill out a specific questionnaire, before one is selected. The formation of organizations to handle work not normally performed is discouraged. An award of more than one contract to any one firm is not contemplated unless the interests of the Government dictate such action.	Selection is on same basis as in office of Q. M. G.
	What is nature of work? How are payments made?	Cost-plus-fixed-fee contracts provide that the Contractor: (a) Furnish all necessary labor, material, etc., and construct project in the shortest possible time; (b) take all discounts, etc., (c) keep records on an approved basis; (d) keep a qualified representative at site of work; (e) conform to prescribed wage scales. Government to (a) Pay contractor: (1) a fixed fee which is sole pay for profit and overhead expense, (2) all costs for labor, material, etc., (3) rental of contractor's plant at scheduled rates, (4) all transportation, including contractor's plant, (5) salaries of superintendent and other key employes, (6) bond, insurance, and Social Security costs, (7) travel and hotel expenses of officers and employes; (b) reimburse contractor weekly or oftener, rentals paid monthly; (c) pay fixed fee 90 per cent as accrued, balance on completion; (d) adjust fee to any material increase or decrease in cost of project.	

BUREAU OF YARDS & DOCKS Rear Adm. Ben Moreell, Chief Design and construction of the naval shore establishments.	U. S. COAST GUARD Department of the Treasury Rear Adm. R. R. Waesche Designs, builds own construction.	F.W.A., PUBLIC BUILDINGS ADMINISTRATION, W. E. Reynolds, Commissioner of Public Buildings For functions see bottom of column *
Architects and engineers employed in Design Division must be on the Civil Service register or have a Civil Service status. Consultant engineers and architects are also engaged to supplement work of Design Division when need for such services is deemed necessary to expedite the work. Work in the field, including supervision of construction, carried out under the direction of officers of the Civil Engineer Corps, U. S. Navy.	Architects and engineers are employed on salary basis in the Engineering Division. These must have Civil Service status or be on Civil Service register. In addition, consulting architects and consulting engineers are called in on special projects, usually the large ones, on a fee basis.	Architects and engineers are employed on a salary basis in the Supervising Architect's office (Louis A. Simon, Supervising Architect) and in the Supervising Engineer's office (Neal A. Melick). These, as a general rule, must have a Civil Service status but for special needs others are also employed. No policy has yet been announced for use of private architects on a fee basis although they will probably be needed for site planning, etc.
For contracts on fee basis, architects and engineers apply to Chief of the Bureau of Yards & Docks, Navy Department. Applications are filed with the Contact & Liaison Section. The head of this Section (Lt. Comm. E. J. Spaulding) interviews each one who applies and will help in making sure his qualifications are properly set forth. It is also advisable to obtain the recommendaton of the local Public Works Officer. Submit (1) experience on comparable work; (2) financial condition; (3) personnel available for key positions; (4) engineering and drafting organization; and (5) suitable plant available. Photographic illustrations of completed work are helpful.	Address all applications to Headquarters of Coast Guard, Department of the Treasury. This information is turned over to Office of Engineer in Chief (Rear Adm. H. F. Johnson) who handles all selection of outside consultants. Submit descriptive information on firm.	Application by architects and engineers for work on a salary basis should be to the Personnel Division, Public Buildings Administration, Washington. This holds true for supervising engineers in the field offices as well. As no policy has yet been announced for use of private architects on a fee basis in emergency construction, procedure is unknown.
Architects and engineers are classified as to the type of work they do; also as to locality, although on large contracts the geographical distinction is not necessarily made. In selecting three or four from the names in the file, the Board carefully studies responsibility of the firm based on its past record, office personnel and equipment suitable for type of work under consideration, and other pertinent information. Usually all three firms are called in to discuss the project before one is selected. Awards are based on consideration of relative merit only, and an effort is made to spread the work, avoiding awarding any major portion of work to one firm except where there is special advantage to Navy in so doing.	Selection of firm is by the Office of the Engineer in Chief.	In recent years, some consulting architects have been selected by regional competition.
A sample contract and a complete description of the nature of cost-plus-fixed fee contracts, prepared by William M. Smith (published May 20, 1940) may be obtained by writing the Bureau of Yards & Docks.	The usual procedure is to have the consulting architect prepare all plans and specifications, and supervise the project. Payments are made, as a rule, in two installments: (1) on delivery of plans and specifications and (2) at completion of the job.	Up to the present time the office of the Supervising Architect has prepared all plans and specifications, while the private architect works with them on a consulting basis. The office of the Supervising Engineer supervises all construction through the central office in Washington and district field offices.
For fixed fee contracts, address letter to Quartermaster General. This request is turned over to Contact & Liaison Section (Lt. Comm. E. J. Spaulding). Application can also be in person, in which case interview is with the above Section, and in the case of ordnance plants, with the project manager (Lt. A. D. Hunt). Submit the following information about your firm: (1) experience on comparable work; (2) financial condition; (3) personnel available for key positions; (4) engineering and drafting organization; (5) suitable plant available. Photographic material acceptable, but be sure to indicate if you want it returned. Contractors may also apply to local Public Works Officer for direct work, or for recommendations to Bureau.	All contractual work on structures for U. S. Coast Guard is done by competitive bid. This clears through the office of the Engineer in Chief.	For fixed fee contracts, contractor should apply to Office of Supervising Engineer (W. J. Kackley, in charge of emergency construction fixed fee contracts.) Contractor is asked to fill out qualification questionnaire on special printed form for their files. On all other work, contracts are let by competitive bid.
Contractors are classified by type of work they do, size of firm and geographical location. All other things being equal, the Department favors awards to local contractors. Negotiating Board of Officers, after careful study of applications recommends three firms to Chief of Bureau for selection. A questionnaire is forwarded to these firms and they are asked to come to Washington for interview. Final selection is made by Chief of Bureau. In the case of contracts negotiated by the District Public Works Officer, additional names of firms may be forwarded to him from Washington files. He considers the list, issues questionnaires and carries on negotiations and hearings. Complete records of these are forwarded to Negotiating Board who pass on their recommendation to Chief of Bureau, for final selection.	Awards made to the lowest bidder.	For fixed fee contracts, contractors are listed geographically. Names are selected for specific jobs according to the type of work, financial condition, type of equipment, size of office force, and location. The Supervising Engineer, together with his assistants, the project manager and others, selects one contractor from these names with whom the contract is negotiated. Final award is made by the Commissioner with the approval of the Administrator of the FWA. On competitive bid, award to lowest bidder through Office of Supervising Engineer.
Contract similar to that of Army. A sample contract and a complete description of the nature of cost-plus-a-fixed-fee contracts, prepared by William M. Smith (published May 20, 1940), may be obtained by writing the Bureau of Yards & Docks.	No special requirements. Partial payments made on delivery of ordered material. Regular payments are usually on monthly basis on recommendation of progress reports from supervisor.	*Builds departmental and service buildings for the Government. Under the Lanham Act FWA is authorized to build housing for Army and Navy personnel and civilian workers.

GUIDE TO WASHINGTON'S DEFENSE BUILDING AGENCIES (cont'd)

	F.W.A., U. S. HOUSING AUTHORITY Nathan Straus, Administrator Provides construction loans and annual grants for low-rent slum clearance projects developed and operated by local housing authorities.	FARM SECURITY ADMINISTRATION Department of Agriculture Will W. Alexander, Administrator John F. Donovan, Chief Engineer Builds housing for rural resettlement. May be used as agency for defense housing.	BUREAU OF RECLAMATION Department of the Interior John C. Page, Commissioner Prepares plans and constructs irrigation projects together with the incidental power development—dams, power plants.	CIVIL AERONAUTICS AUTHORITY Department of Commerce D. H. Connolly, Administrator Prepares schemes, and in some cases finished drawings, for airport buildings.
ARCHITECTS AND ENGINEERS ***To what extent are professional services used?***	Architects and engineers employed on a fee basis by the local authorities. USHA has the power to develop and build defense projects directly. This has not been done to date and the probability is that where local authorities exist, this power will not be used.	Architects and engineers are employed on salary basis in nine district offices. No Civil Service registration necessary for this job. Consultant architects and engineers are also employed on fee basis direct from district office.	Architects and engineers employed on salary basis as part of design and engineering staff. From Civil Service. Architects and engineers employed as consultants to the regular design force. Supervision is through Bureau's own force.	Architects are employed in the Airport Division on salary basis. No consulting architects or engineers are employed by this Department, as all actual construction work and its initiation lies with the local municipalities.
Whom to contact and what to submit—	As the USHA does not yet contemplate direct construction, no procedure for application has been set up. Under the regular procedure architects and engineers apply to the local authority.	Apply to District Office.	Address all applications to Department of the Interior, Personnel Division. When need for consultant arises, the Bureau calls on the Personnel Division for names. Applications may also be made to the Field Office, Customs House, Denver, Colorado—S. O. Harper, Chief Engineer.	
How is selection made?	Selection at present is by the local authority through appointment or competition.	Done at District Office. For employment on salary basis, architect and engineer must be a legal resident of the area.	Bureau of Reclamation makes selection of consulting architects and engineers from names of firms given them by Personnel Division, Department of the Interior.	
What is nature of work? How are payments made?	The same procedure as in regular private practice. Rate of fee varies in accordance with the value of the project.	Determined by District Office.	Consultant to Bureau's design division or engineering division where plans and specifications are made by Bureau's own office. Payments are on a day-by-day basis.	All construction work on civil airports is initiated by the local municipality, often in conjunction with WPA, and usually all contracts would go through it.
CONTRACTORS ***Whom to contact and what to submit—***	As authorization to build direct has not yet been used, no procedure has been set up for letting of contracts under this system. Under present procedure, all contracts are let by local authorities through competitive bidding.	All contracts are let by competitive bid from the District Office.	All work for Bureau of Reclamation is done by competitive bid. Advertising for bids is done through Bureau of Reclamation at Washington, or through Field Office, Customhouse, Denver, Colorado—S. O. Harper, Chief Engineer.	
How is the firm selected?	Award to the lowest bidder.	Awards are made in Washington office to lowest bidder.	Lowest bidder.	
What is nature of work? How are payments made?	Regular procedure under competitive bid.	Determined by contract drawn by District Office	Similar to other Government contracts.	

BUILDING'S ROLE

Wherein new opportunities are explored . . . and ways and means for individual participation examined

Once again, as in World War I, the cry for speed commands all of Building's sources. Defense construction must proceed at the pace of roughly $2 billion a year if the Government's plans for national preparedness are to be realized. Materials and skilled labor are needed immediately. So too are the talents and knowledge of the industry's chief operating men—architects, engineers, contractors, builders, dealers, realtors, bankers. Each has a part to play, for Building's new assignment signifies more than a flood of orders for structures to be erected within a specified time. The problem is how to do the best possible job: not only must work proceed quickly, but quality must be held high and costs kept down. To do this, Building must call on its most progressive men.

In a system of individual enterprise such as ours, Government can set national objectives and appropriate needed funds, but cannot blueprint in detail what each person should do. Building's job has been outlined: it now remains for those who make up the industry to tackle the problem.

What can you do as an individual? Three possibilities are open: 1) appointment as a civilian specialist in a Government agency; 2) private contract work on Government-financed project; or by no means the least significant, 3) contract work on (or sponsorship of) a privately financed project serving the interests of National Defense. No matter what your specialized activity—finance, management, marketing, construction, design or research—each line of attack offers opportunities for individual or group initiative.

Not only is there the immediate task of building for the immediate enlargement of the nation's armed forces. Also to be considered are the long range objectives implied in the task of planning and building for America's permanent defense against outside attack.

Overshadowing all individual activity, however, is the question of what the industry can do as a whole. Clearly, if Building is to be ready to meet any defense demands at any time or any place, it should be known exactly what resources—professional skills, labor, materials—are available not only in each locality but also over the entire country. Shortages in any branch of materials or labor will affect directly the design and construction of all types of buildings.

INDUSTRY'S CAPACITY. Sad fact is that nobody really knows Building's dimensions. In other industries the productive capacities are measurable: steel, for instance, is now operating at 95 per cent. But for Building such a gauge is lacking. Construction statistics cover only what is currently produced each month, do not indicate production potentials. There are no precise data even on how many people Building employs. Best guess: about 2 million. Typical of statistical findings is the Labor Department's latest study which reveals that in 1938 some 14,000 builders operating in 72 cities produced approximately 47,000 one-family houses. Eighty-six per cent of these builders were subcontractors and craftsmen who put up one to four houses and accounted for less than 37 per cent of the total production.

All-time high in private construction was reached in 1925 when the industry produced 894,000 dwelling units in addition to handling almost $2.2 billions worth of non-residential projects. Against this achievement now stands the two-edged fact that while construction techniques have improved the supply of qualified workers and technicians has dwindled. New houses are urgently needed, and the 1941 output should exceed by 10 per cent the 525,000 total being rolled up this year. Furthermore, industrial construction, already up 80 to 90 per cent over last year, should go on to break all previous records next year.

LOCAL LIMITATIONS. Hovering specterlike in the background is the experience of 1917-18 when Building's resources were strained to the breaking point. Will confusion, inefficiency, growing shortages of labor and materials be reflected again in waste and skyrocketing costs?

Since those hectic days Building has made notable strides in its own organization. New marketing and construction techniques have been developed. Standardization—time saving, labor-saving—has simplified building design and pointed the way to prefabrication of building parts.

Nevertheless Building still remains largely localized in its operations. The nation's construction plant is split up in order to be near the sites on which new structures are to be manufactured. Unlike other industries which are distinguished by production centers—Detroit for autos, Pittsburgh for steel, and so on—Building is spread out over the whole country. Each locality is in effect a separate production center. And,

significantly, in this decentralized self-sufficiency of the industry there lies a potential threat to its ability to produce sufficiently fast to meet defense needs.

Already bulking larger than in World War I, demands for defense construction are again concentrated in certain areas for strategical reasons, will doubtless again prove too great for the construction plant in these localities to handle alone. Work must spill over into other localities. Building's entire resources must be drawn on if prospective local bottlenecks are to be kept open.

LABOR. Tapping of the industry's resources on a national scale is already well underway, reports indicate. Significant is the exodus of steamfitters and plumbers from New York's Westchester County to work overtime in Boston, Baltimore, Memphis and Pensacola, thereby creating a local labor shortage in a community not directly concerned with defense construction. Similar shortages elsewhere can be anticipated as skilled trades and drafts are siphoned off to defense project areas. Cabinet makers possess a skill well suited to aircraft manufacture, West Coast plants have discovered. Welders likewise find ready employment and draftsmen are in demand in many places.

No national labor shortage in any line has yet been reported, but Government officials are keeping an eye cocked on the supply of carpenters—a bottleneck in 1917 and a weak spot again today. Late last month advertisements in New York papers were calling for an extra 900 carpenters to work with 2,000 others on New Jersey's Camp Dix. As in most trades, few apprentices have been trained during depression years, and the qualified supply, already low, may possibly be exhausted under the heavy demand of cantonment construction.

MATERIALS. Biggest question mark is lumber. Although stocks are currently ample and no immediate shortage is seen, much wood will be required in building barracks and other emergency structures. The strain may be reflected later on in a tight squeeze for supplies in non-defense construction.

According to National Defense Advisory Commission estimates, between four and five billion feet of lumber will be required for troop housing and other defense installations in the next twelve months. As a safeguard against possible shortages, some 425,000,000 feet of rough lumber salvaged from New England's 1938 hurricane have already been sold by the Government to be repurchased after being sawed and finished. Valued at approximately $10 million, it is reputedly the largest deal in rough lumber in U. S. history.

Similar is the case of steel: output has been stepped up to facilitate the building of tanks and battleships. This primary defense demand can be met easily enough, say Government economists, but they are scratching their heads over what will happen with the secondary demand certain to develop as workers get fatter pay envelopes and begin to think about buying new automobiles and building new houses. As a hedge against rising costs, "open" contracts are being prepared by defense officials for use on construction projects: prices are agreed on in advance for materials to be delivered to unspecified points on call. In this way each contractor obtains a list of controlled supply sources to which he can turn whenever necessary.

INDIVIDUAL OPPORTUNITIES. So large is the demand for defense construction, primary and secondary, immediate and long range, that almost everyone should be able to fit into the industry's changing pattern. For instance:

1. If your work is in a locality already booming with defense orders.

First Government contracts have gone to organizations qualified to turn out working drawings on the double quick and to get construction forces going in the field without delay. But these organizations also have limits of capacity—new contracts must be either farmed out to newly formed subsidiaries or turned over to other specialists who can demonstrate their ability to do the work just as speedily.

Alert to the interests of their members, the three big professional organizations—American Institute of Architects, American Society of Civil Engineers, American Society of Landscape Architects—have petitioned FWAdministrator John M. Carmody, urging that competent private practitioners in the vicinity of a project be employed to do the work by direct contract with the Government and not as employes of other organizations. Awards should be distributed widely to as many practitioners as possible, states the petition. Obviously, if there are no private firms within the vicinity qualified to do the project's design or construction with sufficient speed, the work must then be performed by organizations in other localities or by the Government's own building agencies enlarged for the purpose.

Aside from direct construction with Federal funds, there is the possibility of revamping idle or unprofitable local buildings for military or industrial use. Example: at New York's Fort Slocum, where recruits come for five weeks' training before embarking for service in the Canal Zone, Puerto Rico or Hawaii, Army officers have found quarters for the overflow of men by utilizing a converted garage in nearby Larchmont. Discovered by local Real Estate Man Harry E. Colwell, Jr., and refurbished inexpensively with partitions and plumbing, the building, long a white elephant, now nets the owners a tidy rental while the Army benefits by acquiring shelter at a cost of less than $2 per man per month.

In pointing out local possibilities to local investors, local architects, builders and real estate men can do yeoman service. Indicative of possibilities in this direction is San Francisco, where a thousand houses are being erected in the Mare Island Navy Yard district by Builder Henry Dolger who heretofore has specialized only in large commercial and industrial construction. Dolger's earlier experience is viewed by local lending institutions as eminently suited to the quantity production of low cost dwellings.

Opportunities do not stop with the provision of privately financed housing. Other types of buildings and community services will be required to meet the increase in business activity treading close on the heels of industrial expansion—stores, shops, theaters, and such. Recreational projects are worth investigating. Although the Government intends to take exclusive charge of recreational programs for all men in uniform, the National Recreation Association points out that facilities for workers are lagging in defense factory areas. Particularly desirable are off-time diversions—adult forums and the like—which will foster high morale.

For specific suggestions on how to develop new building possibilities, see case study of a defense plan for The City, pages 409-428. For Government contract procedure, see pages 334-338, and section on Military and Naval Buildings, pages 342-372; on Industrial Buildings, pages 373-408; on Housing, pages 437-468. Additional reference sources are cited in an indexed bibliography, section following page 468.

2. If your work is in a locality not directly involved in production for National Defense.

Other towns nearby may be congested and without adequate means for relieving immediately their housing shortages. This suggests the possibility of improving and extending transportation lines so that workers may commute to better living accommodations locally. Full advantage should be taken of the widest possible commuting range.

By compiling facts showing local advantages in avoiding production bottlenecks, communities can assist Government officials materially in spreading project contracts according to the principle of selective location. Such community promotion should be reenforced by local preparations to accommodate an increased population and business activity. "Ghost" factories, abandoned by obsolete industries, could be quickly put in shape at relatively small cost. Economies are also latent in vacant office buildings that require little expenditure for conversion into new uses. Many big country estates, held under foreclosure by banks, may provide the Government with inexpensive and suitable sites for airfields.

Before trying to get in new defense industries, a town should make sure it can handle them. Unless housing and school facilities are adequate, police and fire departments are strong, the municipal health service is operating smoothly, and local water supply and sewage systems can take the increased loads, new industries may be more of a liability than an asset. City government experts are pushing the National Defense Advisory Commission to insist on checking such items before commitments are made in spotting new plants. Fundamentally, the job is one for the town itself, aided by Building's local representatives.

Where a community sees no possibility of participating in defense production, and may even face the loss of some of its population to other localities, there is still the opportunity to promote slum clearance and rehabilitation of blighted areas. Doing so now, rather than after the emergency passes, will make easier the task of attracting back again the workers who have gone elsewhere. Removal of derelict or unsafe structures is also desirable from a military standpoint.

Defense production, it should be remembered, will create increased purchasing power which will be reflected in an increased demand for commodities and services. Preparation for a higher standard of living for the entire country goes hand in hand with the task of maintaining high civilian morale.

GROUP PROGRAMS. In many communities a local architectural firm, a contractor, a realtor, possibly others, can advantageously combine their services in a joint effort to promote and develop a local defense project. Such an integrated organization would undoubtedly speed output, could cooperate closely with Washington officials. See section on Government Organization, pages 334-338.

LOCAL PLANNING. In virtually every community there should be a local defense council of the sort suggested by the National Defense Council. A few have been organized already. Advisory rather than administrative, such committees are expected to formulate and recommend directives, leaving executive work to the regularly constituted city fathers. Preferably, to be wieldy, they should be kept small. As nuclei in the system of state councils and the broad national plan, their main task is to serve as spearheads in guiding the activities of other local agencies.

Defense planning must take place simultaneously at all levels of government—national, state, local—if the entire program is to move forward harmoniously. At many points the various interests are likely to clash. For instance, sound municipal planning may suggest the building of a new plant adjacent to the central area where it would be relatively easy to provide water and other services, but military strategy demands that it be placed in a suburban area to which utility extensions would be prohibitively costly. Essentially such problems are a matter of adjustment between what is desirable locally and what is imperative nationally.

Where comprehensive land use, social and economic surveys have been made of local areas, the task of the central planning agencies is simplified and local points of conflict can be avoided. But in many instances such data do not exist. Here then is an opportunity for all factors in the Building industry (architects, engineers, builders, labor unions, materials dealers, manufacturers, real estate boards, lending institutions, housing authorities) to assist municipal planning boards and local defense councils by undertaking to:

▶ Inventory available space in various types of buildings. Where housing shortages are already pressing, a definite plan such as that suggested by the 20th Century Fund's research staff should be followed: 1) set up a room registry service, listing quarters suitable for lodgers; 2) start a rent-a-room campaign; 3) bring additional dwellings into the market through a community repair and modernization program; 4) consider improving or extending transportation facilities to less congested areas within commuting distance; 5) promote new residential construction. See Section on Housing, pages 437-468.

▶ Inventory existing municipal utilities and services to determine their limits of expansion. As the American Society of Planning Officials observes, it is important to know, particularly where large defense housing programs are being considered, whether sewers, water lines and power systems can carry the new loads, what transportation can be obtained, how the proposed urban extensions will affect the community's schools and shopping centers. Although most cities have excess capacities in their reservoirs and storage dams, in the average city a population growth of 12 per cent is almost certain to require extra pumpage equipment as well as extensions to the distribution system. Expansion of industry, however, will probably tax city water supply and sewage systems more than will any increase in population.

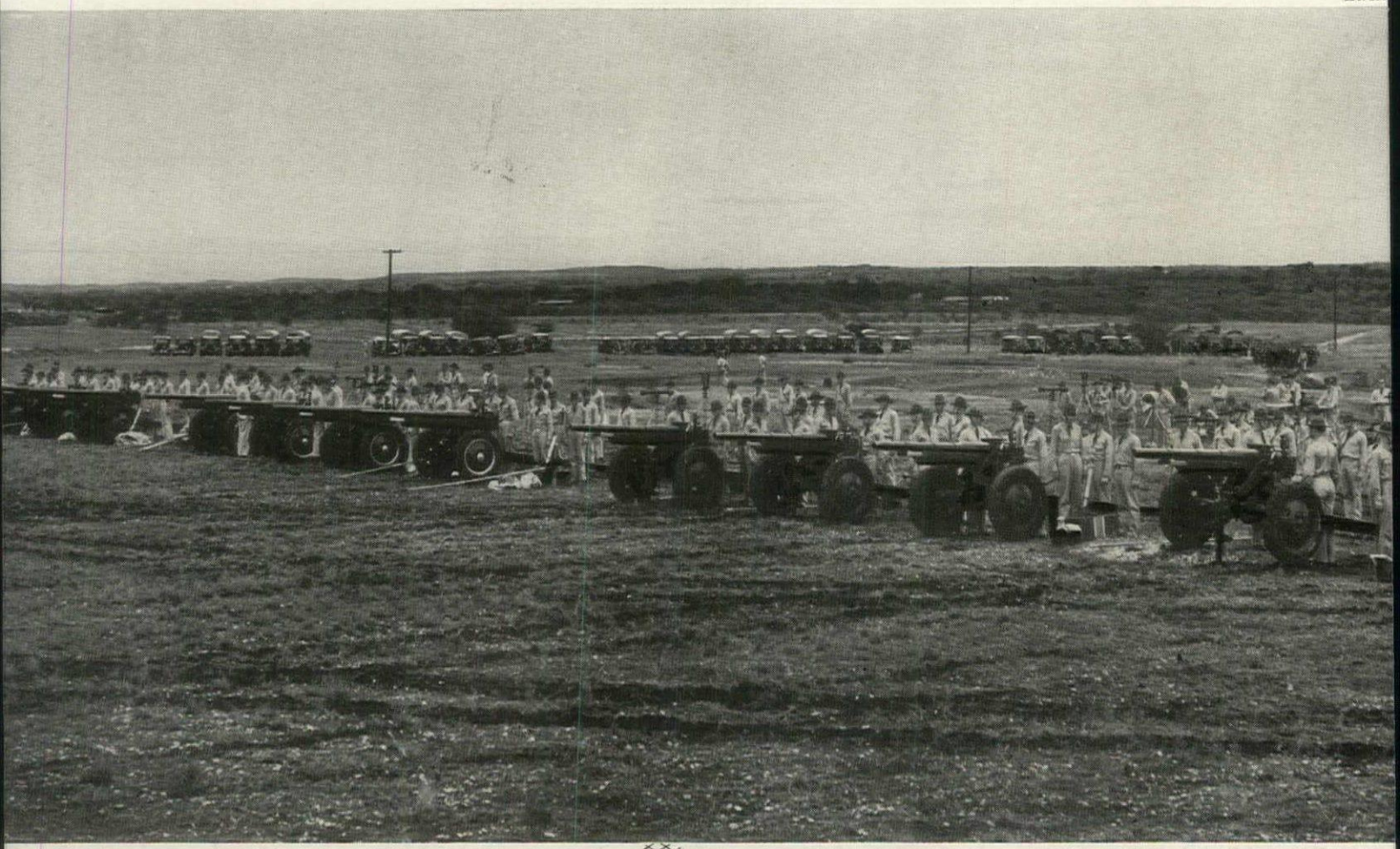
▶ Inventory available building materials and construction plant resources. Where there is a local shortage of skilled labor, training of apprentices should be encouraged.

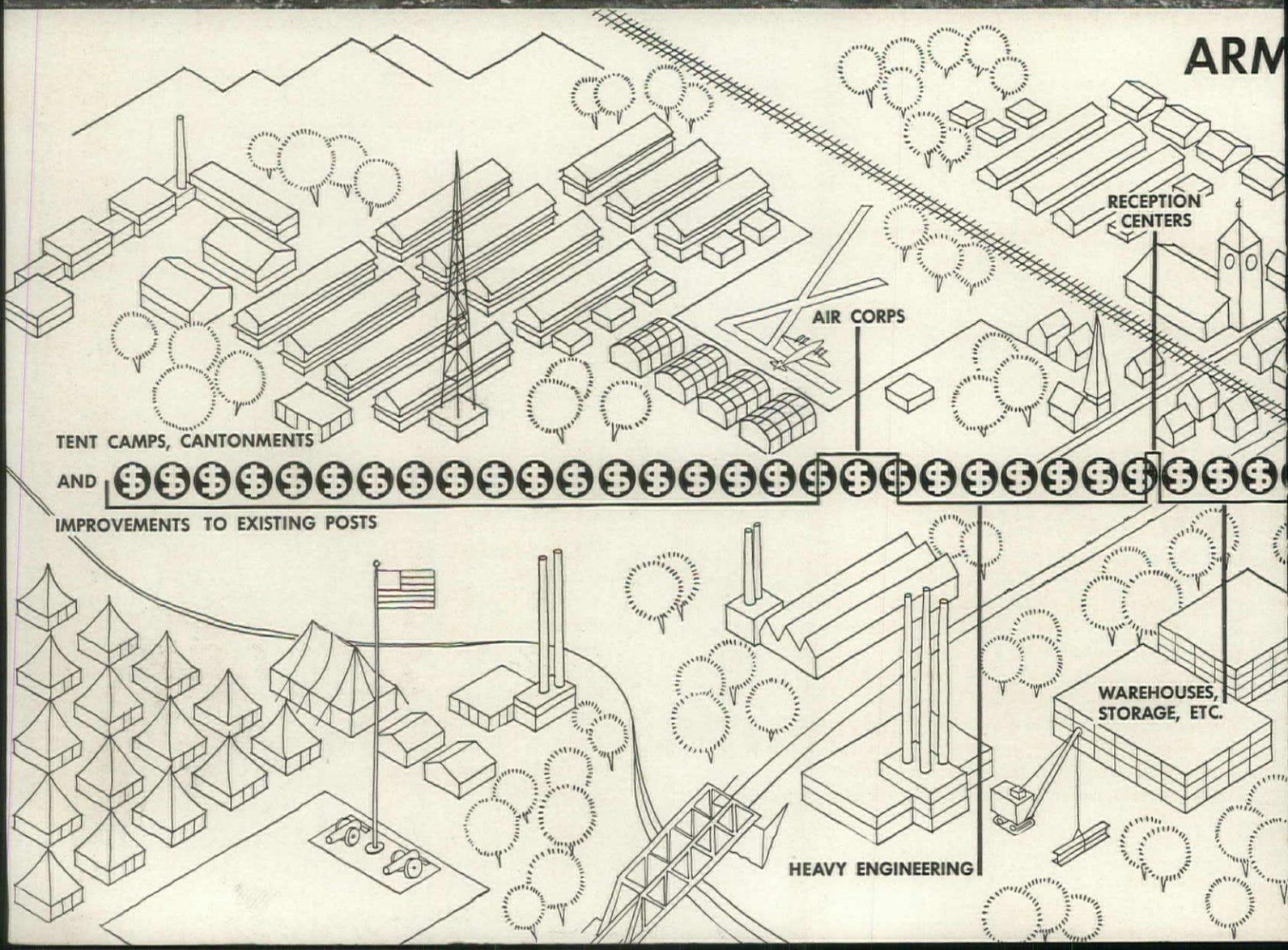
▶ Provide advice on the design and construction of emergency structures. Each town should have a "disaster plan" as a blueprint for action in a local emergency. Some forward looking cities have had them for many years. Now is a good time to devise others. Surprising as it may appear, in many cities the officials themselves do not know the exact location of their own utility and service lines—a matter of no small importance in case of sabotage.

INDUSTRIAL RESEARCH. Looking farther ahead, the industry as a whole can advantageously sponsor studies which will lead to the design of entirely new types of defense structures and to the development of even more efficient construction and marketing techniques than prevail today. Prefabrication promises much for the quantity production of building units in meeting unexpected emergency needs. Such studies merit special attention. And, finally, there is the question of Building's function when peace is restored to a war-torn world—long-range studies should also be in progress along this line.

MILITARY AND NAVAL BUILDIN

Horace





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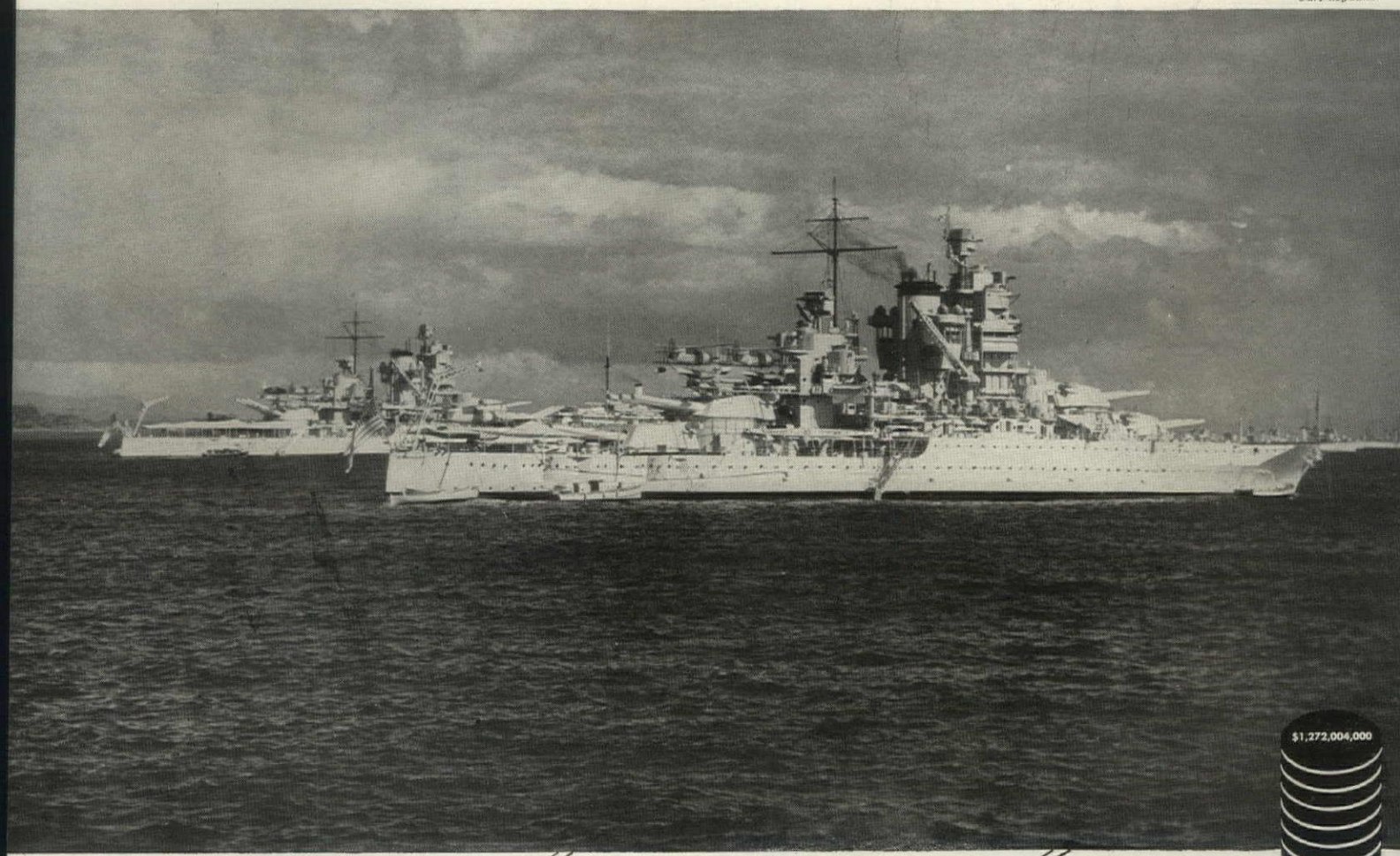
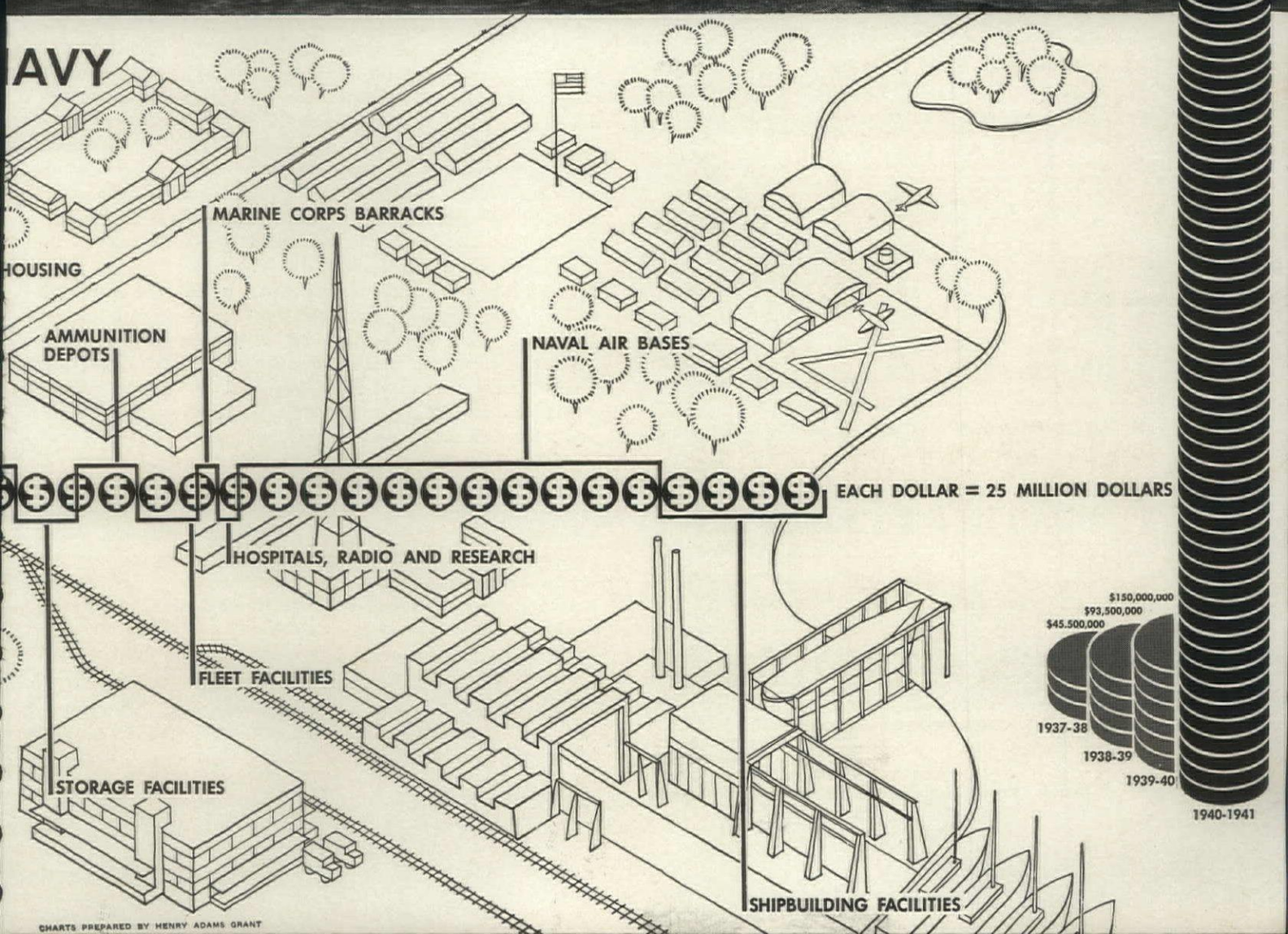



AVY
MARINE CORPS BARRACKS
HOUSING
AMMUNITION DEPOTS
NAVAL AIR BASES
EACH DOLLAR = 25 MILLION DOLLARS
HOSPITALS, RADIO AND RESEARCH
FLEET FACILITIES
STORAGE FACILITIES
SHIPBUILDING FACILITIES
$150,000,000
$93,500,000
$45,500,000
1937-38
1938-39
1939-40
$1,272,004,000
1940-1941
CHARTS PREPARED BY HENRY ADAMS GRANT

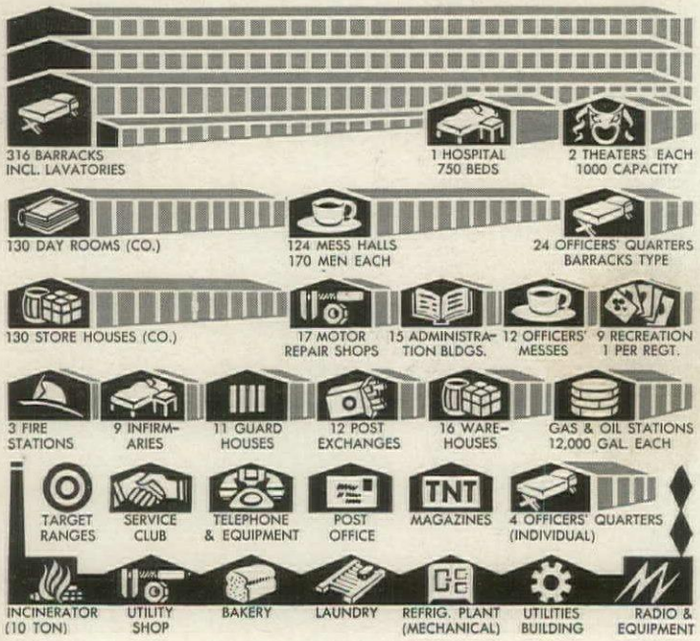
MILITARY AND NAVAL BUILDING

TYPICAL RECEPTION CENTER

1000 MAN CAPACITY — ESTIMATED COST $275,000

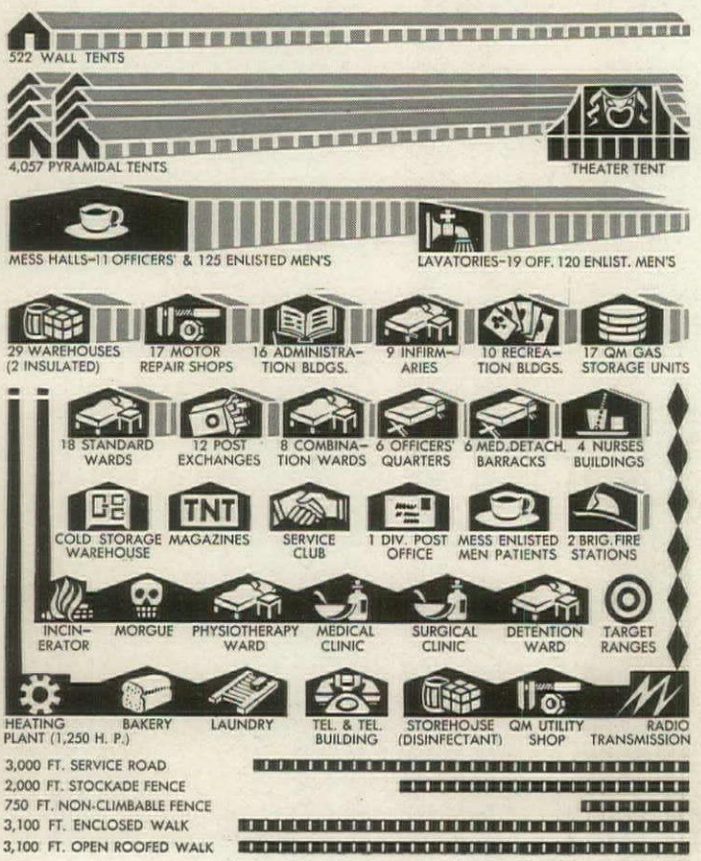
TYPICAL CANTONMENT

CAPACITY 1 DIVISION — ESTIMATED COST $8,000,000



TYPICAL PERMANENT TENT CAMP

CAPACITY 1 DIVISION — ESTIMATED COST $5,000,000



DEMAND

Since last July, the Army and Navy have contracted for more building construction per month than the total for any previous peacetime year. By next July, they expect to have completed more than a billion dollars worth of military and naval buildings. Not all, or even most of this construction will take the form of light, barracks-type structures, nor will the greatest effect of the increase in military and naval construction be felt in those branches of the building industry usually concerned primarily with frame construction. Temporary cantonments for the enlarged army account for only about a third of this year's bill for military and naval building, and this part of the program—even allowing for the fact that it must be largely completed within six months—represents an increase in the normal rate of light construction of not more than 30 per cent. The influence of permanent military building, to which two-thirds of the money will be devoted, will be of longer duration and greater intensity. Relative to the normal volume of construction of corresponding building types—which last year totaled one-and-three-quarters billions—the 750 million dollars which the army and navy will spend on permanent buildings during fiscal 1940-41 will have an effect on building more drastic than any other part of the defense program: an increase of more than 40 per cent in the class of construction which requires elaborate working drawings, detailed specifications, and exacting supervision; and which uses the greater part of the brick, steel, cement, and glass which building normally consumes. The cantonment program is scheduled for completion December 15, but the need for permanent hangars, tank parks, shop buildings, etc., will go on increasing as long as the essential equipment which they are to house is being made available—by the most optimistic estimates, for some years to come.

PROCEDURE

Viewed in this perspective, it is evident that the military and naval building program presents a design task and construction problem which will tax the resources of the entire building industry. Present procedure (detailed on pages 334-35) puts the job of getting the buildings built up to private contractors, leaves the job of getting them designed mostly in the hands of the Army's and Navy's construction bureaus. To date, private architects and engineers have been employed only to lay out and supervise the construction of cantonments (Army), using standardized buildings designed in advance as part of the M-day plan; and to help out the Navy's overloaded Design Division in the preparation of working drawings.*

Prime justification of this arrangement is speed. The Army and Navy design divisions, due to their long experience with military and naval types, are obviously able to produce plans for these specialized structures with a minimum of time-consuming preliminary study, and to fit most readily into the regular military routine. As time goes on, however, this justification will carry less and less weight. With the immediate emergency out of the way, it will be increasingly evident that it is the total amount of building in process of construction—rather than the time required to complete an individual project—which controls the progress of the entire program. The private architect, as he acquires experience with military requirements and methods, has a more significant part to play in the furtherance of this program than that presently assigned to him. Besides increased speed, a change in policy which recognizes this fact should pay dividends in the form of better designed buildings, better adapted to local conditions both as to use and manner of construction.

*Exceptions: New York Architects Harrison & Fouilhoux, and Delano & Aldrich who are handling design and construction of two different jobs in the Canal Zone.

For additional references on Military and Naval building types see Bibliography, pages 4, 5, 7, 9, 10, 14.

All photos, Robert M. Damora

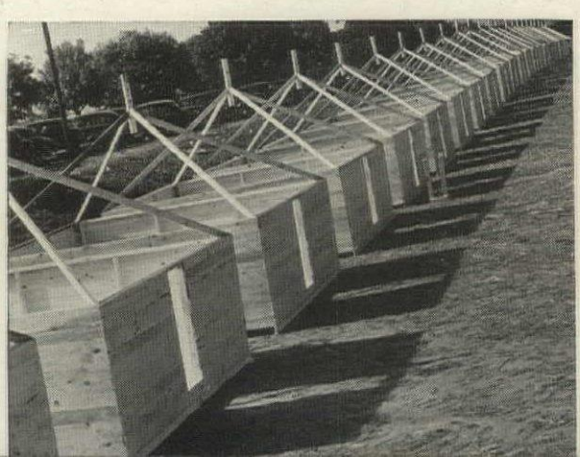
TEMPORARY BARRACKS

TEMPORARY BARRACKS CAMP DIX, N. J.

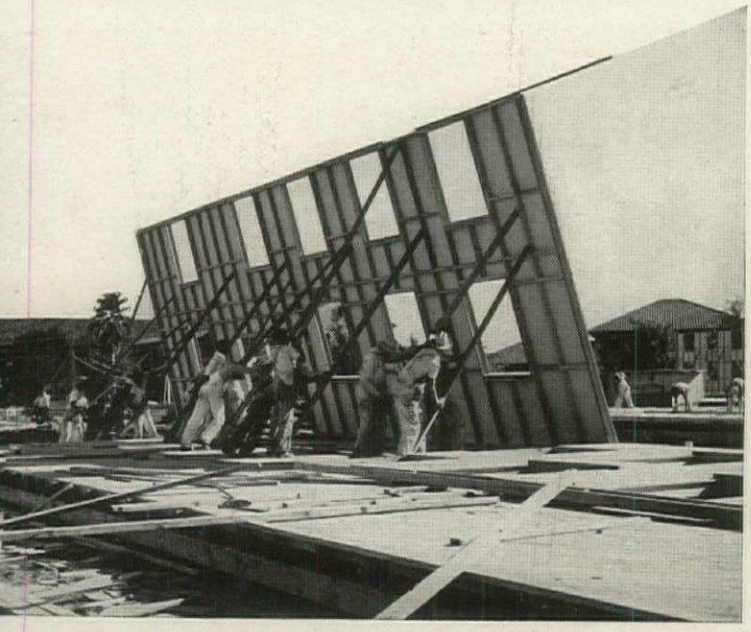
"PROCESSING" BUILDING

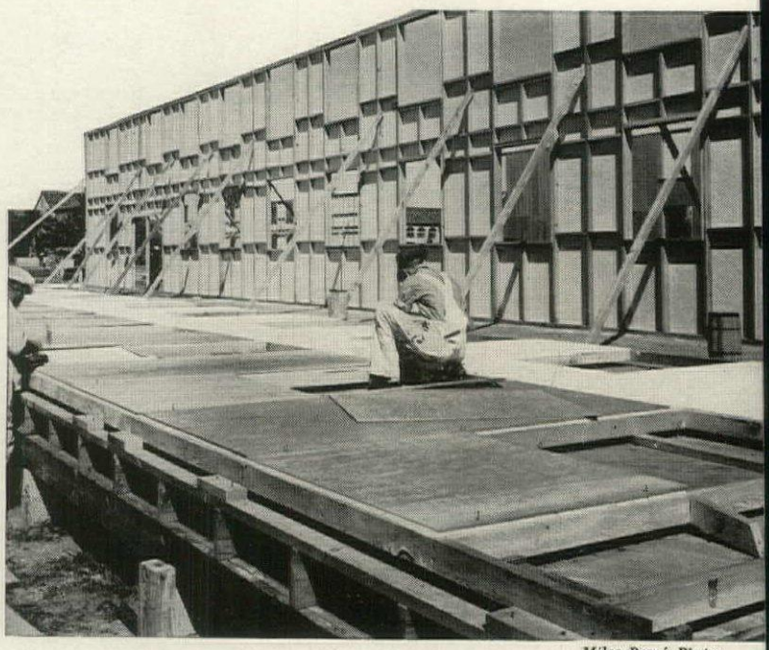
Characteristic feature of the Army's standard half-company barracks in most climates is a continuous hood over the first floor windows to permit adequate ventilation in bad weather. Platform and ladder at the end of each building is an emergency exit only, inside stairs being provided for inter-floor communication. The single-story building at the right is for the induction of raw troops; here the draftee surrenders his civilian clothing, goes through various stages of inspection, and receives his military equipment.

"WINTERIZED TENTS" have proved necessary at some of the camps where regular barracks have not been completed rapidly enough to keep up with the need. Tents have canvas roofs and a small, conical stove, accommodate four men each.



TEMPORARY BARRACKS





Miles Berné Photos

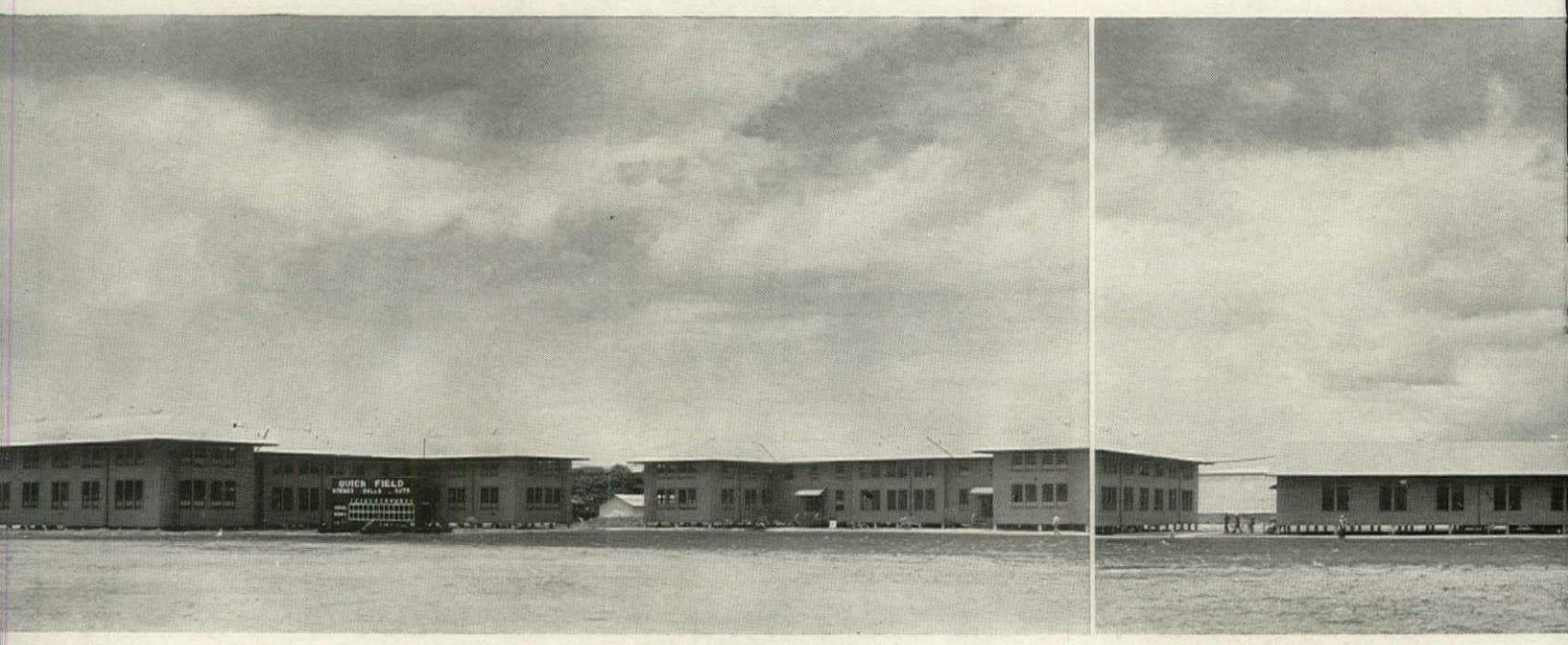
MARCH FIELD, CALIF. Here Escherich Bros., contractors, frame one-half of a two-story, 80 ft. barrack sidewall in a horizontal position, using the rough first floor as a platform, then apply insulating sheathing and an exterior plywood facing with one set of nails before tilting the wall into its final vertical position. Second floor joists are filled in afterward between the braced sidewalls, and end walls,

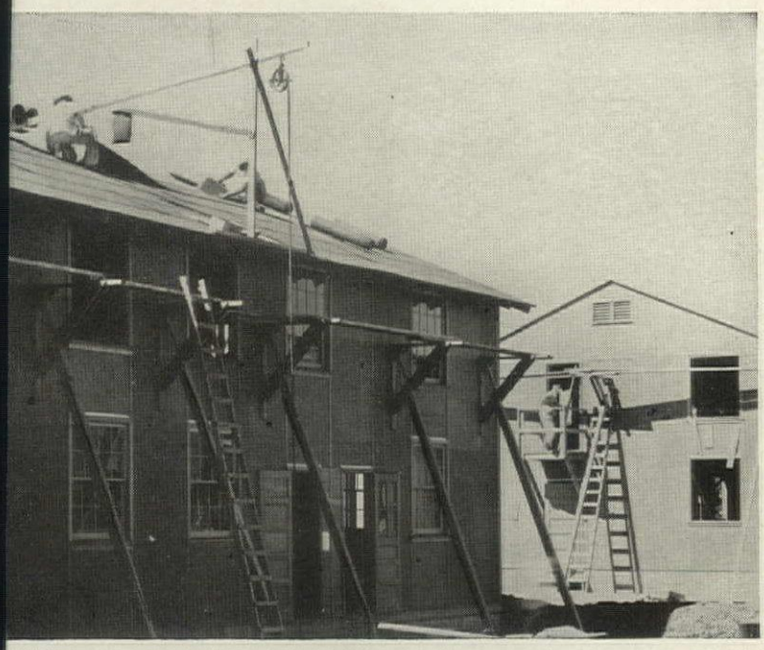
Piaget

SCOTT FIELD, ILL., showing barrack spacing

Housing an army of more than a million trainees in the space of a few months is a colossal undertaking—particularly for an industry reputedly tied to horse-and-buggy methods. Prime aids to speed: standardized units (right), pre-designed as part of the War Department's "M-plan," and advanced building techniques, including the use of labor-saving sheet materials, worked out by enterprising contractors on the job (above). The typical barrack is of two-story wood frame construction, with details varied to suit three temperature zones, and accommodates half a company (53 private soldiers in open dormitories, 8 non-commissioned officers in 2- and 4-bed rooms). It contains its own toilet and wash facilities and is heated by forced warm air distributed through an overhead duct. Units are arranged in company and regimental groups with necessary mess halls, storehouses, recreation buildings, and headquarters of similar construction.

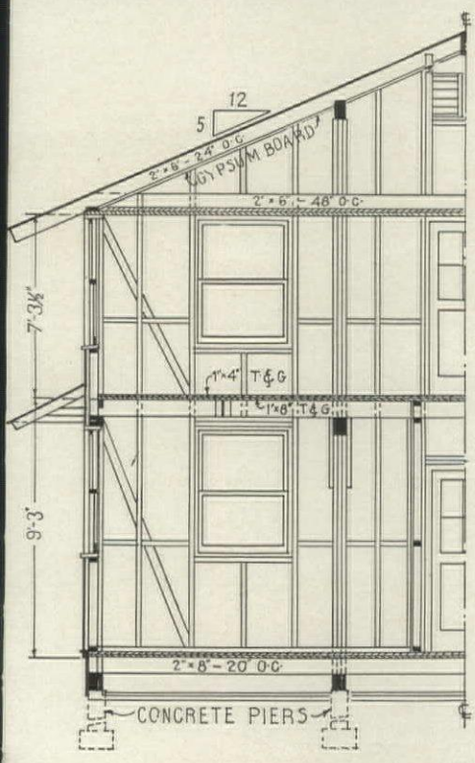
NAVY YARD

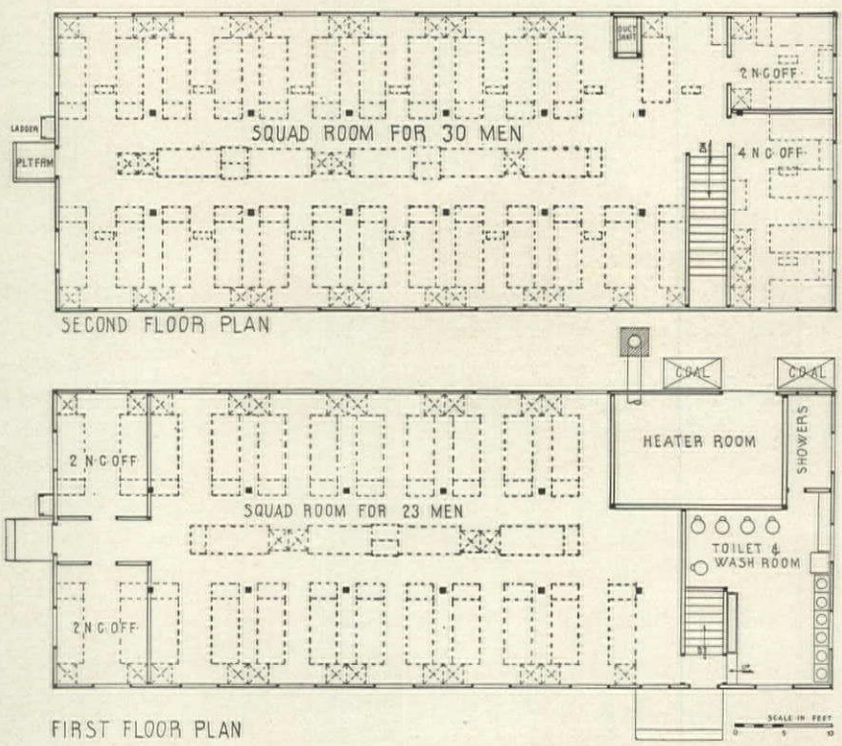




Miles Berné Photos

ceiling and roof framing put in place in the conventional fashion. In mild climates, barracks require no inside finish, the inside surface of the insulating sheathing board acting as the finished wall.





WPA Photo

LOWRY FIELD, COLO.

PERMANENT BARRACKS

Coincident with the Army's training program, with its demand for temporary cantonments, there is naturally growth of what the War Department calls the "Authentic Army"—permanent standing forces. For such troops, and for the Navy's permanent shore personnel (which increases at about the same rate as new ships and aircraft are commissioned) fire-resistant barracks of the type shown on these two pages are going up. Huge, and with open interiors (below) which belie their outward similarity to summer hotels, many of these units are capable of housing several thousand men. Construction is generally of reenforced concrete with brick curtain walls.

FORT MEADE, MD.

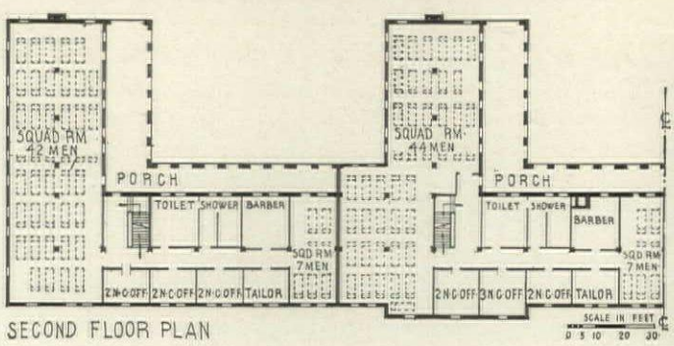
Mitchell Studio

NAVAL OPERATING BASE, NORFOLK, VA.

Eliot Elisofon

1

Mitchell Studio



SECOND FLOOR PLAN

2

Above and below, Harold A. Willoughby & Associates

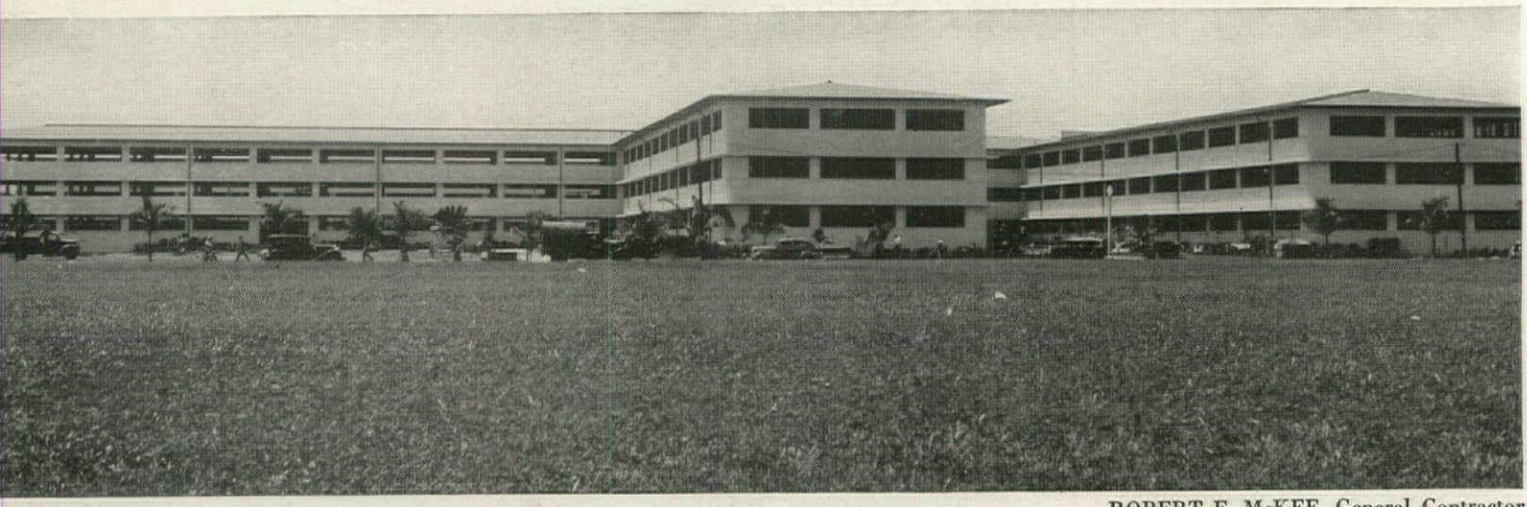
Architecturally uninspired, the permanent army barracks (right) are still being built from standardized plans which have changed but little in the last decade. Some effort is made to adopt the design to climatic requirements and local tradition, but the tendency has been to freeze design into two styles, designated (somewhat inaccurately) as "Colonial" and "Spanish." The example at the bottom of the page is one of the better buildings for a Naval Operating Base, and includes, in addition to quarters for the men, a mess hall, and galley.

3

U. S. Navy

4

1. Fort Meade, Md. **2.-3.** Front and side views—Camp Devens, Mass. **4.** Naval Operating Base, San Diego, Calif.



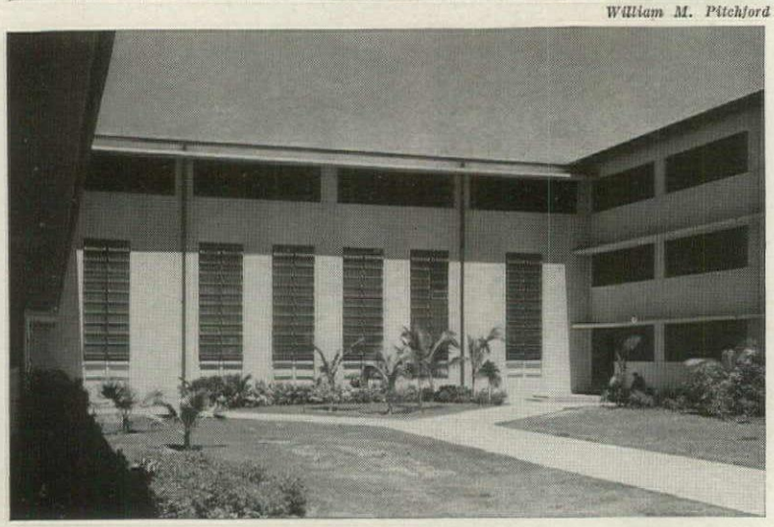
ROBERT E. McKEE, General Contractor

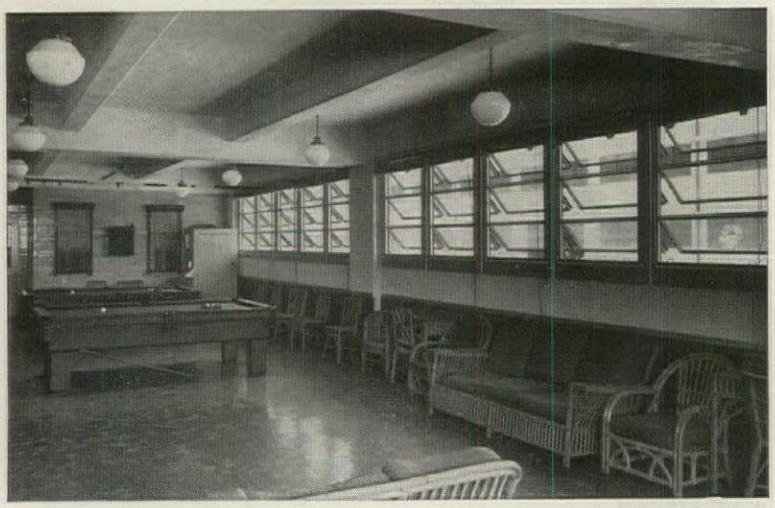
William M. Pitchford

BARRACKS, HICKAM FIELD

TERRITORY OF HAWAII

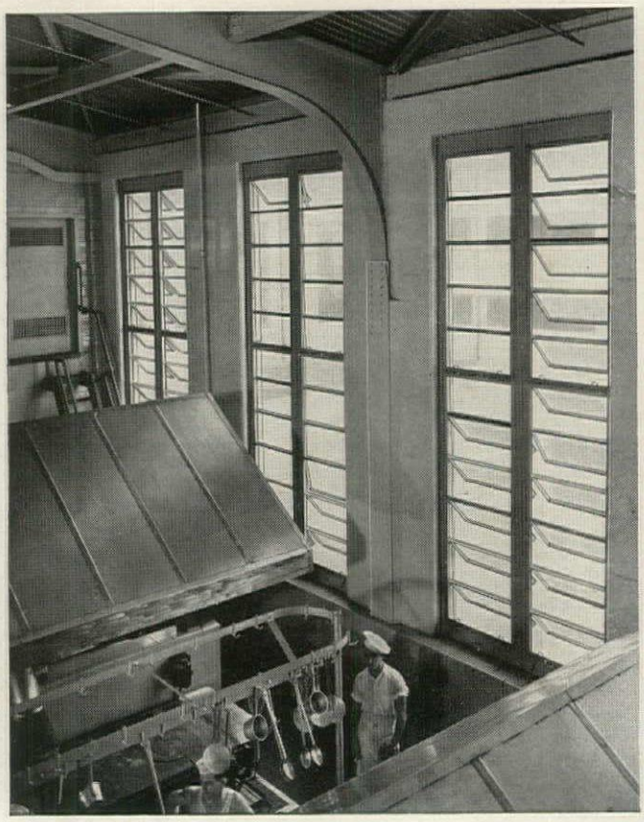
Not all of the Army's permanent barracks are as unimaginative as those on the preceding page. This tremendous territorial unit employs bold horizontals expressive of the open character of the interior and the structural frame, as well as up-to-the-minute awning-type metal sash and bent steel structural members. Projecting hoods over window heads are to keep out excessive sunshine.





RECREATION ROOM

KITCHEN

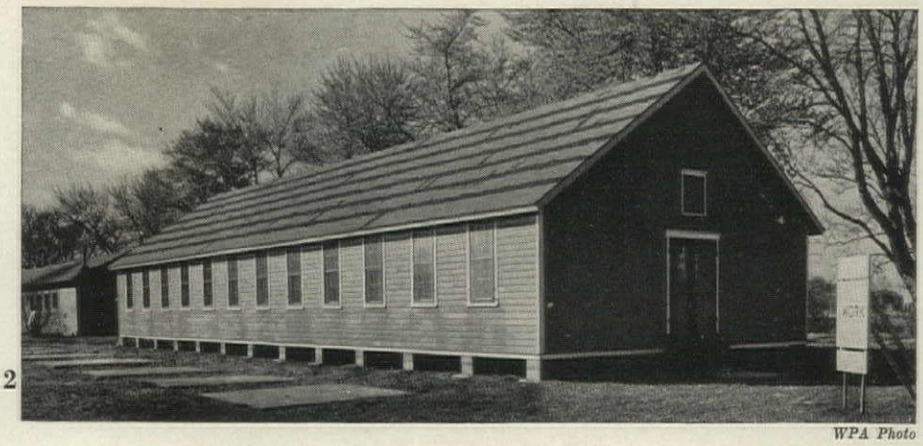


1

Walter Wilcox

Military and Naval recreation buildings range all the way from the temporary wooden building for a single Company shown at the right to the large, permanent auditorium for an entire Marine Post shown under construction at the top of the page. Also included are gymnasia like the one below, while every Army and Navy unit has its chapel, large or small, permanent or temporary.

1. Auditorium, Marine Post, Quantico, Va. **2.** Assembly hall, Fort Du Pont, Delaware City, Del. **3.** Chapel, Ft. Myer, Va. **4.** Gymnasium, New London, Conn.

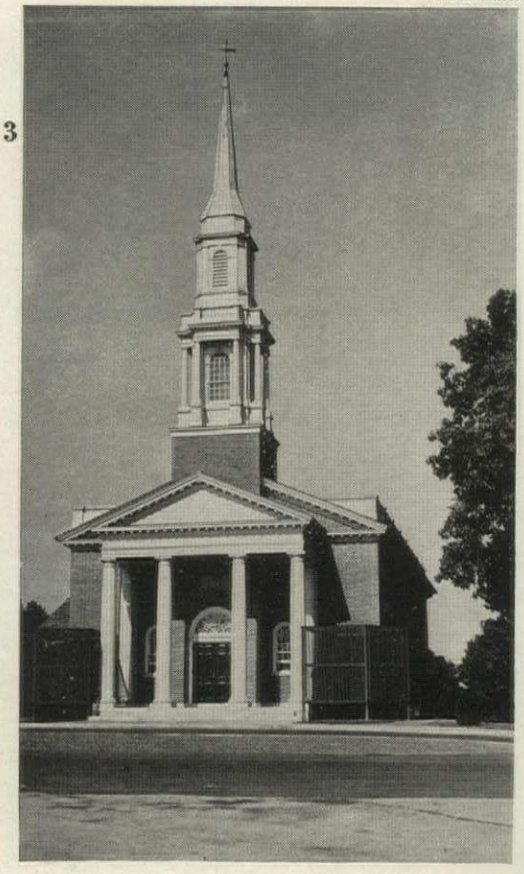


2

WPA Photo

RECREATION BUILDINGS

WPA Photo



3

U. S. Navy

4

SOLDIERS' MESS HALL, TEMPORARY ENCAMPMENT

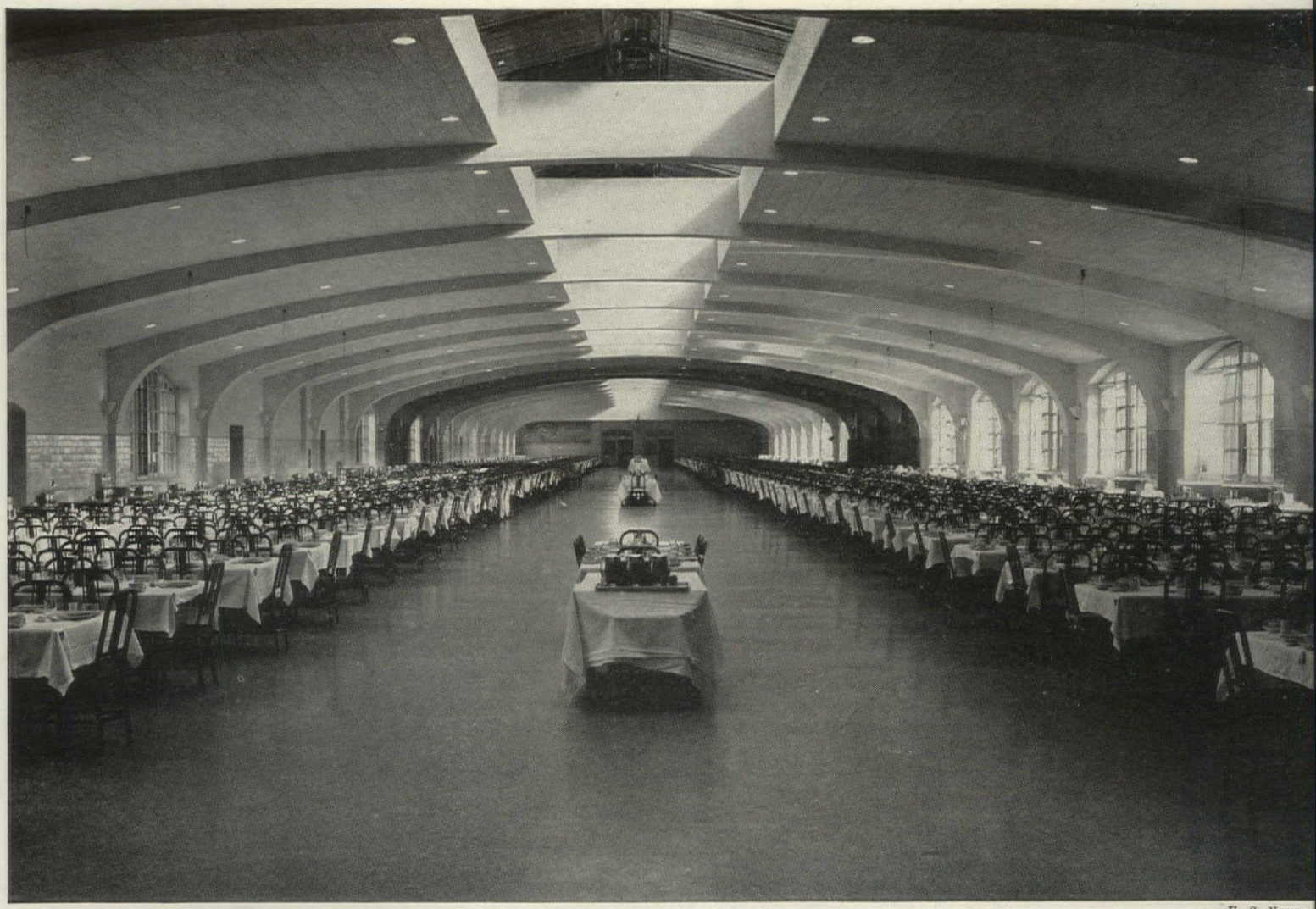
U. S. Navy

SOLDIERS' MESS HALL, CAMP ORD, CALIF.

Above, below, Roberts & Roberts

OFFICERS' MESS HALL, HAMILTON FIELD, CALIF.

One of the basic considerations underlying all military architecture is the carefully maintained distinction between the commissioned officer and the ordinary soldier. Besides separate housing, this means that dual recreational facilities and mess halls must always be provided, and the niceties of rank maintained even in such matters as table linen and interior decoration. Only rarely, however, do either officers or men enjoy surroundings as pleasant as the excellent new midshipmen's mess on the facing page.



OFFICERS' MESS HALL, U. S. NAVAL ACADEMY, ANNAPOLIS, MD.

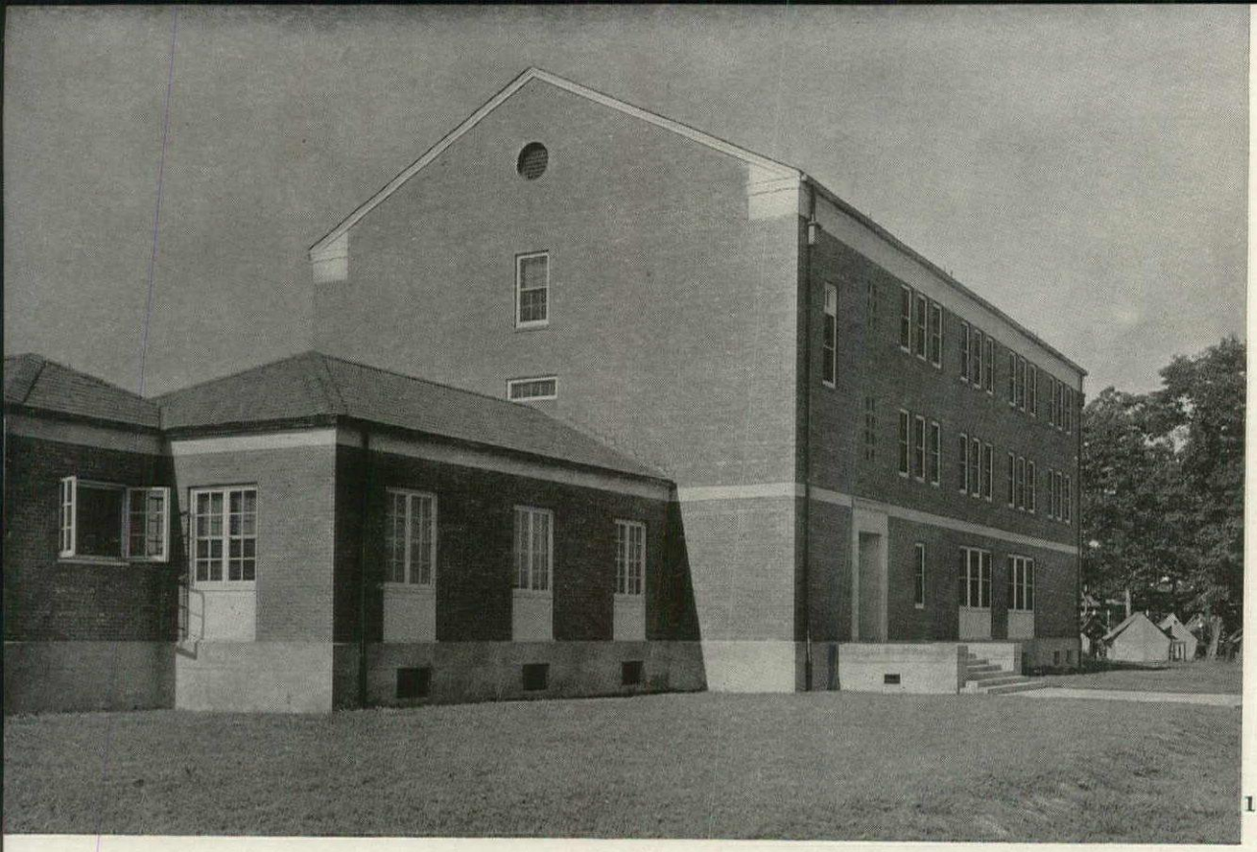
U. S. Navy

WPA Photo

NON-COMMISSIONED OFFICERS' CLUB, FORT KNOX, KY.

WPA Photo

COMMISSIONED OFFICERS' CLUB, FORT KNOX, KY



1

2

Piaget

3

Mitchell Studios

4

Walter Wilcox

ADMINISTRATION AND OFFICE BUILDINGS

The paper work of the Army and Navy, as in every large organization, is considerable, and each permanent Army post and Naval station must have its share of modern, well-equipped office space. As will be seen from the examples on this page, the tendency to make such structures into overgrown replicas of the headquarters buildings once commandeered by the Revolutionary Army is giving way, if to nothing else, to sheer bulk. In its place there is gradually appearing the simple and dignified type of design exemplified by the Brigade Office Bldg. at the top of the page—certainly a more fitting expression of modern military science than its nostalgic prototype.

1. Brigade Office Bldg., Marine Post, Quantico, Va. **2.** Headquarters Bldg., Scott Field, Ill. **3.** Headquarters Bldg., Fort Meade, Md. **4.** Administration Bldg., Marine Post, Quantico, Va.

1

Eliot Elisofon

U. S. Navy

2

STORAGE BUILDINGS

3

WPA Photo

4

Roberts & Roberts

5

Mitchell Studios

6

U. S. Army

Supply, always the critical factor in military organization, in this day of mass, mechanized warfare takes on the proportions of a large scale industry. The supply divisions must grow in direct proportion to the growth of the army and navy, and require a tremendous amount of building construction, ranging from huge, centrally located freight terminals and warehouses to the individual Company storehouses which dot each army post. Added to this are storage facilities for equipment, which must be ready before the huge numbers of guns, tanks, and trucks now on order can actually be used by the armed forces. Traditionally, such buildings are utilitarian in character—a fact which probably accounts for their better-than-average design.

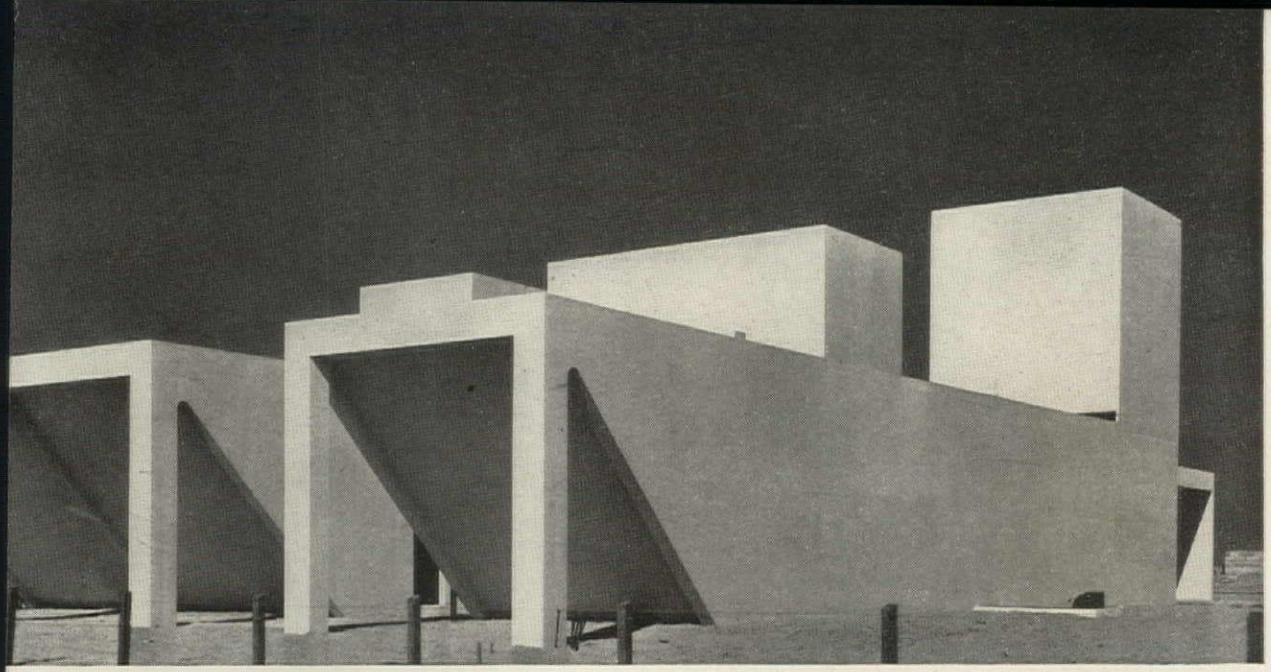
1. Supply Depot, Naval Operating Base, Norfolk, Va. **2.** Industrial Storehouse, Navy Yard. **3.** Motor Park, Calif. **4.** Warehouse, Camp Ord, Calif. **5.** Motor Park, Fort Meade, Md. **6.** Commissary Bldg., Lowry Field, Colo.

NAVAL AIR STATION, WEST COAST

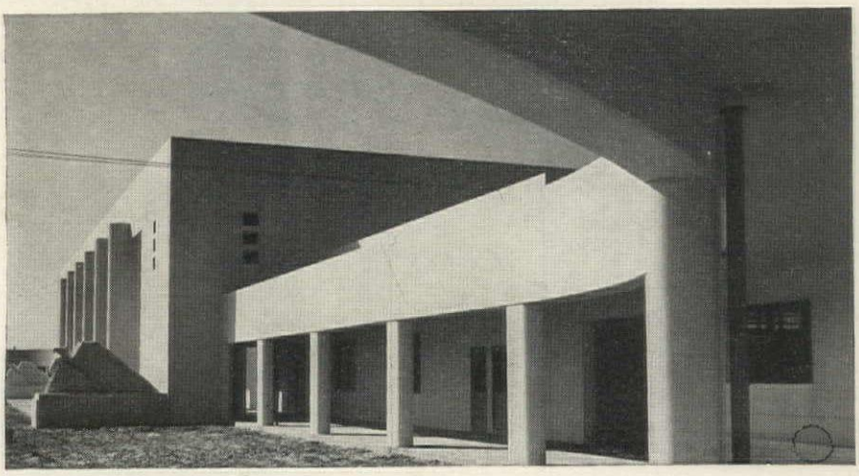
Roberts & Roberts

BARRACKS

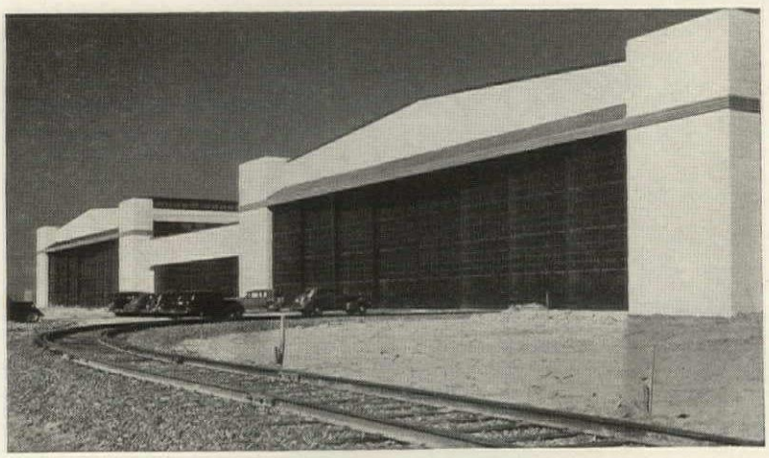
About one-half of the Navy building program for 1940-41—a quarter of a billion dollars—is for naval air stations, many of which, like the one shown on this page, will be entirely new. Permanent bases for both land and water planes, the typical station includes in addition to landing fields and basins, a score of hangars, industrial shops for the maintenance of the planes and engines, headquarters buildings, storage buildings, mess and recreation halls, and barracks and quarters for the men and officers. Designed by the Navy's Bureau of Yards and Docks, this station is typical of the forward-looking trend in naval building, and is a model of compact planning and orderly organization.



GINE TEST BUILDING



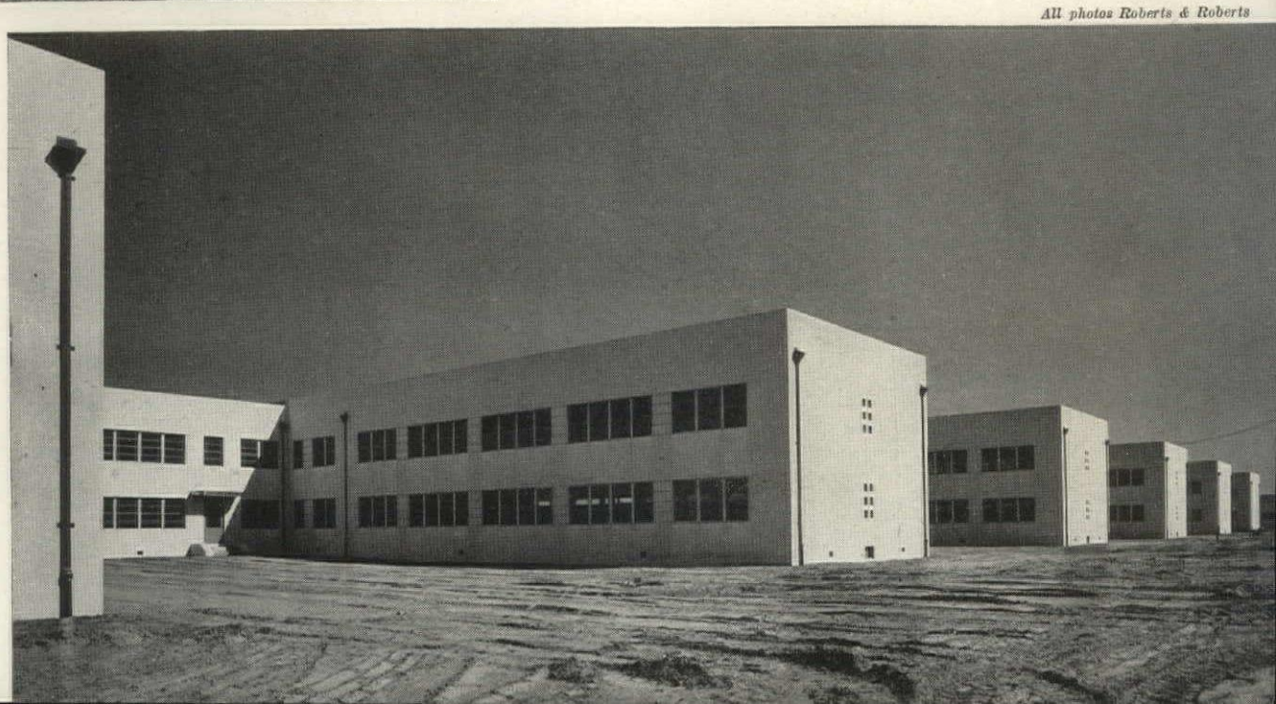
GALLEY AND MESS HALL



ASSEMBLY AND REPAIR BUILDING

All photos Roberts & Roberts

BARRACKS, rear



U. S. Army

SINGLE HOUSES FOR NON-COMMISSIONED OFFICERS
Fort Knox, Ky.

U. S. Army

BACHELOR OFFICERS' QUARTERS
Fort Knox, Ky.

Piaget

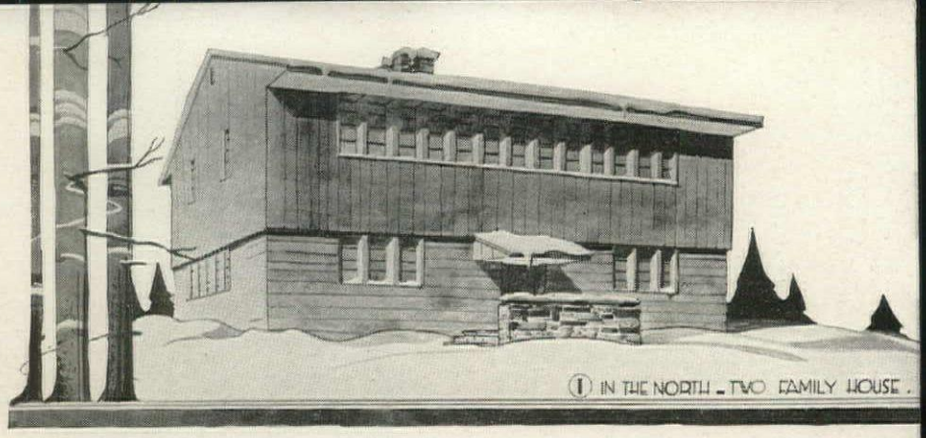
OFFICERS' TRIPLE HOUSES
Scott Field, Ill.

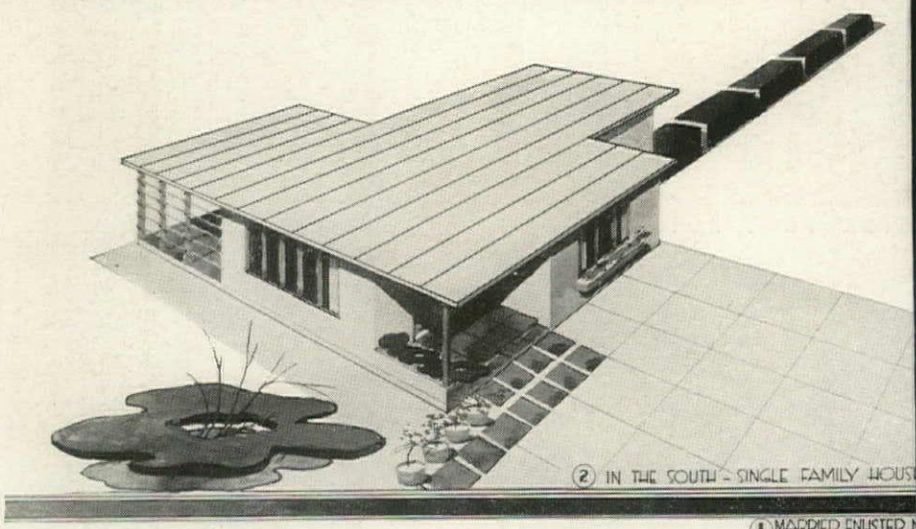
Burgert Bros.

OFFICERS' DOUBLE HOUSES
McDill Field, Fla.

Walter Wilcox

OFFICERS' APARTMENTS
Quantico Marine Post, Va.

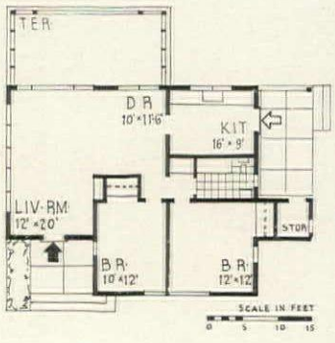


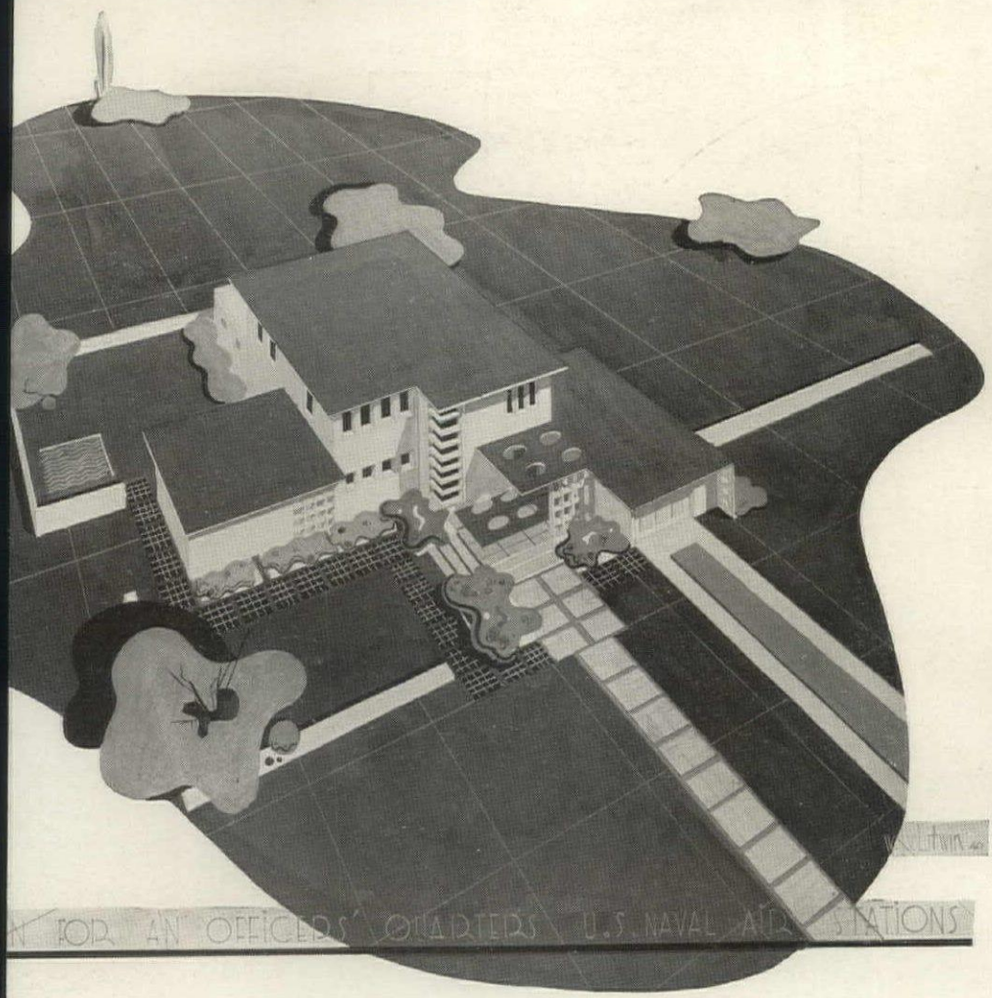


(1) MARRIED ENLISTED M
QUARTERS-NORTH
(2) MARRIED ENLISTED
QUARTERS-SOUTH
NAVY DEPT. BUREA
YARDS & DOCKS.

OFFICERS' QUARTERS

Where private enterprise rental units are not convenient or available, both Army and Navy provide for the housing of their officer personnel in bachelor dormitories, and in apartments and single-family houses for married officers and their families. As most of the examples on this page indicate, designs tend to follow, but lag slightly behind private housing practice. Notable exception to this rule is the recent work by the Navy's Bureau of Yards and Docks, shown in the renderings above. These are standard designs which will be reproduced—with suitable modifications for climatic variation—in all parts of the country, and incidentally illustrate the extremes of the whole range of this type of work, from the house of the Petty Officer or married enlisted man to the Commandant in charge of a Naval Station or Air Base.





U. S. Navy

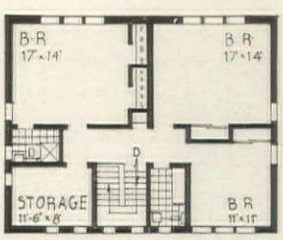
CHIEF PETTY OFFICERS' QUARTERS
Canal Zone

U. S. Navy

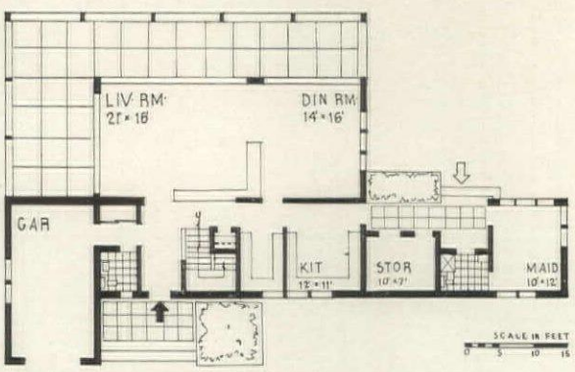
CHIEF PETTY OFFICERS' QUARTERS
Canal Zone

U. S. Signal Corps

OFFICERS' DOUBLE HOUSE
Fort Meyer, Va.



SECOND FLOOR



FIRST FLOOR

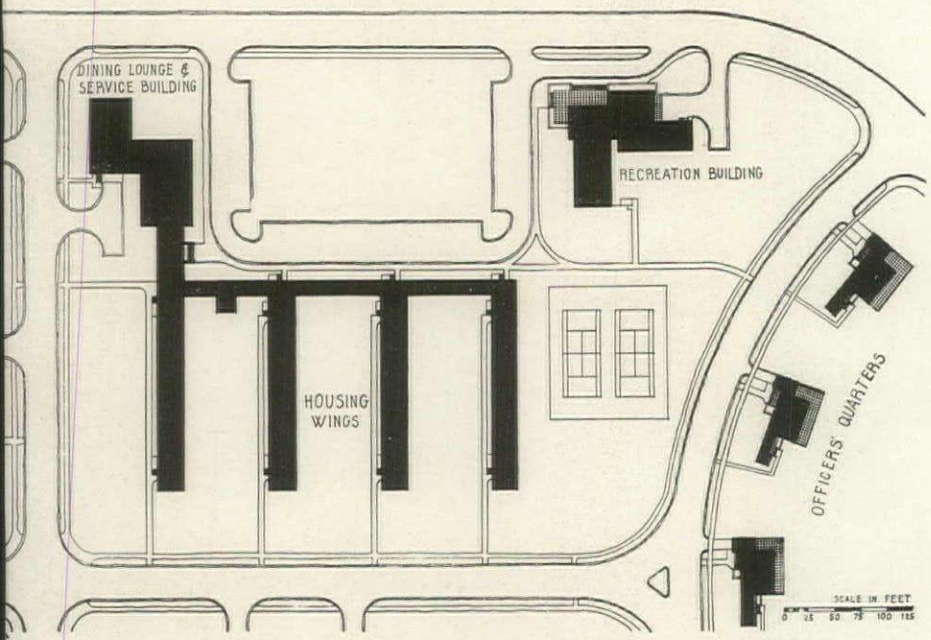
W.P.A.

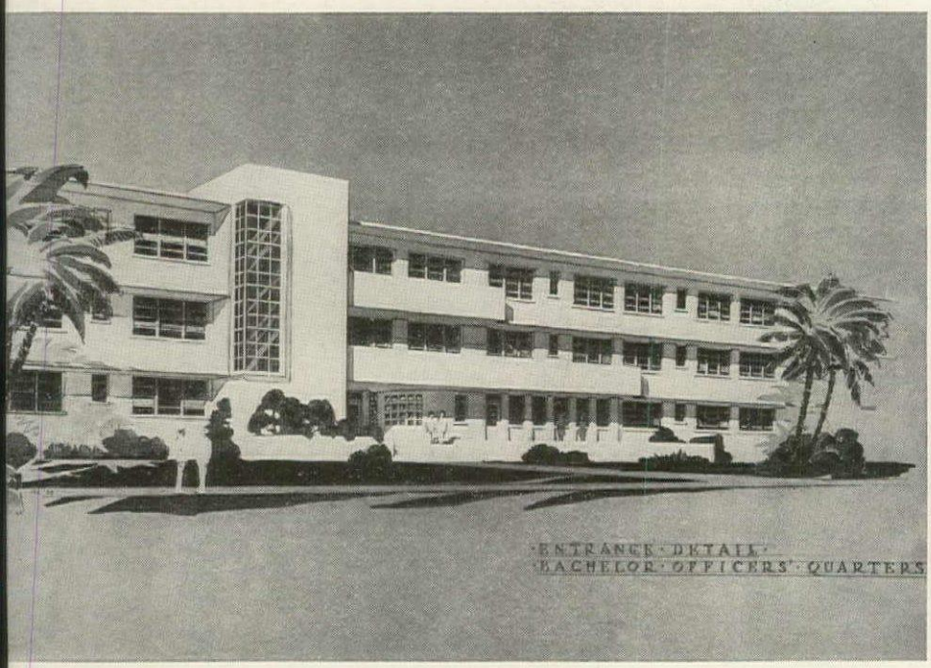
SENIOR OFFICERS' SINGLE HOUSES
Naval Air Station, Seattle, Wash.

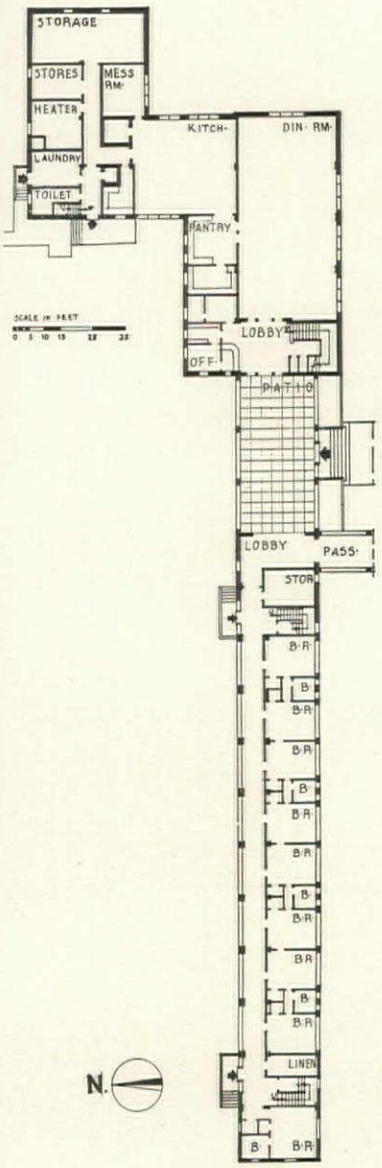
U. S. Signal Corps

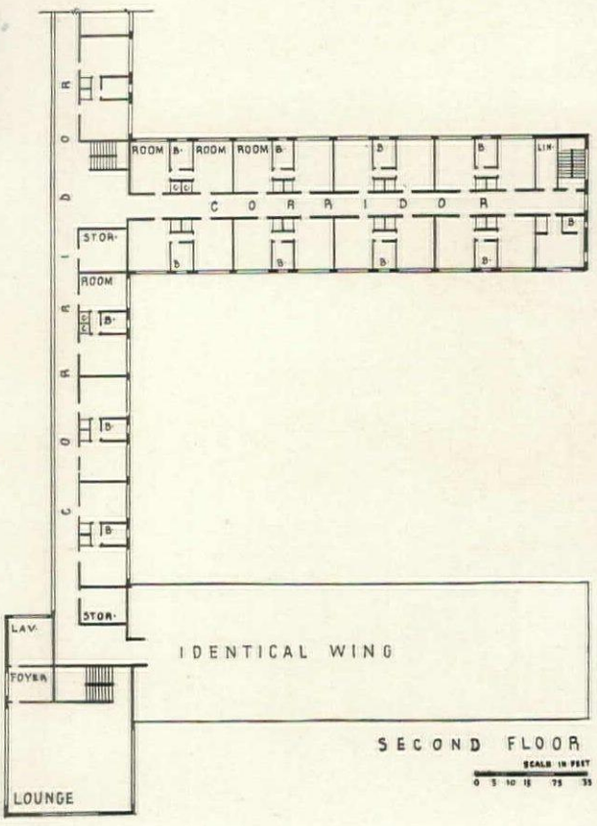
FIELD OFFICERS' SINGLE HOUSE
Fort Belvoir, Va.

OFFICERS' QUARTERS




ENTRANCE DETAIL
BACHELOR OFFICERS' QUARTERS





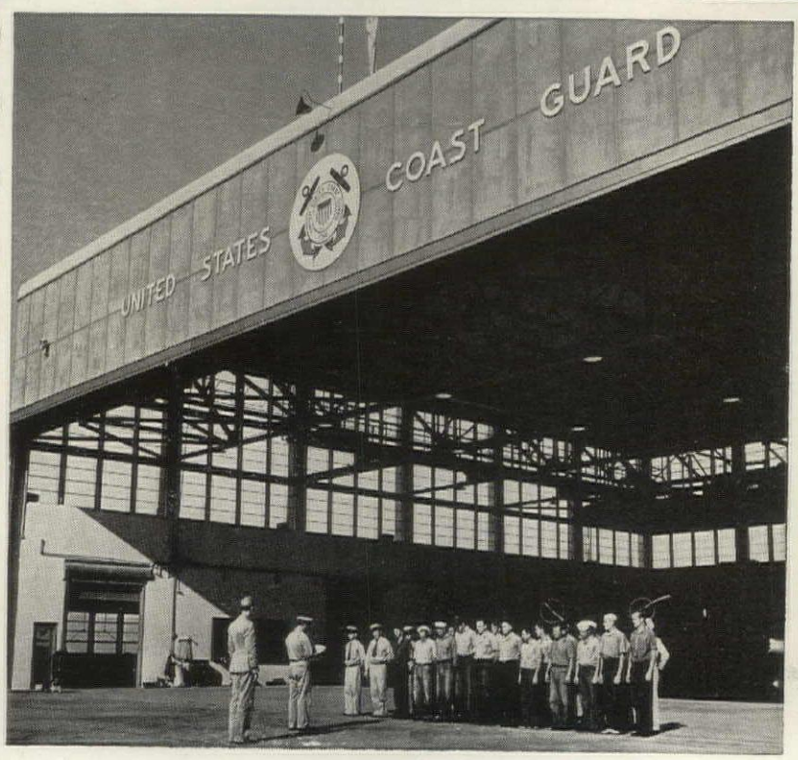
Current designs for bachelor officers' housing being produced by the Navy's Bureau of Yards and Docks show a distinct improvement over previous work of this type. Characterized by orderly, open planning in which orientation with respect to sun and prevailing breezes plays a determining part, each of these new "schematics" will furnish the design-basis for a score of naval air stations throughout a general geographic area, thus speed the production of working drawings without sacrifice of architectural quality. Illustrations show the general plan of a typical officers' group, with bachelors' quarters and mess, recreation building, and houses for senior married officers; details of typical bachelor quarters for two different orientations; and perspective of a typical unit. The paired rooms with common bath shown in both detail plans have proved highly successful, since they may be used with equal facility in a variety of ways by officers of varying ranks: for two junior officers, who share the bath; as a bed-sitting-room suite for the next grade; or—using two of the units—as a single bedroom and bath, joint sitting room, and two bedrooms with common bath.

U. S. COAST GUARD AIR STATION

ELIZABETH CITY, N. C.

An integral part of the national defense program is the improvement of non-military airports for possible emergency use by the armed forces. The U. S. Coast Guard, in wartime a part of the regular navy, is naturally no exception to this rule. The excellent, orderly Coast Guard air stations, built for long-range safety patrol, are readily adaptable to military use, and thus will figure importantly in our second line of aerial defense. It is to be hoped that the architectural excellence of this example—extraordinarily high for government work—will be maintained and extended to other branches of the service.

HANGAR & SHOP



All photos, David E. Scherman

BOAT SLIP

U. S. COAST GUARD, CLEVELAND, OHIO

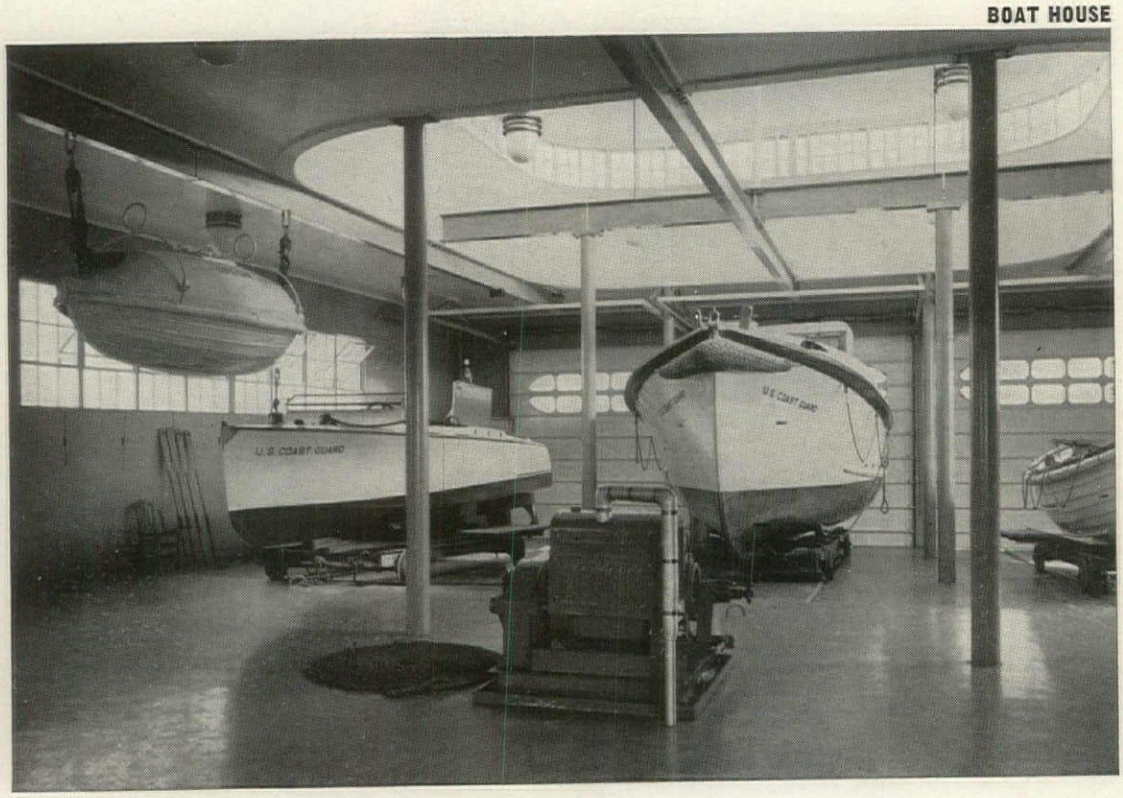
J. MILTON DYER, ARCHITECT

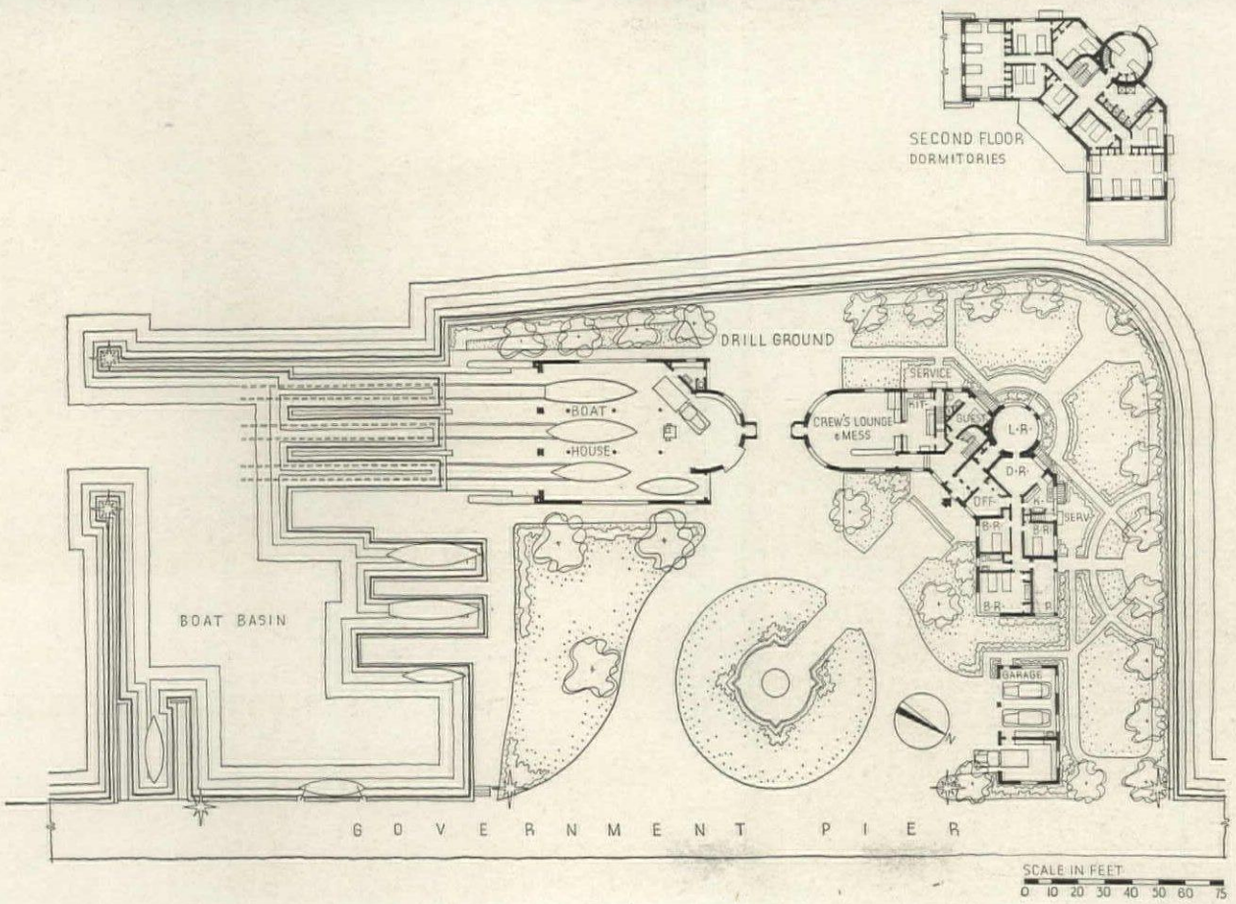
LOOKOUT TOWER

The peacetime functions of the Coast Guard include life saving, property protection, navigation safety regulations, border patrol, and sea hazard patrol. The Cleveland Station, first to be designed from scratch as an architectural entity, consists of three units—a boat house, quarters building, and garage. Arranged in the shape of an L, the buildings are organized both for efficiency and architectural effect into what seems to be a single, homogeneous unit; worked out—in the words of the architect—"to give the impression of wind and wave resistance, and to express the impelling humanitarian activities of the Coast Guard in appropriate architectural terms having a nautical meaning." The boat house is arranged for rapid transfer of boats from truck to water, and vice-versa, as the occasion demands, and includes an overhead trolley hoist and a power winch for drawing boats up the inclined launchway. The quarters building houses the officer in command, his mate, and a crew of 22 seamen. Offices, living rooms, mess, and officers' quarters are on the first floor, with dormitory for the mate and crew above. A lookout tower, reached by a spiral stairway, commands a view of the entire horizon.

MESS ROOM

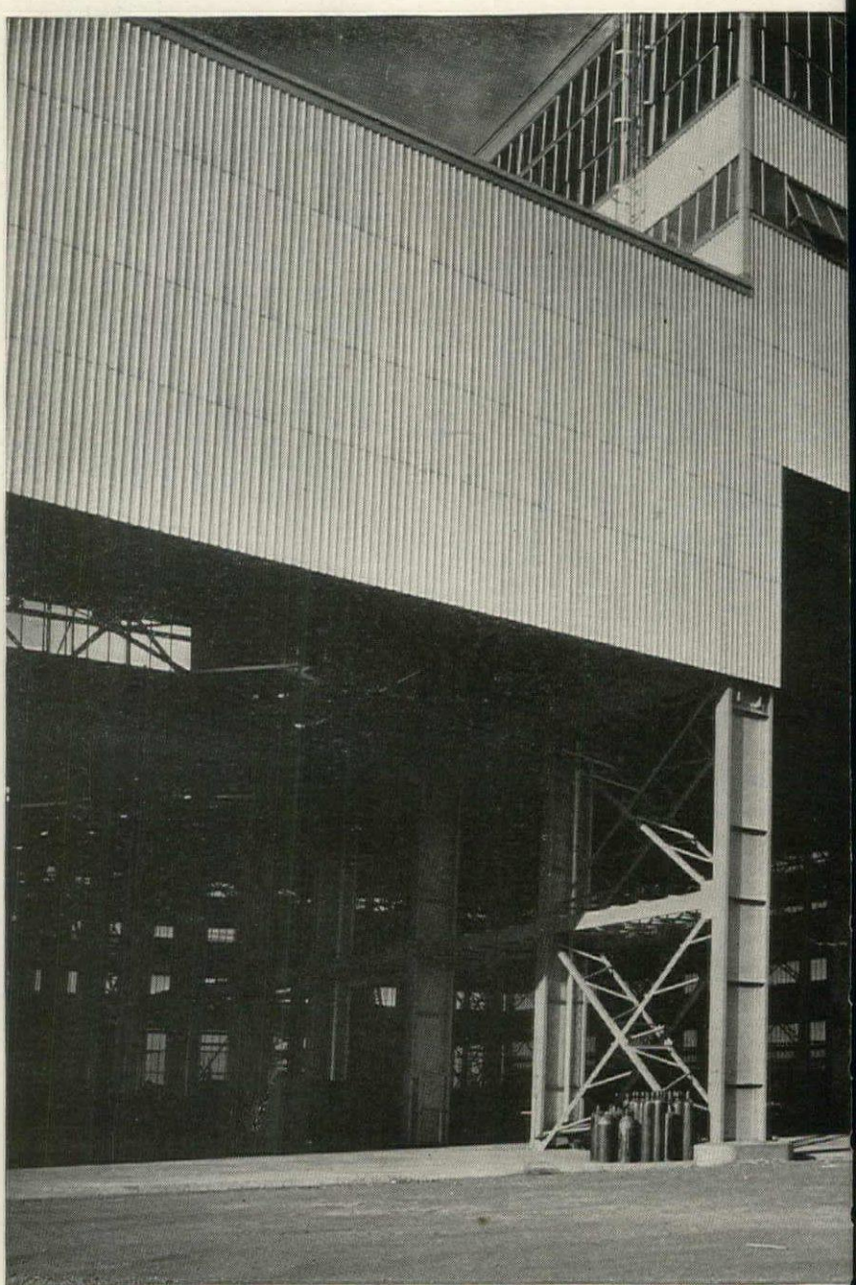
BOAT HOUSE




SECOND FLOOR
DORMITORIES
DRILL GROUND
SERVICE
CREW'S LOUNGE & MESS
BOAT
HOUSE
L.R.
D.R.
OFF.
K.
SERV.
B.R.
P.
GARAGE
BOAT BASIN
GOVERNMENT PIER
SCALE IN FEET
0 10 20 30 40 50 60 75

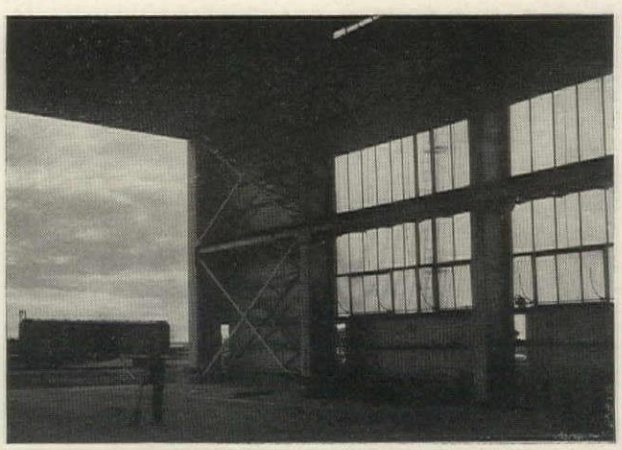
NAVAL SHOP BUILDINGS

Construction, maintenance, and repair of a modern navy is an industrial job of the first magnitude. At its various bases and operating stations scattered up and down the Atlantic and Pacific coast lines the Navy has scores of huge industrial buildings, shops, and foundries capable of reproducing or reconstructing any and all of the parts which may be required on short notice by any of the units of the fleet. As the size of the fleet increases, so, too, must the size of its industrial base. Naval expansion plans for the current year include more than 125 million dollars for the construction of such facilities.



D. Kessel

STRUCTURAL ASSEMBLY SHOP



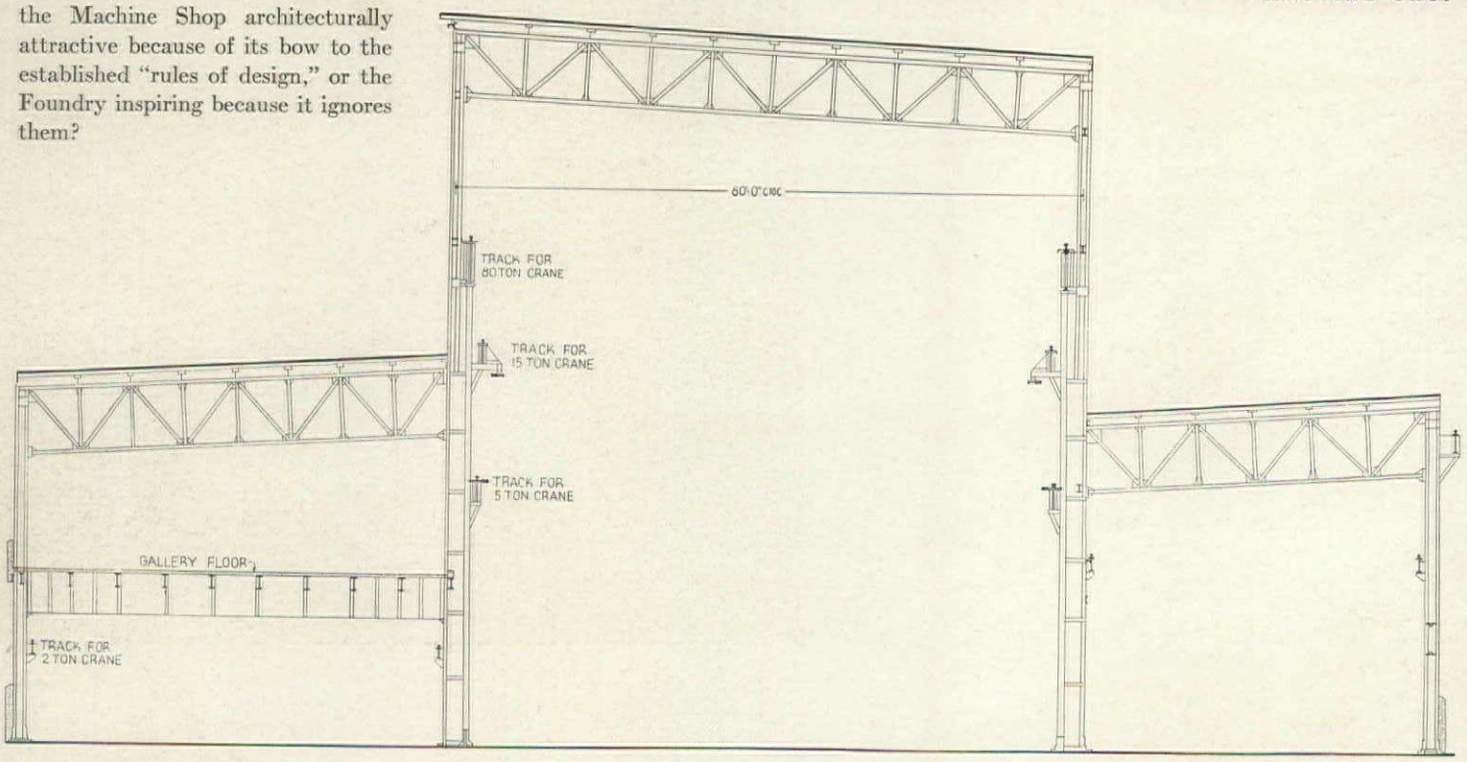
NAVY YARD, EAST COAST

NAVAL SHOP BUILDINGS

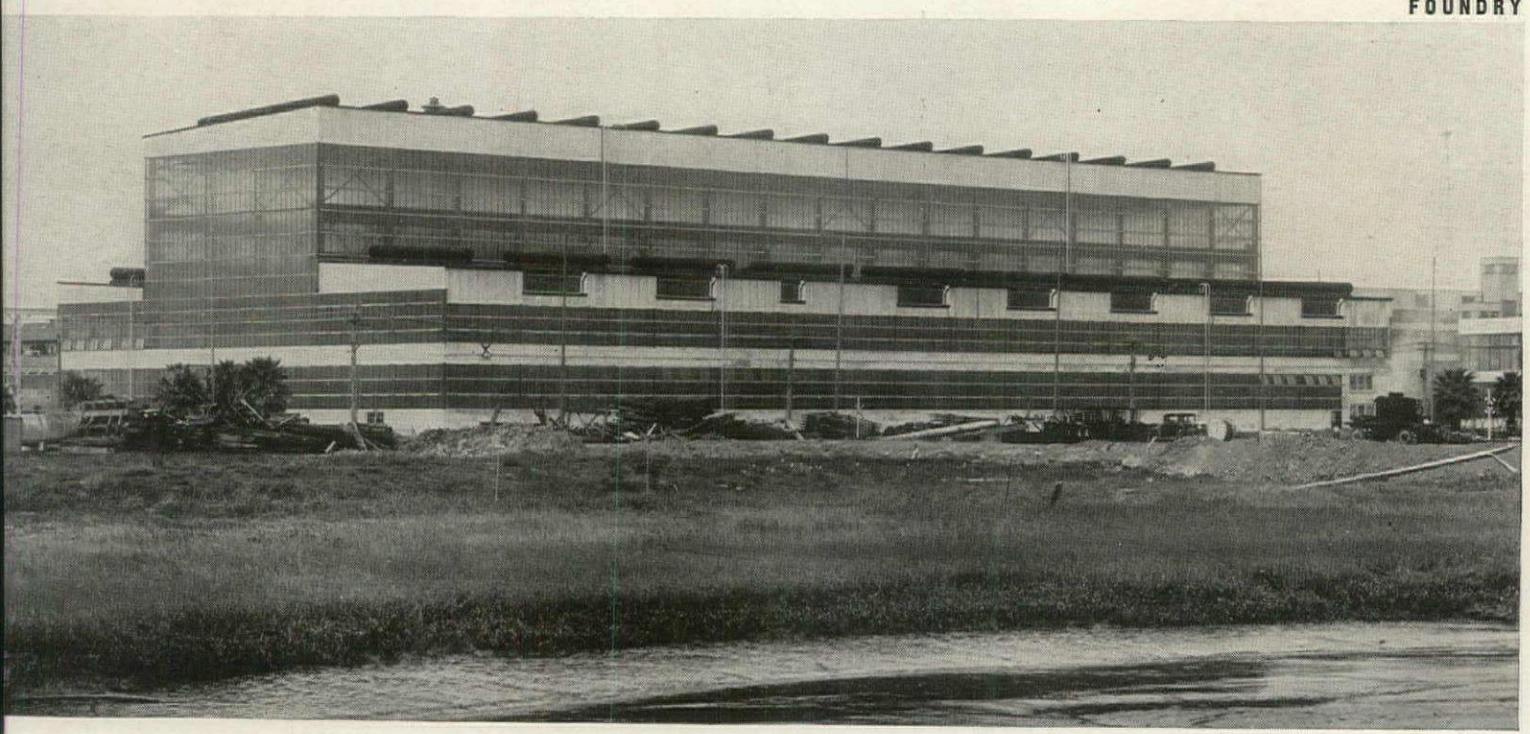
MACHINE SHOP AND FOUNDRY, NAVY YARD, WEST COAST

Two trends in the design of industrial shop buildings are illustrated by the two buildings on this page, both the work of the Navy's Bureau of Yards and Docks. Essentially similar in cross section, their exterior treatment has been approached from diametrically opposed points of view. The Machine Shop (right) shows the effect of a conscious effort at symmetry and continuity entirely absent in the Foundry (below), which is evidently a purely functional expression of the physical and structural requirements. Question is: Is the Machine Shop architecturally attractive because of its bow to the established "rules of design," or the Foundry inspiring because it ignores them?

MACHINE SHOP

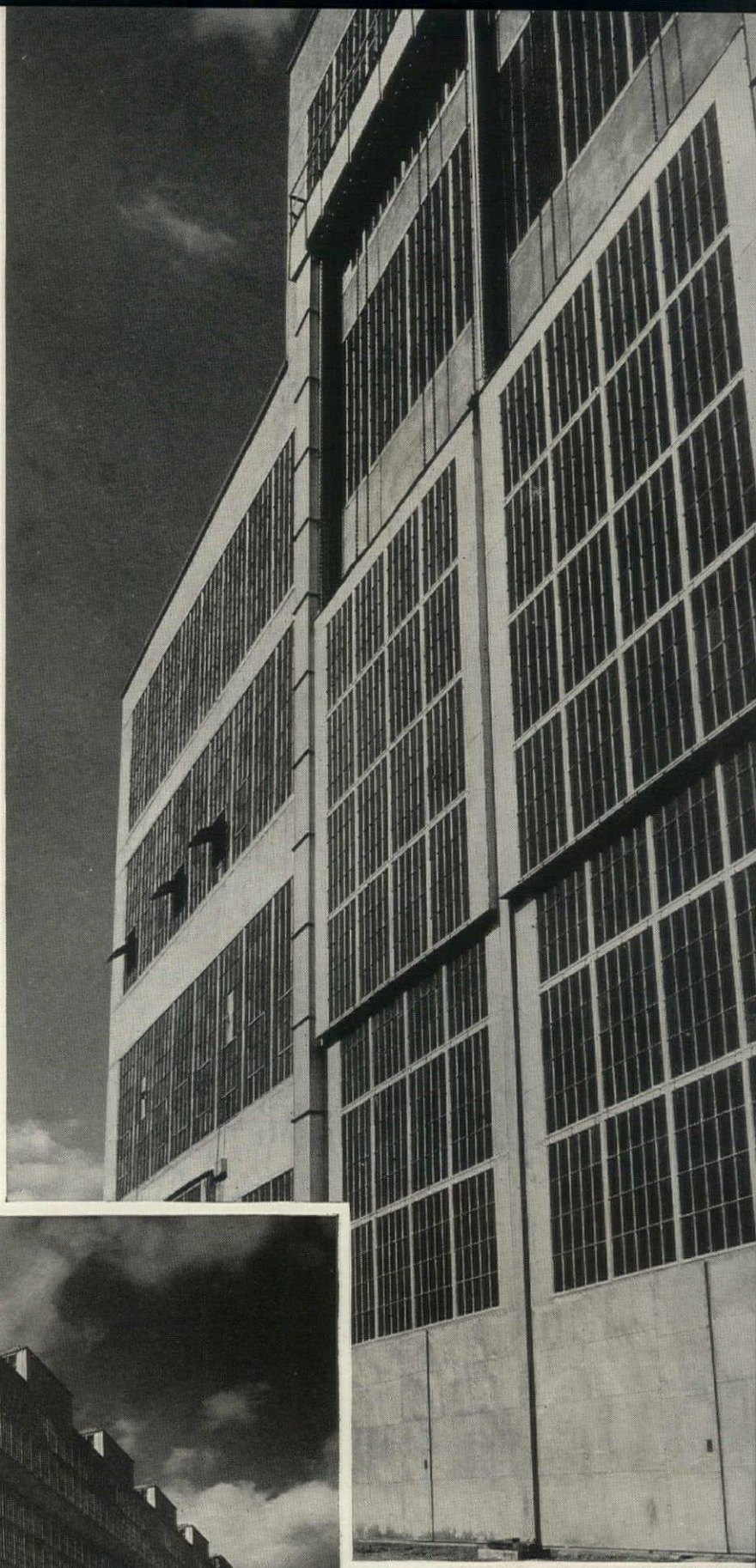


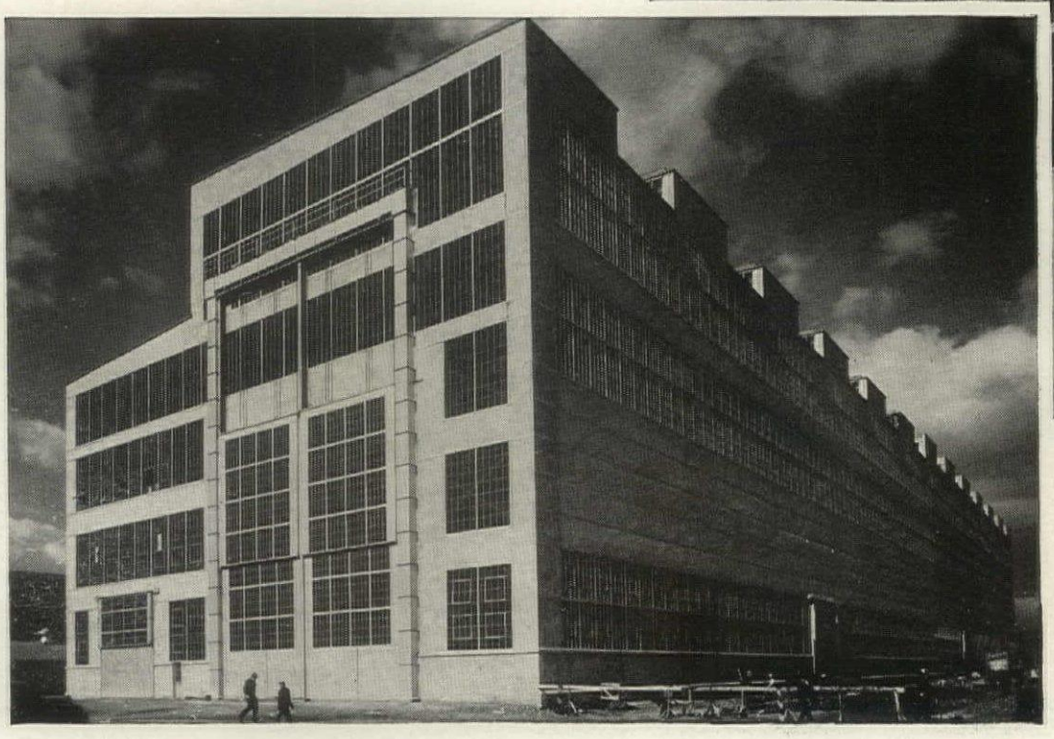
FOUNDRY



MACHINE SHOP, NAVY YARD, EAST COAST

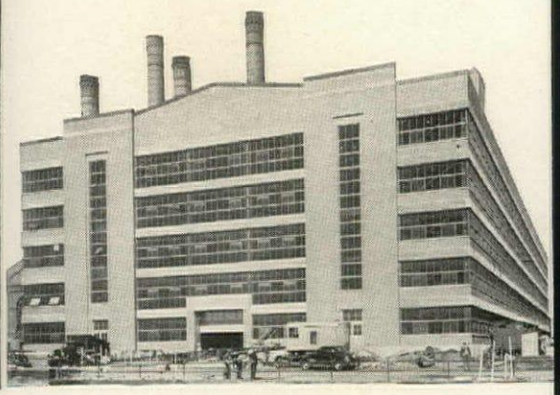
Nowhere is Design's dependence upon the development of improved building products so evident as in the huge, utilitarian structure. Thus whatever difference there is between the visual appeal of this building and the foundry on the opposite page arises out of the different glazing and sheathing methods employed, factors which are only partially within the designer's control.





D. Kessel Photos

NAVAL SHOP BUILDINGS

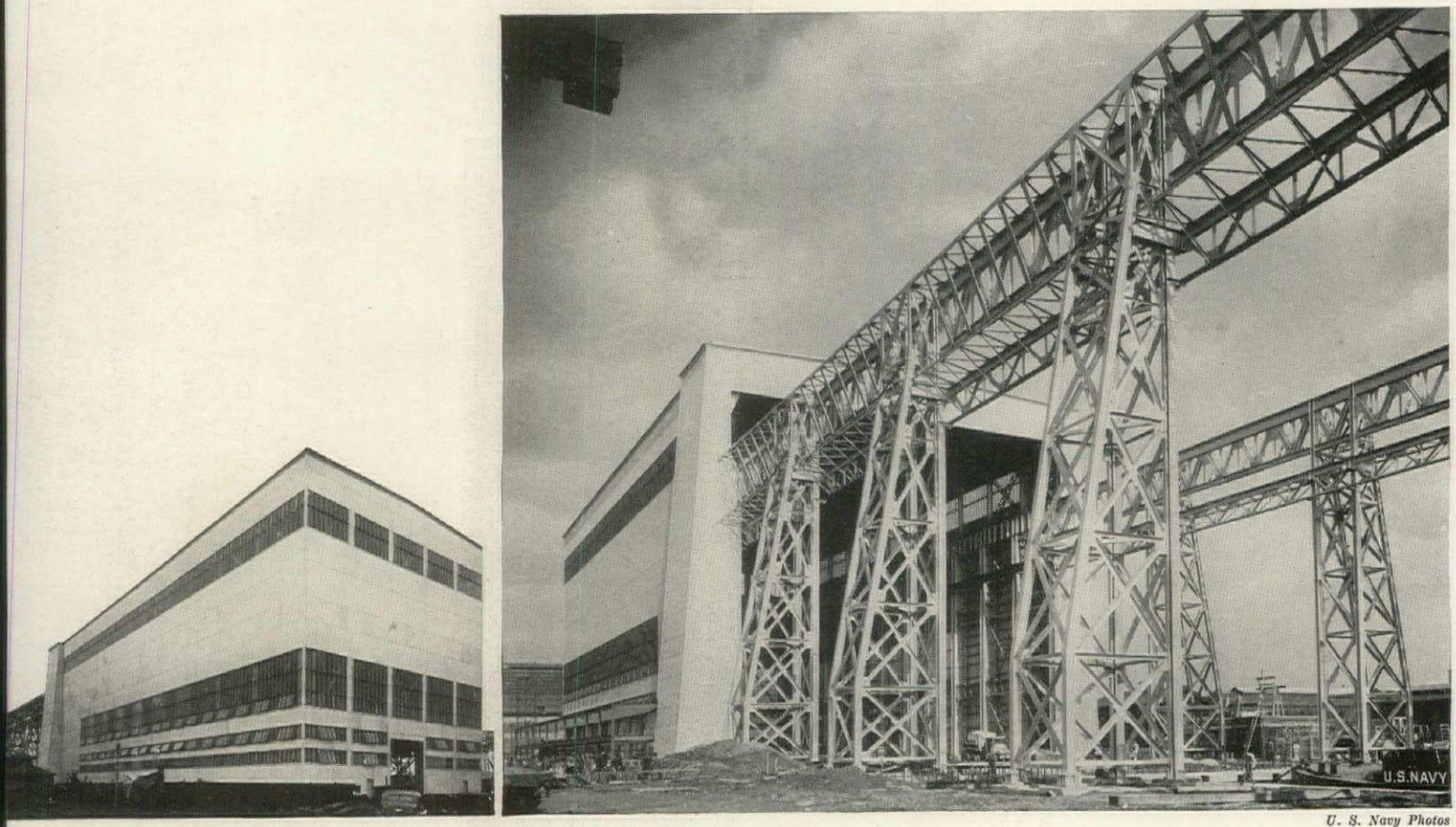


Walter Wilcox, Photos

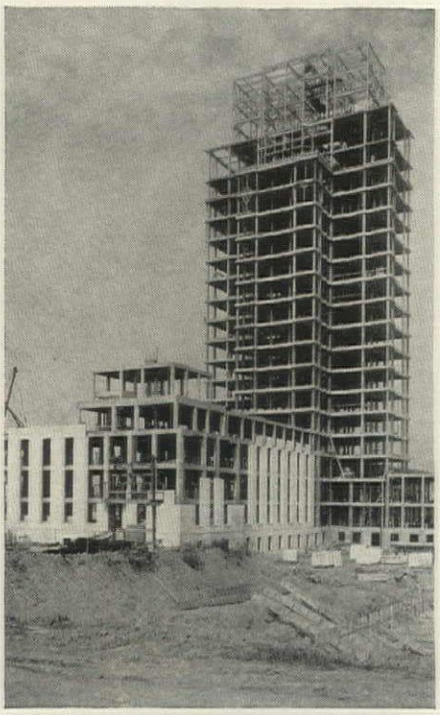
GUN ASSEMBLY SHOP, NAVY YARD, EAST COAST

Specialized buildings for handling heavy equipment must be available for emergency repairs to the fleet in time of war. For this reason, the Navy owns and operates shops for much of the final fabrication and assembly of its ships. In the interesting building below, huge gun turrets, together with their below-decks powder storage bins and conveyors, are assembled for transfer to the ship as a single unit.

TURRET SHOP, NAVY YARD, EAST COAST



U. S. Navy Photos



NAVAL MEDICAL CENTER, BETHESDA, MD.
Paul P. Cret, Consulting Architect

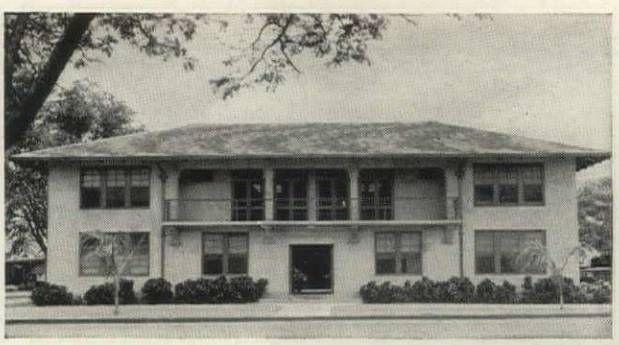
Walter Wilcox Photos

NAVAL HOSPITAL, MARINE POST, QUANTICO, VA.
Upham and Adams, Architects

HOSPITALS

One of the great shortcomings of the Army construction program in World War I was the failure to provide base hospitals adequate for the needs of the inducted troops. If this is to be avoided in the present emergency it is essential that new hospitals be built as rapidly as cantonments are made ready for occupancy, and that they be sufficiently well constructed and equipped to care for the sick load which invariably results when large numbers of men are housed in confined quarters.

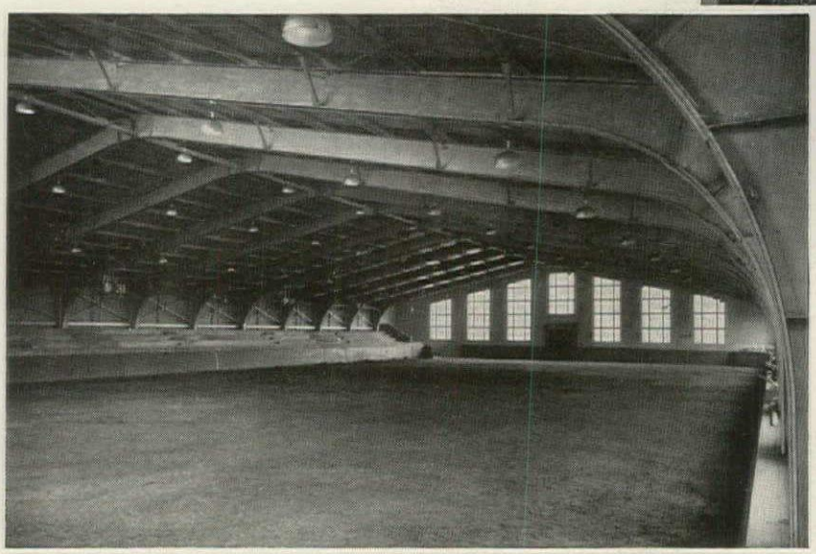
DISPENSARY, TERRITORIAL NAVY YARD



Alfred Cook Photos

NATIONAL GUARD ARMORY, MORRISTOWN, N. J. HUGH A. KELLY, ARCHITECT

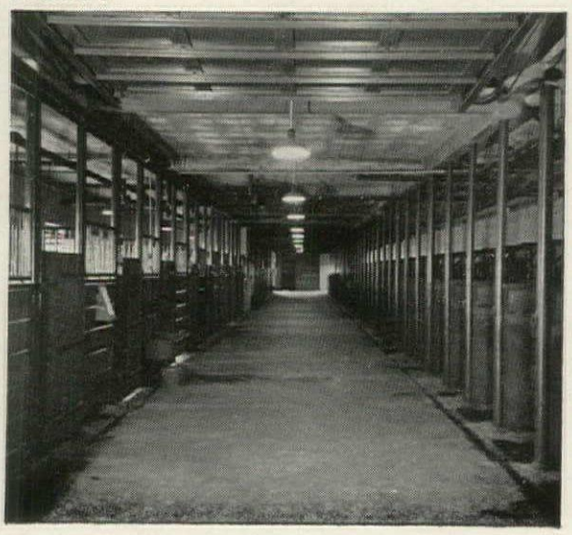
ARMORIES

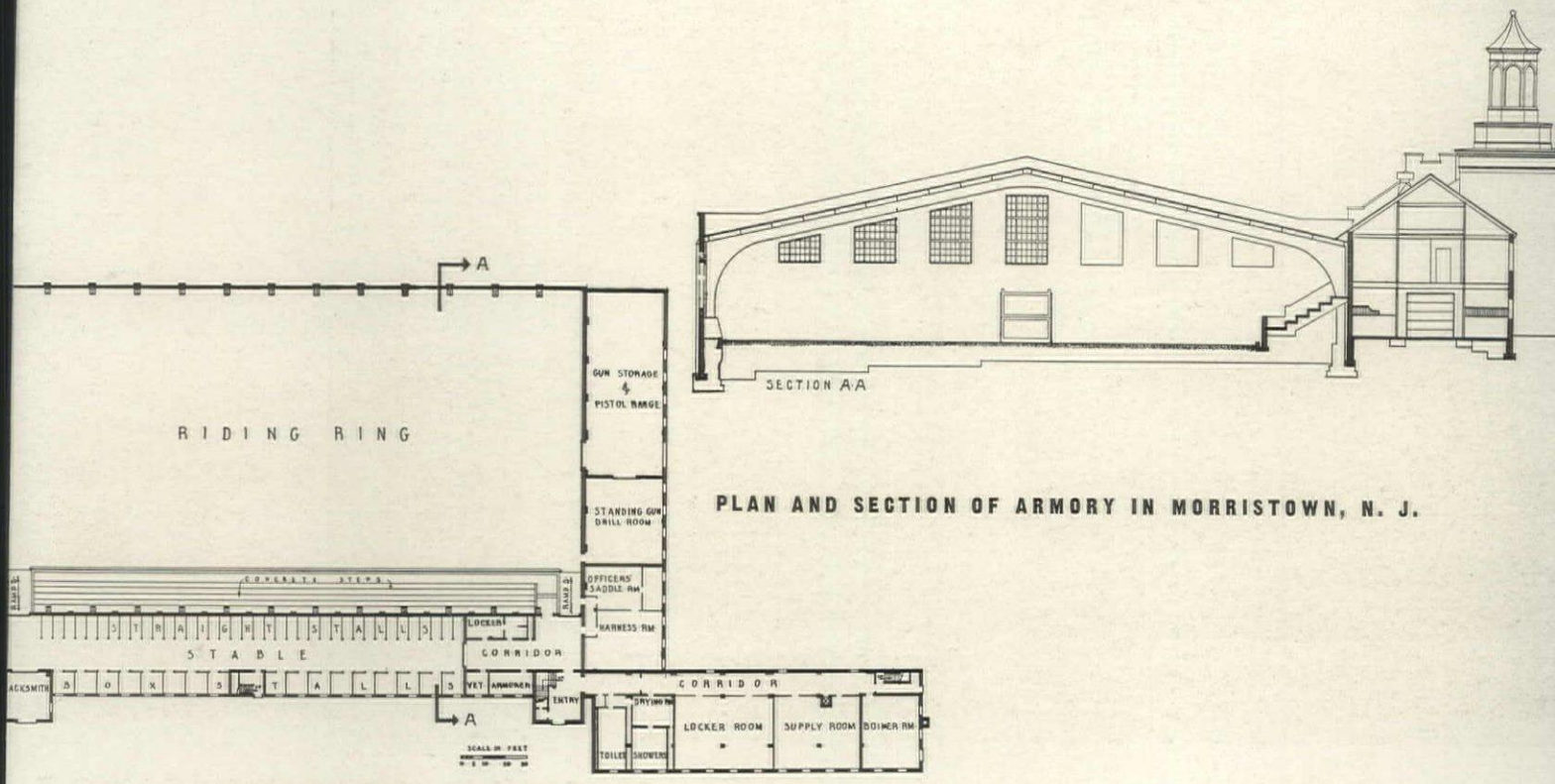


Armories are customarily built by the States for the use of their National Guard units. During the past few years a great number of these structures have been put up with WPA funds and labor, although still under State supervision. Illustrated on these pages are

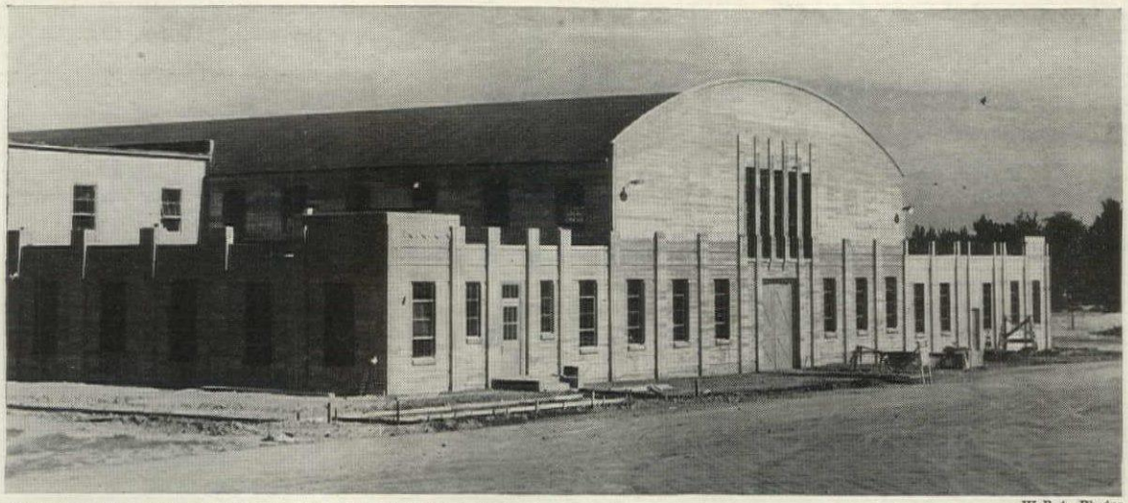
LOUNGE

STALLS





PLAN AND SECTION OF ARMORY IN MORRISTOWN, N. J.

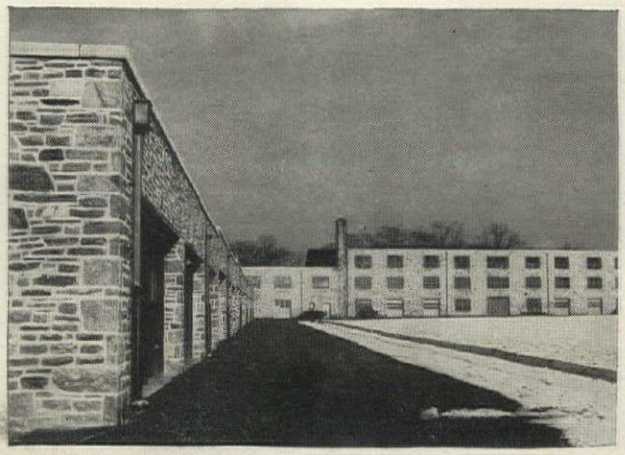


NATIONAL GUARD ARMORY, BOISE, IDAHO

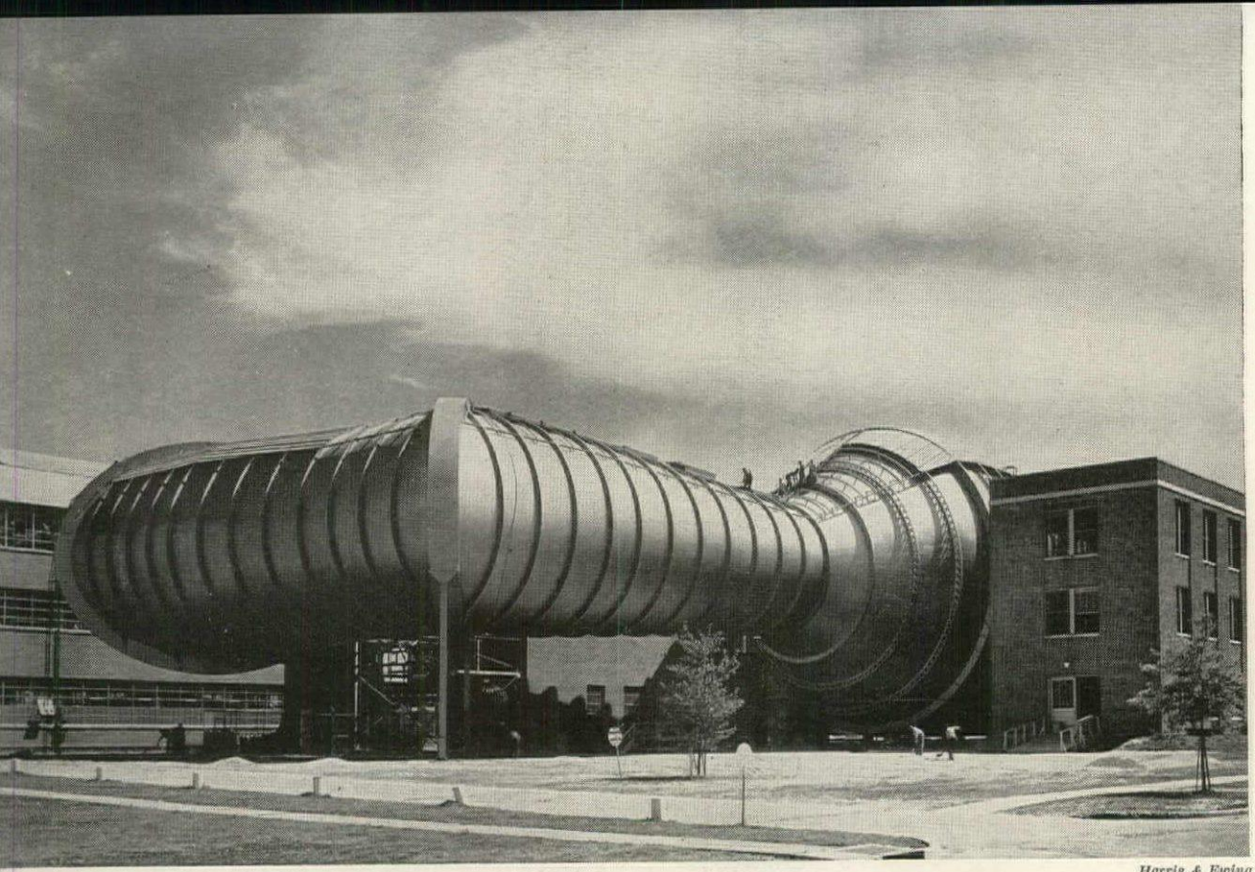
W.P.A. Photos

three recent examples. The Morristown armory is Colonial in design with a very handsome interior of rigid frame construction. Other views show the equipment racks, stalls, and the lounge.

In planning armories at the present time, flexibility of arrangement is an important requirement, since there is no doubt that armories now set up for cavalry or infantry training will in many cases be used for new types of units, such as mechanized cavalry, chemical defense, anti-aircraft regiments, etc. Obviously, with the organization of the army and its reserves undergoing swift changes, the structures built to serve them should be equally capable of adaptation to new uses.



GARAGE AND STORAGE HOUSE
National Guard Armory, Pikesville, Md.



1

Harris & Ewing

SCHOOLS AND RESEARCH

Intensified training and research naturally form a part of the growth of the Army, Navy, and Air Corps. Each of the technical branches of the service will have to expand its training program to keep pace with the increasing need, and many buildings such as these will be required to house this activity.

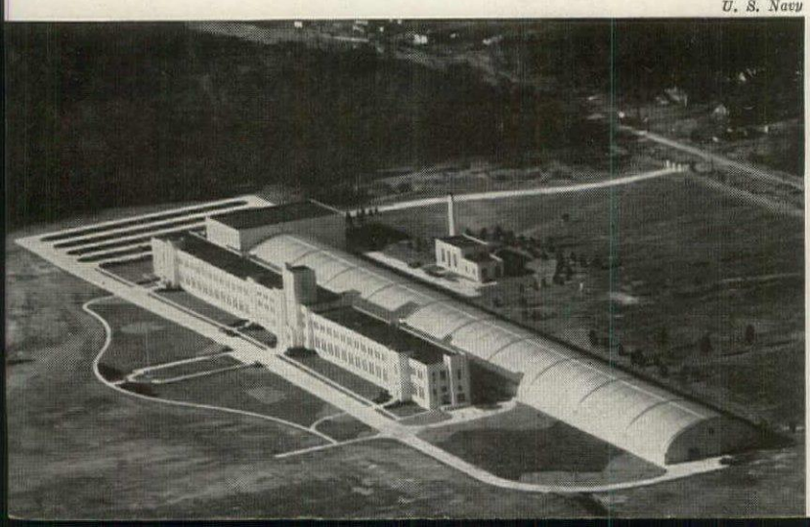
2

U. S. Army

3

U. S. Navy

U. S. Navy

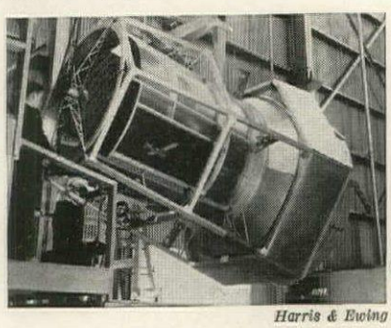


4

5

Clyde H. Sunderland, Harris & Ewing

1. Pressure Tunnel, National Advisory Committee for Aeronautics, Washington, D. C. **2.** Squier Laboratory (Photographic), Army Signal Corps, Fort Monmouth, N. J., A. E. Poor and R. P. Rodgers, Architects. **3.** Fleet School Building, Naval Operating Base, West Coast. **4.** Model Testing Basin. **5.** Link trainer. **6.** Wind Tunnel for experiments free flying models. **7.** Test tank, Washington Navy Yard, D. C.



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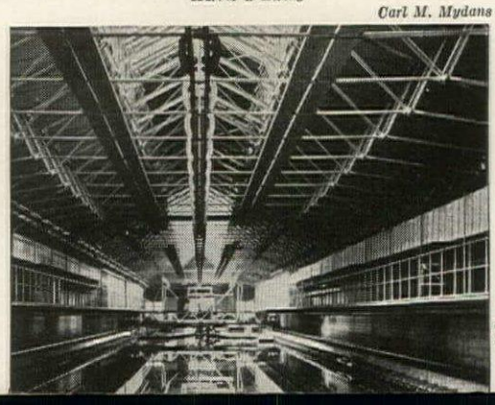
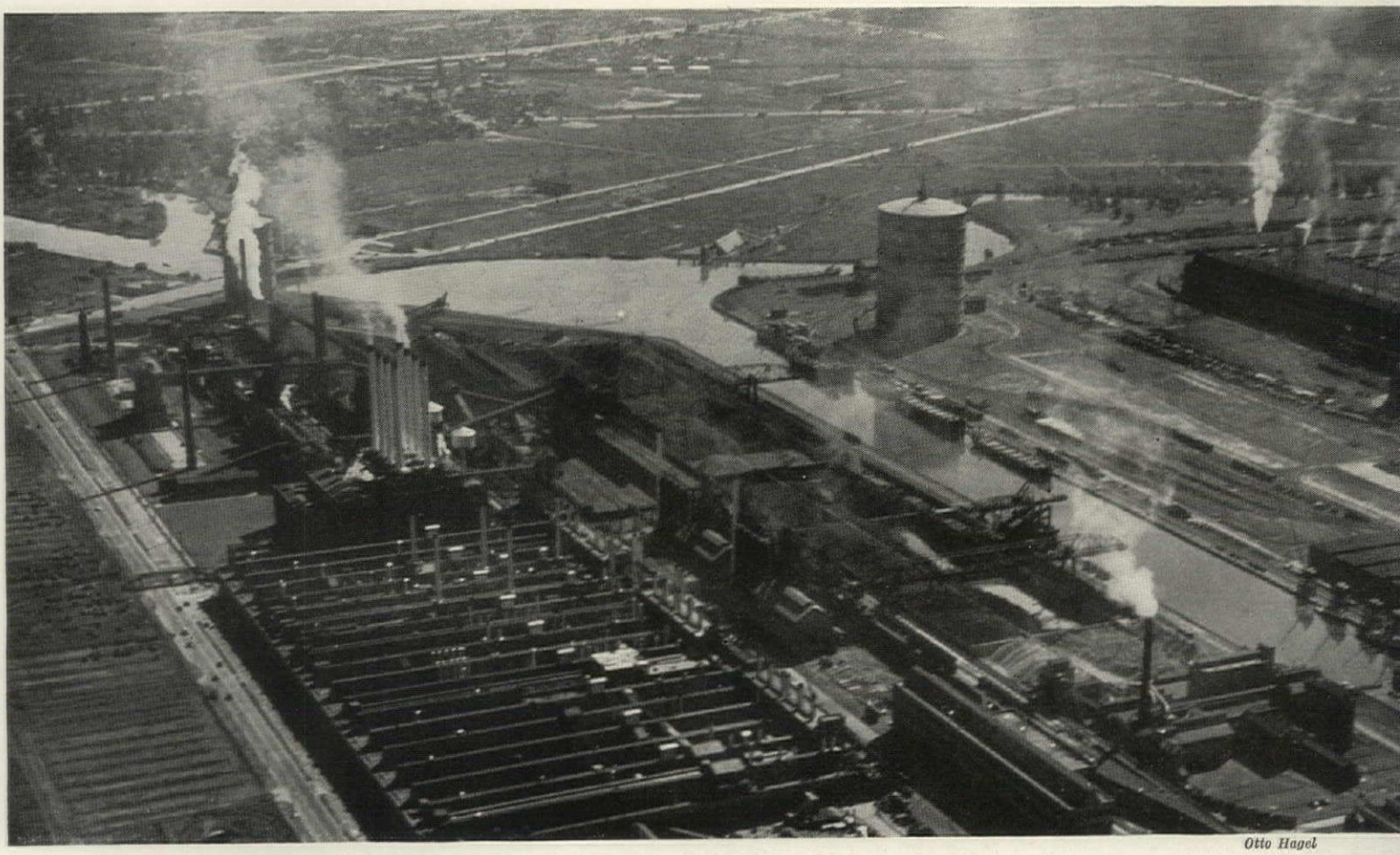
Harris & Ewing

Carl M. Mydans



7

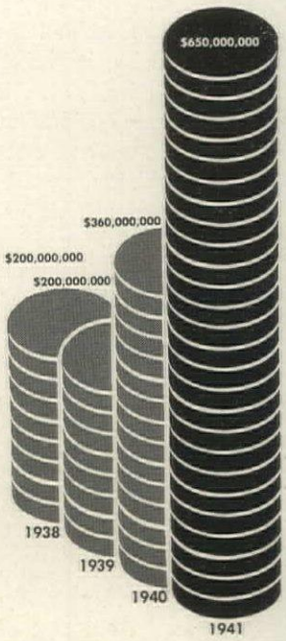
INDUSTRIAL BUILDING



Otto Hagel

Due mainly to a defense-inspired third-quarter surge, privately financed industrial construction at September's end was about 90 per cent ahead of 1939's first nine months. And, indication is that the gain will be at least 80 per cent for the full year, raising the 1940 total to some $360 million. Next year will probably see this percentage increase repeated for a total of about $650 million—a shade above the average annual volume of the 1926-29 heydays.

An upturn in factory construction normally follows close on the heels of improved consumers goods business. The short-lived boomlet of 1937 jacked up private industrial construction expenditures by about 75 per cent—to $391 million. But, with business recession, the total dropped sharply to $192 million in 1938. Last year, the consumers goods business peaked and flopped before industrial construction had time to get started, and expenditures for new factories toted up to an unimpressive $200. This year, national defense has turned the tables; private industrial building has responded more quickly than usual to the acceleration of consumers goods business, has in recent months equalled the booming 1929 pace.



In addition to private factory building dollars, national defense means millions more during 1940-41 for new factory sites and machinery, for ships and shipbuilding facilities, for public utilities and transportation facilities and for all kinds of publicly financed industrial construction. It also means reopening, reconditioning and, in many cases, conversion of existing factories. The reason is obvious: most of the $13 billion job of preparing the U. S. for defense naturally falls on the nation's industrial plant.

DEMAND. Today this industrial plant (at least that part of it necessary to defense) is jam-packed with orders—so much so that there is already indication that the Army and Navy, Industry's biggest consumers, may soon exercise priorities over their non-defense competitors. Big U. S. Steel Corp. is trying to put the last 4

(For additional references on Industrial Building, see Bibliography, pp. 5, 6, 7, 8, 9, 14 and 15)

per cent of its theoretical capacity to work, while smaller Bethlehem Steel Corp. has already been forced to turn down some orders. Meanwhile, every private and public shipyard in the country, which is equipped to build warships, is laying keels in every ship way and is building new ways. Construction of the two-ocean fleet (more than 300 new warships) will take a lot of steel. Existing airplane plants, while recently expanded to handle British orders, are far from adequate to fill U. S. needs in the specified time. The same is true for airplane engine production, one of the defense program's tightest bottlenecks.

Along with orders for airplanes and airplane equipment, munitions orders are presently the hardest to fill. Result is that factories for their production are now in bigger demand than most any other type of industrial building. But, the demand embraces countless other types from tank plants to textile mills, from optical instrument laboratories to warehouses. As good an indication as any of the breakdown of this demand is a summary of the $220 million already loaned by the Reconstruction Finance Corp. to private industry for defense purposes (plant construction, equipment and machinery). Biggest chunk ($92 million) went to the airplane engine industry; $77 million has been loaned to aircraft manufacturers; $19 million to airplane parts makers, $16 million to metal makers, $10 million to machine tool makers and $6 million to a host of other industries. (Since expansion of munitions plants will be financed largely with Government grants, not loans, manufacturers in this field are near the bottom of the RFC list.)

LEGISLATION

Much plant expansion during the first part of 1940 resulted from British (and for a while, French) orders. Some new plants were even financed with British money. Then came U. S. national defense. Between the planning and contract-letting stages of the program, the War and Navy Departments issued "letters of intent" to manufacturers, guaranteeing protection against any losses they might incur in building and tooling-up their plants for anticipated contracts. Then came the contracts—month ago more than three-fifths of the Army's had been let. Up to that time orders had been accepted and new plants had been launched on the assurance that, while Congress would eventually enact a law limiting their profits via taxes, it would also permit them quickly to amortize their new plants. However, they had only a vague idea as to how the law would read, and some of them preferred to hold up their plans pending its enactment.

On October 8, after it had stewed in Congress for two full months, the President put his signature to this law. But manufacturers were and still are befuddled. (Some 500 pages long and weighing a pound and a half without its binding, the Second Revenue Act of 1940 was branded "a complicated hodge-podge" by one Senator, "an imponderable mess" by another.) From the confusing legal verbiage three important facts stood out:

1 Every corporation, for tax reduction purposes, is entitled to amortize any "emergency facility" during a five-year period (previous period: flexible, about 20 years). By "emergency facility" the Act means "any . . . land, building, machinery or equipment, or part thereof, the construction, reconstruction, erection or installation of which was completed after June 10, 1940, or which was acquired after such date . . ." The "facility" must also be certified as to its necessity by the Advisory Commission to the Council of National Defense and by the Secretary of War or Navy. Briefly, this section of the Act permits the cost of defense plants to be written off in double-quick time, before the passing of the emergency converts them into white elephants.

2 Repealed is the Vinson Act which limited the profits of contractors and subcontractors supplying naval vessels and Army and Navy aircraft.

3 In its place goes an excess profits tax designed to limit profits on all contracts—defense and non-defense, public and private. A direct answer to the President's declaration that U. S. rearmament must make no new "war millionaires," this section of the Act raises from 20.9 to 24 per cent the "normal" income tax on normal corporate earnings in excess of $25,000 and adds a graduated "excess profits" tax of from 25 per cent (under $20,000) to 50 per cent (over $500,000). "Excess profit" for any year is defined roughly as either 1) any profit exceeding 8 per cent on average invested capital or 2) any profit exceeding 95 per cent of the average annual profit for 1936-39. Apparently, Congress felt that most of the increase in corporations' profits during 1940 over the previous four-year average can safely be attributed to the current defense-inspired business boom. Corporations may take their choice of the two alternative methods of computing their tax, and in either case the first $5,000 of their excess profits will be tax-exempt.

Detailed analysis of the Act reveals several inequities and other shortcomings. Thus, chances are that much of the 1940 tax bill will be paid under protest, that the legislation will be redrafted in the next session of Congress.

PROCEDURE

With the long-awaited law finally on the books, manufacturers now have concrete facts with which to work and may take their postponed plant expansion programs off the shelf. But, the building of factories with existing working capital, bank loans and bond proceeds, to which this legislation primarily applies, is only one of several ways in which industrial plant expansion is taking place:

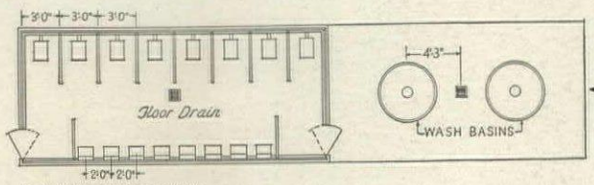
RFC loans. Known as the shrewdest, most tightly closed corporation in the Federal family the Reconstruction Finance Corp. has already done yeoman service for national defense. On September 30 it had loaned $220 million to private manufacturers to finance defense production. Biggest loans: $92 million to Wright Aeronautical Corp., $51 million to Curtiss-Wright Corp., $18 million to Bendix Aviation Corp. and $16 million to Reynolds Metals Co. Probability is that about two-thirds of the $220 million total will go for plant machinery and equipment, one-third for actual building construction.

Federal installment grant. Where plant expansion is undertaken by private manufacturers solely for military purposes, Government may foot the cost of construction by what is known as a "bankable contract" which protects the manufacturers against loss and safeguards the Government's residual interest in the plants upon termination or completion of the contracts. Thus, money for the new facilities would come originally from a manufacturer's own funds or from the granting of credit by private bankers. The Government would give the manufacturer, in five equal annual installments, enough cash to cover the entire capital investment as audited by approved accountants. The manufacturer, in turn, would reimburse the original source. Under this contract the manufacturer would provide management and operation and assume all the ordinary risks of the business.

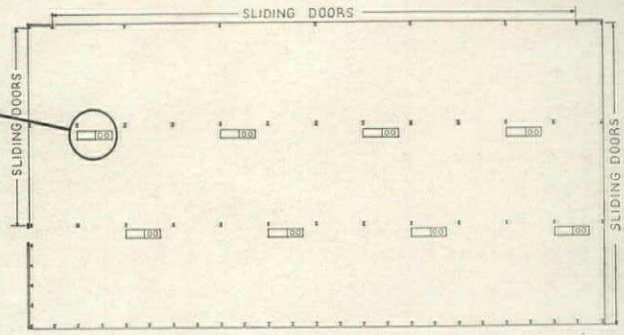
At the end of the five-year period if the manufacturer has no further Government contracts to fill, the plant would be evaluated by three appraisers, one appointed by the Government, one by the manufacturer, the other by the local Circuit Court of Appeals. If he wanted it, the manufacturer could then buy the plant at its appraised value, otherwise, the Gov-

(Continued on page 82)

EDWARD AND ELLIS TAYLOR, ARCHITECTS & ENGINEERS. B. O. LARSON, GENERAL CONTRACTOR

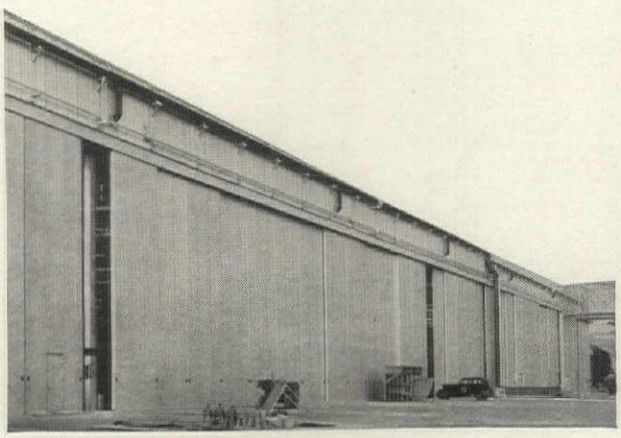


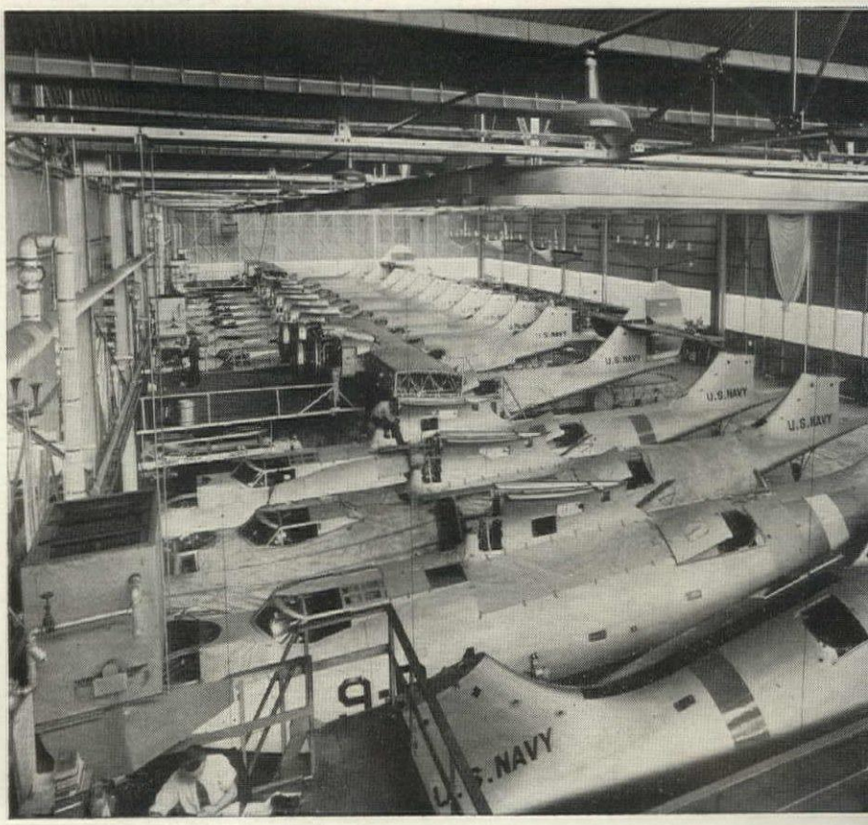
PLAN OF TOILET ROOMS



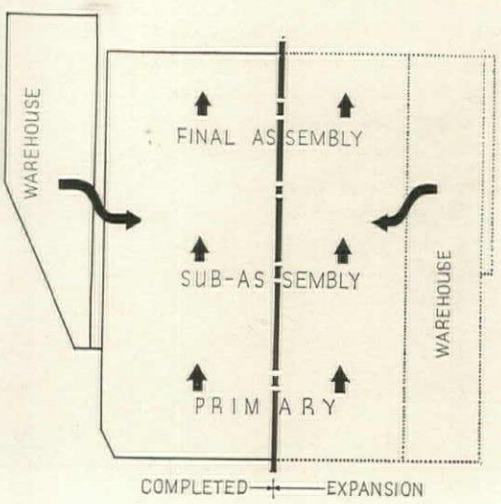
FLOOR PLAN

Four separate buildings, and additions to several others were incorporated in this $2,500,000 expansion program. Besides a 281,600 sq. ft. final assembly building, the program called for an experimental building, office building and final finish building. Because of its size, heating of the assembly building offered the chief problem of technical interest. It called for keeping the heating units above the 36 ft. clearance and providing for additional loads due to the habit of leaving the large hangar doors open. It was solved by high velocity, high output unit heaters located above the bottom chords of the trusses. As in all line production plane plants, the assembly building makes maximum use of overhead cranes for handling parts after they have left the sub-assembly areas. The final finish building is used for final adjustments and painting after planes have completed experimental tests. All buildings make use of high intensity incandescent lighting for night shifts.

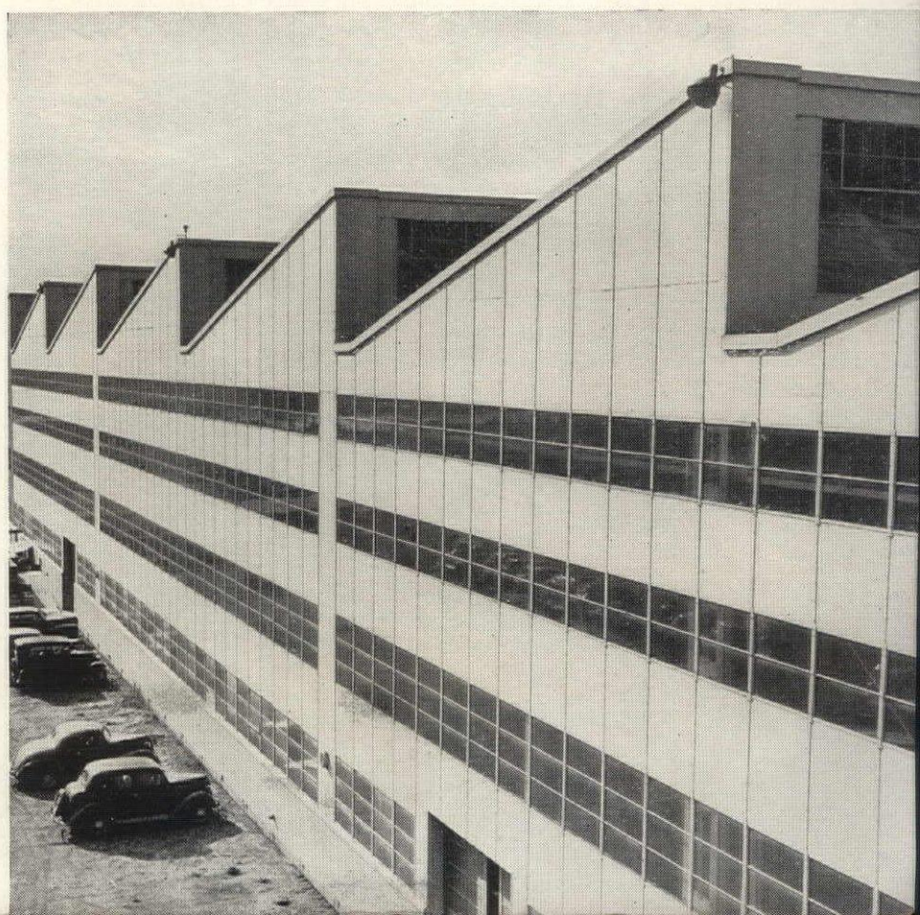


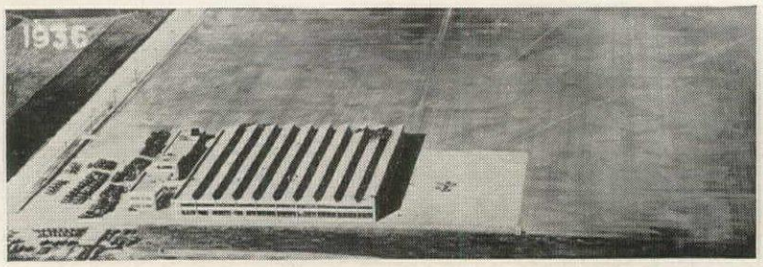


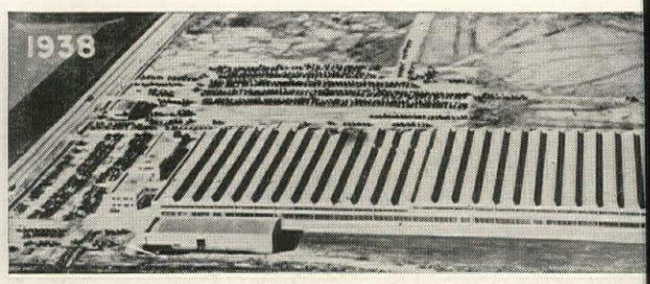

FURTHER
EXPANSION
NOW PLANNED
ORIGINAL
AREA
NEW AREA JUST COMPLETED


WAREHOUSE
FINAL ASSEMBLY
SUB-ASSEMBLY
PRIMARY
WAREHOUSE
COMPLETED
EXPANSION

Increased to six times the original size in four months at a cost of approximately $3,000,000 and with further expansion planned to double the area to turn out large bombers, this plant has multiple-windowed steel walls and a saw-tooth roof providing overhead light throughout. Adjacent to the plant is a warehouse from which raw materials and parts are issued directly to the shops requiring them. Work progresses toward the forward end of the three-sectioned building. In the first section, material is prepared and parts formed. In the two-storied second section operations are executed on the first floor, and completed parts are routed by elevator to the sub-assembly area above. Overhead cranes carry sub-assemblies direct from loading stations to the various points in the assembly line in the third section shown above which is one-story high with an overhead clearance of 35 ft. throughout. Completed planes move through wide gates, across a highway to the field. An overhead pass is contemplated. Service lines, electricity, compressed air, etc., are carried through underground tunnels to distribution points. Entrances to all plant areas are through a system of underground corridors.



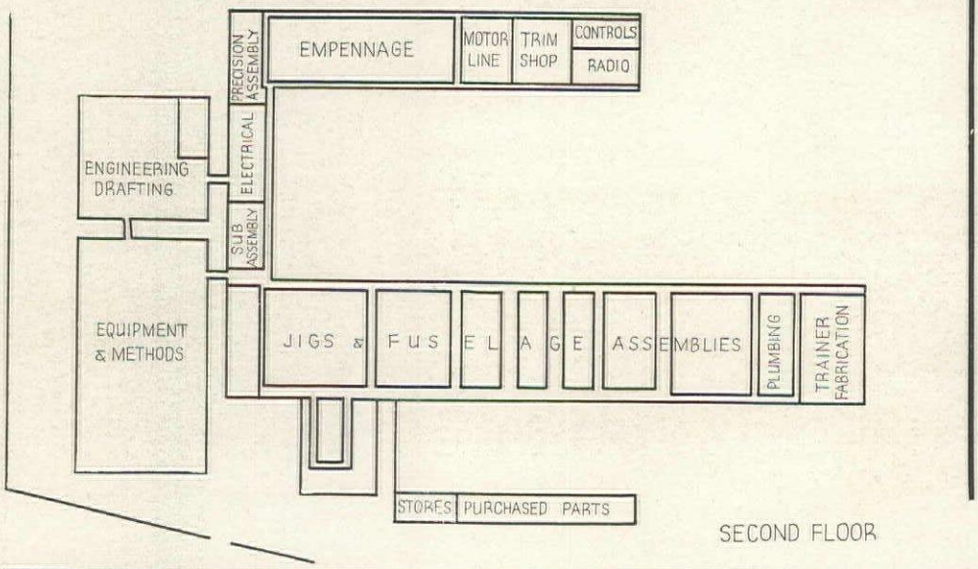


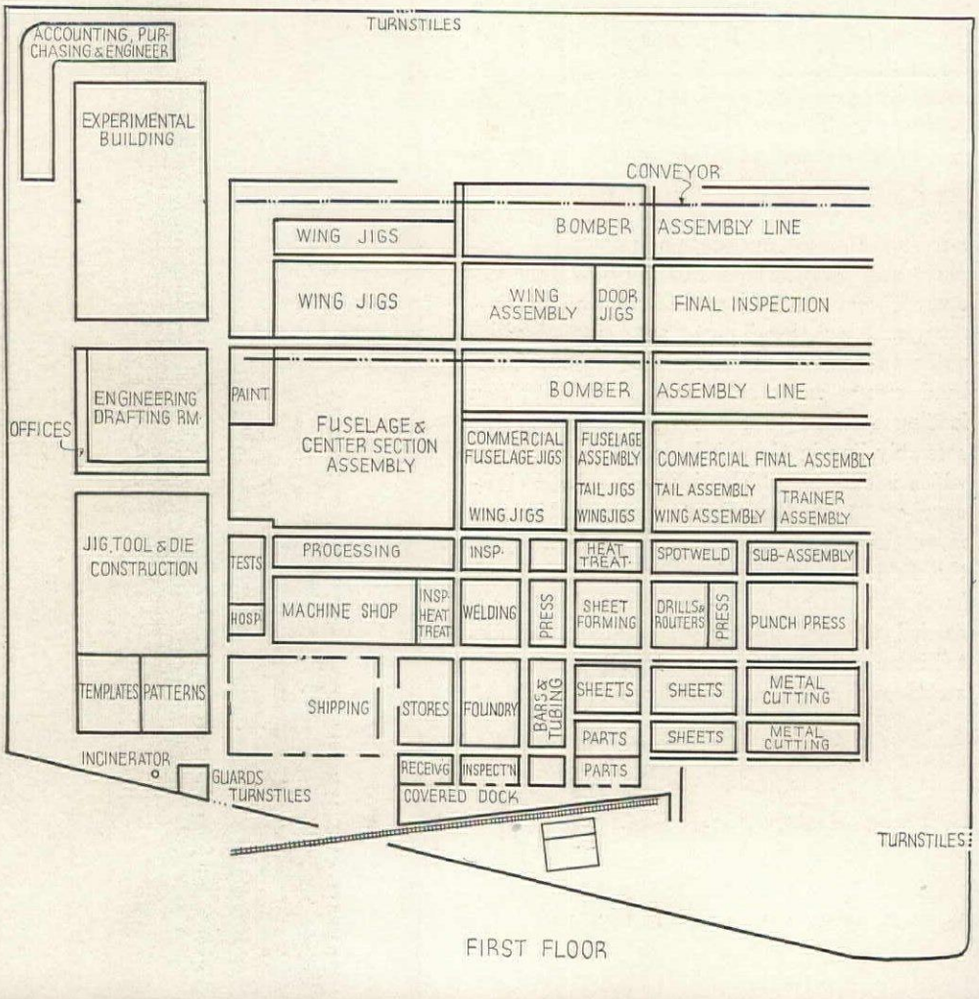


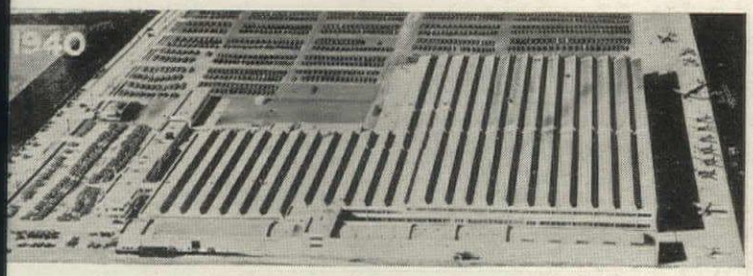
THE AUSTIN CO., ENGINEERS & BUILDERS

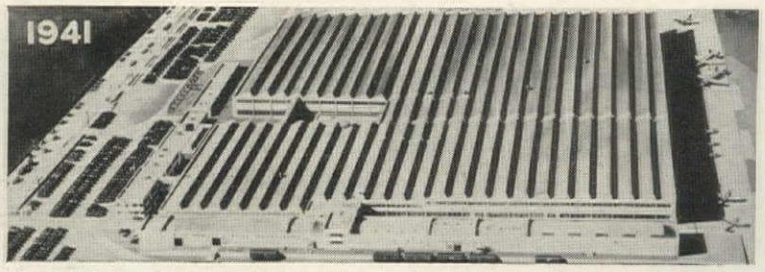
AIRCRAFT JOHN AND DONALD B. PARKINSON, ARCHITECTS ELLIOT LEE ELLINWOOD, ENGINEER

This new plant is located about a mile from the parent organization, with ample rail and air transportation facilities nearby. When completed it will contain over one million square feet of floor space and will have a capacity of more than 2,000 planes a year. There are eight separate structures in the plant. The administration building is a three-story unit housing all offices not connected directly with production. The engineering building is a virtually windowless structure with designing studios, a drafting room and space for the construction of experimental models. Storage vaults for blueprints are also contained in this building. Immediately adjacent is a third building in which tools, jigs, templates and patterns are produced; space for the offices of factory executives and their staffs is also provided here. Other separate units take care of storage of combustibles, warehouse facilities, shipping, utilities, etc. The main structure is the fabrication and assembly building, which contains the sub-assembly areas on a mezzanine, and the two main assembly lines which run the full length of the building.



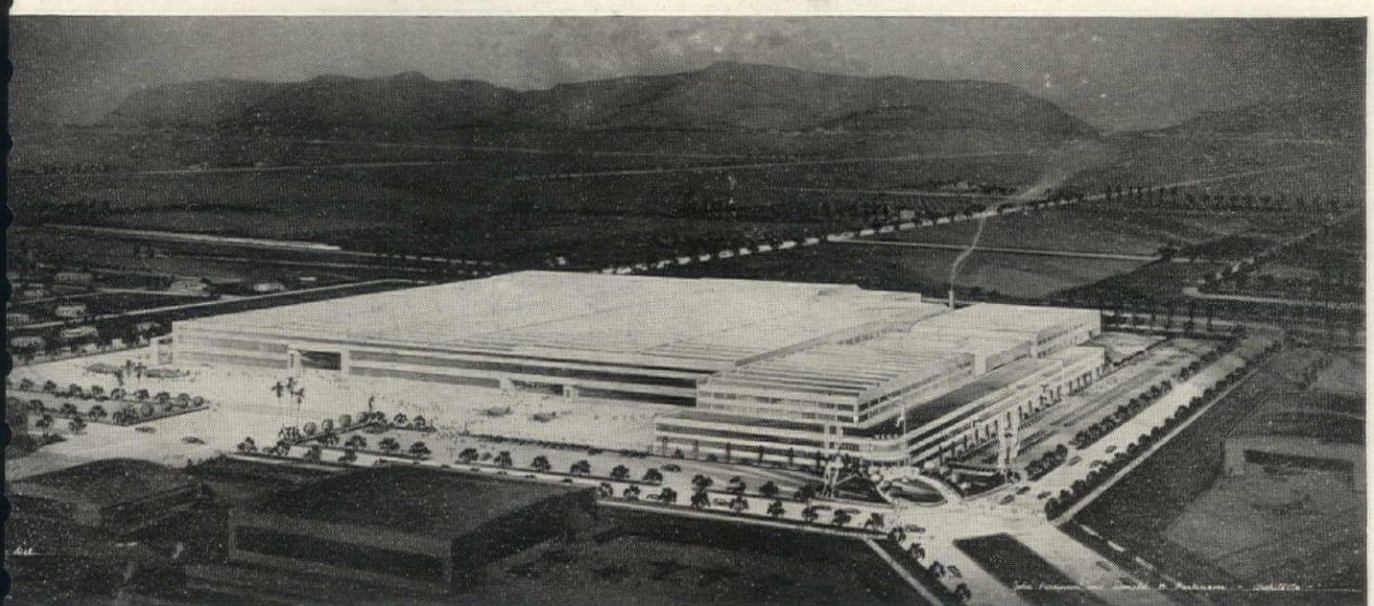


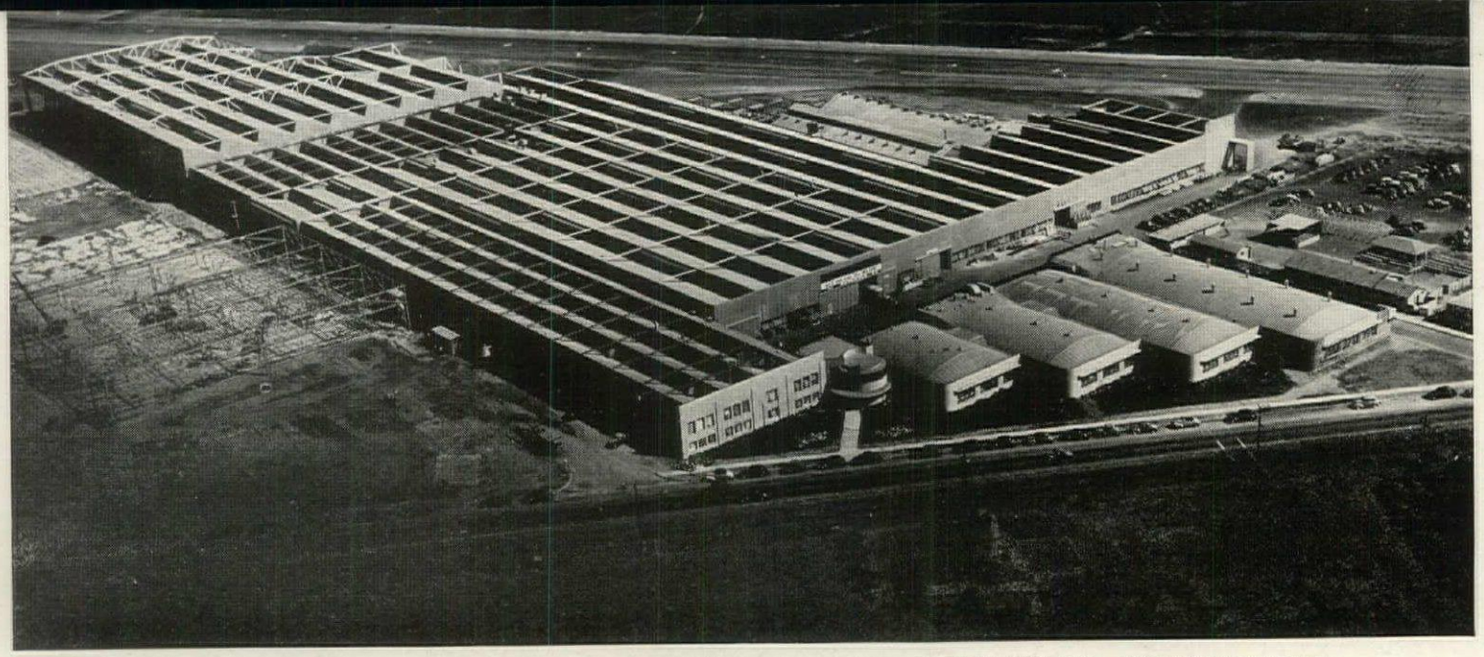




The photographs above show a record of continuous growth over a period of several years. The plant is predominantly a two-story structure, with the ground floor devoted largely to storage and shipping, while the second floor is taken up with bench work on parts and sub-assemblies. Basic production facilities include a foundry and press shop. Wide-span areas covered with sawtooth roofs are provided for plane assembly.

WILLIAM SIMPSON CONSTRUCTION CO., CONTRACTORS

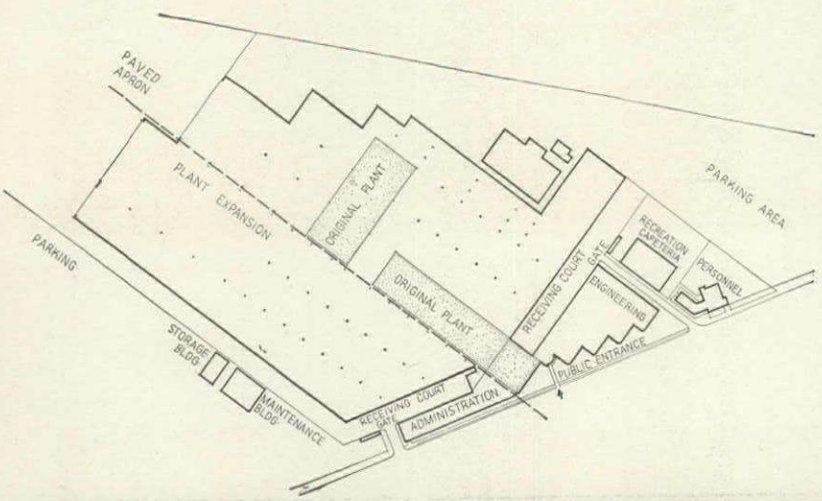




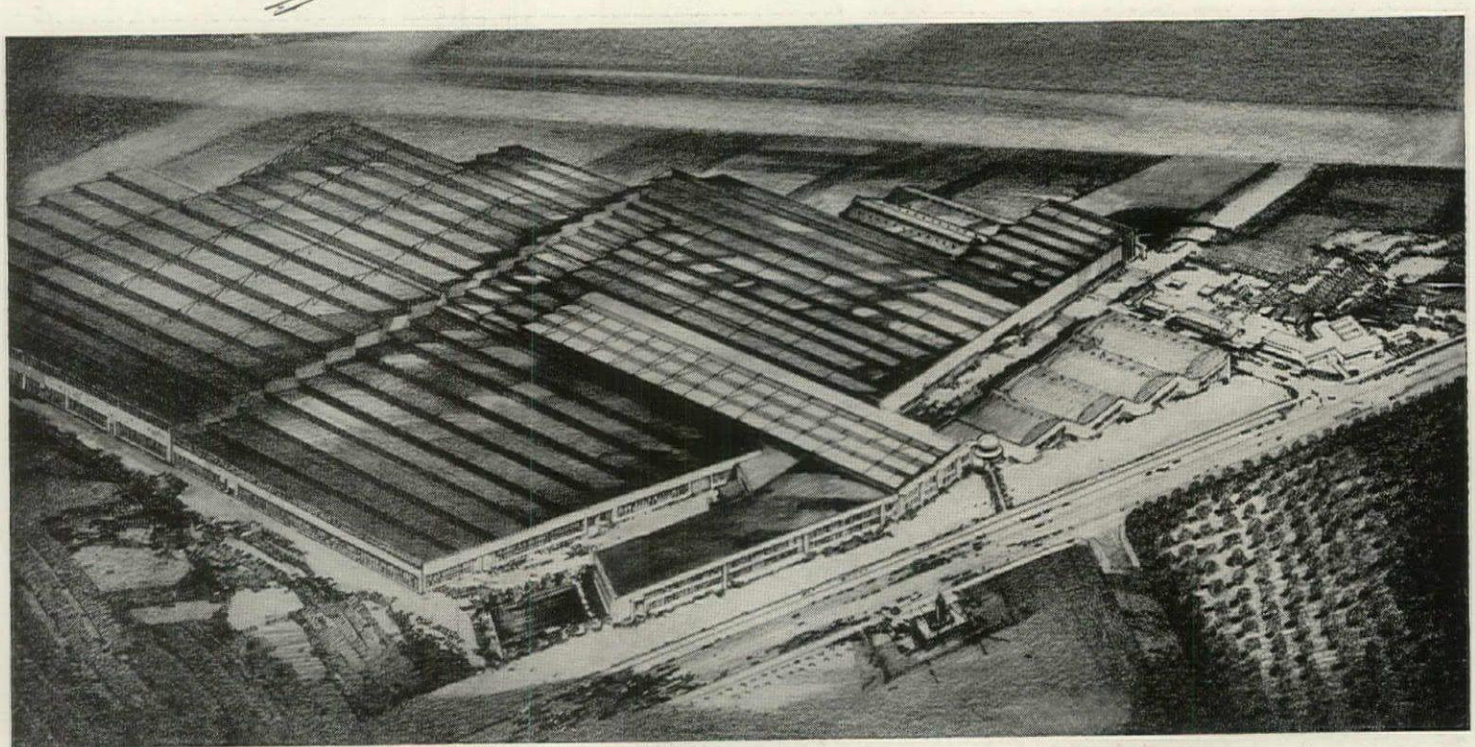
AIRCRAFT

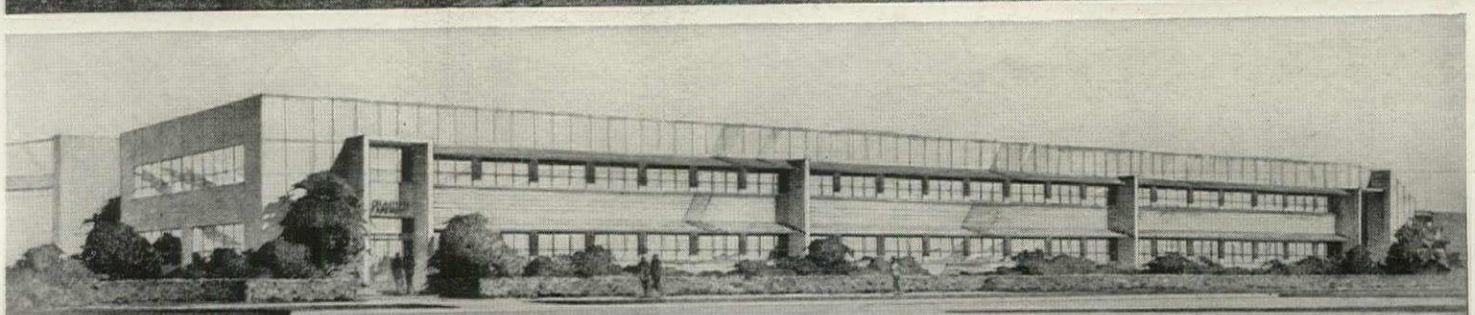
GORDON B. KAUFMANN, ARCHITECT

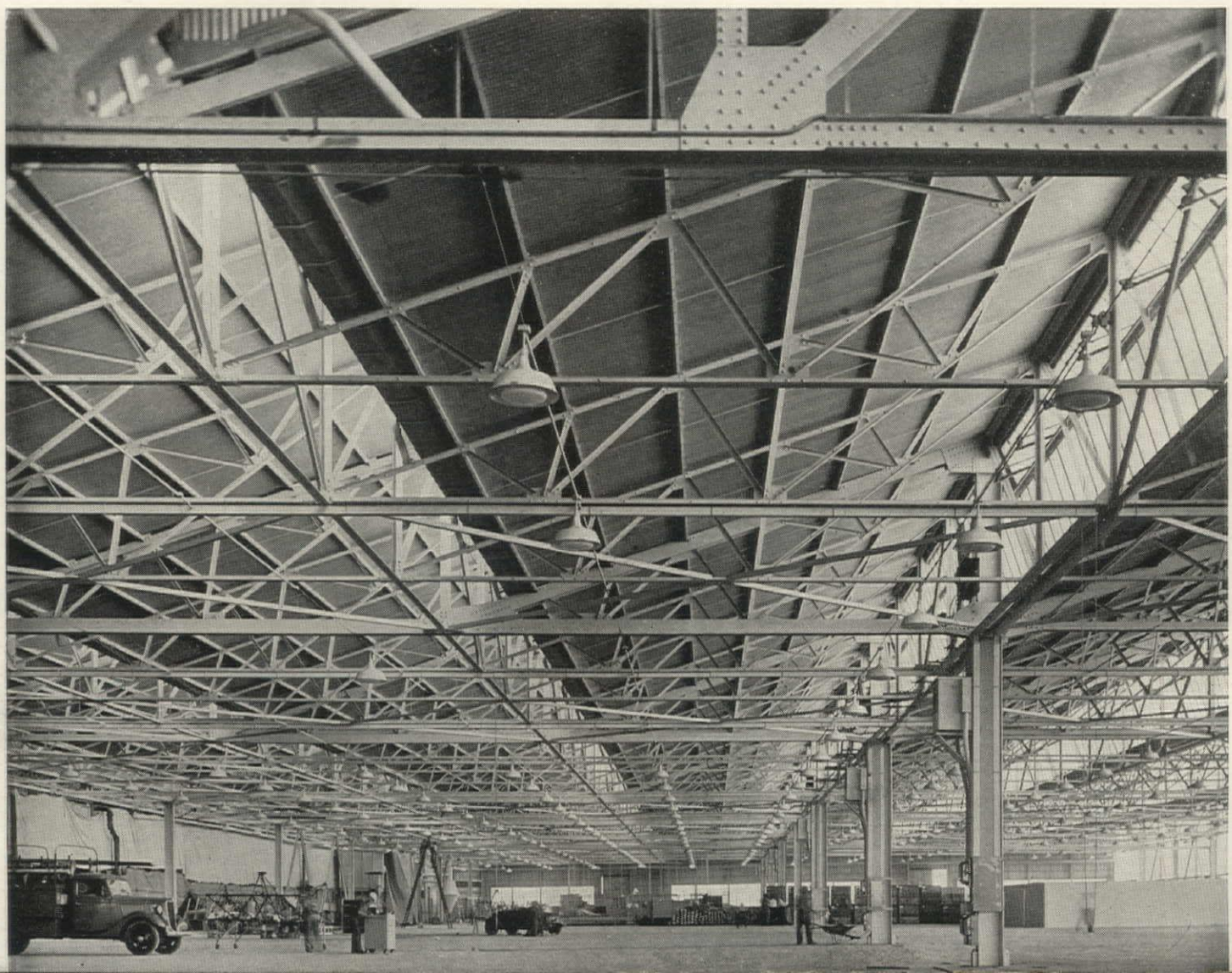
FORD J. TWAITS CO., CONTRACTORS



In ten months and nine erection stages this plant has expanded 700 per cent. Fortunately speedy additions were anticipated in the original layout, which was conditioned further by the irregular-shaped lot and the existing runway. Several small buildings were moved to new locations but two major buildings, the original office and factory, remained as part of the enlarged plant. Most notable feature of the steel construction is the clear span of 196 ft. in the high buildings. This span, accomplished by a parallel chord truss, is one of the longest in the country. In the low buildings the weight to area ratio is 11 lbs. of steel per square foot floor area and in the high buildings 17 lbs. A monitor sash in the sawtooth roof supplies ventilation. Artificial lighting is fluorescent under the mezzanines, and incandescent in the rest of the plant. Toilets are located on the mezzanines.



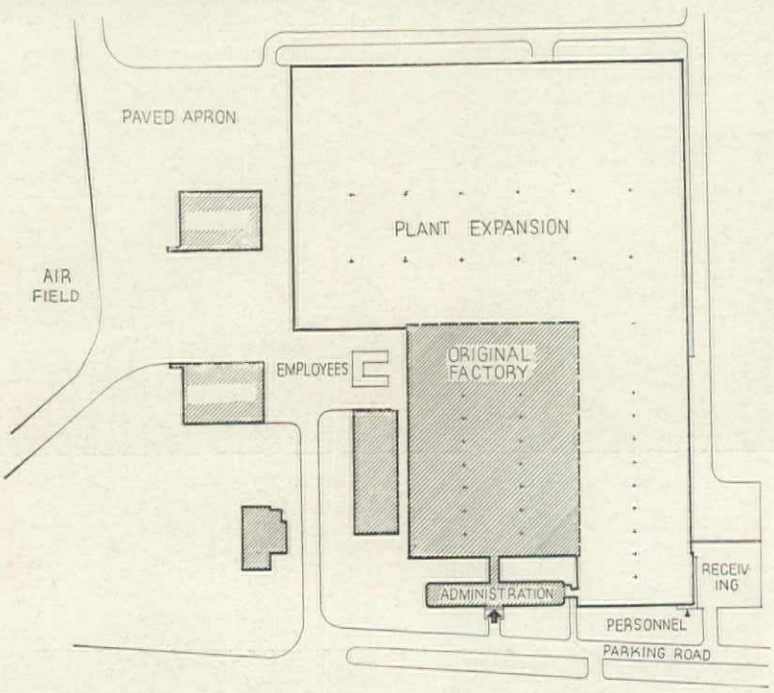




AIRCRAFT

A. C. Kelly

ALBERT KAHN, INC., ARCHITECTS & ENGINEERS

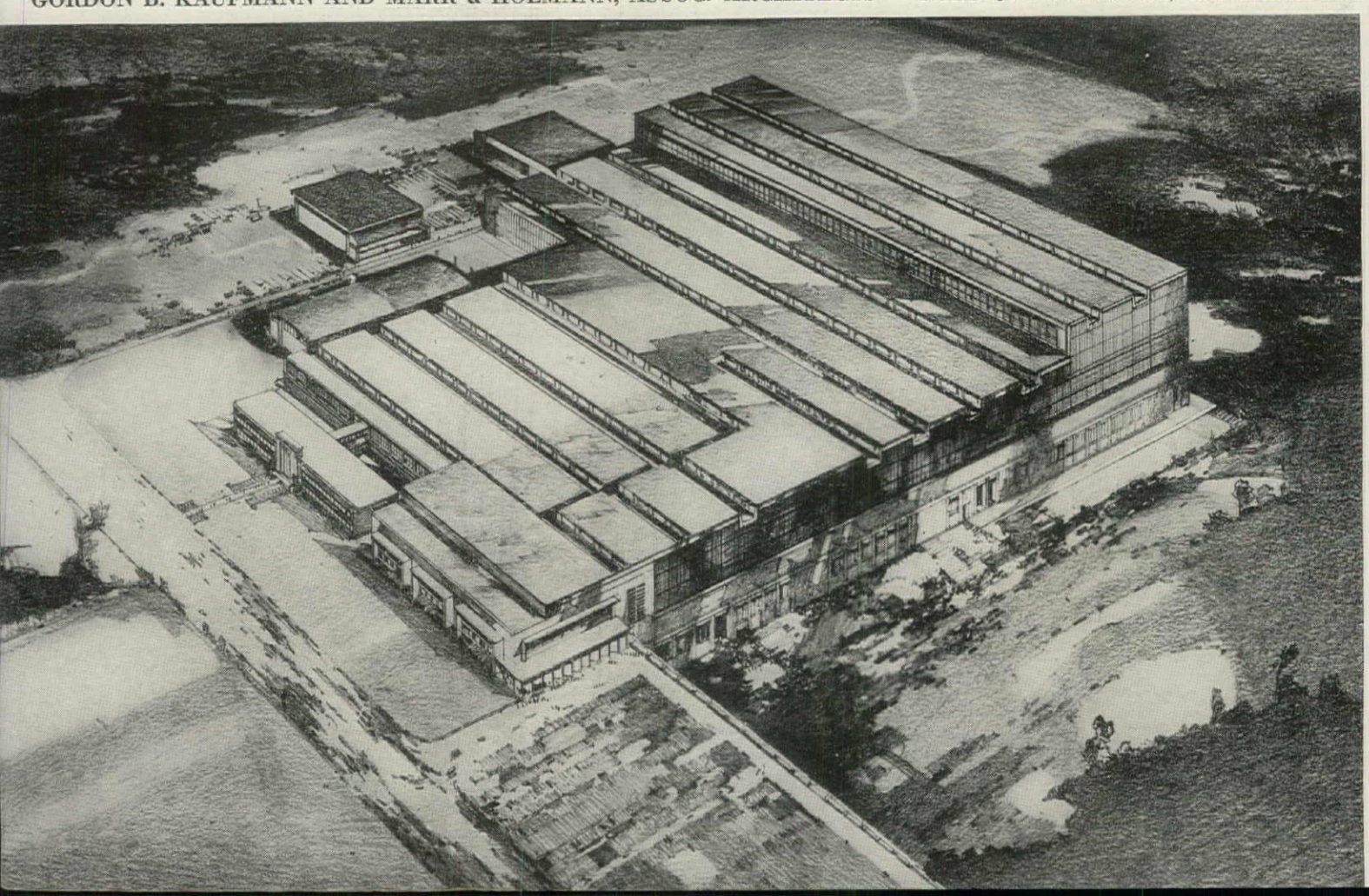


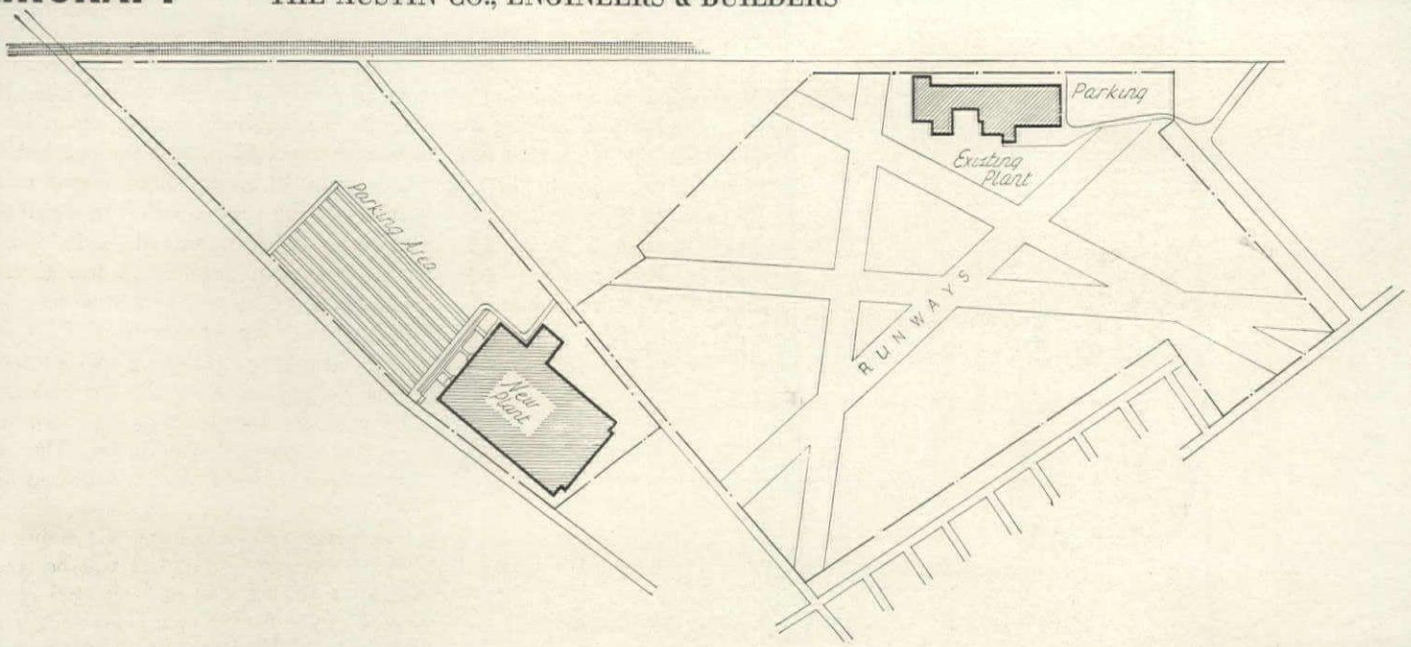
Clear manufacturing space, uniform daylighting and flexibility of layout were the main problems requiring an integrated solution in this new aircraft plant.

Storage departments for incoming material are placed to permit direct access to the three straight line production and sub-assembly departments. Balconies provide additional sub-assembly and storage facilities. Lighting is of the fluorescent type, and the heating system is a direct-fired warm air duct system supplying air through floor outlets. Pivoted sash ventilators in the glass-and-steel walls and roof monitors provide controlled ventilation. The sash in the east and west walls are glazed with a non-glare, heat-resisting glass.

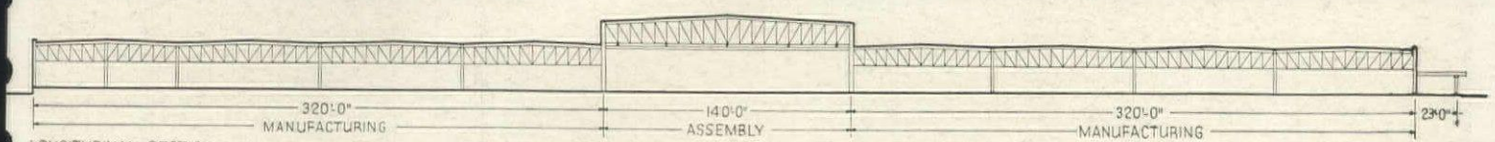
The sketch below indicates the manner in which its present facilities will be incorporated into a greatly enlarged plant. In addition to increased manufacturing space there will also be new offices and a cafeteria.

GORDON B. KAUFMANN AND MARR & HOLMANN, ASSOC. ARCHITECTS FORD J. TWAITS CO., CONTRACTORS



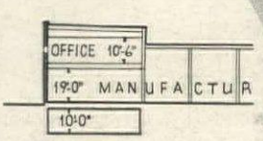


Samuel H. Gottscho Photos

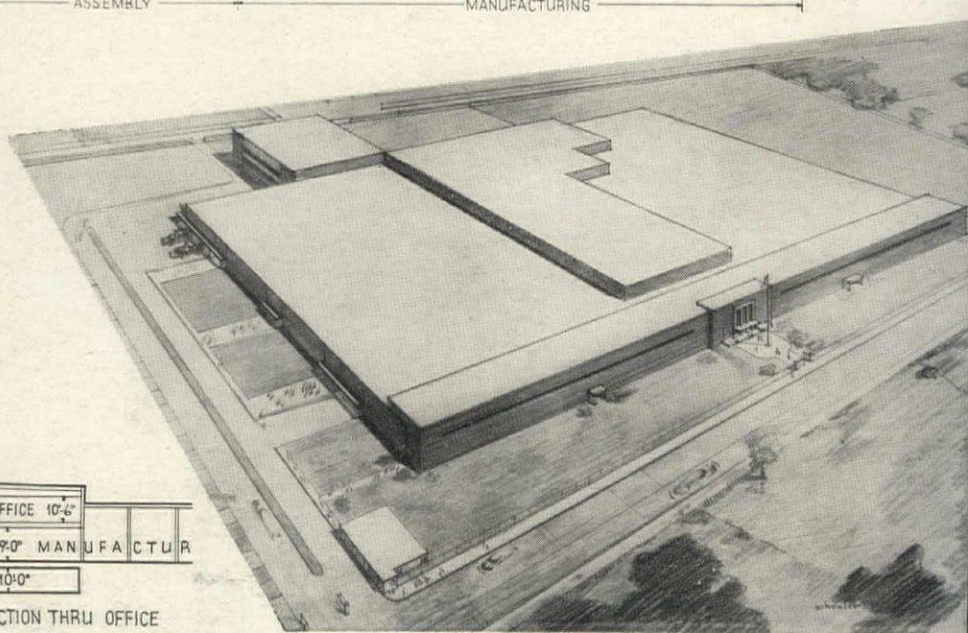


LONGITUDINAL SECTION

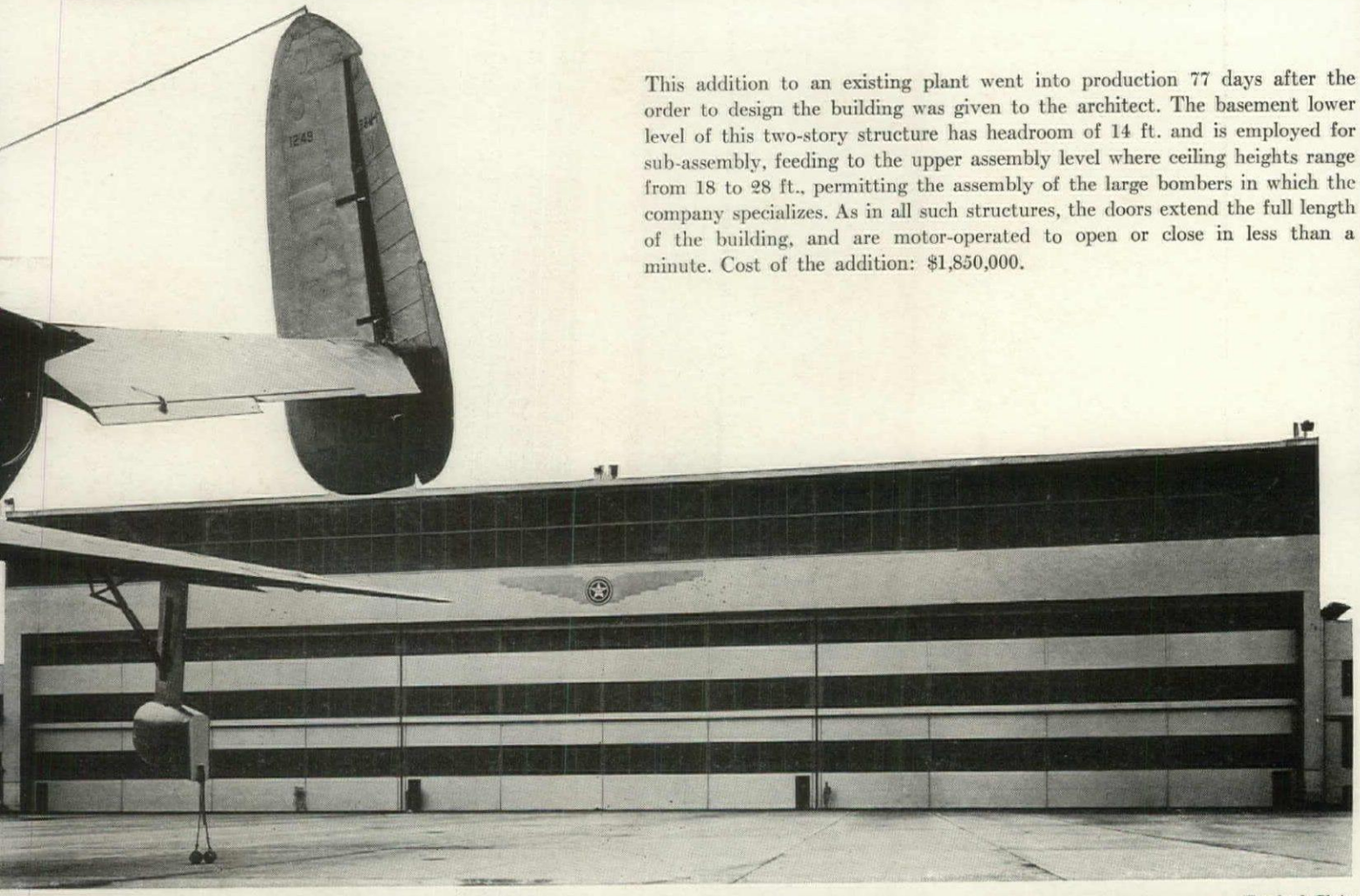
Tripling present capacity, without interfering with the existing plant (above), the new building (at the right) will cost $2,100,000 to build. Its windowless walls handicap visibility from the air at night, and its non-reflecting wall surfaces are adaptable to camouflage technique. The clear span in the 25 ft. high assembly aisles varies from 140 to 280 ft. Primary production and sub-assembly work is carried on in several bays flanking the assembly aisle. On the second floor are plant offices, engineering quarters and a cafeteria. Exterior walls are brick faced with acoustic block on the inside. The plant is completely air conditioned, and illuminated with fluorescent tubing except in the assembly aisles where high intensity incandescent lamps are used.



SECTION THRU OFFICE



AIRCRAFT ALBERT KAHN, INC., ARCHITECTS & ENGINEERS C. W. SCHMIDT, GENERAL CONTRACTOR



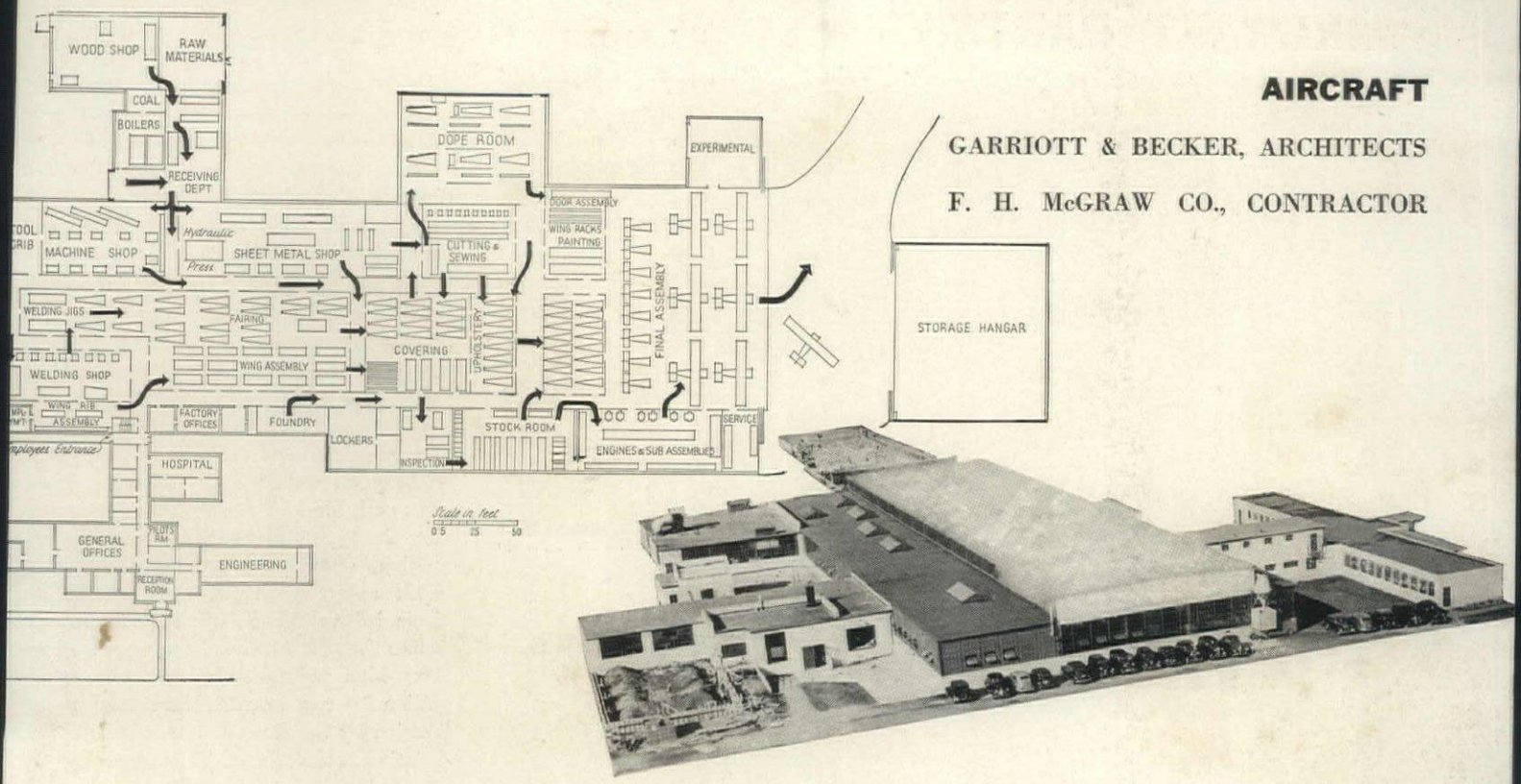
This addition to an existing plant went into production 77 days after the order to design the building was given to the architect. The basement lower level of this two-story structure has headroom of 14 ft. and is employed for sub-assembly, feeding to the upper assembly level where ceiling heights range from 18 to 28 ft., permitting the assembly of the large bombers in which the company specializes. As in all such structures, the doors extend the full length of the building, and are motor-operated to open or close in less than a minute. Cost of the addition: $1,850,000.

Horydczak Photos

AIRCRAFT

GARRIOTT & BECKER, ARCHITECTS

F. H. McGRAW CO., CONTRACTOR



This new plant of moderate size for the manufacture of sport and training planes is located between a highway and the municipal airport, with the manufacturing unit facing the airport. Materials enter from a receiving and storage wing (see diagram) located at one corner, and after passing through successive stages of assemblage emerge at the far end as finished planes ready for flight. All departments are keyed into the main assembly and manufacturing unit so that materials travel a minimum distance to the proper point on the production line. The plant also includes a storage hangar, a recreation room, an experimental unit and offices.

AIRCRAFT PARTS

ALBERT KAHN, INC., ARCHITECTS & ENGINEERS

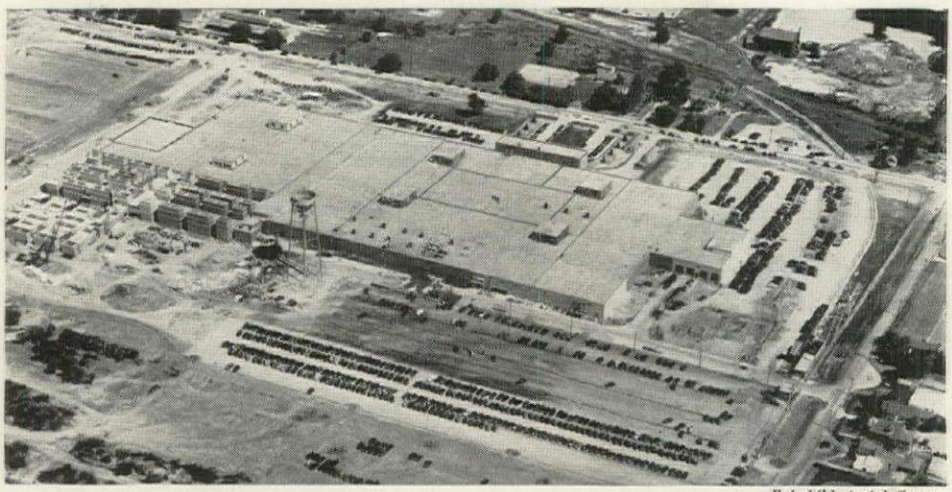
MAHONEY TROAST CO., CONTRACTORS

The rapidly increasing production of airplane motors has made necessary a substantial increase in the number of testing blocks. Typical procedure in engine manufacture is to test each unit for five to ten hours after assembly, tear it down, inspect each part and reassemble it, after which it is again tested for three to six hours. In addition to this routine procedure, the test building is important for research on new designs. The illustrations show two views of the new blocks at an aircraft engine plant. The cells open off each side of a corridor, and each cell has a door of the cork and steel "ice box" type. Controls and measuring instruments are located in a separate room, soundproofed to prevent transmission of engine noise from the testing cells.

Samuel H. Gottscho Photos

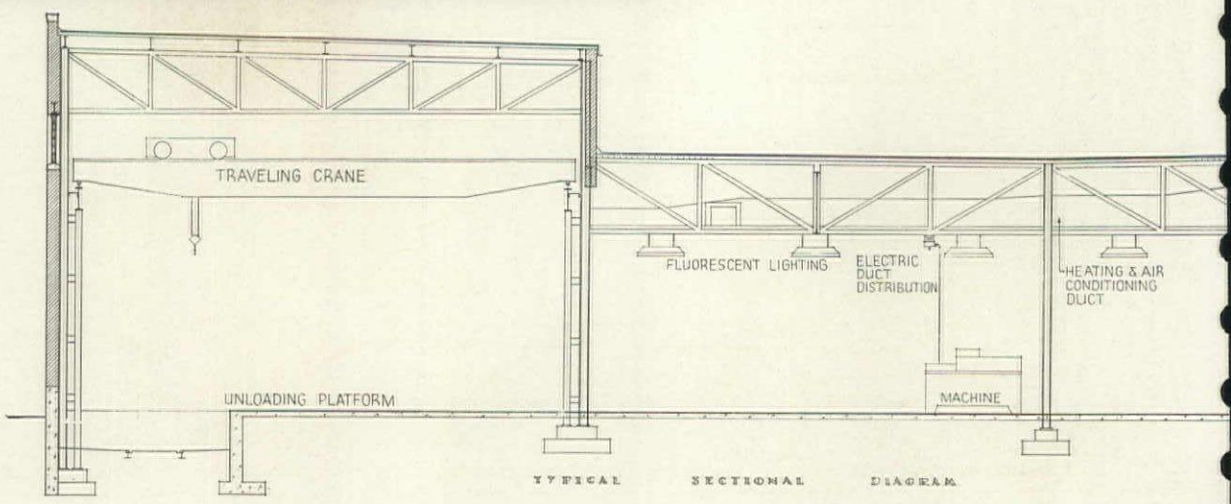
AIRCRAFT PARTS

J. LLOYD ALLEN & JOHN R. KELLEY, ARCHITECTS



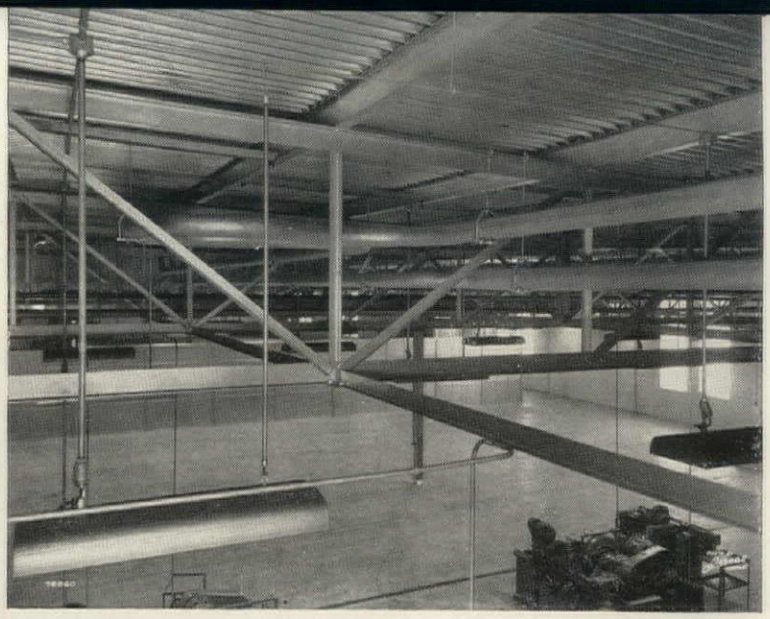
Fairchild Aerial Surveys

This new plant has been built to house the manufacture of the only American V-type liquid-cooled airplane engine of high power. The selection of site was dictated by availability of skilled labor, water supply, electric power, railroad facilities, and provision for inevitable plant expansion. Due to the absolute precision character of the work, control of temperature, humidity, cleanliness and illumination were set down as primary considerations. As in all such precision work, when the external conditions are under complete control, the output is more uniform. Consequently, a fully air conditioned windowless plant was early decided upon. Before determining the type and intensity of the illumination, several experimental bays were built approximating working conditions. This led to the adoption of fluorescent tubes throughout, thus insuring good color correction and general illumination in addition to reducing the heat load to be carried by the air conditioning plant. The relative economies of (1) increasing the insulating qualities of the construction, and (2) increasing the capacity of the air conditioning system led to the adoption of concrete block walls with brick exteriors and a metal roof deck with 2 in. insulation. To avoid complete breakdown of the air conditioning, eight identical systems were laid out, housed in pairs in penthouses on the roof. They are of the evaporative rather than the refrigerating type, and the same coils are used for both summer cooling and winter heating. The only manually operated valve is used for the change over from a heating cycle to the cooling cycle. Prevention of possible shutdown through power deficiency has been accomplished by joining the local utility company's lines with the plant's own Diesel unit.

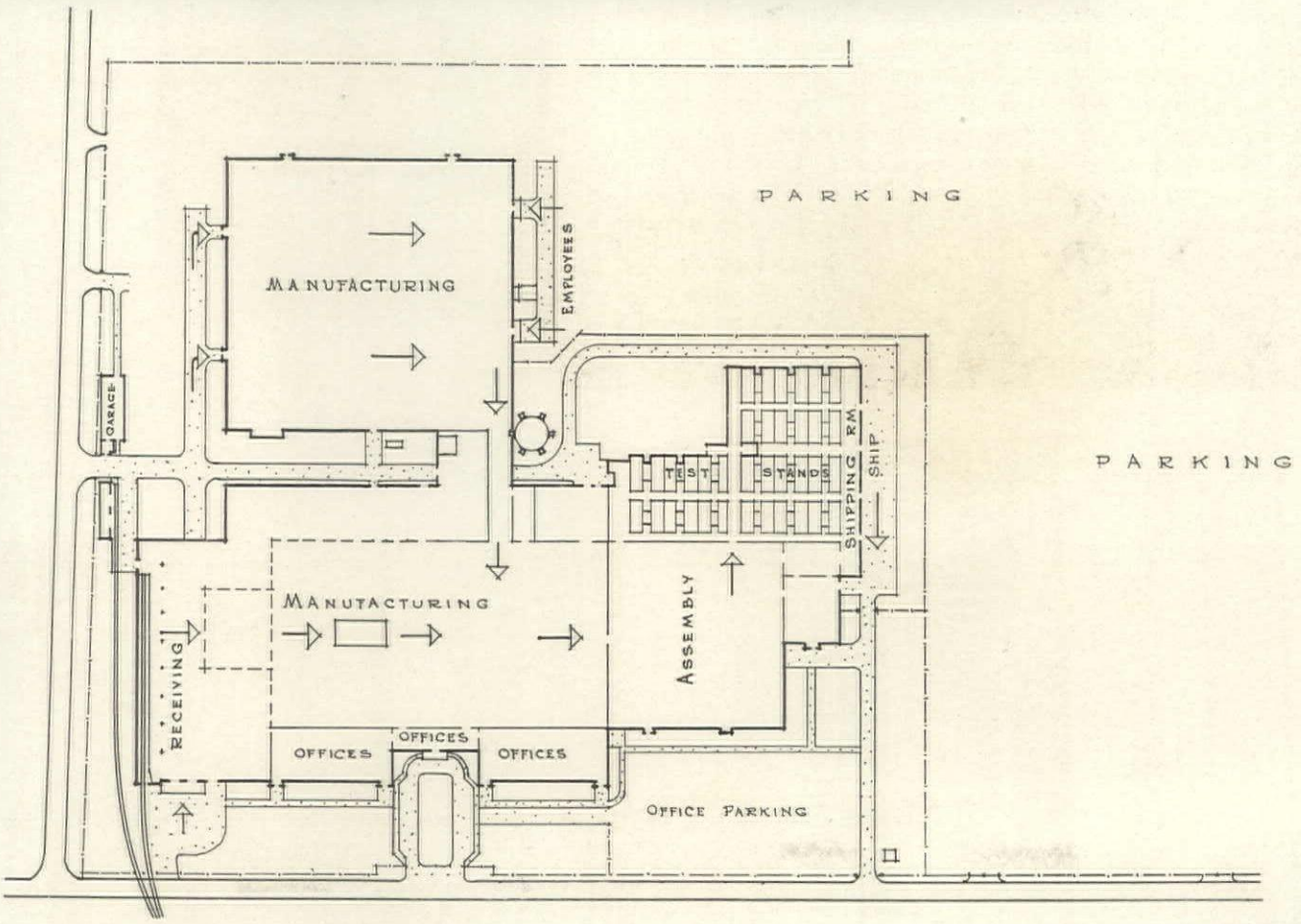


TYPICAL SECTIONAL DIAGRAM

THE AUSTIN CO., ENGINEERS & BUILDERS
J. G. TURNBULL, CONSULTING ENGINEER



CEILING DETAIL

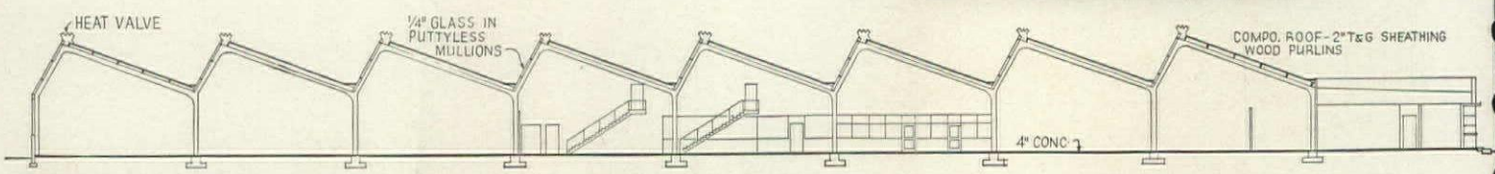


AIRCRAFT PARTS

THE AUSTIN CO., ENGINEERS & BUILDERS

Max Tatch Photos

This welded rigid steel frame plant and office building, costing $200,000, is the first factory in the Far West to employ "tree-form" design to maintain unobstructed headroom in structures of saw-tooth design. The plant has aisles 40 ft. wide, and a clearance of 27 ft. to the peak of the sawtooth, with no intermediate members to obstruct operations or the even distribution of light. A mezzanine area 40 x 160 ft. houses locker rooms, toilets and lunchroom facilities. Artificial lighting produces a 30 to 35 ft. candle intensity at working levels, and is of the fluorescent type. More than twice the capacity of the old plant, which though comparatively modern, did not permit future expansion, the layout is designed for expansion in three directions and permits line production of three basic types of castings in parallel lines. A one-story and mezzanine office building housing executive and engineering departments extends across the front of the plant.



LONGITUDINAL SECTION

AIRCRAFT PARTS

EVANS, MOORE & WOODBRIDGE, ARCHITECTS

BROWN & MATTHEWS, INC. ENGINEERS

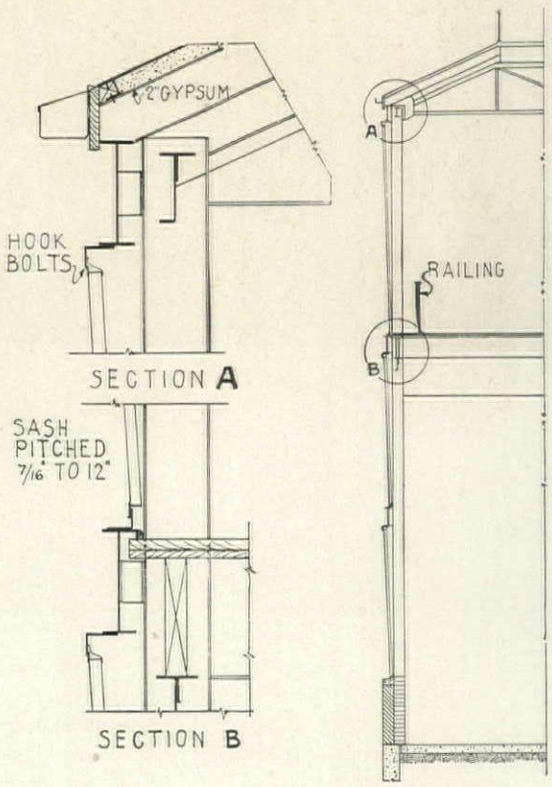
In addition to the normal problems of a light manufacturing plant this manufacturer of sea floats and pontoons was faced with the following problems which confront any industrial plant in wartime.

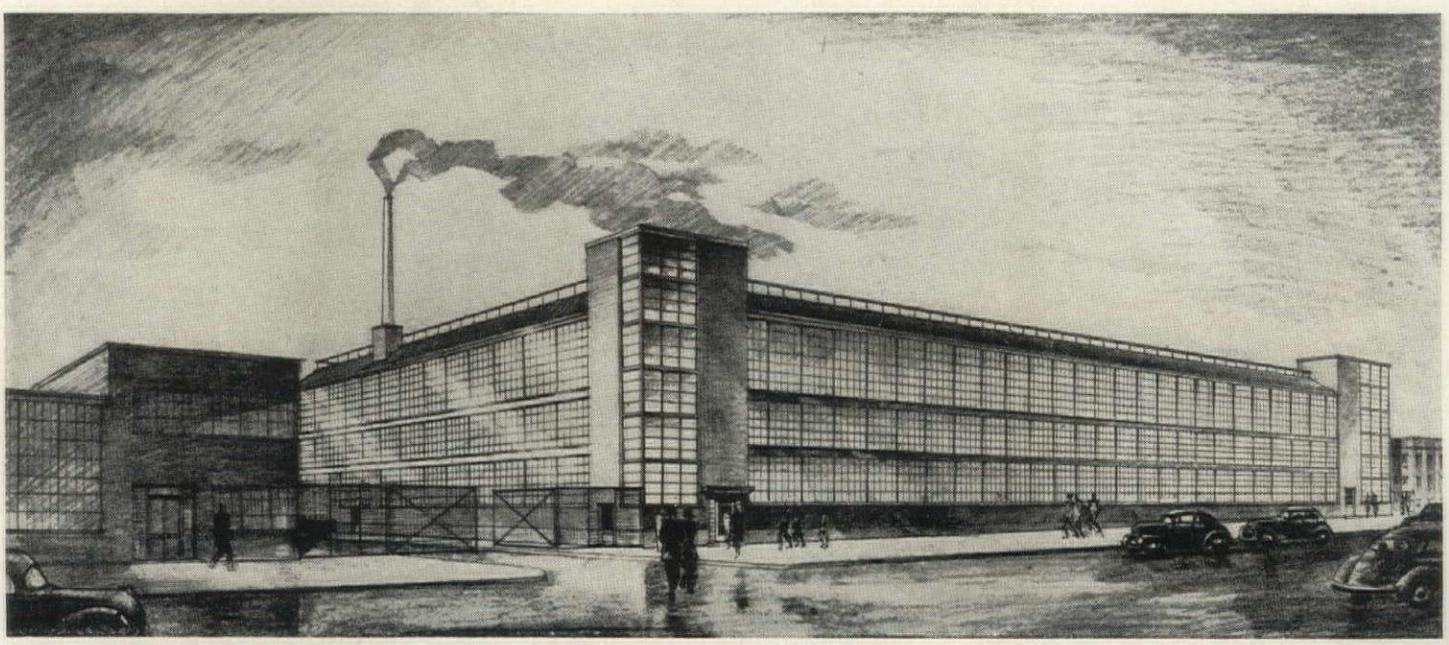
CAMOUFLAGE. The roof has been so designed that it may readily be covered with a material to break the straight line contour of the building. The continuous steel sash that encircles the building is slanted so that glass will deflect the sun's rays downward.

BOMB RESISTANCE. European experience indicates that the buildings which have best withstood the effects of bombings are those with a sturdy frame and the most flexible possible exterior shells. In this plant there are no brick parapet walls, no sharp corners at the roof line to offer resistance to bomb concussion. Masonry at the upper floors and at the corners has also been eliminated. The building has a strong skeleton steel frame and a light exterior wall, which if blown out, would result in a minimum amount of damage to the structure. Employes are further protected from flying fragments by a thick blackout curtain and a strong wire mesh screen extending from the roof to the first floor.

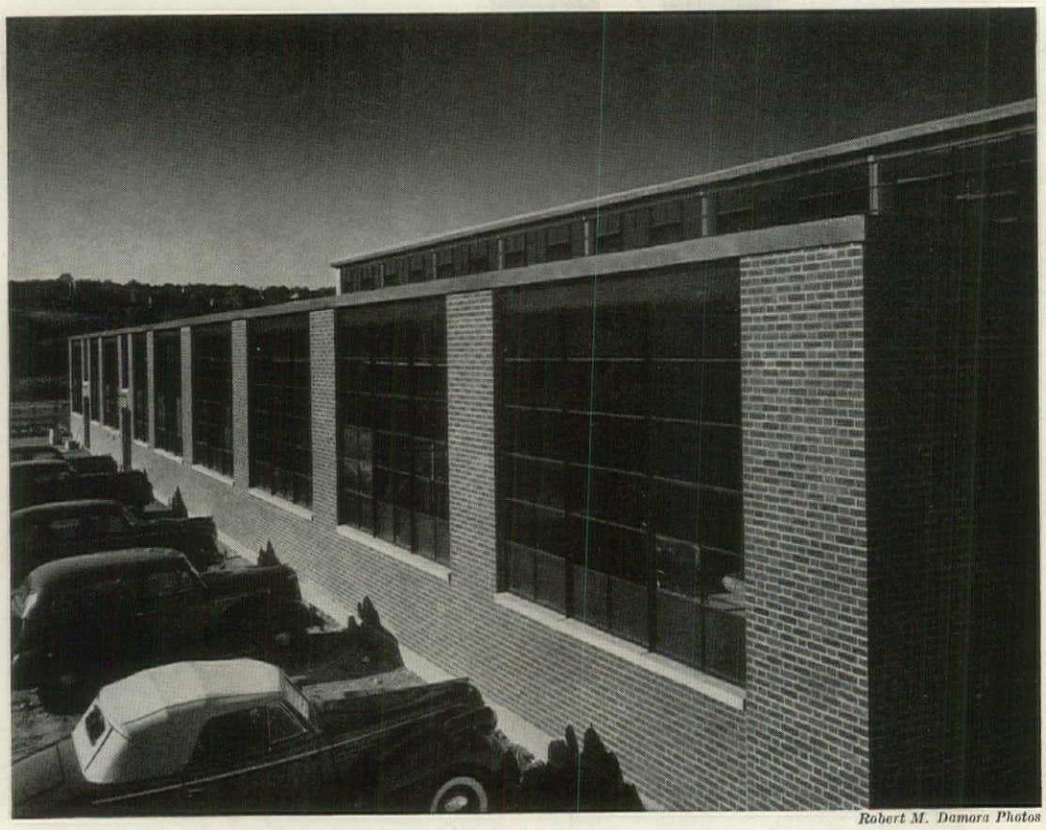
BLACKOUT. Despite an understandable tendency to build windowless buildings as the best security from night attack, the type of blackout selected for this plant was a result of European experience plus the economy factor. The cost of a windowless structure with air conditioning and fluorescent lighting was estimated to be more than double the cost of a windowed factory. Further, European experience has indicated that there is no protection against a direct hit, regardless of the type of blackout. But an even more important lesson to be learned from Europe is that although a plant might be some distance from the point of explosion, gas, water and electric lines might be destroyed by the hit which would leave the windowless plant inoperative. A plant not dependent on artificial light and ventilation could operate on a 10 or 12 hour production basis because a large portion of aircraft manufacturing can be done manually in an emergency so long as there is light and fresh air.

Furthermore, there was the problem of coordinating the new additions with the existing plant in which the company's operations had been conducted prior to the increase of defense orders. The problems arising from possible invasion and the solutions as conceived by the architects and engineers were as follows: The new building incorporates all the principles applicable to light manufacturing plants. Since the company makes no units of immense size, there was no unusual problem of wide spans. Besides the continuous sash, skylights help to provide adequate daylighting, and high intensity incandescent lights supply ample foot-candles at the work levels for night shifts.

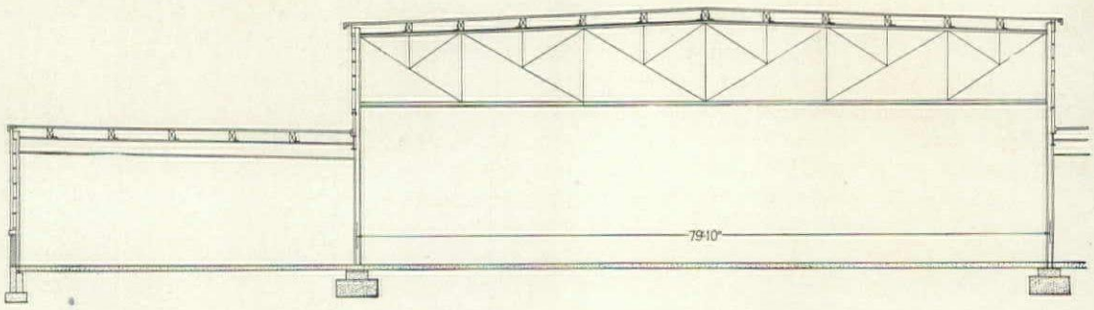




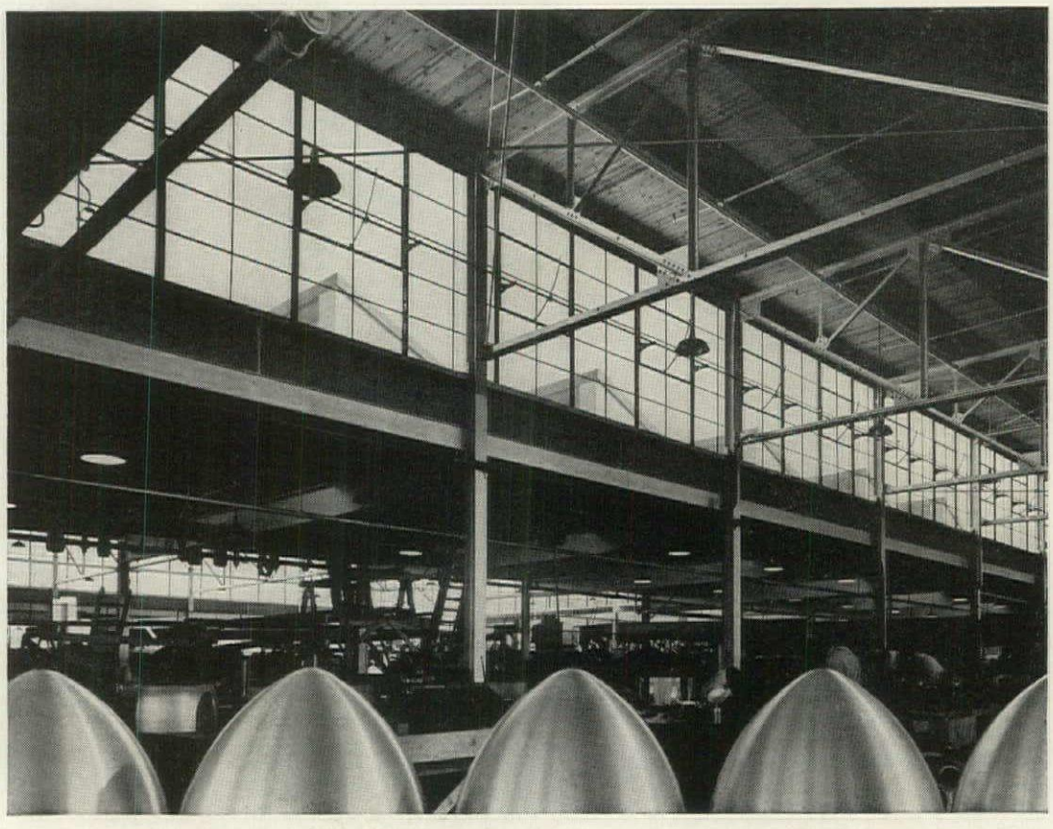
AIRCRAFT PARTS THE AUSTIN CO., ENGINEERS & BUILDERS



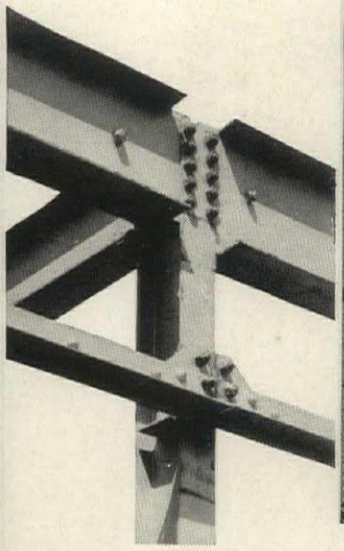
Robert M. Damora Photos

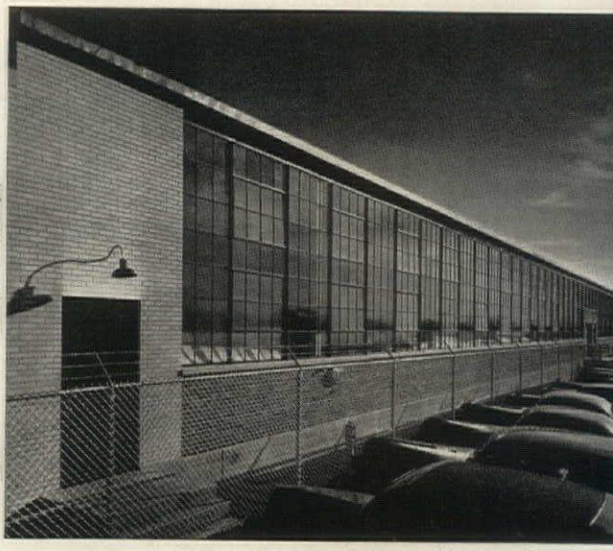


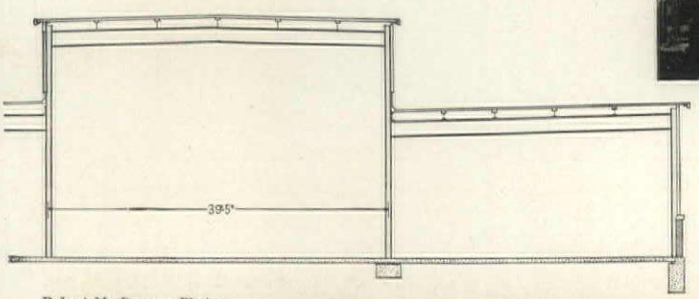
The integration of operations now carried on in five different buildings resulted in this $300,000 plant for plane parts and accessories. The plant is steel and glass of the monitor type. The high aisles are 80 ft. wide, low aisles 40 ft. Continuous sash in side walls and monitor provide continuous daylight. Because of the comparatively small units of manufacture, no unusual layout or structural problems were involved, simply the provision of ample free areas for the different types of assembly. Heating units are disposed overhead. As in all aviation plants being hurried to completion as part of the defense program, provision for economical expansion is as much a part of the problem as the character of the immediate space. Future additions, already planned, will be simply repetition of the existing elements, added on as needed without interference with current operations.



AIRCRAFT PARTS THE AUSTIN CO., ENGINEERS & BUILDERS

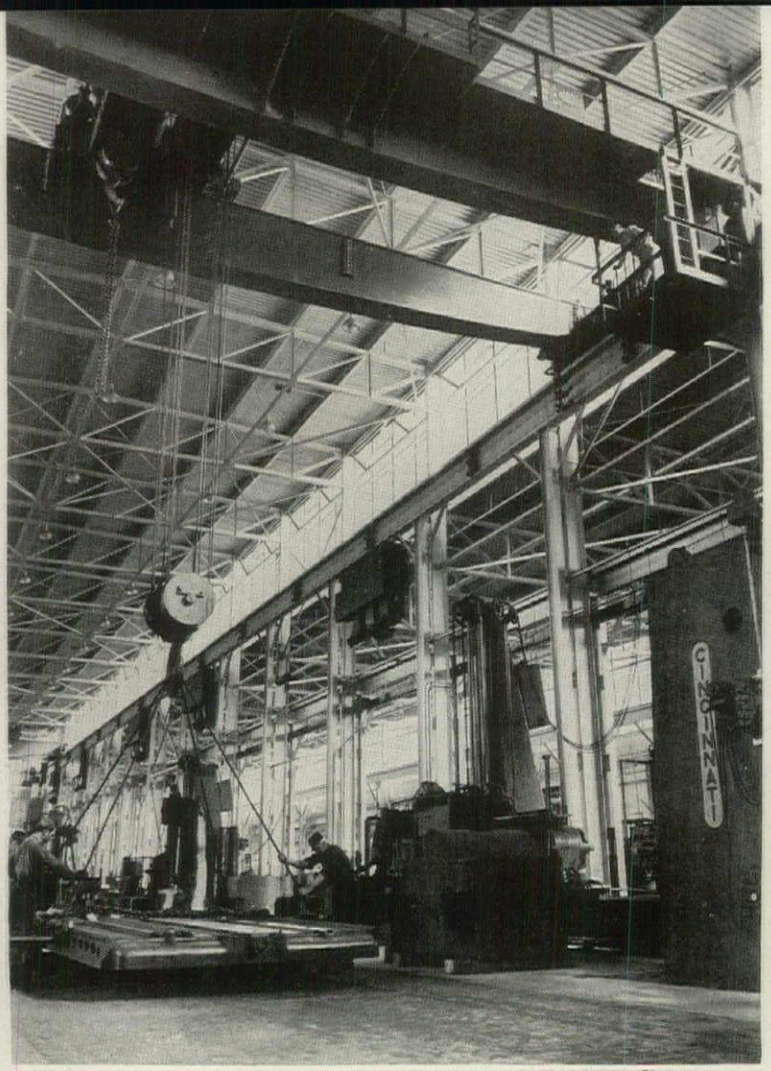






Robert M. Damora Photos

With its patented product widely used in the airplane industry, this firm abandoned its old plant to build an "elastic" one. Starting with a one-story plant, work has already begun on an addition that doubles capacity. Straight-line production, impossible in the old plant, is attained by incorporating heat treating and pickling—heretofore isolated—right into the production line. Bar stock stored on one side of the plant is completely fabricated ready for inspection when it reaches the other side. Present expansion contemplates a cafeteria, 35 x 100 ft.; and the second floor, originally unfinished, is being finished to accommodate the engineering departments. The steel structure employs self-locking elastic nuts.



C. W. Ackerman Photos

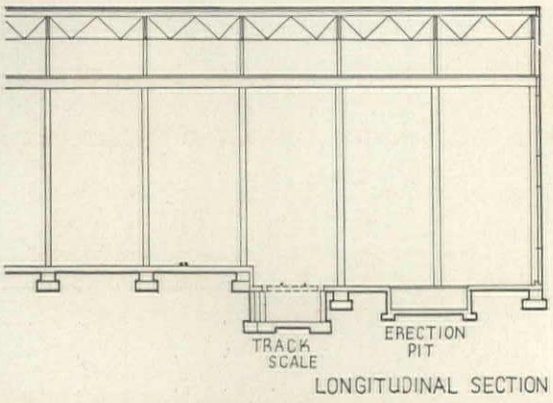
THE AUSTIN CO., ENGINEERS & BUILDERS

Plans for adding to an old plant were scrapped to build this new unit to produce, assemble and test hydraulic presses. High continuous runs of sash on all sides and alternating mercury vapor and incandescent lighting guarantee "daylighting" both night and day. Two 50-ton cranes operate in the central 55 ft. wide craneway, which has a 45 ft. clearance. Heavily reenforced 10 and 12 in. concrete slabs are used for flooring where the heaviest machinery is assembled, and 6 and 8 in. reenforced slabs are used elsewhere. Two tracks, one for receiving and one for shipping, extend into the building at each end of the craneway.

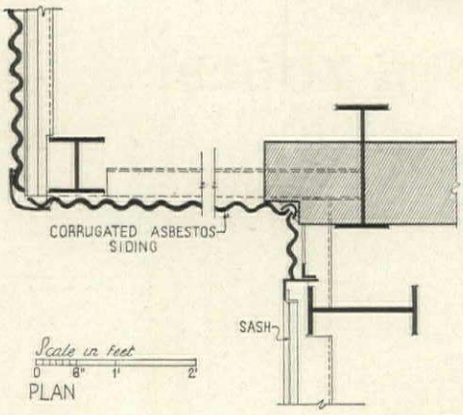
MACHINE TOOLS

THE AUSTIN CO., ENGINEERS & BUILDERS

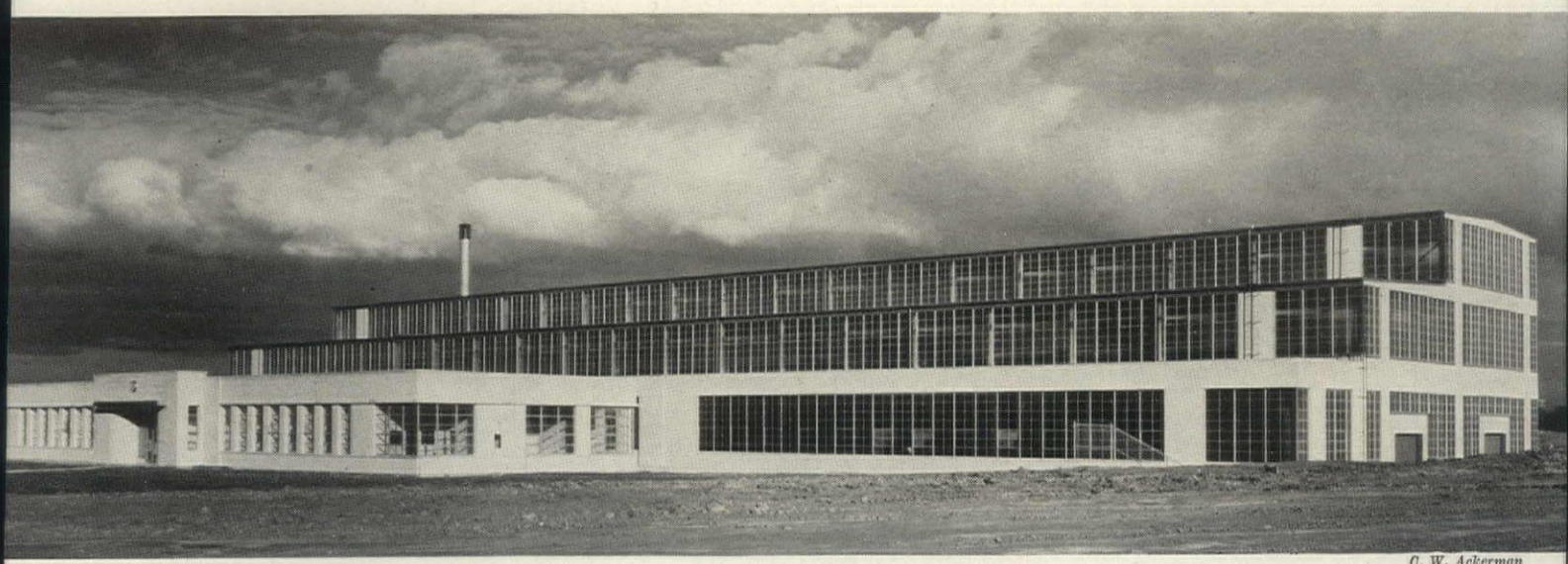
Hydraulic controls for the aviation and machine tool industries are manufactured in this $500,000 addition. Originally planned for 80,000 sq. ft., it has already been greatly increased. Primary requirement was a space served by cranes, well lighted without direct sunlight. Of welded rigid frame saw-tooth design, its principal construction feature is the welded tree-form columns which eliminate shadow-producing web members. Elimination of shadows was also effected by nesting ducts, compressed air and steam lines between the crane rails and columns. The steel roof deck is welded to the purlins, and a sprinkler system sprays the roof in summer to maintain working comfort. Mercury-vapor lighting is used throughout. Toilet and locker facilities are located in the mezzanine. Offices are placed in a second story section extending along the 340 ft. limestone and brick facade.



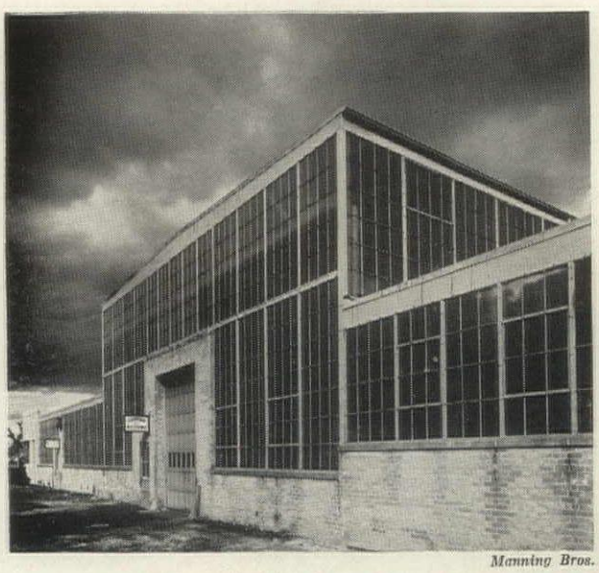
LONGITUDINAL SECTION



PLAN



C. W. Ackerman



Manning Bros.

MACHINE TOOLS

THE AUSTIN CO., ENGINEERS & BUILDERS

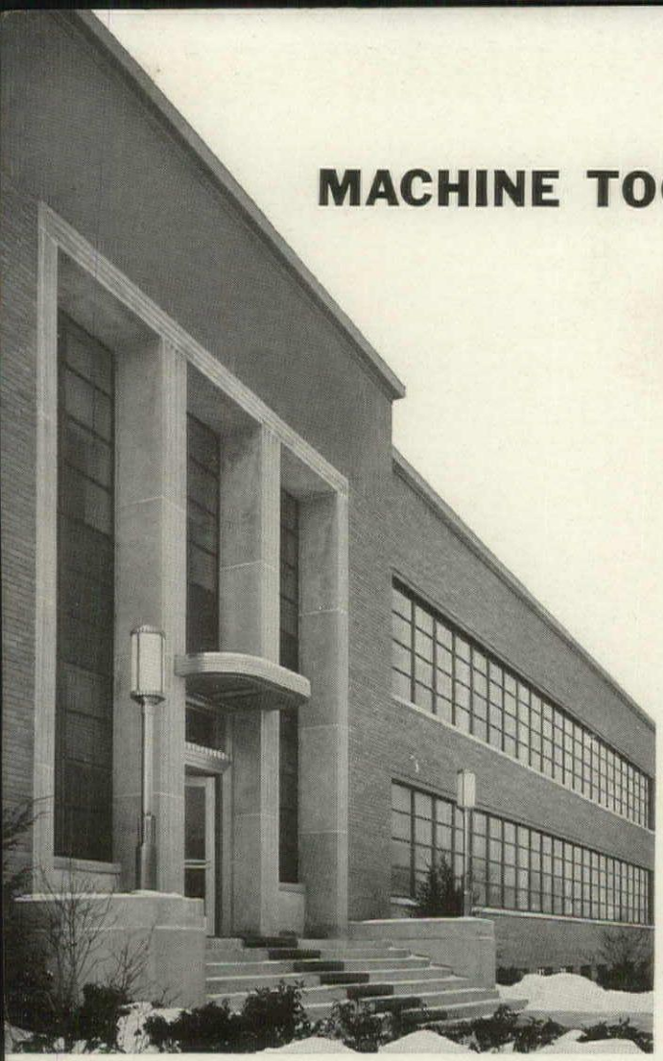
In only 10 per cent more floor area than its old plant, the manufacturer has doubled production capacity of spot welders, punching and riveting machines in this new plant. A 60 ft. monitor aisle for final assembly is flanked on each side by 30 ft. aisles where standard machining operations and sub-assemblies take place. Side walls are of glass except for the brick veneered executive office area, and bar joists support the metal roof deck. Fluorescent lighting supplies 20 foot-candles at all machine locations.

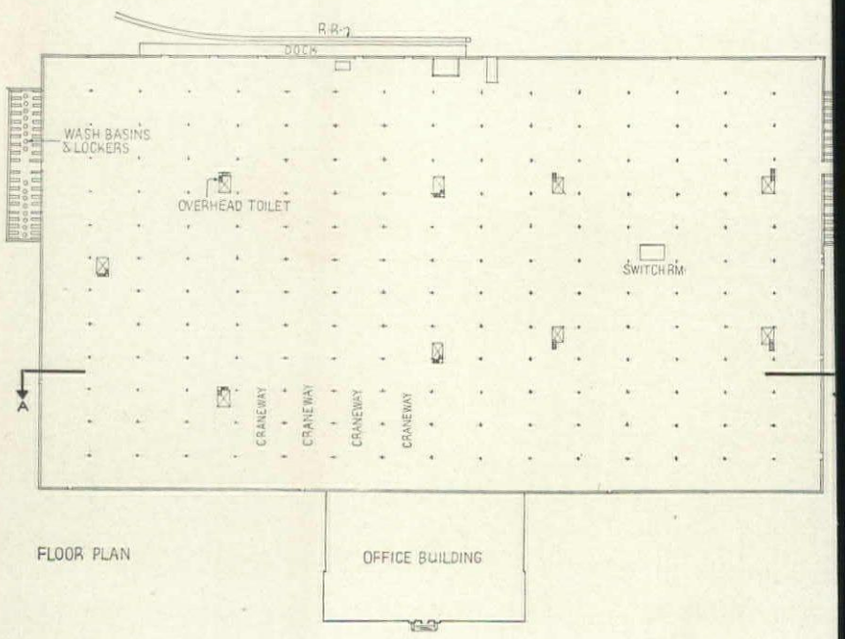
Courtesy, The Austin Co.

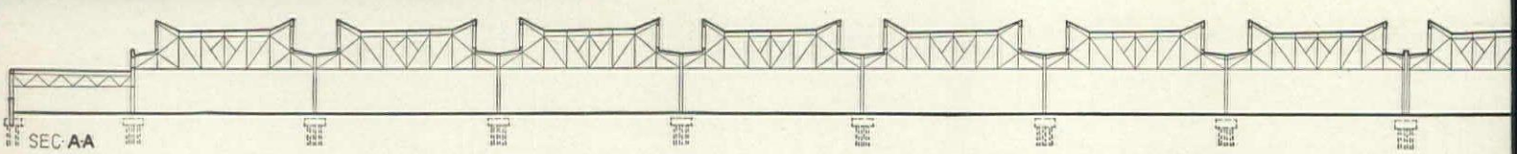
MACHINE TOOLS

ALBERT KAHN, INC., ARCHITECTS & ENGINEERS

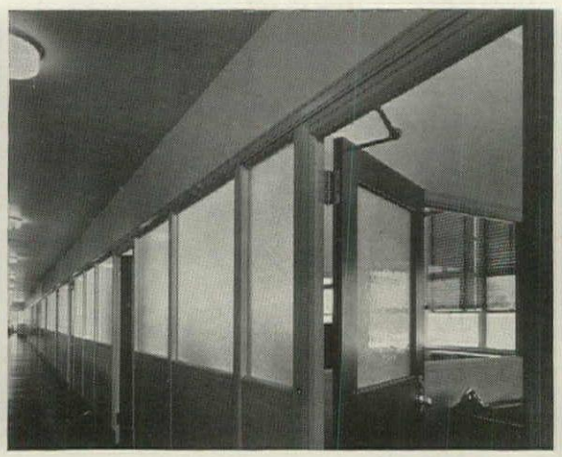
JAMES STEWART & CO., GENERAL CONTRACTORS







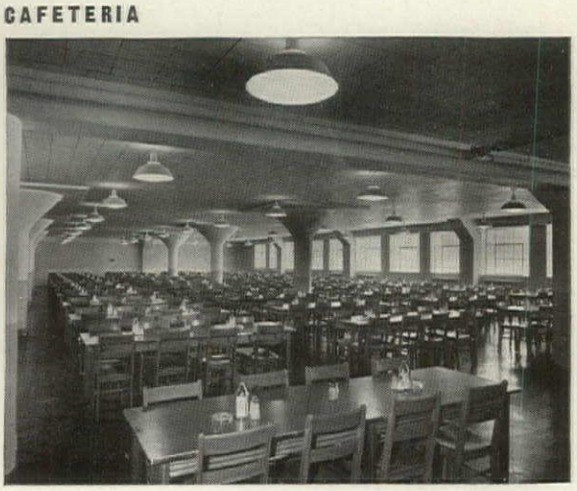
CONFERENCE



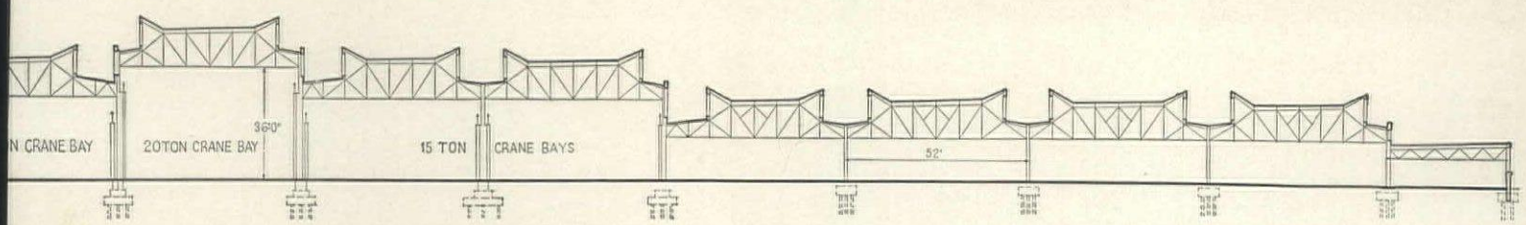
OFFICES

All photos, Robert M. Do

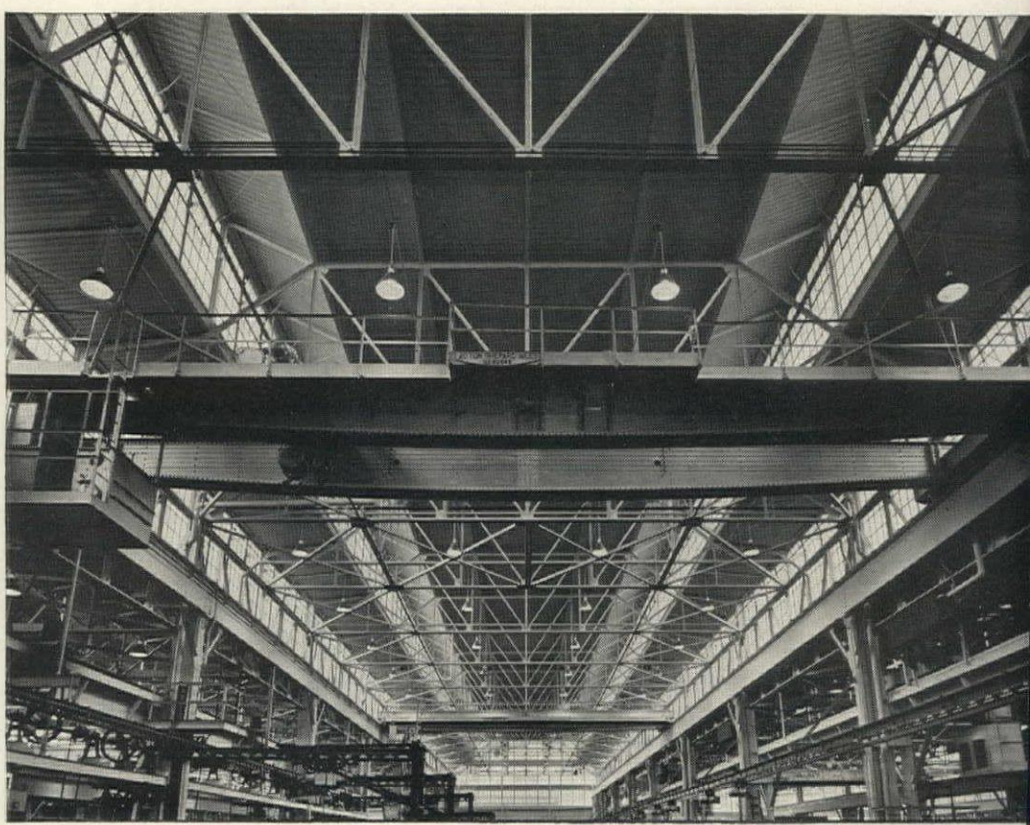
CAFETERIA



Robert M. Damora



To replace its existing plant of 23 separate buildings, this company built an entirely new plant housing all its manufacturing under one roof, and is now capable of expansion in all directions. The manufacturing plant is a one-story building, 960 x 520 ft., with 182 x 40 ft. wings on two sides containing shower and locker rooms. Column spacing is 60 x 40 ft. and clear working space is 14 ft., except in center crane bays where 36 ft. and 26 ft. clearance is provided. Vertical monitors of the continuous ventilator type provide daylighting. Toilets are placed on bottom chords of roof trusses. The administration building has two stories and basement, housing executive, production, and engineering departments. Cafeteria and recreation rooms are in the basement. The pattern and storage building, a third unit, incorporates also garage and boiler house. A cinder block firewall separates the pattern shop from the garage. The boiler house, of cinder block construction, supplies steam for heating and processing and also houses three air compressors and three motor generators supplying direct current.

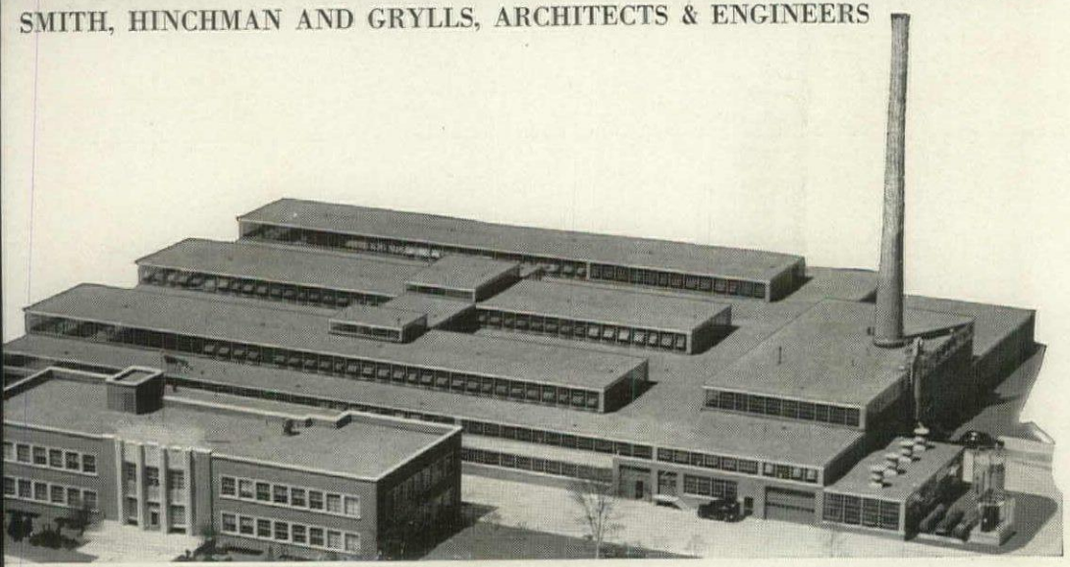


Pictorial Studios Photos

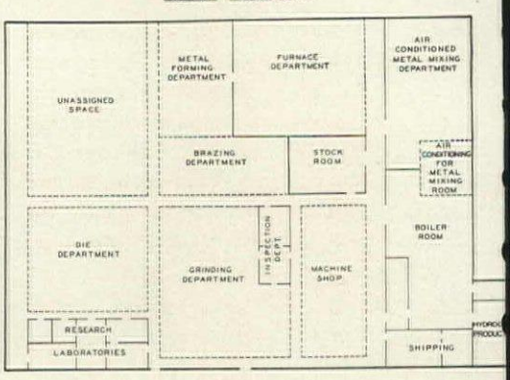
MACHINE TOOLS

All the manufacturing facilities of an abrasive manufacturer, formerly spread out in Cleveland, Detroit, and Stamford, Conn., have been brought together in this new $750,000 factory and office building. The product is used in metal cutting, drawing wire, and dressing grinding wheels. The manufacturing plant is a one-story welded steel frame and brick building and the two-story office building is reenforced concrete, faced with brick on the front. Since some of the metal powders employed are hydroscopic, humidity is kept at a very low level, and a temperature of 85° is constantly maintained. All water, except that used for sanitary purposes, is reclaimed by the use of trenches leading to a settling basin, from which it is pumped to a cooling tank and reused in the air conditioning system production machines and general cleaning. The plant also includes complete hydrogen manufacturing facilities. In the office building, incandescent lighting provides 25-40 foot-candles, and the factory is equipped with both mercury-vapor lamps and fluorescent tubing with a foot-candle intensity of as much as 50 at working levels.

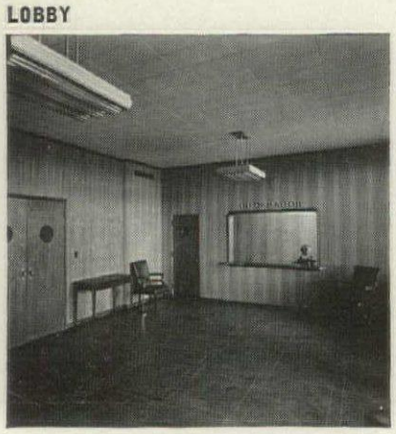
SMITH, HINCHMAN AND GRYLLS, ARCHITECTS & ENGINEERS

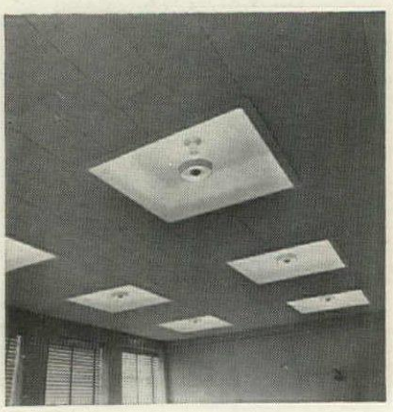


FACTORY FLOOR PLAN



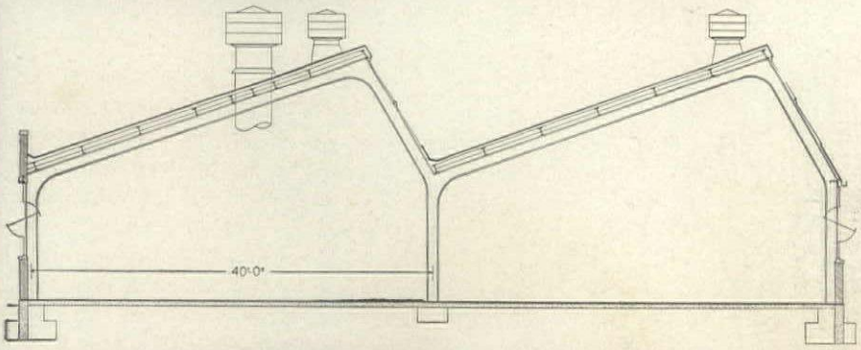
LOBBY



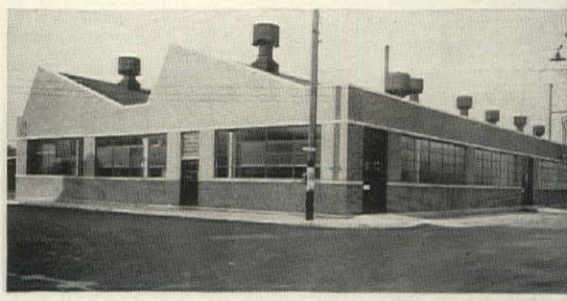


CAFETERIA

DIESEL ENGINES THE AUSTIN CO., ENGINEERS & BUILDERS

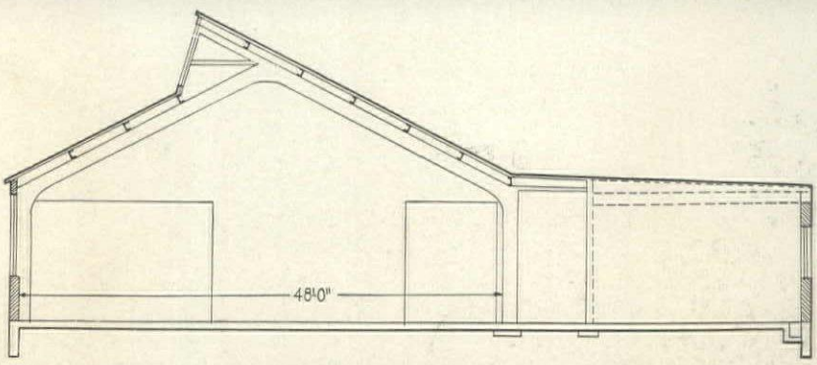


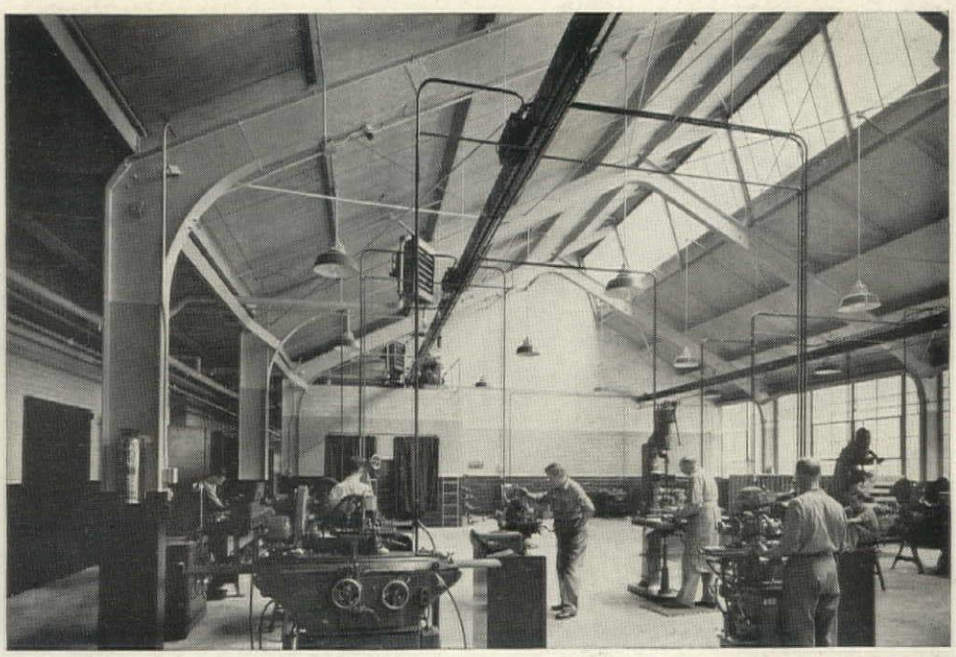
High percentage of waste in the old plant plus increased demand prompted the building of a new fuel pump and injector plant, which has been planned for further expansion. Welded rigid frame sawtooth cross-section was adopted because of superior lighting in a clean-cut shadow-free interior. Dustless air, required for testing and assembly operations, is provided by filters in the unit heaters at air intakes. Plating operations are accommodated in a special glass-enclosed room in the center of the main bay. The general character of the building design is harmonious with the new research laboratory (below) which is also part of the broad expansion program.



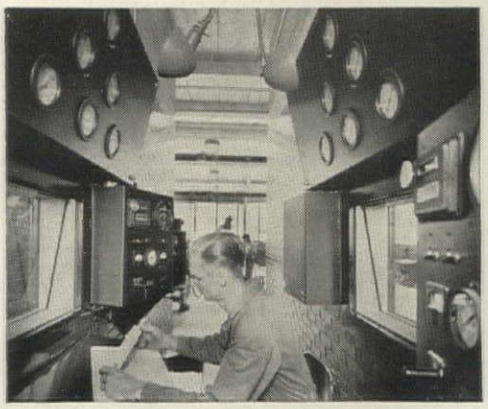
FUEL PUMP AND INJECTOR BUILDING

Daylight working conditions have been provided in the research laboratory by means of a novel whaleback cross-section which introduces light through a fin supported by a 50 ft. rigid frame arch. Six test rooms, separated by observation corridors and each equipped with its own hoisting machinery, ventilation and special lighting, line one side of the plant. On the other side are chemical and metallurgical laboratories. Power distribution is facilitated by overhead busways.



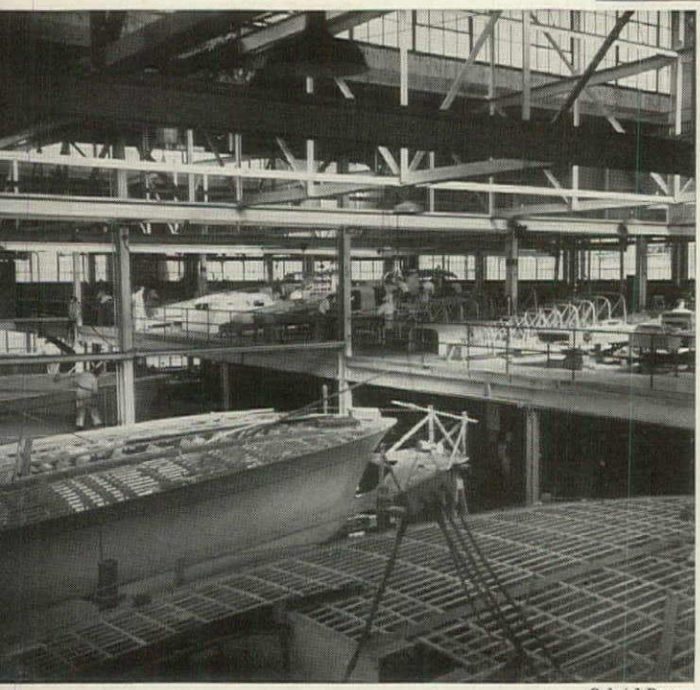


RESEARCH LABORATORY

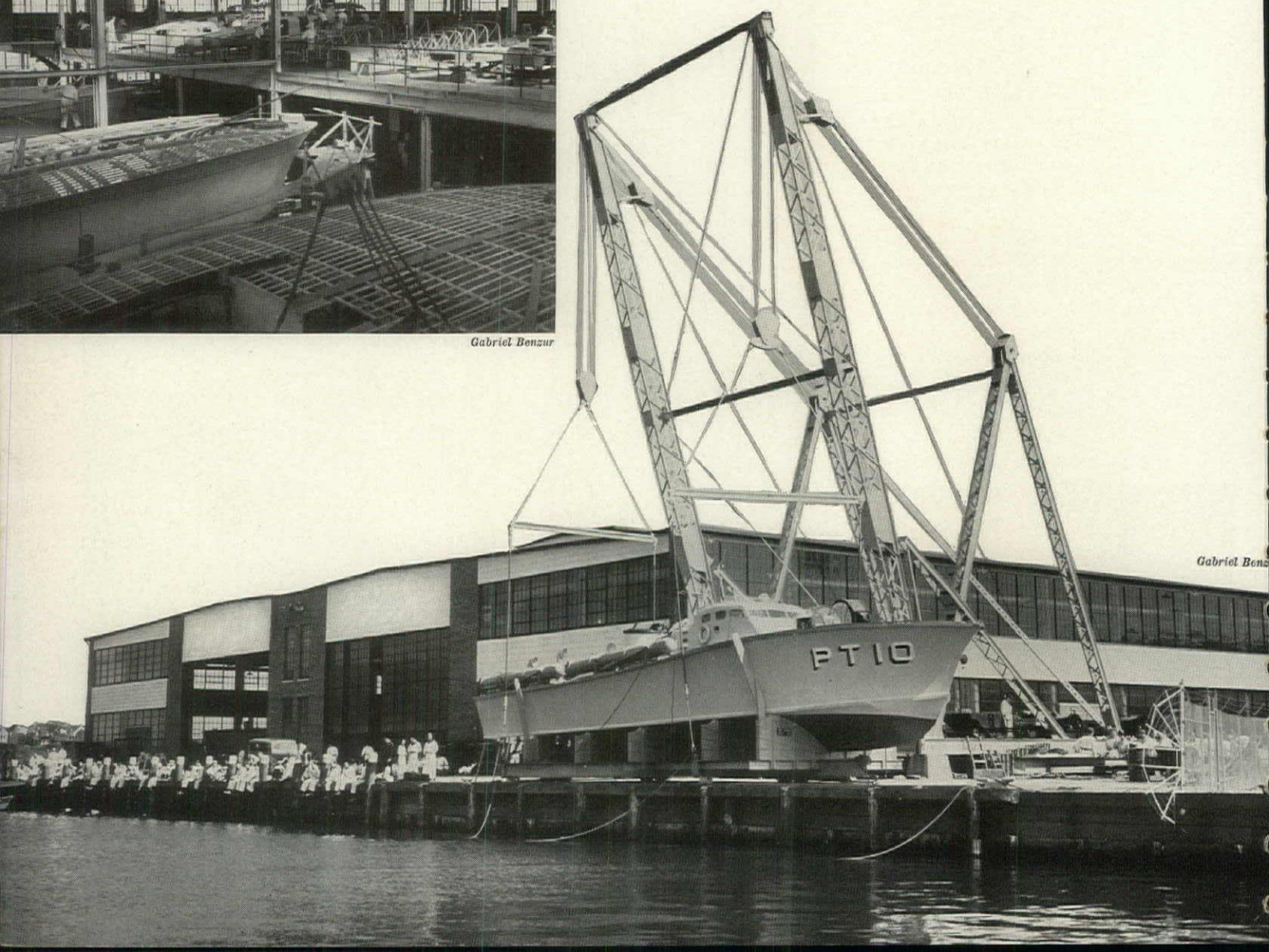


SHIP BUILDING

Seventy foot subchasers and torpedo boats are on a line production basis for the first time in this new 142,000 sq. ft. plant. The unit is equipped with mechanical handling facilities in two main 70 ft. monitor aisles, with a 100 ft. clear span at the end of the lines where the boats are finished. There are four parallel production lines, each boat moving along on its own cradle. All primary operations are concentrated in 50 ft. aisles on either side of the assembly area, while deck houses are assembled on a mezzanine at one end of the plant above the storage area, locker rooms and toilets. The boats are built upside down, and then turned over on their cradles ready for decking and machinery installation. Progress inspection required a mezzanine observation walkway commanding a general view of the assembly lines. Use of stock steel members made it possible to complete the building in 75 days.

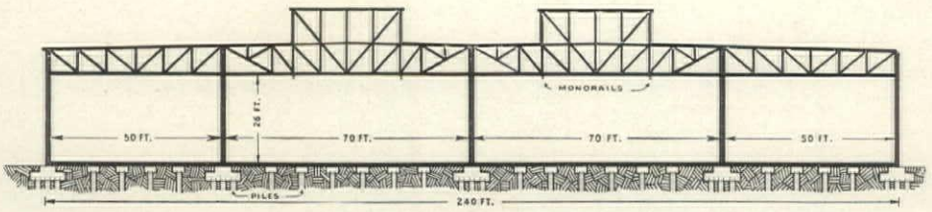


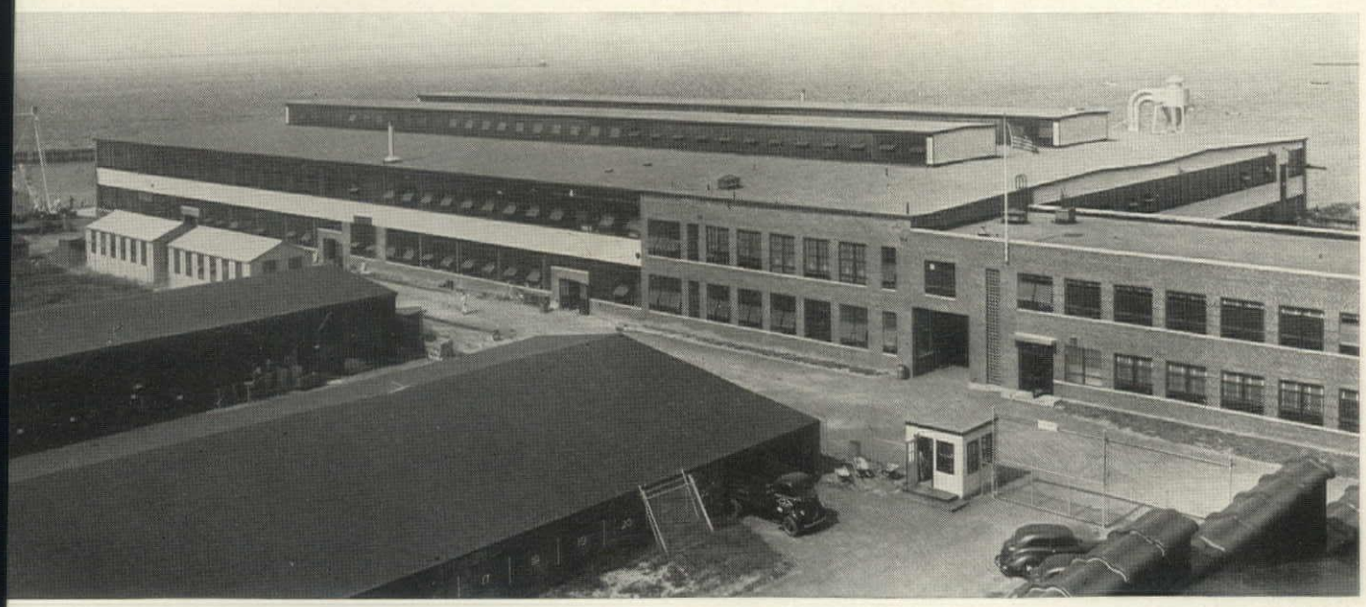
Gabriel Benzur



Gabriel Benz

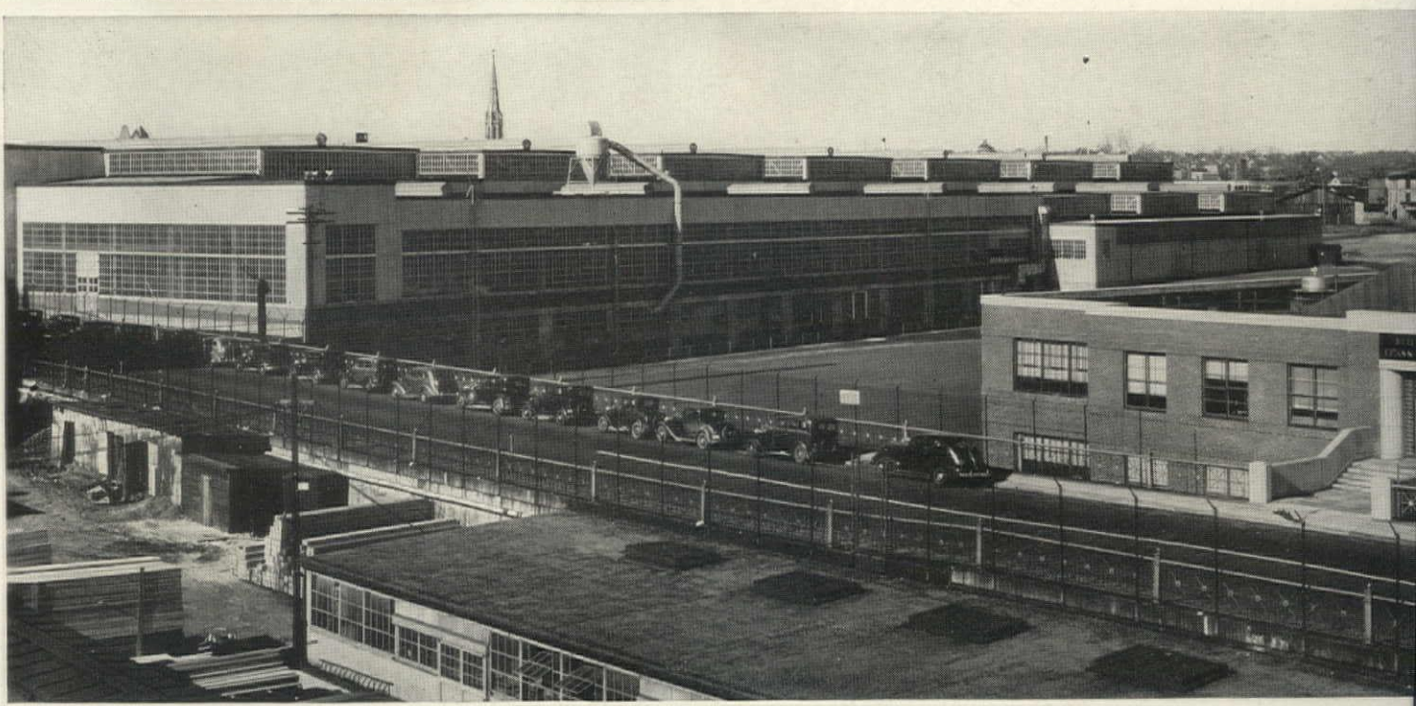
THE AUSTIN CO., ENGINEERS & BUILDERS



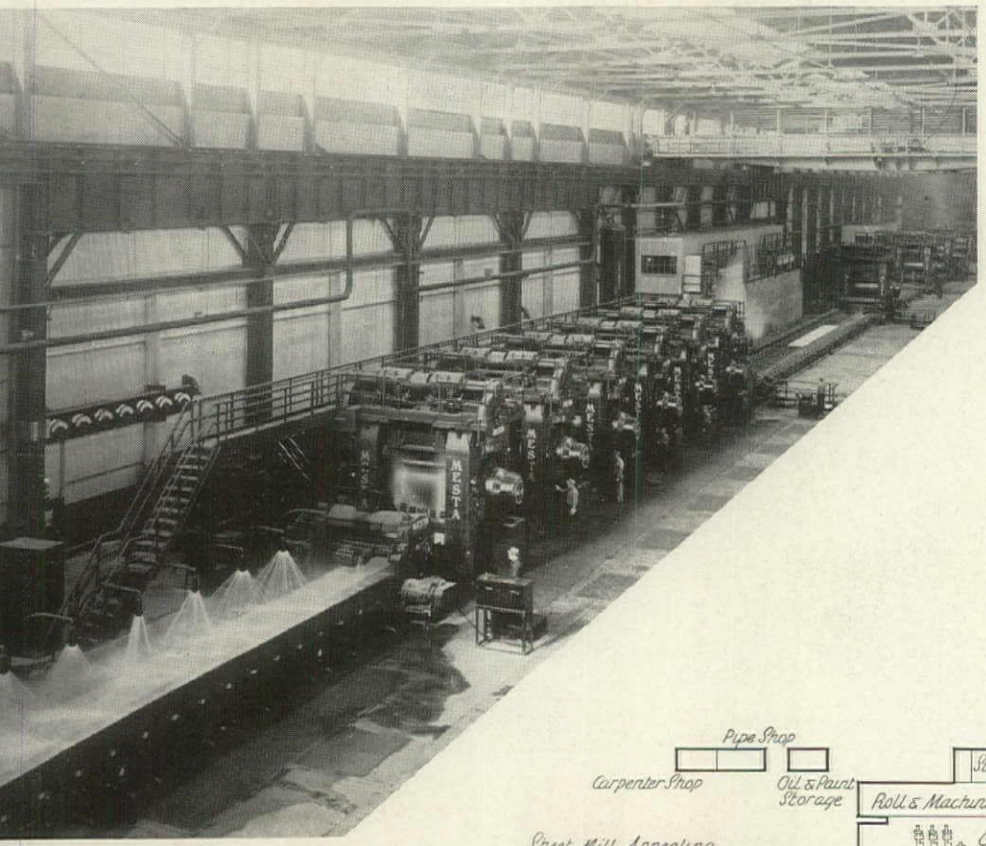


ROLLING MILL STONE & WEBSTER ENGINEERING CORP., CONTRACTORS & ENGINEERS

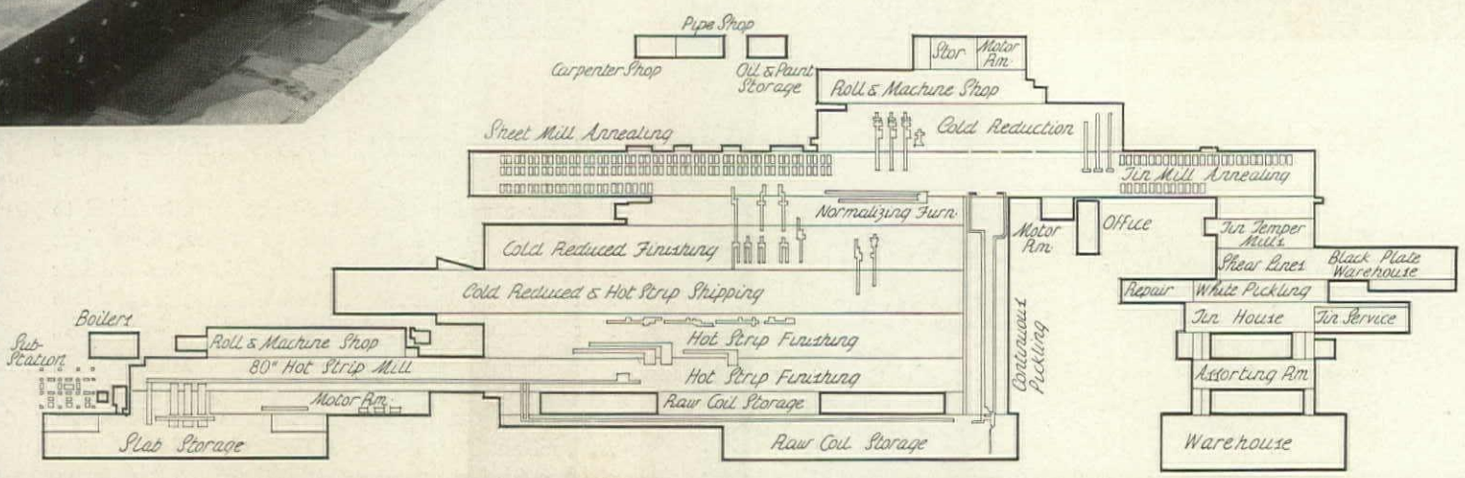
Monthly capacity of 6,000,000 pounds was added to production by this new highly mechanized, straight line production rolling mill. The 155,000 sq. ft. floor area (plus 50,000 sq. ft. in the basement) is split into four main aisles, two 80 ft., one 70 ft., one 50 ft., with crane service in the three wide aisles. A substation adjoining the building supplies both d.c. and a.c. power, and distribution systems provide water, acid, oil and gas. Executive and engineering quarters are provided in a separate building.

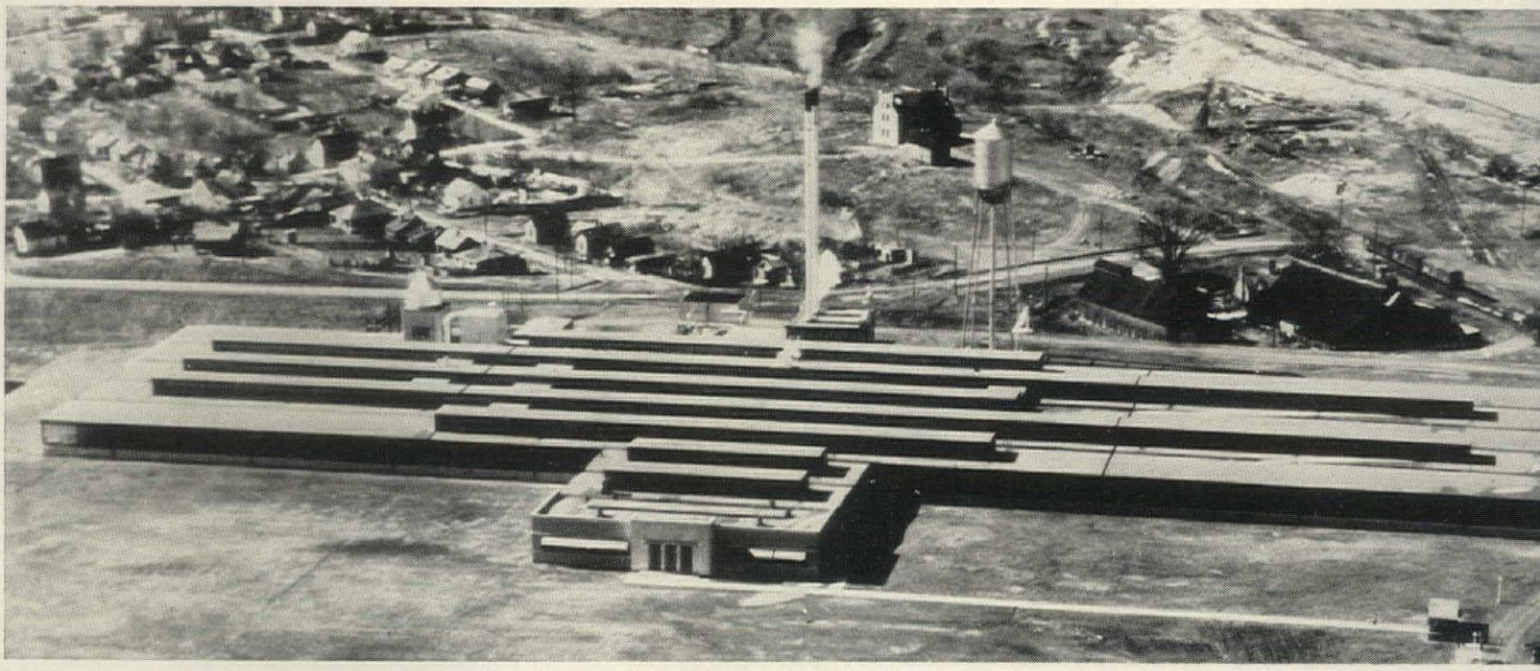


STEEL WORKS



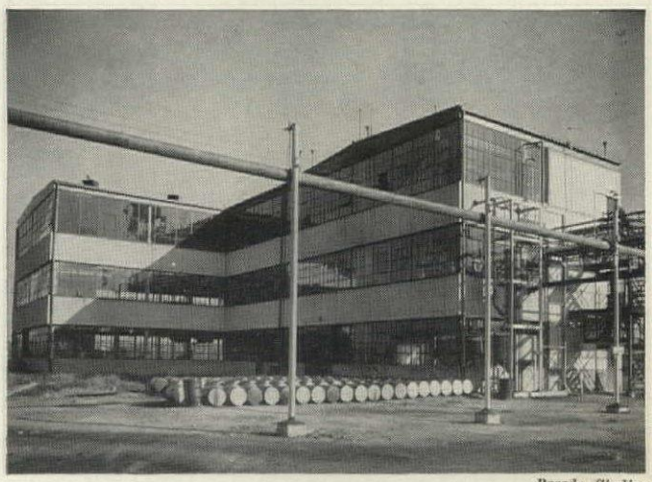
The 34 plants that constitute these steel works have been called one of the most modern mills in the world. Begun before national defense was as pressing a problem as it is today, the plant has an annual capacity of 672,000 tons of strip products, processed from slabs that come from a mill seven miles away. Most impressive unit of the works, the strip mill itself is 2,520 ft. long and nearly 100 ft. wide. It is topped in size only by the annealing plant which is 2,544 ft. long and 125 ft. wide. Begun in May, 1937, the first unit was in production March, 1938. Generally regarded a major feat of construction organization, work progressed day and (under batteries of floodlights) night. During the winter months it required even "heating all outdoors" when forced draft unit heaters were employed to warm the workmen. The magnitude of the project is revealed in such figures as: Area under roof, 51½ acres; Conduit, 200 miles; Installed horsepower, 300,000.





BATSON COOK CO., CONTRACTORS

The plant illustrated above was built for the production of mechanical rubber goods, including hose, belting, batteries, gaskets and a variety of other appliances. At present the building contains 200,000 square feet of floor space and provision has been made for future expansion. Cost of the factory was approximately $1,500,000.



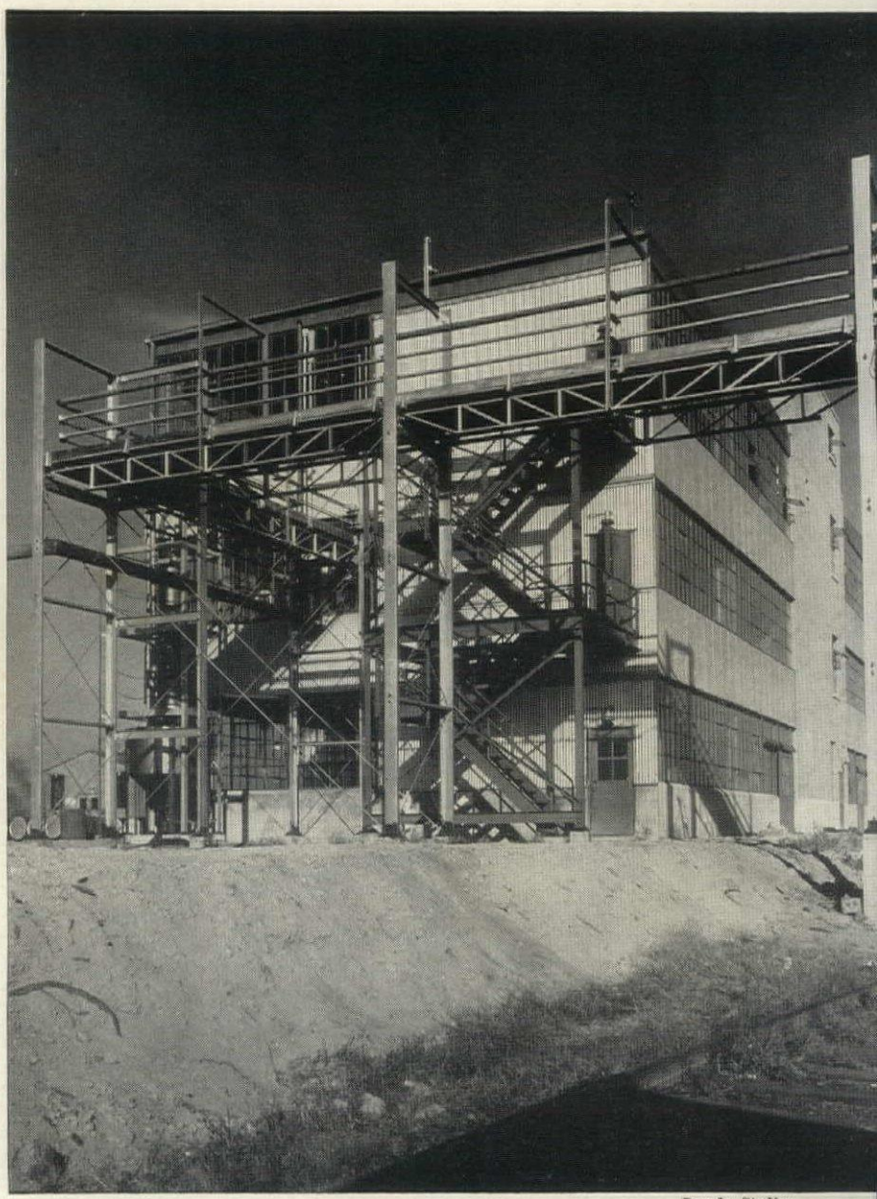
Parade Studios

WILLIAM B. THOMPSON, ARCHITECT

WILBUR WATSON, ASSOCIATE

B. F. PERRY, CONTRACTOR

The importance of the synthetic rubber industry lies in the present dependence of this country on sources which could be cut off in time of war. A number of processes are well beyond the experimental stage, and it has been estimated that an expenditure of $200,000,000 for factories would ensure a production adequate for all U. S. requirements. While housing a complex of highly specialized chemical equipment, it is of interest to note that the structure shows no important deviation from the standard pattern of the present-day factory.

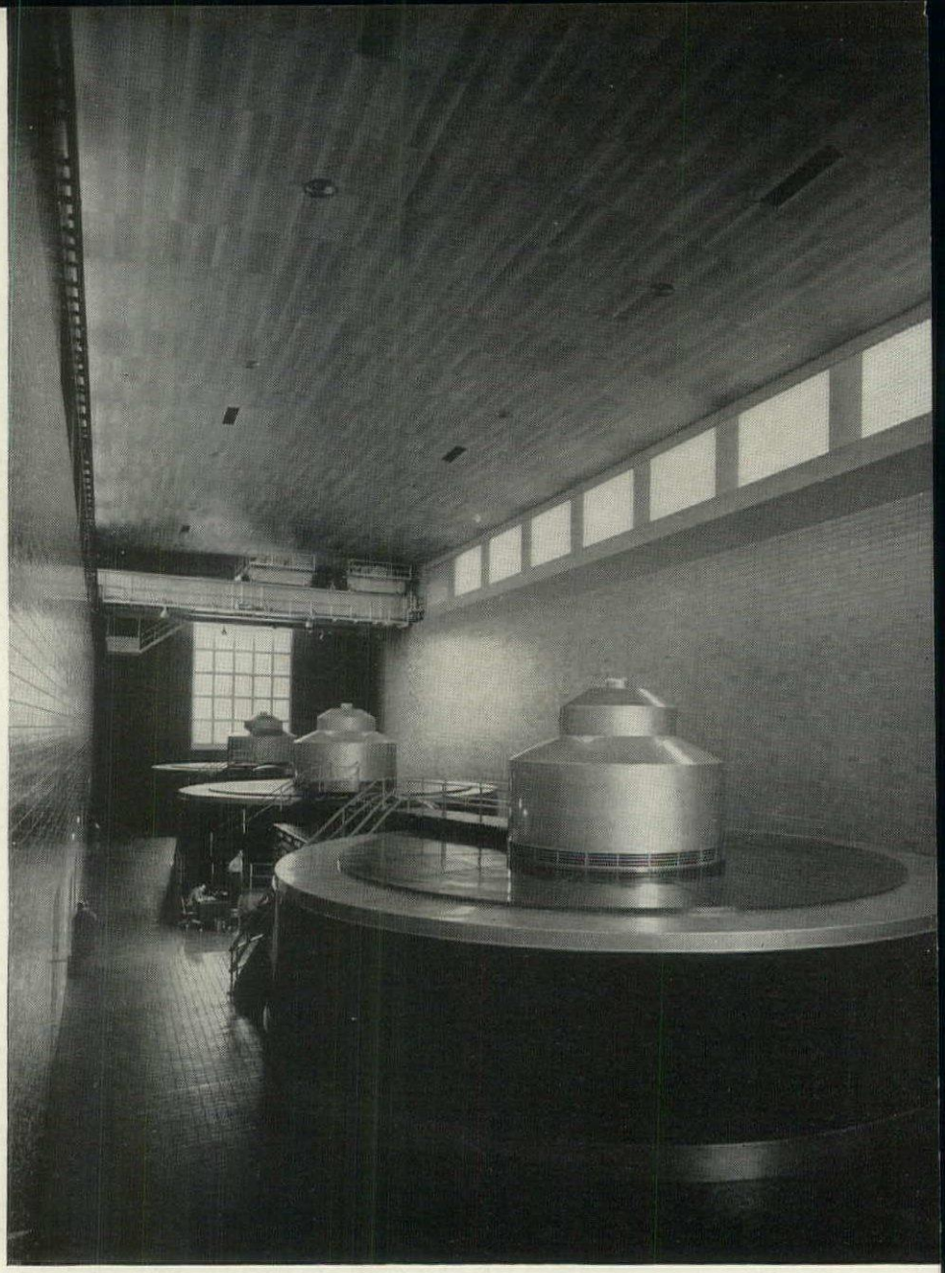


Parade Studios

UTILITIES

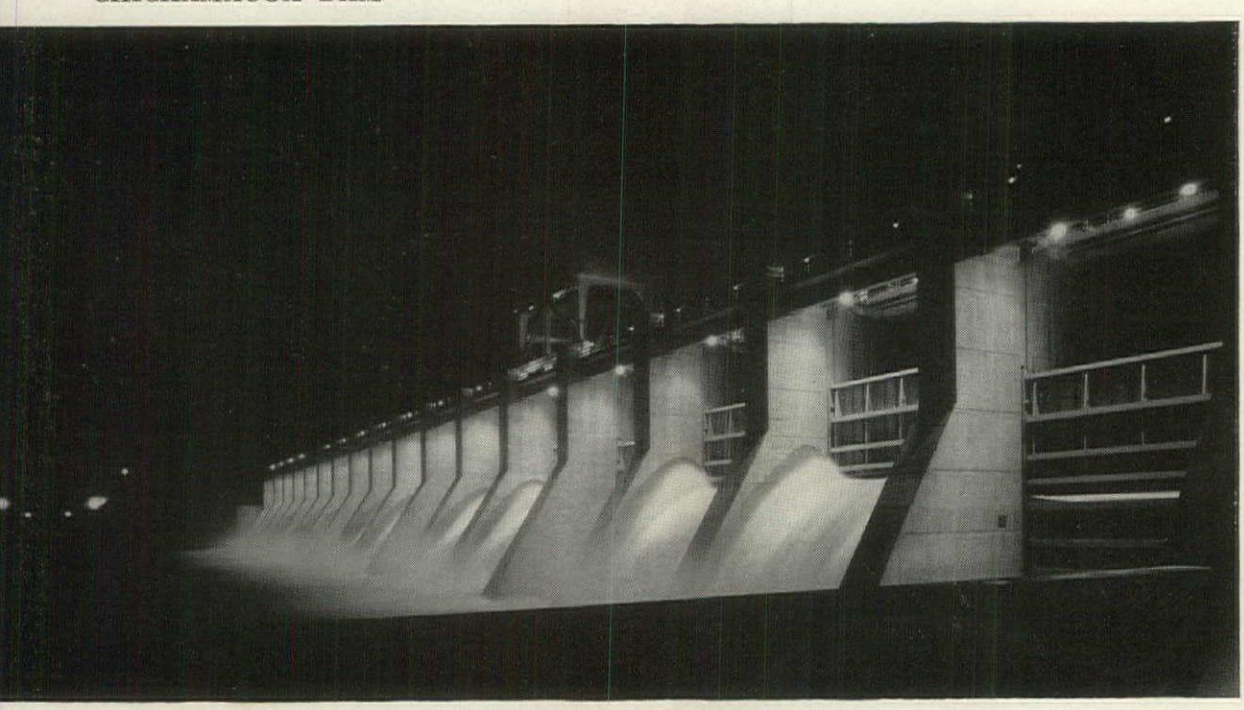
TENNESSEE VALLEY AUTHORITY

Latest of the dams to be put in operation as part of the integrated system of the Tennessee Valley Authority, the Guntersville Dam, built at a cost of $32,500,000 was opened early this year. Regarded by military experts as a vital unit in the national defense system, the several plants of the TVA serve a large number of war-industrial plants in the Tennessee Valley —among them factories that produce essential metals, military cloth, munitions, planes and plane parts. The dam, 94 ft. high, has a total reservoir volume of 1,018,700 acre-feet. The power house, interior shown at the right, has a present capacity of 72,900 kw. with a possible ultimate capacity of 97,200 kw. Chickamauga Dam, another unit of the TVA system just completed, is 129 ft. high and has a potential capacity of 108,000 kw. (for complete description of TVA power plants, see THE ARCHITECTURAL FORUM, Aug. '39, p. 92).



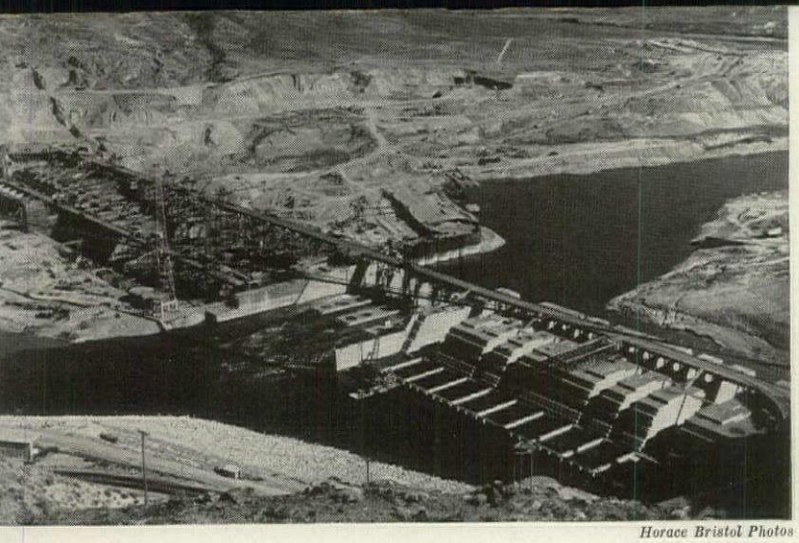
ROLAND A. WANK, PRINCIPAL ARCHITECT

CHICKAMAUGA DAM



GUNTERSVILLE POWER HOUSE

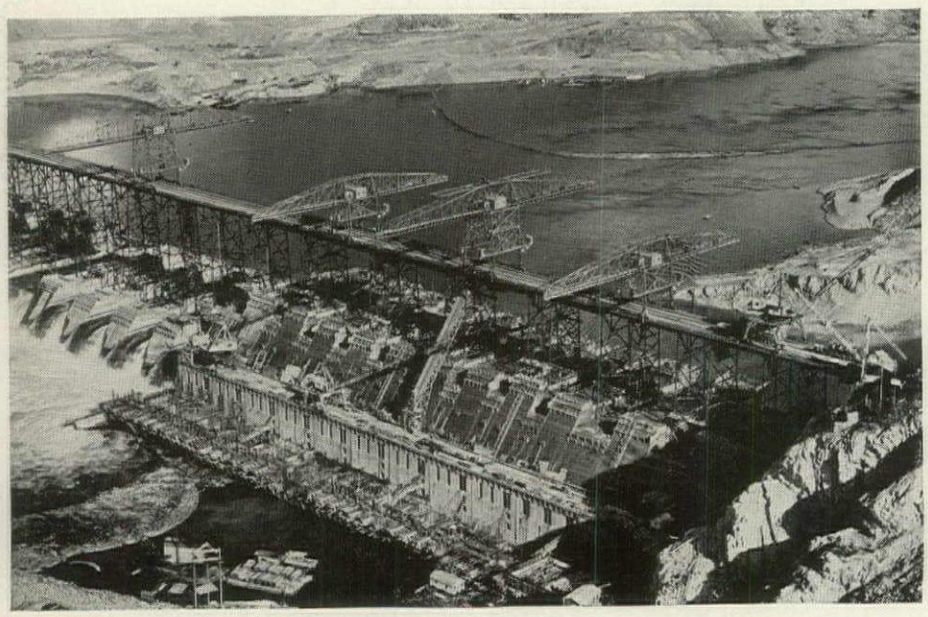
UTILITIES GRAND COULEE DAM



1937

Horace Bristol Photos

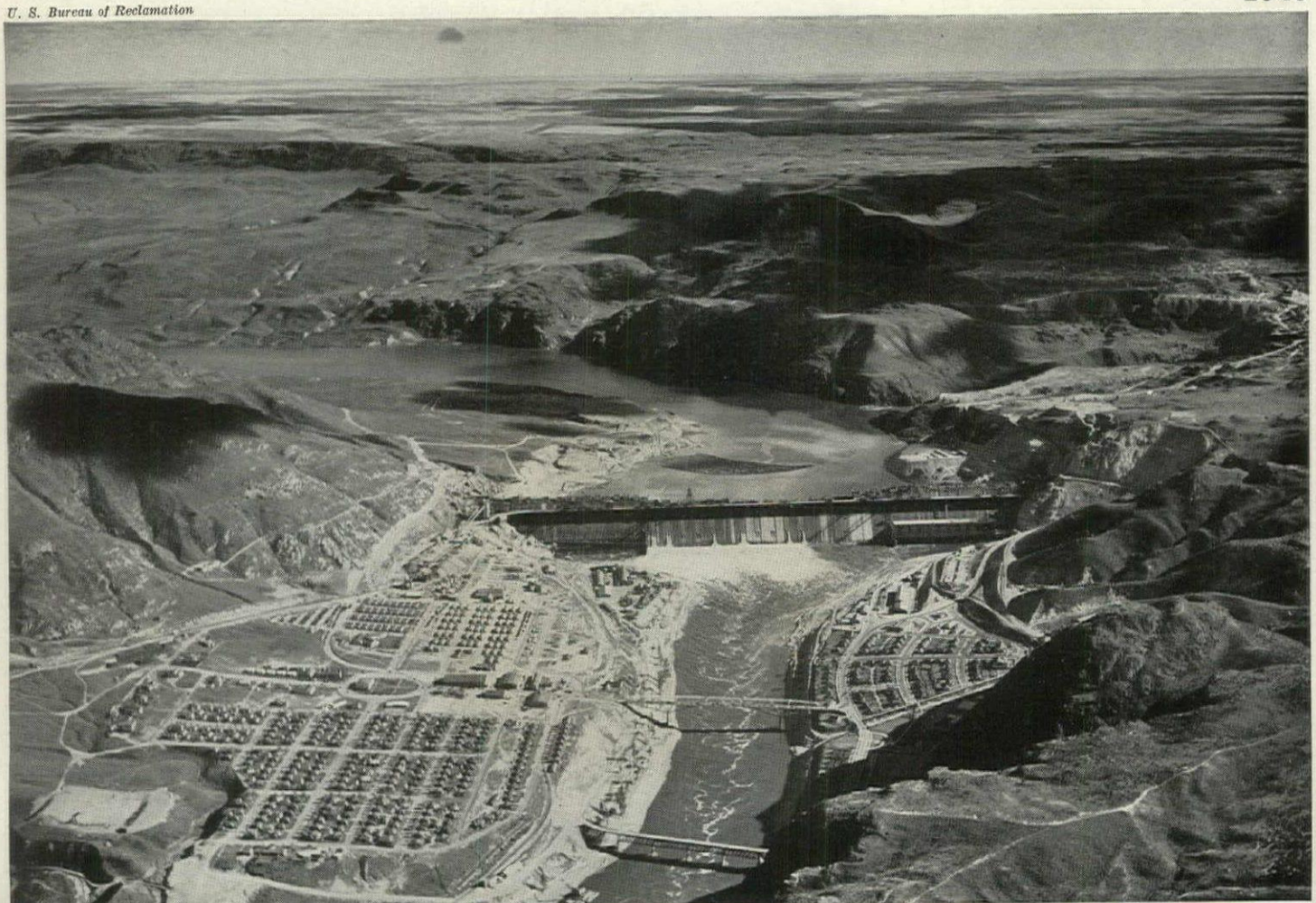
If Boulder is the world's most dramatic storage and power dam, Grand Coulee stands out as the greatest producer of power. Linked with Bonneville Dam, this engineering giant will be part of a unified transmission system with a capacity of 2,400,000 kilowatts, bringing cheap electricity to industry, farms and domestic consumers. The Pacific Northwest is a comparatively undeveloped region, rich in minerals of critical importance in the defense program, and the significance of these dams is already expressed in the contracts recently made with aluminum, iron, electrical and other industries. Added to the national wealth being created by the projects is the vast quantity of water being impounded by the dams, some of which will be used to bring now arid lands under cultivation.

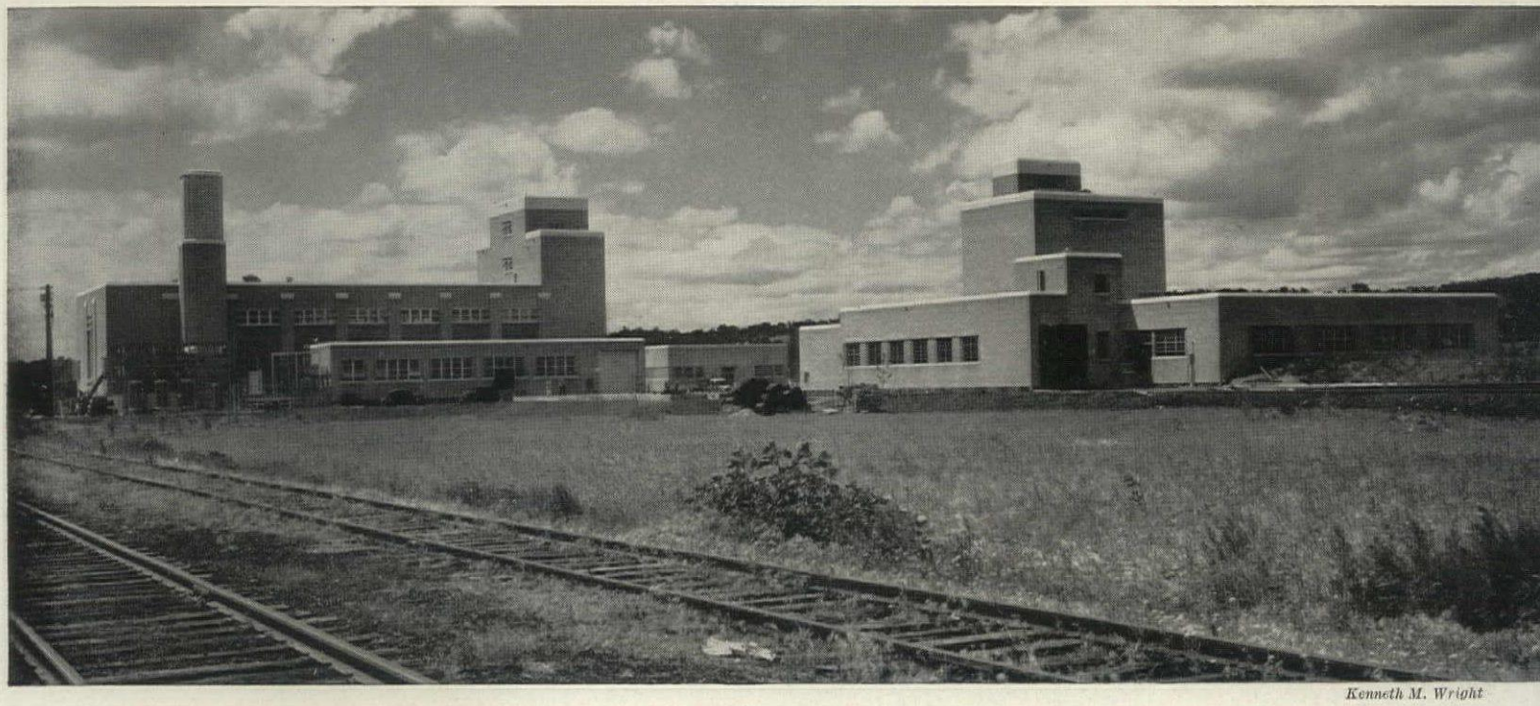


1938

1940

U. S. Bureau of Reclamation



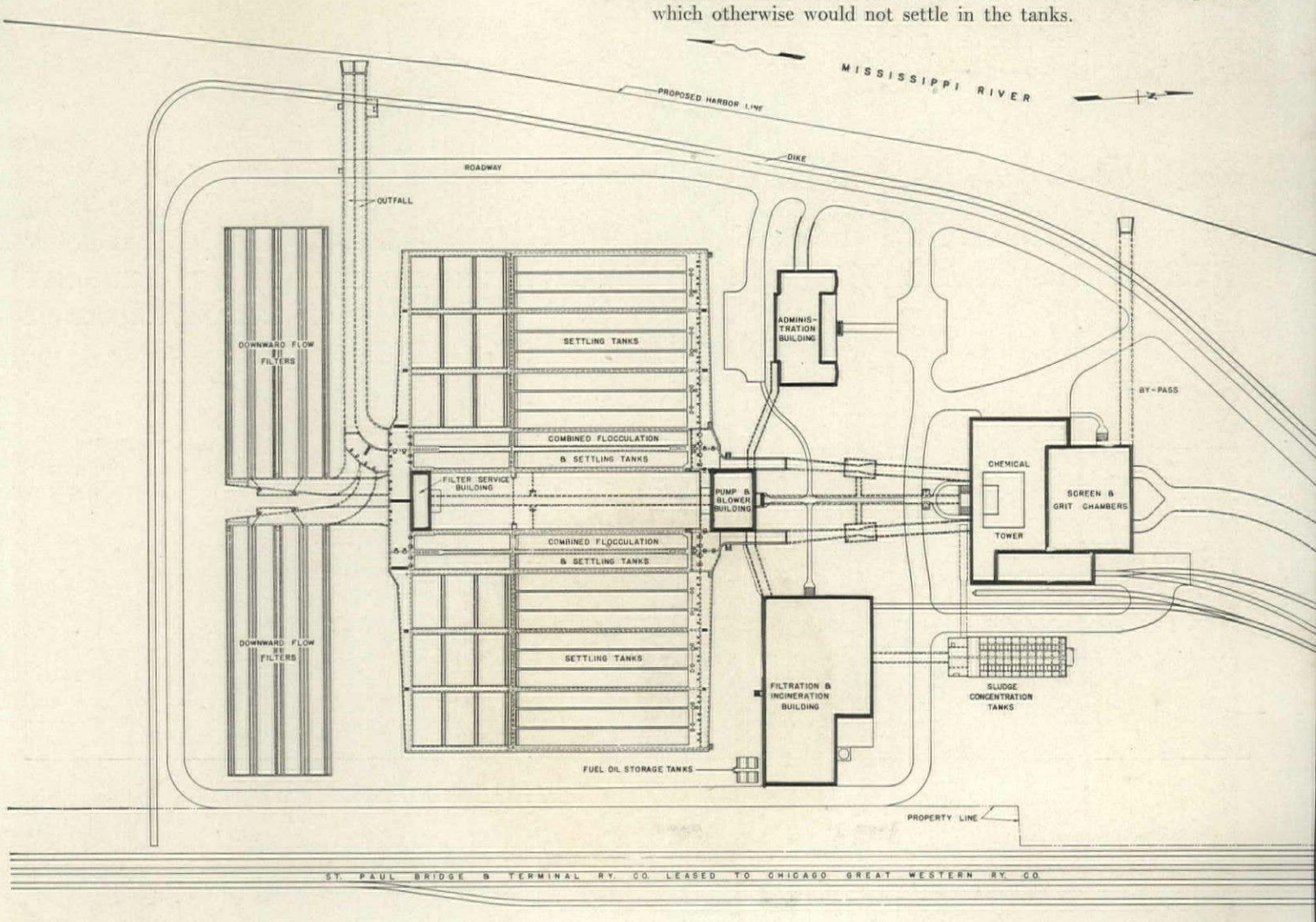


Kenneth M. Wright

C. C. WILBUR, CHIEF CONSTRUCTION ENGINEER

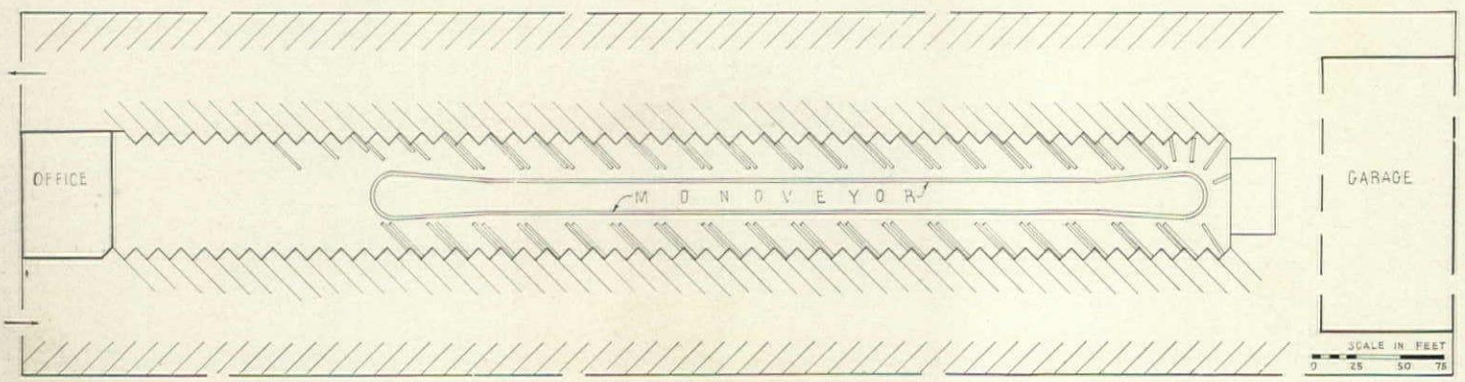
WARREN SLEEGER, ASS'T CONSTRUCTION ENGINEER

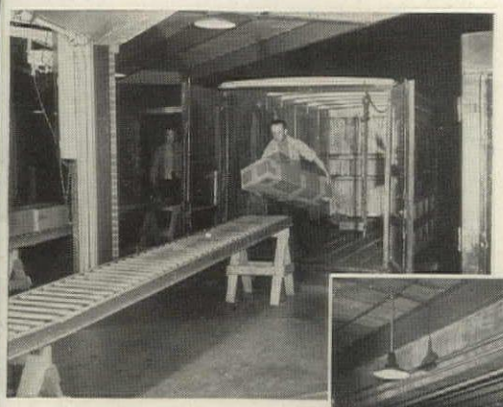
This $3,500,000 sewage plant handles over 100,000 gallons of sewage a day. It is equipped with six-inch and one-inch screens through which the sewage passes to grit chambers and then to settling tanks which are the longest of their type in the world. Solids caught in the screens and tanks are mechanically removed either by rakes or vacuum filters, hauled away, or shredded and incinerated. The sewage finally passes through effluent screens and the clear water flows out into the river. When river water is low a chemical is added to produce a floc that carries down with it particles which otherwise would not settle in the tanks.



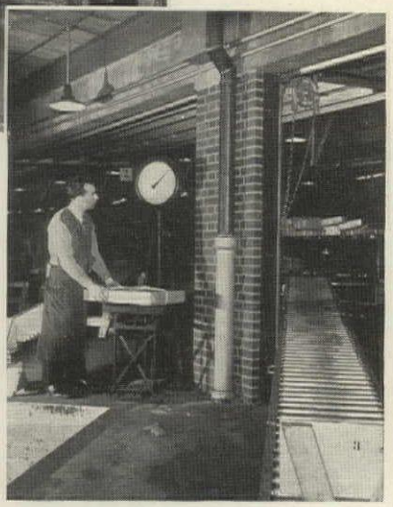
FREIGHT TRANSFER STATION

RAILWAY EXPRESS TERMINAL, NEW YORK CITY
H. O. WEYGAND, ARCHITECT





RECEIVING



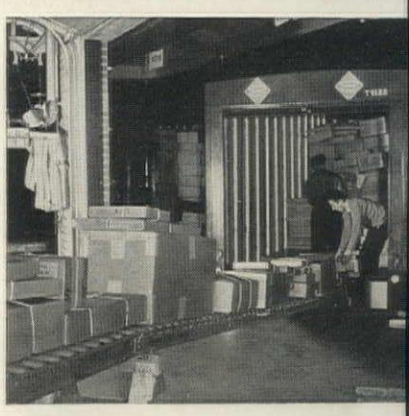
WEIGHING

SORTING

John D. Beinert Photos

THE MONOVEYOR

While the chain-drawn truck method of sorting and conveying is not new, this plant differs from previous ones in that it is completely new and represents the highest level of technique yet attained in the field. The method is of particular interest, not only because it speeds up parcel handling, but also because it has many uses in industry, for classifying scrap, selective assembling, aggregating, shipping, receiving and the like. The chain-drawn trucks are attached to an overhead conveyor, forming a loop 964 ft. in length; they can handle about 25,000 packages per hour. One side of the conveyor loop is adjacent to an unloading platform, where loads to be sorted are brought in, the other is used by trucks which carry sorted loads to their ultimate destination. Color codes make the conveyor trucks easy to identify; the work of trans-shipment of parcels is further accelerated by the use of gravity conveyors, as illustrated in the large photograph above.

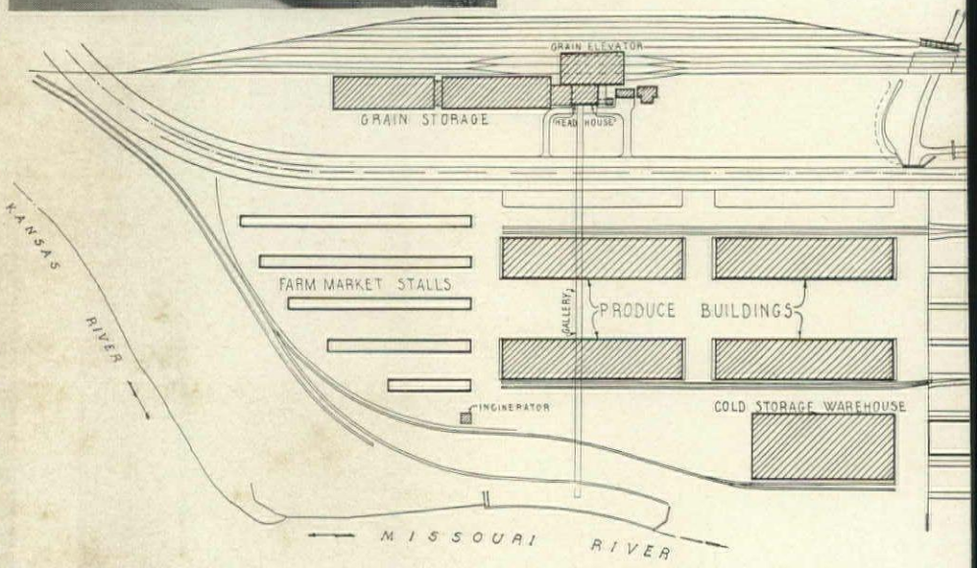


DISTRIBUTION

UTILITIES KANSAS CITY FOOD TERMINAL, KANSAS CITY, MO.

The Kansas City Food Terminal, covering some 62 acres of ground, is one of the largest perishable food terminals in the country. Built at a cost of approximately $6,000,000, it houses a number of different enterprises: a farmers' wholesale market, four large produce buildings, a cold storage building with a central refrigeration plant, brokers' offices, a merchants' building, and fifteen acres of parking space. The small illustration shows an interior of one of the produce markets with the exterior wall made up entirely of overhead doors. The Terminal has been well placed in relation to highway facilities; from all directions roads, coupled with viaduct and street approaches, make possible rapid access from any part of the two Kansas Cities. The project was made possible by a Public Works Administration grant.

Produce Buildings:
Architects: Gentry, Voskamp & Neville, Architects, Inc.
General Contractor: Patti Construction Co.
Farmers' Market Group, Cold Storage Building and Merchants' Building:
Architect: Joseph W. Radotinsky.
General Contractors: Weeks Construction Co., Inter-State Construction Co., J. E. Dunn Construction Co.



DEFENSE PLAN
FOR THE CITY

Defense for the city does not begin or end with preparations for the reception of hostile airmen. Many a U. S. community, well out of the range of bombs and bullets, was nevertheless severely damaged in the last war by ill-considered expansion, extension of city limits, waste of surrounding resources and other activities undertaken in the fever of war hysteria. With this experience as a background, THE FORUM's editors presented W. Earle Andrews with the case of a typical American city, now faced with the double problem of cooperating in the defense program, while still maintaining its hard-won amenities and financial stability.

The City discussed in Mr. Andrews' report is imaginary. Its status and problems are not the less real, however. In size, population, property values, tax rate and public debt it represents an average of Allentown, Pa.; Charlotte, N. C.; El Paso, Texas; Lawrence, Mass.; and Savannah, Ga. It has a population of 94,400 and occupies 8,562 acres or 13.4 square miles. Assessed valuation of private property is $94,900,000, 77 percent of true appraised value. Taxed property is 85⅓ percent of all real estate. Real estate taxes are $1.60 and total taxes are $3.63 per $100. The bonded debt is $7,170,300.

Following Mr. Andrews' report is a statement on passive defense for the City by Richard M. Bennett, covering the necessary steps to be taken by the City to protect its citizens and property.

W. EARLE ANDREWS Engineer and town planner. Associated in design of Long Island parkways and State Parks including Jones Beach, Deputy Chief Engineer Jones Beach and Bethpage Authorities; General Superintendent New York City Park Department, Chief Engineer and General Manager Marine and Henry Hudson Parkway Authorities; all under Robert Moses.
General Manager New York World's Fair. Now in private consulting practice designing parks, parkways, beaches and municipal developments.

RICHARD M. BENNETT Architect. Graduate Harvard School of Architecture. Winner fellowship for European travel and study. With Caleb Hornbostel, won national competition for the Wheaton College Art Center. Now practicing in New York City. Visiting lecturer and critic at Pratt Institute, Vassar College and Yale University. Has made intensive study during past six months of air raid protection.

Air view of the Chemical Company's plant. Expansion of the plant, which involves tripling its present size, would involve the use of vacant land to the south, part of which is shown in the foreground.

Mayor of The City

City Hall

Dear Sir:

You have asked us to comment on the following activities for national defense in The City.

1. EXPANSION OF THE CHEMICAL COMPANY

The Chemical Company expects to expand to manufacture explosives. Production is to be tripled, adding 7000 men to the 3000 now employed. Of the new workers 4500 would be drawn from outside The City. Cutting and hauling slash pine to feed the mill and other incidental services would provide new employment for 500 city residents and 500 who would move to The City.

Existing rail and dock facilities are adequate for shipping the finished product. The bulk of raw material would come in by truck.

The Chemical Company has an option on 115 undeveloped acres on the downstream side of the plant for the proposed expansion.

The present factory is in an unrestricted zone but the area required for enlargement is zoned for Class B residence, with single family houses built up to the proposed new property lines.

2. INCREASED PRODUCTION OF THE CLOCK COMPANY

The Clock Company has converted the idle one-third of its present plant to manufacture precision parts for projectiles. Without adding to its buildings it will employ 500 more men and 500 more women, mostly local residents.

3. CONVERSION OF THE OLD FORT TO MUSTER TROOPS FOR TRAINING

The military garrison of 450 occupies a walled fortress originally built for frontier protection. It is planned to build temporary barracks on the old parade ground to receive and equip for transfer to other camps men reporting for military training.

The dock now used for fuel delivery is to be replaced by a covered pier to be used as a quartermaster's depot.

4. INCIDENTAL INCREASED ACTIVITY

With business stirred by defense activities, it is estimated that there will be new or expanded service, delivery and supply establishments to employ 1500 more workers. The new jobs would be largely in scattered small businesses and filled by kinsmen or neighbors of manager-owners.

There are 1300 men and women on work relief in The City.

There can be no assurance that the expansion will be permanent.

5. POPULATION INCREASE

The 5000 new workers will arrive in The City over a period of about three months. A large number will not bring families at first, but the migration will come to a head at the time of school closing in the early summer when you may anticipate an increased population of at least 10,000 men, women and children.

With the exception of scattered community stores, your retail business is concentrated in the older part of The City. Like most municipalities there is too much property zoned for business.

A business block properly developed pays more taxes than a residential block of the same size. Business property demands less in the way of police and fire protection and sewer and garbage disposal.

However, having too much property zoned for business tends to deter sound development rather than to stimulate it and the threat of too much of it discourages business initiative. With the announcement of the proposed plans for the defense program, there will be insistent demands to change zoning on the margin of your present retail district from Class B residence to business. Your Building Department will be swamped with applications to use the ground floors of the old three-story residences for retail establishments.

You should not extend the area of your principal business zone. It is large enough. If you adopt a firm stand, your new prosperity can do much to clean up the dilapidated condition of the vacant stores on its outer edges and side streets. Emphasis should be placed on cleaning up and improving public facilities within it and the rejuvenation of the adjacent residential zone neighboring business rather than on promising owners of residential property on the margin of business that their values can be increased if the business zone can be extended to include their property.

Your City grew in waves from the old trading post, and radiated from this core to newer homes on the outer rim of a gradually enlarging wheel. The little expanding frontiers left behind decaying developments and skyrocketed land prices to make reasonable home construction too expensive. Your growth has reached natural limits. The City is built up now to the steep hills on the east and west, to the throat of the valley on the south and to the suburban development on the north. It may be fortunate that limited room for expansion requires the repair of areas which are rapidly becoming slums. Property owners would be encouraged to renovate if they can be assured that the forces which caused their property to deteriorate in the past can now be checked. Widening of several streets through the old area and building three new playgrounds will do much toward rehabilitation.

Your Building Code should be reviewed and modernized to encourage renovation as economically as possible without relaxing safety and health measures.

The low cost housing development proposed by The Limited Dividend Corporation in the slum area south of the Railroad station should be again considered. We understand that the Corporation seeks partial tax exemption and contribution of land left over by closing streets. There is also the question of The City assuming the operating cost and control of the playgrounds. If the project is ever to go ahead it should do so now in connection with your new activity.

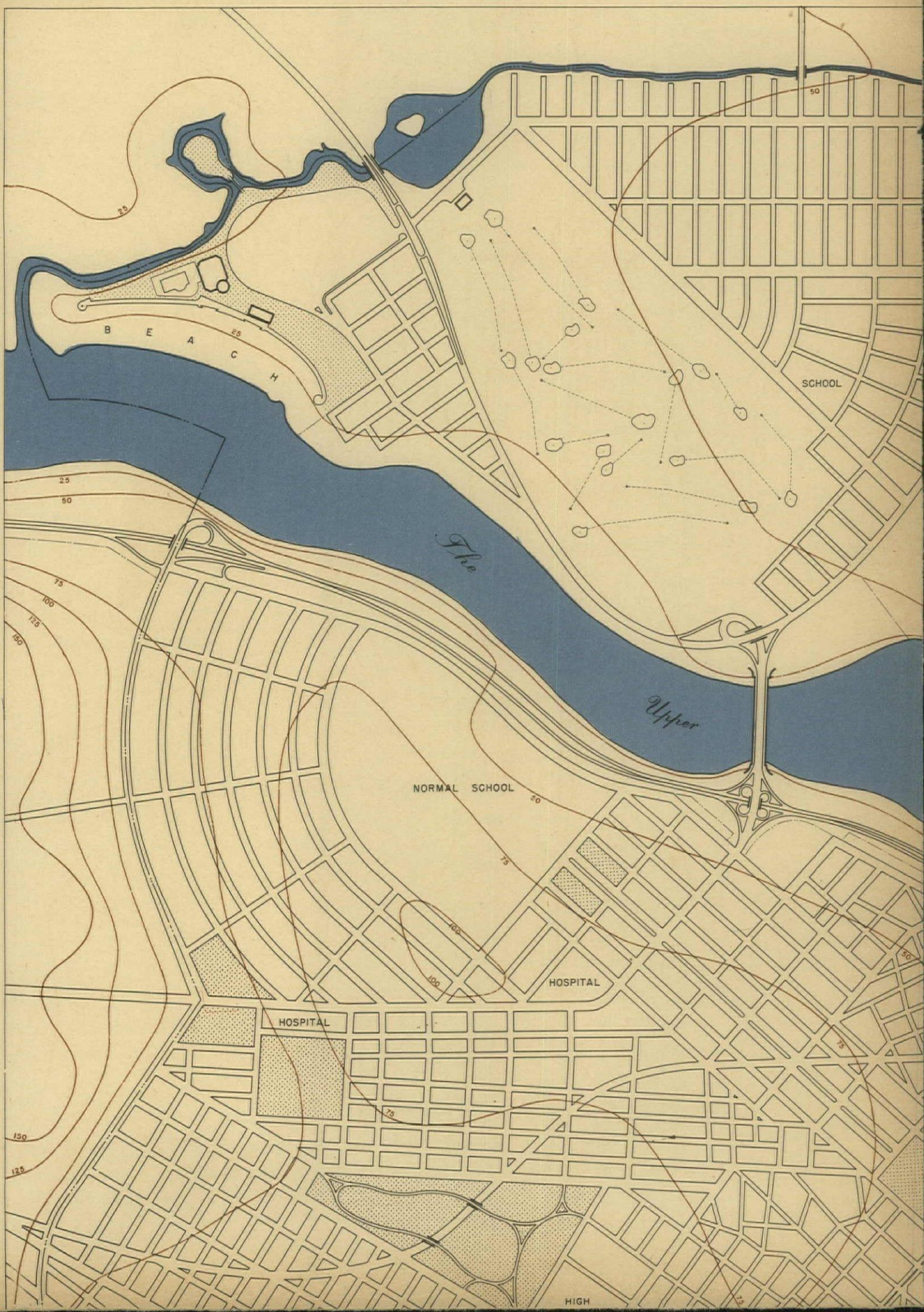
Projects to build cheap houses on the outskirts of The City will be placed before you. You will be asked to ease restrictions in the name of expediency. Such requests should be scrutinized carefully with particular study of the probable tax return. It is possible that there may be less return than the families occupying them require in the school budget alone.

The former infantry regiment using the State Militia Armory has been converted into an anti-aircraft unit and will require permanent storage for several hundred pieces of new mobile equipment. The Armory need not be extended at the present time but land should be reserved for the expansion if time proves that it is a permanent need. In the meantime, the unused carbarn three blocks away owned by The City since scrapping street railways can be used for the temporary storage of the militia's new equipment.

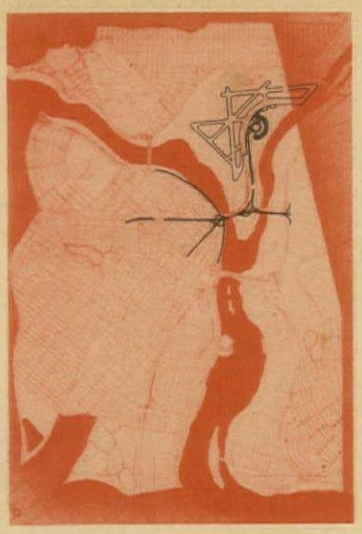
Substantial increase in population will reflect larger annual maintenance budgets. New money brought into The City will not increase city revenue in proportion to maintenance costs for a long time.

Your Police Department will require little increase in personnel to preserve order, especially if the slum districts are cleared up, but you will run into substantial increase with added traffic confusion. During the last generation there has been steady transfer of police officers from control of crimes of violence to the control of traffic. Police work has been aided materially by radio cars, improved communication and better street lighting, but regulation of increased traffic has more than offset savings. You can afford to make substantial capital outlays to relieve traffic bottlenecks. A measure of their cash value would be the number of policemen relieved from traffic duty.

Your health budget need not increase much unless your area is expanded and provided you do not allow the further pollution of The River. You should require expanded industrial plants to adhere strictly to your modern standards of waste disposal. You should review the history of the over-expansion of The Chemical Plant in the last war when your shellfish industry was completely destroyed, and


B E A C H
SCHOOL
The
Upper
NORMAL SCHOOL
HOSPITAL
HOSPITAL
HIGH
25
50
75
100
125
150


POWER PLANT
STATION
FORT
THE CHEMICAL PLANT
River
The
SCHOOL
THE CITY
SCALE
O N E M I L E



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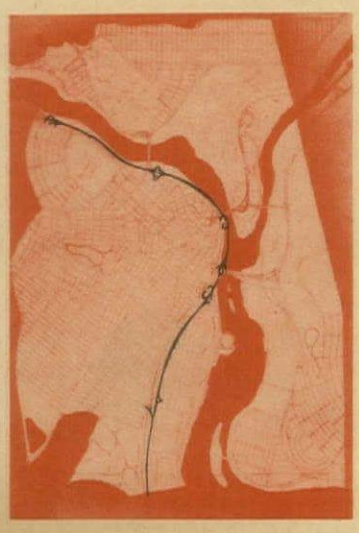

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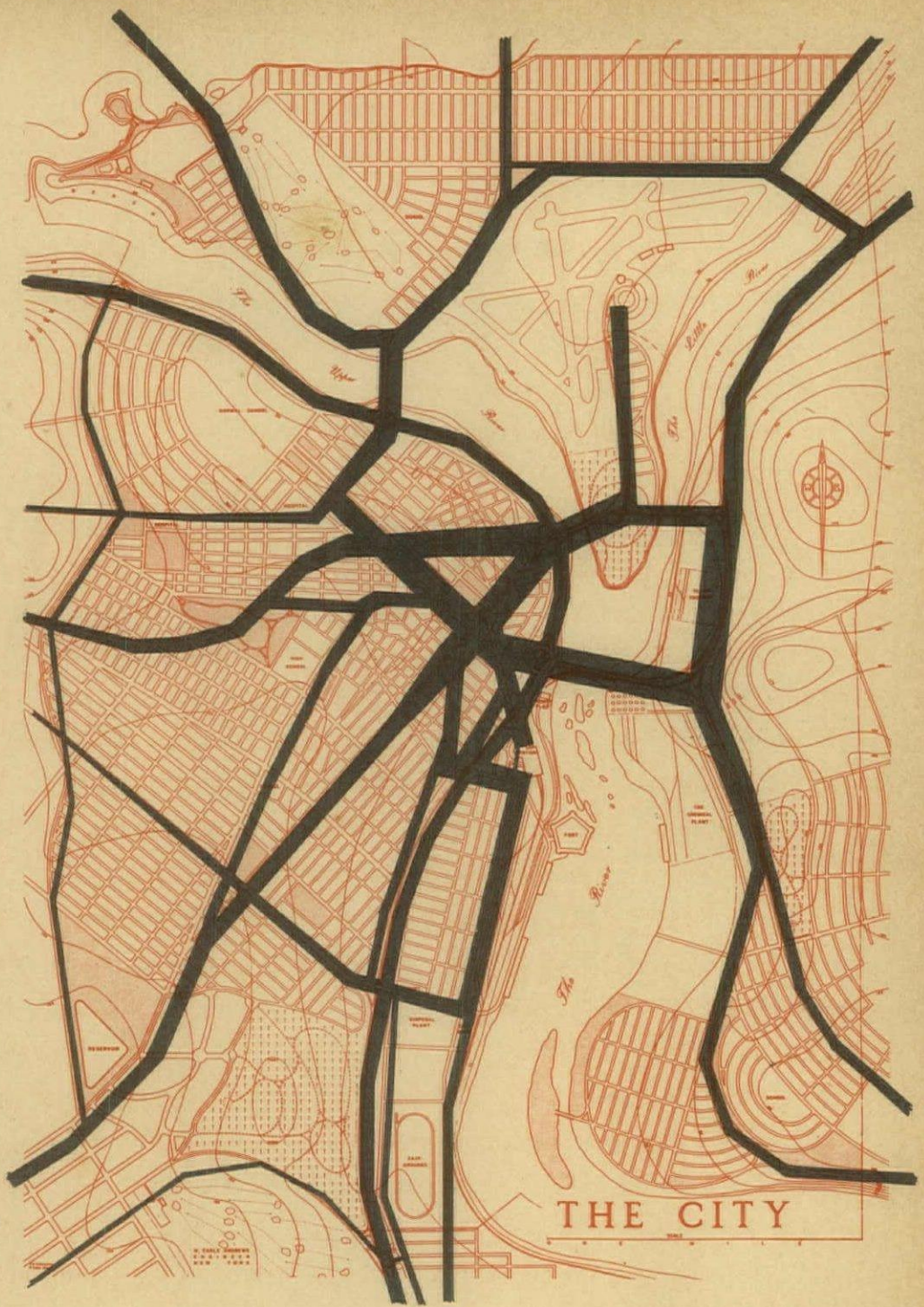
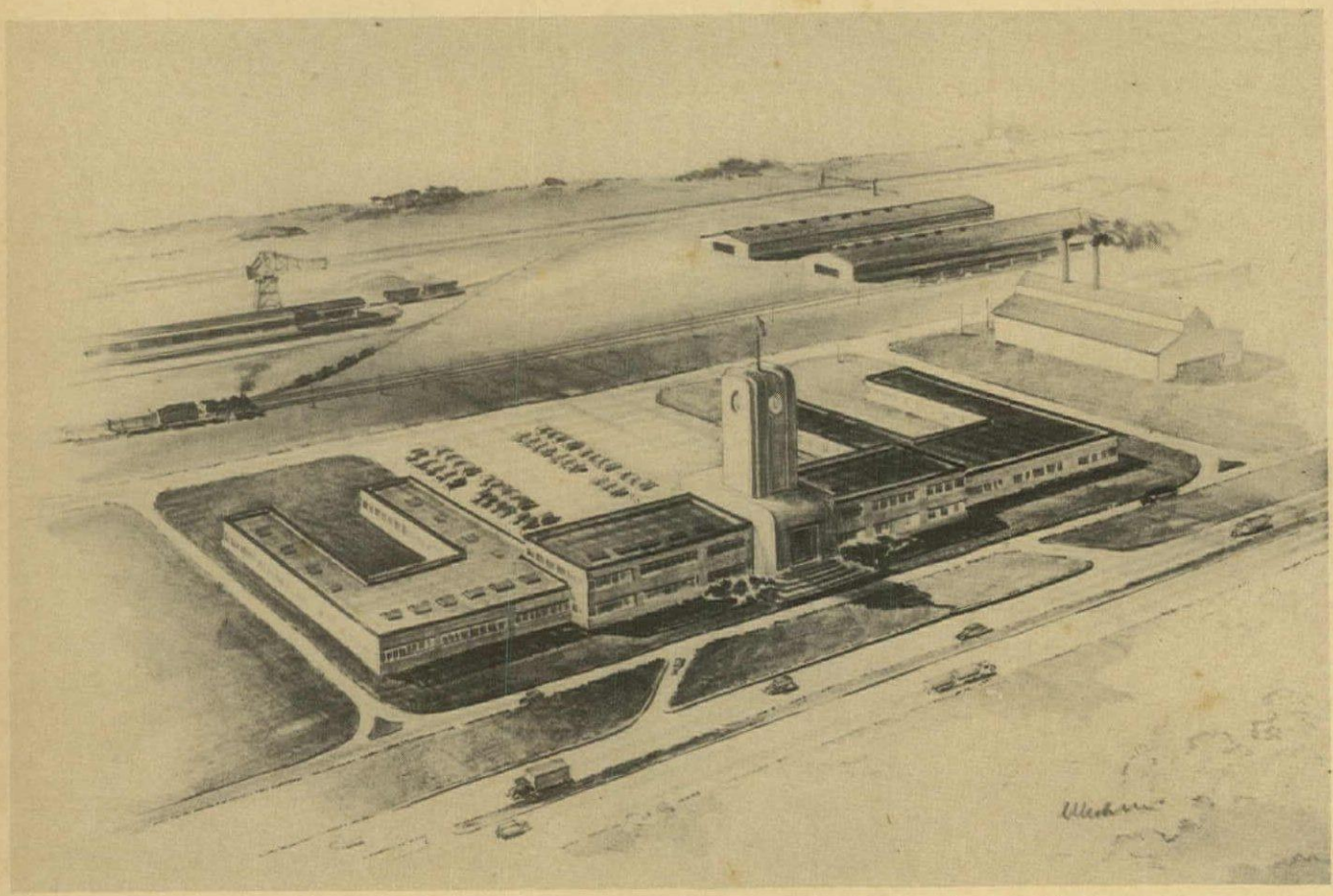


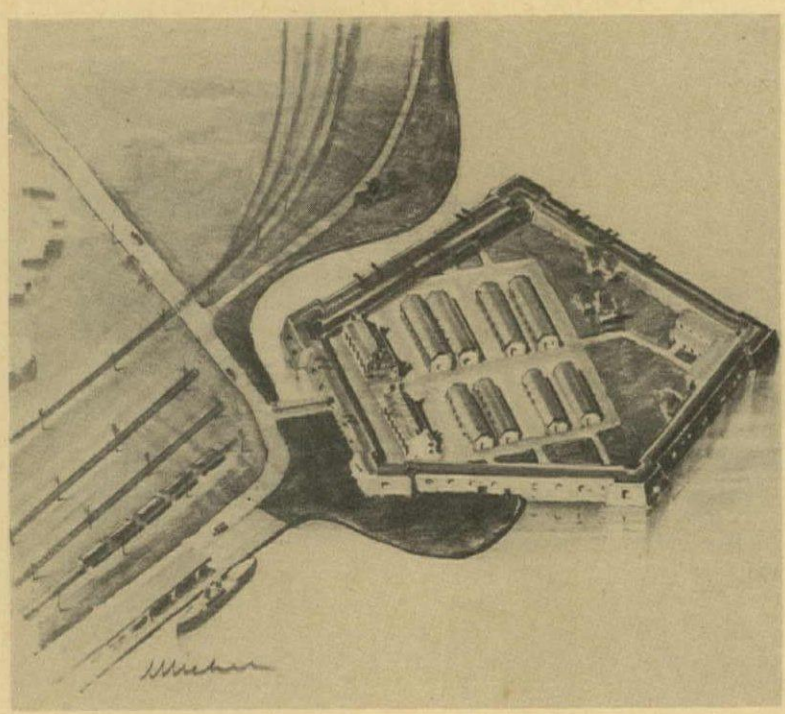
Above: Diagram of present traffic density. The street widening program is based on accurate periodic measurements.

Left: 1. Direct channels of traffic into the heart of the city were constructed as incidental improvements when the airport was built in 1936. 2. Main Street between City Hall and the Normal School was widened and straightened after the fire of 1906. 3. The inter-regional highway was widened through the city in 1931. Main street intersections have since been rebuilt. 4. The parkway was built in 1939 on the abandoned right-of-way of the old short line railroad.


The Little River
River
CLOCK FACTORY
CITY HALL
N
W
E



Above, a view of the Watch Company plant. The building will be used in part for the manufacture of ammunition components, but no expansion in size is contemplated. The sketch of the old fort shows barracks on the site of the former parade ground.



only by the enactment of laws limiting the amount and governing the manner of disposal of industrial waste has it recovered in fifteen years.

The renovation of the old law tenements should make unnecessary increase in your fire fighting service within the present built-up zones, but if you expand your area, you will have to build new stations.

Your hospital budget will be increased, and it is doubtful if you have enough beds in your hospitals for substantial increases in emergency service.

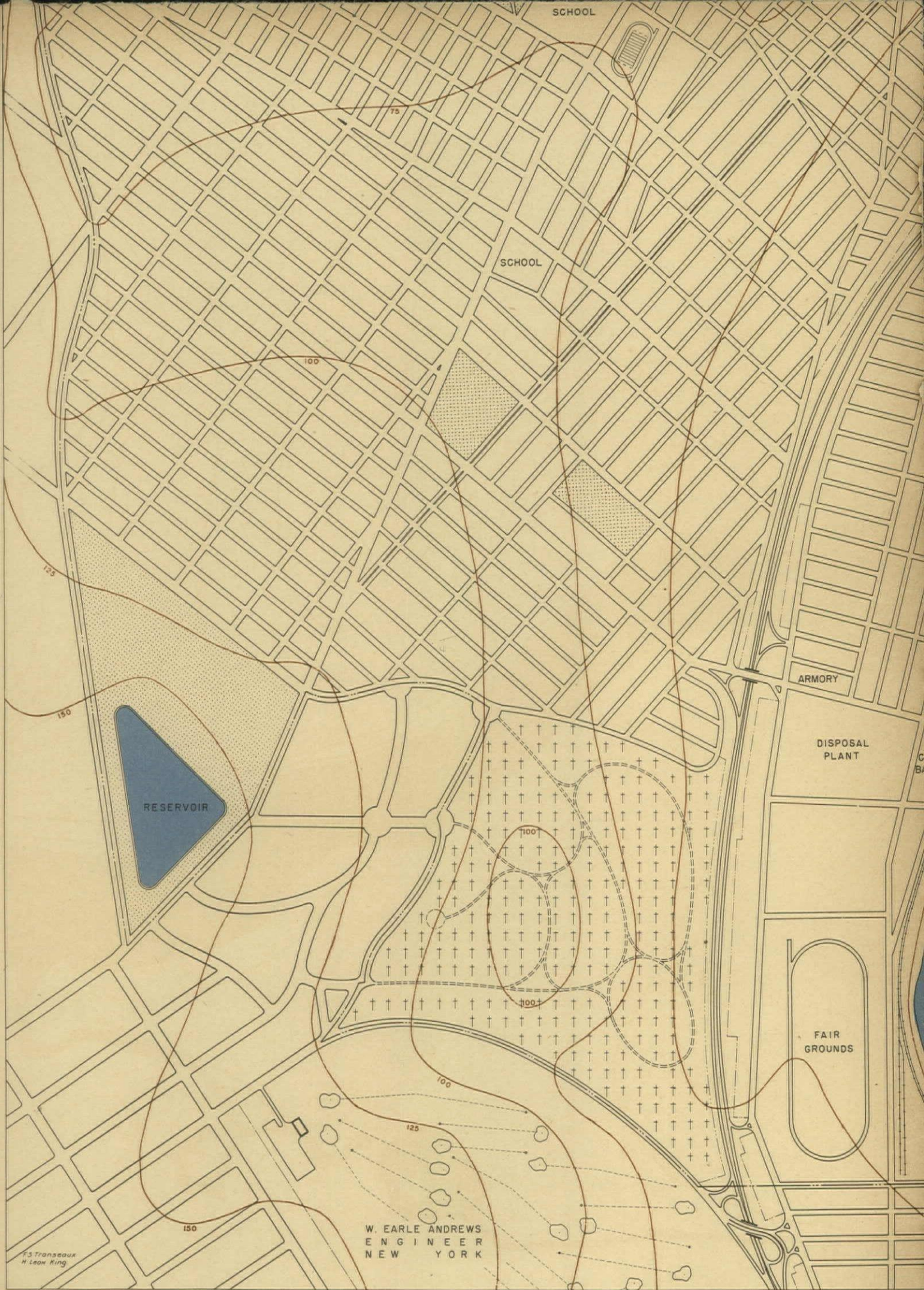
Your recreation budget will be increased for custodial services to the extent to which you expand your facilities, but the benefits derived from furnishing recreation are well known to reduce police, juvenile delinquency and other corrective expenses.

The teaching staffs of your public schools, which account for a substantial part of your taxes, will be increased with the number of pupils. You remember the confusion during the last war when classes were enlarged and two daily sessions attempted. The increase in school population will occur next fall and by then you will have to measure the need for new school buildings or the extent of renovation of partly used buildings in old areas.

Your Normal School offers free extension night courses for all residents of The City. Your enrollment will be greatly increased by men living away from home, and, as The City shares the cost of this extension service, there will probably be addition to your budget for this.

Your social welfare budget will be reduced to the extent men on work relief are reemployed. The permanent or temporary nature of increased employment cannot be determined at the present time and you should not look yet upon savings in this service as a permanent lowering of your budget.

You now have 1300 men on work relief. The men are paid by the Federal Government but most of the materials are supplied by The City. The relief workers are employed on construction jobs and on white collar projects. The value of the building projects under way is estimated at $1,400,000 and the projects average about half completion. While social workers hold that few of the men are capable of competitive employment, we believe that most of them will respond to offer of private work. Relief construction projects under way, which should not be abandoned, would represent an appropriation approaching $1,000,000. Many of the so-called white collar W.P.A. projects have drifted into expected local government service. If there is offer of complete employment in the community, the need for these jobs by the workers will cease to exist and the cost of services which continue may fall back on the local government.


SCHOOL
SCHOOL
75
100
125
150
RESERVOIR
ARMORY
DISPOSAL
PLANT
100
100
FAIR
GROUNDS
100
125
150
W. EARLE ANDREWS
ENGINEER
NEW YORK
F.S. Transeaux
H. Leon King

You are asked to re-zone the Residence B area to industrial use for The Chemical Company plant to expand. We know that you are prepared to make any necessary sacrifice in the present emergency but before you risk the permanent stability of your principal industry you should recognize that you may be killing the goose that lays the golden egg.

In the first place, you are vitally concerned with the conservation of slash pine. This is the reason this plant is located in The City. From the lesson learned in the last war, when the surrounding area was almost completely cut over, you have secured State laws which limit cutting to the extent which new growth is set out. It took a long time to do this and you have just reached a sound balance between supply and demand. Substantial stepped-up cutting will endanger future supply of this raw material. We understand that timber might be transported by rail or water for the temporary emergency but it will be risky to expand a plant for the consumption of raw material, part to be shipped from a distance but the part which cannot be spared temptingly convenient near by.

The Chemical Plant is ugly but generally well located. Its buildings are tucked against the hillside. The plant takes its wash water from The River and dumps it back with chemically harmless refuse. The buildings are generously spaced.

The proposed extension will be wedged between The River and a built-up residential area. The plant could be extended into about one-half of the area proposed without lowering the value of the private homes in the neighborhood if the intervening open space was permanently established as a park and recreation area.

Your local laws regulate the volume of wash water taken from The River and the character of refuse returned. While this industrial waste of The Chemical Company is unpleasant to look at, it is not a health menace now. There is a serious question, however, if The River can take as much as the intended expansion would add to its pollution.

It is our judgment that you should deny the application to change the zoning to the extent requested for the expansion of The Chemical Company. You should change the zoning for approximately one-half of the proposed area, which would permit doubling production. You should acquire at city expense the remaining land for a public park. This would establish a buffer and permanently fix the character of the adjacent residential area.

We know that it is difficult for public officials to make any decisions which would appear to retard business. The proposed expansion, however, is greater than your city can absorb in an orderly manner. The margin between your

bonded indebtedness and your borrowing power is insufficient to pay for improvements you would need immediately. Such sudden growth would add greater annual tax burdens than you can bear. It would encourage unsound speculation. It would create a boom unlikely to survive.

Competition between communities for temporary war-time facilities often results in spotty over-congestion and permanent distortion of normal growth. This was true in many places during the last war and many communities regretted when the war was over that the persuasive powers of local leaders had left them with all the problems of a boom town after the boom had passed. In your own particular case, there are other communities in your general region that could share the burden of increasing production in plants similar to yours and it would be wiser to distribute some of the production which has been planned for The City.

We recommend that you point out to the directors of The Chemical Company that you are willing to cooperate in extending the plant for about 1400 feet along The River but that beyond this it would infect your whole community more than it can stand.

The Clock Company expansion requires no specific action by your City government. Increased production will largely involve the reemployment of former workers or the employment of their sons and daughters who grew up in the shadow of the established enterprise. It is a good thing for your community. A large number of the workers will be drawn from the flexible line between employable and unemployable. The new part of the industry, catching up on delayed manufacturing of ammunition components, will probably continue for a long time.

The conversion of the old Fort to muster troops for training is not strictly a matter before you but you should inform the War Department that the proposed housing of troops within the present reservation would cause congestion which is not allowed elsewhere in your city. While your water supply is adequate for increase in personnel at The Fort, the sewage treatment plant in this area is not large enough for the increased service. There will be traffic congestion on the streets crossing the railroad tracks at grade to reach The Fort and there is no justification for the municipality to spend considerable sums to widen roads and possibly eliminate grades without knowing how long the congestion will last. This camp should be located either in a larger city or be a self-contained unit in the open country. It does not belong in the heart of your city. The improved dock for the quartermaster's depot will not create any problems as the transfer of freight will be largely from ship to rail.

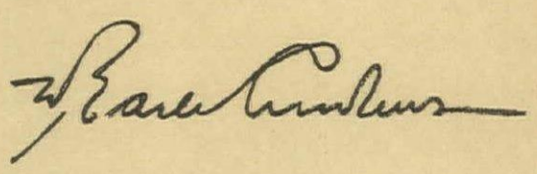
We advise that you call together the responsible heads of the three townships touching your city to work out uniform regulations for gas stations, hot dog stands, so-called tourist camps, and roadside signs. They are not permitted in The City and should not be allowed to crop up just over your line because the rural and suburban sections are as yet unzoned.

You have a good city. It grew from a trading post to a well-balanced metropolis. You built your streets, parks, schools, hospitals, university, water supply, sewage treatment works and other improvements as you learned that these things were good investments for people living in cities.

The heterogeneous plan of the old city flows with minimum confusion into the better layouts of later years. The map of The City speaks for the orderly growth of the community. It is evident that the past generations responsible took stock of conditions which were unlikely to change, foresaw clearly the major physical developments likely to happen anyway and adjusted incidental requirements to these inevitable happenings as they were needed and as you could afford them.

In the present emergency, the greatest problems revolve around the extent to which the proposed industrial expansion in The City will be permanent. It is impossible, of course, to estimate the length of time the accelerated program of munition-making will continue. It is certain, however, that at some future time it will taper off or stop suddenly. So the continuation of industry in The City at the scale proposed will depend largely on the possibilities of converting the plants to post-war production without too great changes.

We could not attempt to outline in a report of this scope details of plans. We have simply tried to remind you what to look out for and urge you to maintain the high standards which now make The City a good place in which to live.




LEGEND
BASEMENT SHELTERS
SURFACE SHELTERS
FOCAL SHELTER
BOMB PROOF
FACTORY SHELTER

Mayor of The City

City Hall

Dear Sir:

The City, with oil station, industry and transportation, is a target of total war. Total war strikes at civilian production, not primarily to kill people, but to destroy machines and drive the workers away from their posts.

Your program of Air Raid Precaution must have three objectives:

1. Humanitarian. The reduction of civilian casualties.
2. Strategic. Protection to be achieved in such a way as to release as many airplanes and soldiers as possible to carry the war to the enemy.
3. Political. Protection to be extended to all citizens equally so as to prevent dissension springing from class distinctions.

PASSIVE DEFENSE

First of all, passive defense is hiding from the enemy, and may be achieved by camouflage, erection of shelters, and evacuation of as many people as possible from danger zones. It is also essential to prevent the spread of fires, to minimize paralysis of industry by dispersing it, and to supply it with auxiliary utilities and well-planned emergency communications and transport.

CAMOUFLAGE

The City's rivers make it almost impossible to hide. However, the new plants outside of town and the extension of the chemical plant under the protecting bluff can be concealed. At night the blackout will be effective but here again reflection from the water will prove a handicap. The Park Department should be advised by military authorities in their tree-planting program so that the trees will help in the general camouflage scheme. Highly reflective roofs and road surfaces should be treated to reduce their visibility from the air.

TYPES OF SHELTERS

Air raid shelters are of five types:

1. Garden or surface shelters, providing protection from blast, splinters, and falling debris. These keep the population dispersed and minimize casualties.

2. Basement shelters can be made effective by reinforcing cellar walls and ceilings and providing exists which will still be open even if the superstructure collapses.

3. Factory shelters must be provided near each worker's post.

4. Large-group focal shelters must be provided in the business districts for those caught in the streets when warning is given. These should be divided

into compartments each holding no more than fifty people. The larger shelters must be equipped with sanitary conveniences, and those near the river must be safeguarded against flooding.

5. Complete bomb proofs for the main telephone exchange, the fire and police signal station, and the operating rooms in both of the main hospitals. Some shelter can be effectively provided by tunnelling into the hillside.

SHELTER POLICY

Until such time as a national program is formulated, the City should decide on a municipal program of protection for its citizens. Those citizens who can do so will probably build garden shelters, those below a certain income level must be provided for by the City. These family shelters need not be started until an emergency arises, provided the necessary materials are at hand. The City should require new industrial structures to allocate areas where shelters can be speedily built. Focal shelters for street crowds and recreational buildings have been tentatively located on the master plan. The City should inaugurate a survey to locate definitely such sites and determine which buildings have basements that can or should be trussed for use as shelters.

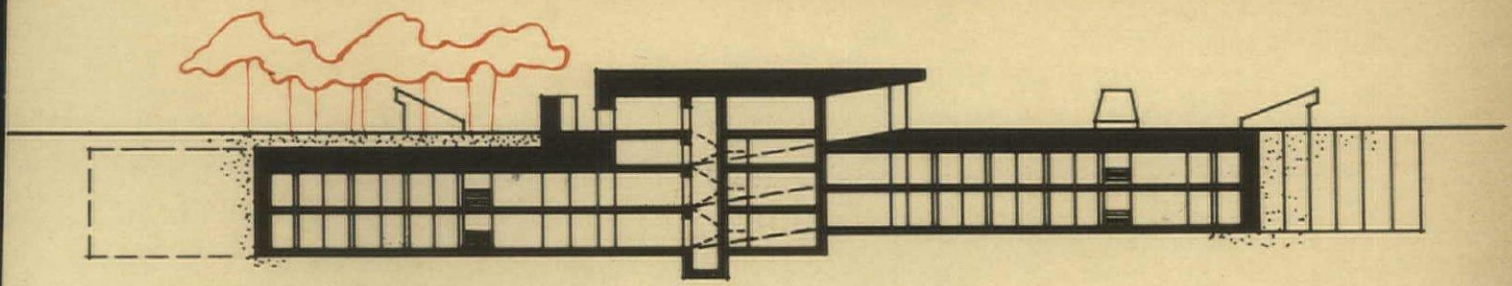
DUAL-PURPOSE SHELTERS

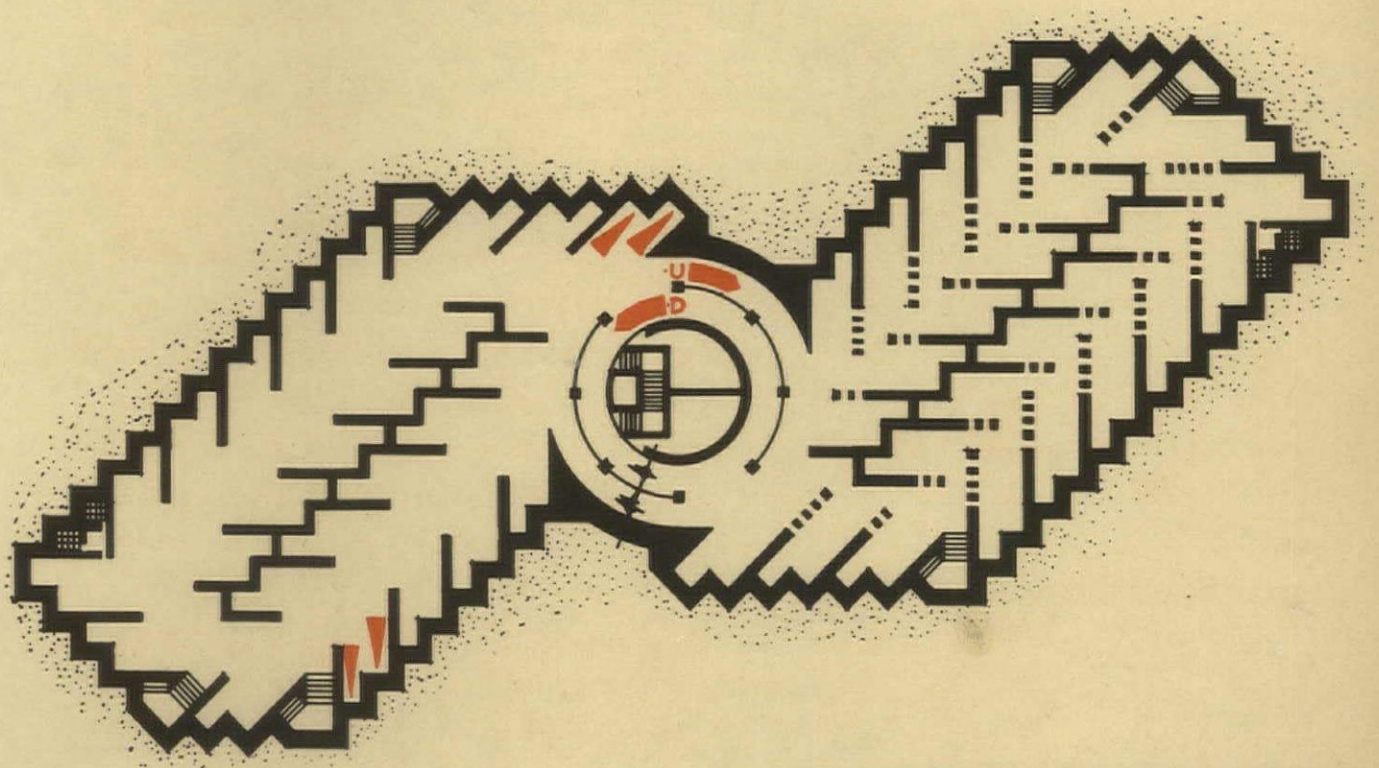
Large shelters will be expensive and take time to build. If they can be used for peacetime purposes, then the cost need not all be charged to "insurance." One suggestion has been the erection of underground parking areas, the objection being that the many columns needed for the loads of a bombproof shelter prevent easy parking of automobiles. This difficulty might be obviated by building all the column footings, designing the spans for parking and then installing temporary steel columns in time of war. Such a shelter and parking lot under the City's Center Park would be ideally located for a focal shelter and would help with the parking problem along Main and Ferry Streets. It is hoped that more examples of dual-purpose shelters can be projected as the study progresses.

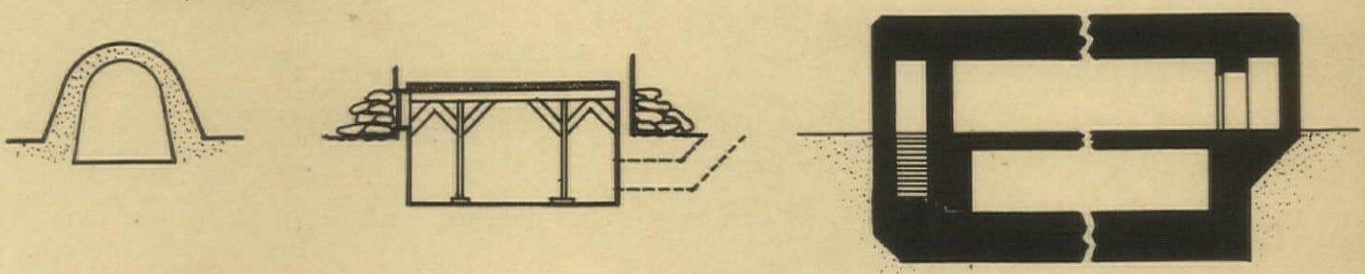
EVACUATION

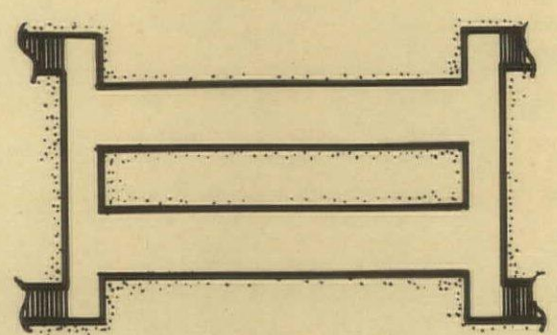
The present slum area near the freight yard should be razed. Its potentiality as a firetrap would endanger not only the lives of those in the area, but would also threaten the industrial plant along the river.

Plans should be made to have the children, aged and infirm leave the City. The summer houses, private schools, and hotels on the near-by lake can care for large numbers of people. The rural education system, by morning and afternoon sessions and the employment of the City's teachers, will be able to take on the extra load.









The drawings above show one scheme for a large bombproof shelter, capable of peacetime use as a parking garage. Staggered walls provide maximum strength with minimum wall sections. When taken over for A.R.P. the interior walls would be extended, as indicated by the dotted lines, to take the additional roof loads.

The diagrams directly above illustrate an Anderson type shelter (earth-covered metal sheets), a reinforced basement, and a bombproof. Note that in the latter the bottom slab is very thick to resist the action of bombs exploding deep in the ground. At the left is the plan of a factory bombproof with four stairways for rapid access and egress. Stairs should always face a concrete wall which acts as a baffle protecting the shelter's occupants.

Hospitals in the City should be cleared of chronic patients. Many of the rural sanatoria could take these patients.

It should also be recognized that some provision may have to be made for handling evacuated people moving inland from the coast.

ORGANIZATION

The primary job that must be done by the government of the City is to organize those groups which will bear the brunt of enabling the people to exist, and which will help to keep up production and morale. Signs and plans should be in readiness so that each citizen will know what he is to do in any emergency. Exhibits should be arranged to show the people how they can help defend themselves during attacks. Air Raid Wardens should be organized and trained. It will be their duty to get the people to shelters, cooperate with fire fighting brigades, and once the raid is over, keep traffic moving and help to complete the demolition of dangerous ruins.

All attics and other spots susceptible to incendiary attack must be kept under strict control. An air raid warning system must be set up.

The City's location probably insures it against daylight raids, but that does not keep it from being subjected to the blackout. All new industrial plants and other establishments in continuous operation must be able to function during the blackout by means of forced ventilation. Corners of buildings, curbstones, lighting standards, entrances, etc., should be painted white and other measures taken to aid during the blackout. The City must make sure that all vulnerable points in utilities, such as the water supply, electric lines, etc., may be replaced quickly, or by-passed, if destroyed.

The Air Raid Protection outlined above may seem elaborate. It is a form of insurance, something bought when it is not needed because it is without price if it is needed. The City may have but little time to decide on its policy, to plan and organize against air attack, for an outbreak of war will find the people demanding action---and for the sake of all of us, may that action be wise.

Richard W. Bennett

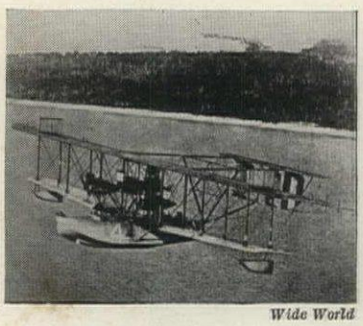
AIR RAID PROTECTION

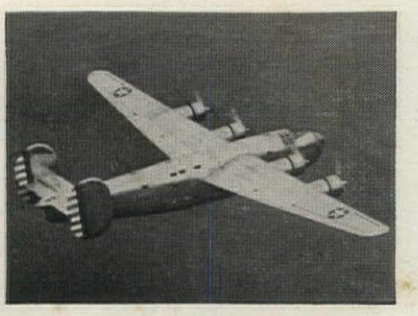
Oswald Wild

Whether Air Raid Protection is a subject of immediate U. S. concern is a question of expert military opinion—and of mass psychology. To date no decisive answer has come from either quarter.

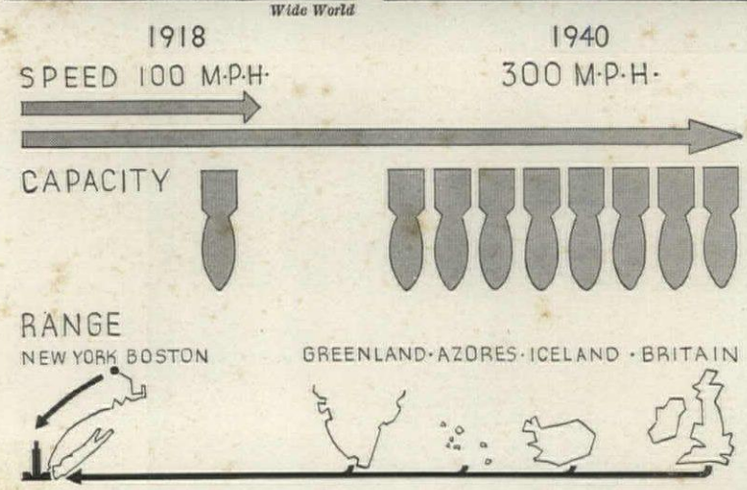
Meanwhile, the responsibility for successful Air Raid Protection—if and when needed—is not the least of Building's farflung Defense assignments. Preparedness means the development of carefully worked out skeleton plans for complete ARP. And it entails, so far as practical, insuring minimum hazards and maximum potential protection in the buildings now being designed and built.

Both jobs require an understanding of the nature of the danger which is to be guarded against, and





Wide World



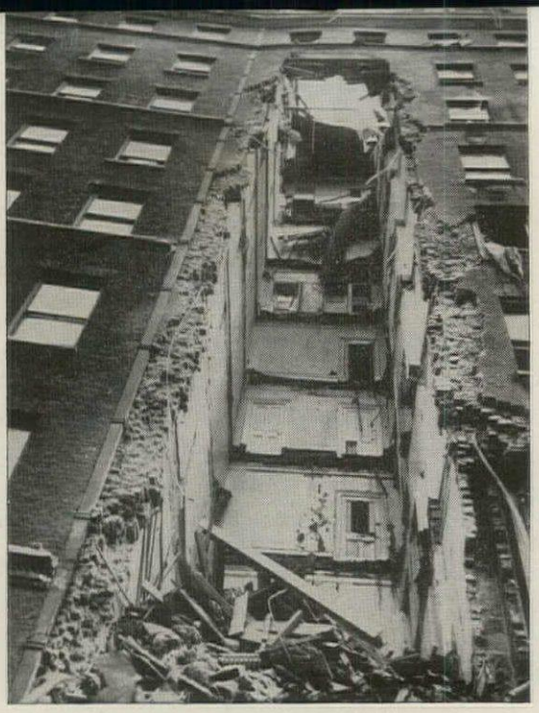
All data, drawings and photographs in this section were collected and prepared for THE ARCHITECTURAL FORUM by Erling F. Iversen. Mr. Iversen has just returned from a two year study of Air Raid Protection covering fifteen countries and 25,000 miles. He is now conducting a course on the subject at Pratt Institute.

For additional ARP and Camouflage references, see Bibliography, page 15.

a knowledge of the principles and methods which have so far been found to provide the most efficient protection.

Becoming the target of an enemy bombardier is the obvious first danger to any building. This is the danger of being seen, either by the eye, or, more particularly, by the camera. It is the even greater danger of being recognized—or mistaken—for an objective. The consequences vary from a direct hit to the shell fragments of an anti-aircraft barrage.

Study of the photographs and data on these pages will reveal the striking power of different types of bombs and the nature of damage inflicted



1

1. Bombs always fall at an angle, and frequently hit the side rather than the roof of a building. This photograph shows a wall-bearing structure which collapsed after a pier was hit at the third-floor level, indicating the weakness of this type of construction.

2

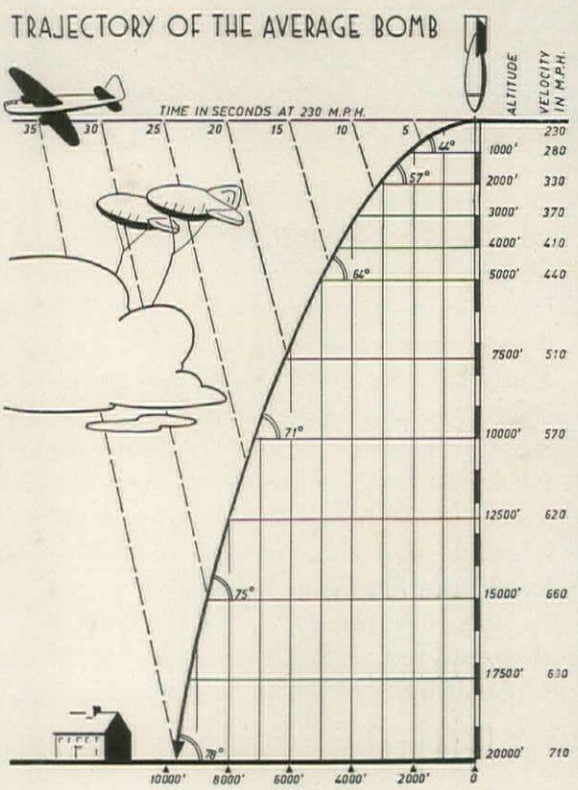
2. Effects of a delayed action fuse. The bomb exploded after passing through the upper floors.

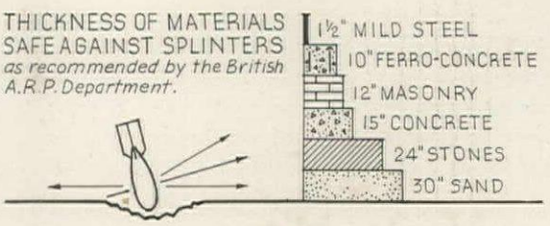
3. Fragmentation bombs explode immediately on impact, making but a small crater. Splinters fly horizontally at twice the speed of a rifle bullet. As illustrated here, they can penetrate an eight-inch brick wall.

3

4. Light-case bombs also explode at the surface. The comparatively large explosive charge produces a tremendous blast effect, with results as shown.

4





1, 3. Associated Press of Great Britain, 2. Graphic, 4. Acme

under varying circumstances—all of which must enter into defense calculations. And to these manifold risks should be added the incendiary bomb.

In the face of such dangers Air Raid Protection has three major objectives:

1. To prevent men and buildings from becoming targets.
2. To minimize damage.
3. To provide escape in bombproof shelters.

Most talked about, the air raid shelter is logically a last resort.

An underlying principle of all ARP measures is to spread the risk. Thus, the first step in preventing a building from becoming a target is to

1

1. The heavy-case bomb has a small charge but high penetrating power. Designed to pierce armor plate and reenforced concrete fortifications, it is seldom used against cities. The illustration shows a deep crater with practically no damage to nearby shops.

2

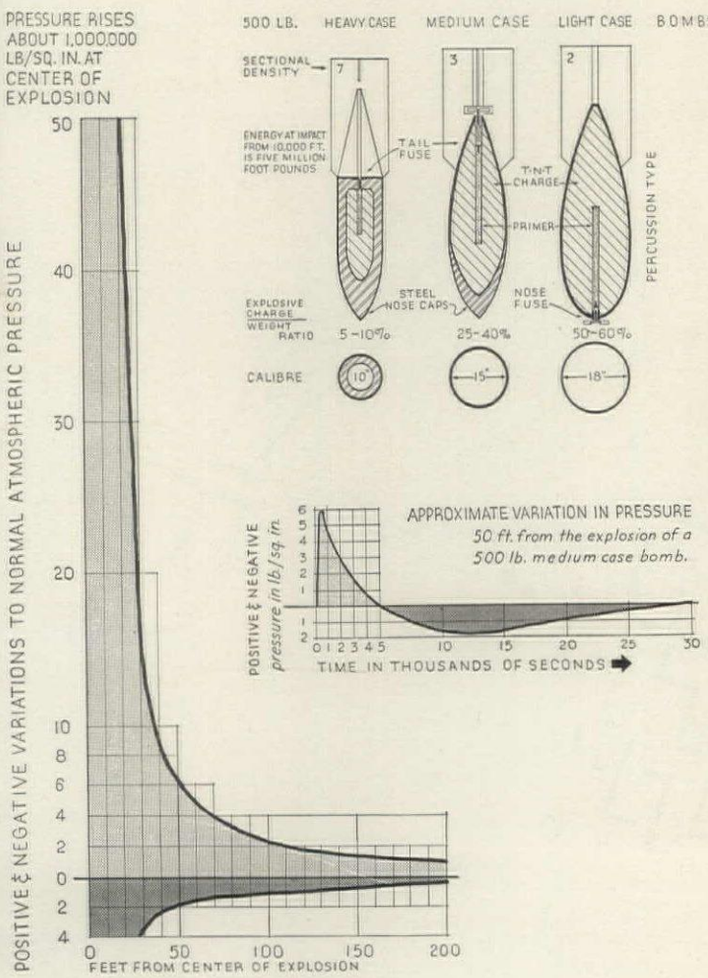
2. Most devastating are the medium-case bombs, which combine the "favorable" characteristics of all other types. The effects of a 500-pound medium-case are shown.

3. Immediately after the shock of an explosion there follows a suction wave (see diagram), less powerful than the initial blast, but lasting three times as long. Walls, where not properly anchored to the floor joists, may collapse outwards due to this effect.

4. The pressure caused by the explosion of a 500-pound medium-case bomb will be about 30 pounds per square inch at a distance of 25 feet. A substantial masonry structure can withstand such a pressure, as indicated in the photograph, and most surface shelters are designed on the basis of this fact.

3

4



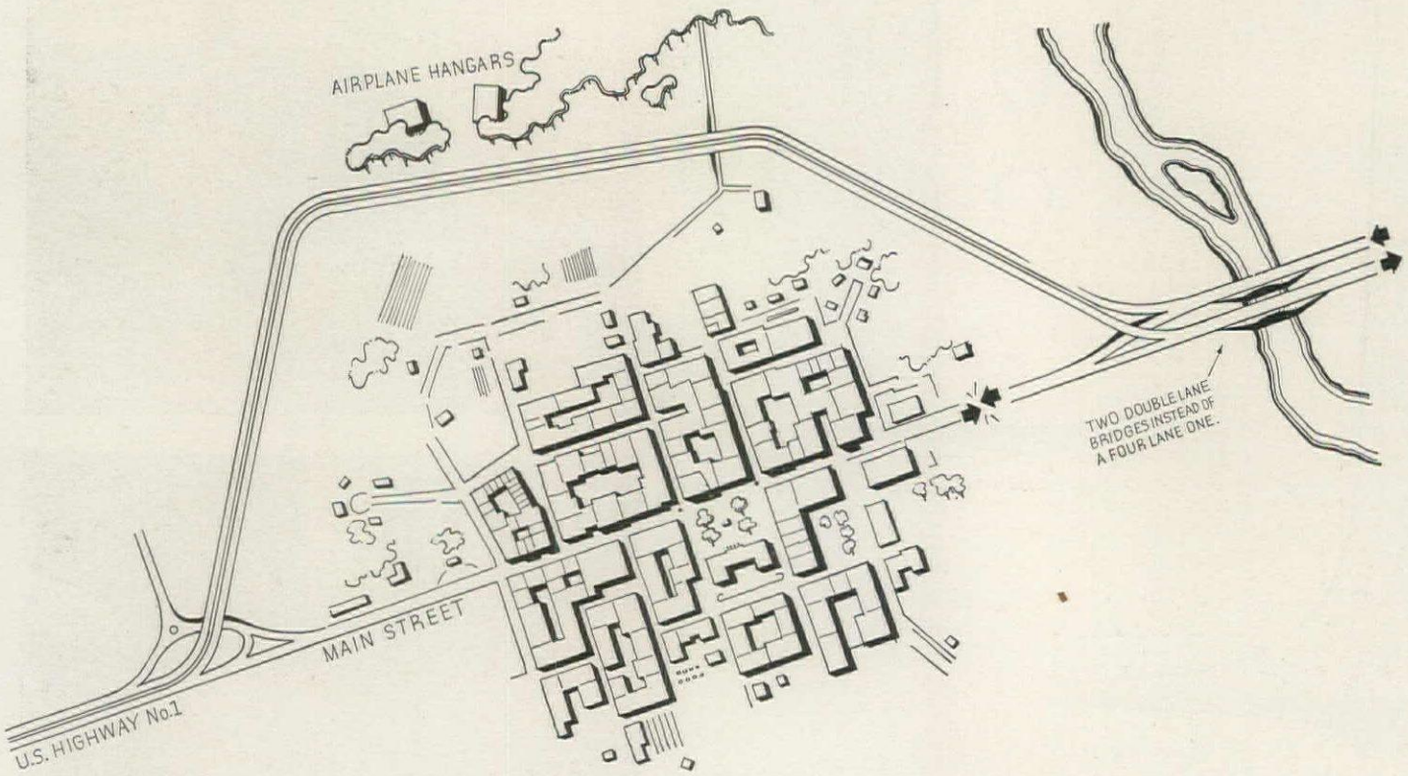
1. Associated Press of Great Britain, 2. Graphic

Associated Press of Great Britain

HIGHWAYS passing through town and village centers are a source of congestion; in wartime these bottlenecks may seriously hamper the movement of mechanized troops and equipment. Such photographs as the one shown give sufficient evidence of the completeness with which a road through a town may be blocked. In the open country the highway may also be bombed; under such conditions, however, the sides of the road are not closed in by ruined buildings, and traffic can get past the crater without much difficulty.

The by-pass road, used more and more as a means of lessening congestion, has distinct military value as well as peacetime usefulness. One way in which this value may be enhanced is suggested in the plan below.

The drawing shows a two-lane road, with a dividing strip of asphalt. By orientation in the direction of prevailing winds, the various sections of the road could serve as an excellent emergency airport. Trees are planted close to the hangars to eliminate ground shadows. Each lane is served by a separate bridge at the crossing, a practice frequently followed on the German military highways. The increased cost over that of one bridge is slight, while vulnerability to air attack is greatly reduced.



locate it away from other exposed targets which include congested industrial areas, main rail and road arteries and primary military objectives. Preferably, the location should afford natural protection through trees and hills—surroundings which suggest neither military nor industrial activity and offer covering and shadows which can be further exploited through camouflage.

Just as the location should avoid announcing the building's presence, it is important that the design of the structure itself be as unobtrusive as possible from aerial observations. Revealing geometric patterns which cast recognizable shadows, reflecting windows and exposed surfaces which pick up light, and colors which contrast with the general surroundings should be avoided. Prominent and characteristic features such as chimneys should be as far as possible from the main center of activity. Breaking up the buildings into units of varying sizes and shapes and generous use of trees and informal landscaping further reduces the hazard of discovery.

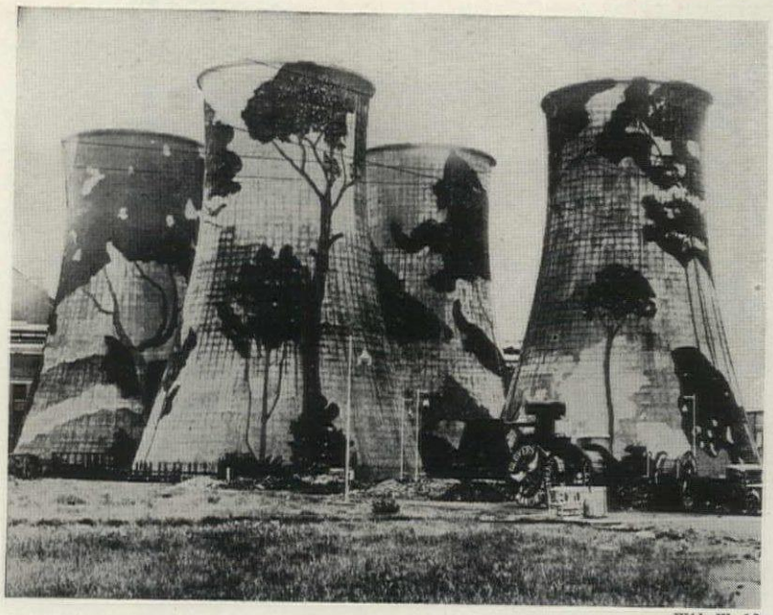
Many of these principles are hostile to the ordinary demands of peacetime economy and design. However, the efficiency of war-time camouflage can be increased in direct relation to the extent that such provisions are made in the original plan and location of the building.

Camouflage, as generally known, is the imitation of the surrounding color scheme, or the disruption of the general form of objects to make them indistinguishable. To be effective, camouflage must work in all likely weather and with equal effectiveness under varying day and night conditions.

The devices which can be employed are limited only by the designer's ingenuity. Stock items include painting the roofs with flat coats of protective covering, planting roofs with grass and shrubs, introducing new and extraneous shapes to the structure, spreading leaf-covered nets, etc. Particular attention is given to all approaches which might reveal the building's presence, i.e. railroad spurs, docks, roads and parking fields. Under certain conditions the camoufleur's art includes diverting the enemy's attention to decoys in the form of neighboring evacuated buildings.

In planning new buildings, much can be done to minimize air raid damage. The risk of complete demolition can be considerably lessened by spreading building units over a wide area. Further assurance is provided by auxiliary utility connections and traffic exits, and by decentralizing essential bottleneck operations.

Provisions should be made to step up to the maximum all normal facilities for fire prevention and fire fighting, with particular attention to roofs



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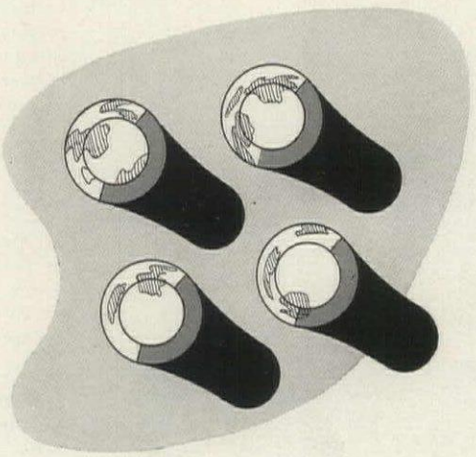
Wide World



2

3

International News, Crown Copyright

4

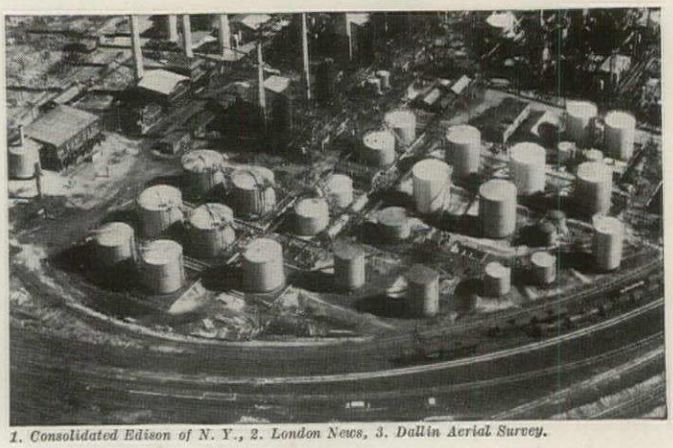
1. The water-cooling towers of a power house in England. This type of camouflage serves little useful purpose, since it would not be visible from a height of two miles or more, and the structures would stand out very distinctly.

2. A diagram showing how the water towers would actually appear to a flyer. The problem here is largely one of erasing shadows, and its solution is not to be found in the mere application of paint. Placing trees around the towers would be one means of concealing them, and much more practical. Obviously such measures cannot wait until war comes, and the improved appearance of normally unsightly industrial communities offers one incentive for carrying out a tree-planting program in peacetime.

3, 4. In the group of tents paint has also been used, but more effectively. Having sloping roofs, the tents cast small shadows and would hence be less easily detected. Irregular placement would be a further aid to concealment.

1

2



3

1. Consolidated Edison of N. Y., 2. London News, 3. Dallin Aerial Survey.

and to the location of storage facilities for inflammables which should preferably be underground. The menace of glass splinters demands that fenestration be planned to make screening devices feasible.

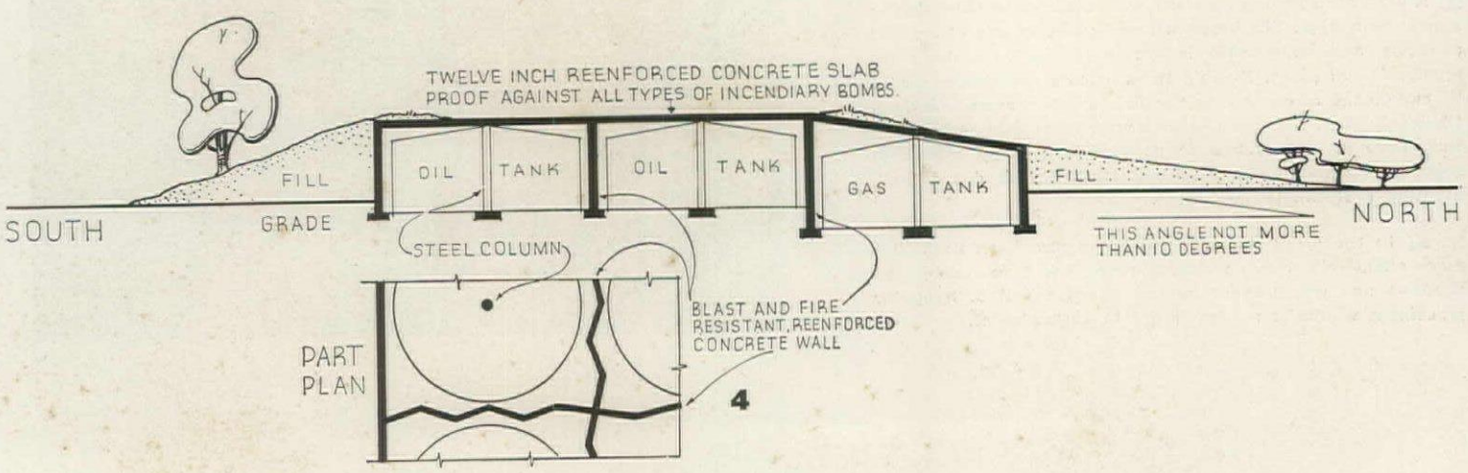
Decentralization of the buildings not only lessens the danger of complete demolition from one hit, but also reduces the effectiveness of successful projectiles whose explosive violence is increased if the expanding gases are confined by neighboring buildings. Thus, open spaces between buildings are highly desirable, and narrow courts and alleys are to be avoided. Structural frame construction is preferable to solid masonry walls. And simplicity of design will eliminate the danger of falling decorative elements.

1. Hiding so prominent a structure as a power plant is of tremendous importance. One well-placed bomb between the stacks and the plant, along with factories dependent upon it, might be put out of commission for the duration of the war. Where new units are to be built, they should be designed to resemble adjacent buildings as closely as possible, using forced draft to eliminate the need for excessively tall chimneys. The strategic advantages of building a number of small plants rather than one large one should also be evident. Another solution might involve the installation of telescoping metal chimneys, and of mounting decoys on evacuated firetraps in the neighborhood.

2. Many chimneys in England have been painted as shown. The technique is effective only when the tower is seen from a low altitude. Highlights and shadows cannot be eliminated, or even materially reduced in this manner.

3. An excellent illustration of the vulnerability of industrial structures. The forms of the oil tanks are unmistakable, and while their light-reflecting properties might be reduced by the use of paint, they cannot possibly be hidden in this manner. It will be noted that some of the tanks have been so treated that their tops merge in with the ground; nevertheless the shadows and highlights make them instantly recognizable.

4. The concealment of oil tanks is not difficult, particularly where the terrain is somewhat hilly. The diagram shows how they could be hidden from aerial observation on level ground. The ten-degree slope to the east, north and west will not cast shadows, and when landscaped the spot would escape detection even on an aerial photograph.



4

A. R. P.

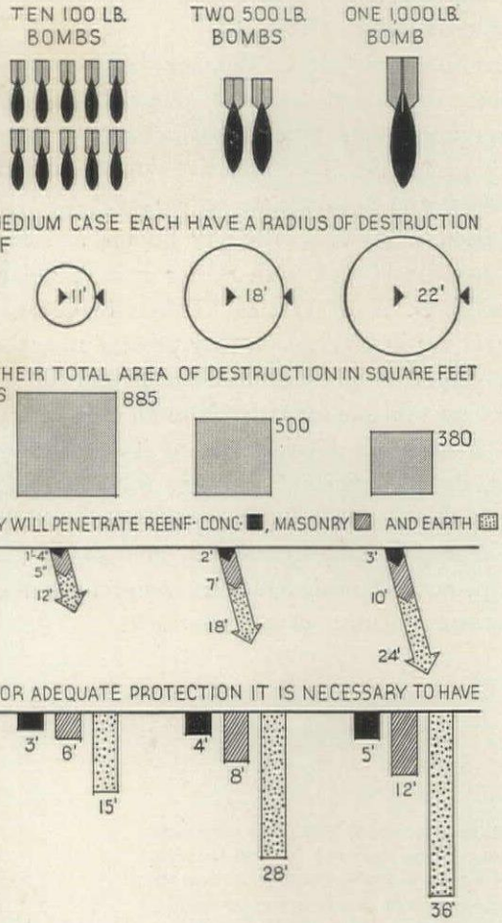
1. All the shelters illustrated at the right offer protection against blast and splinters, but will not withstand a direct hit. Since the overwhelming majority of casualties come from bomb fragments, concussion and falling debris, such structures have an extremely important function. Shown here are individual steel shelters for air raid wardens, being tested to determine their resistance against falling masonry.

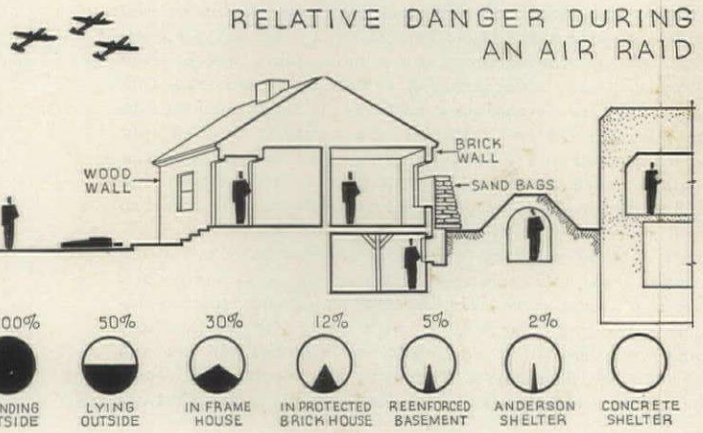
2. A monolithic concrete shelter of American design.

3. Another concrete structure, built of precast blocks. It would be more effective if it were not so large. Use of a window as shown is entirely inadmissible.

4. A group shelter, later to be covered with a six-inch slab. The brick partitions are only for privacy.

The diagram directly below illustrates the destructive power of the more common types of bombs. Provision of complete bombproofs, with roofs containing five feet of reenforced concrete, is obviously completely beyond the means of the individual.





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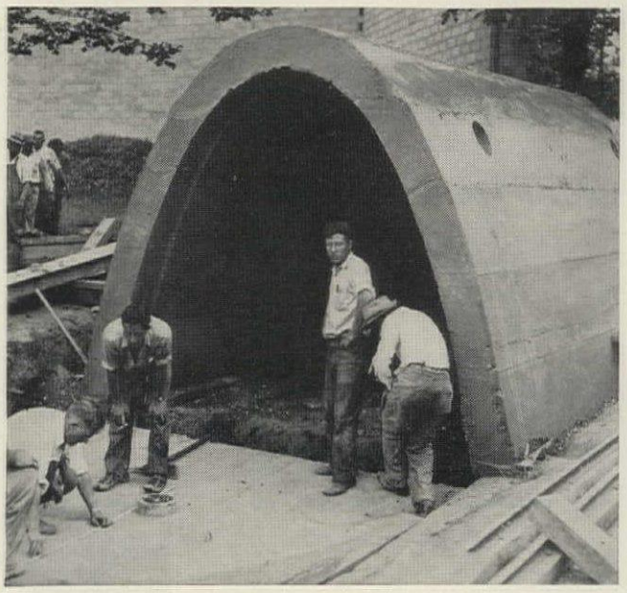

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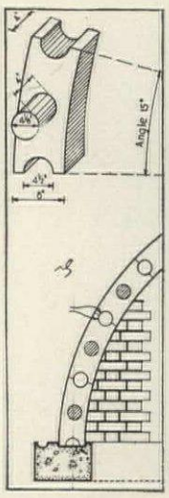

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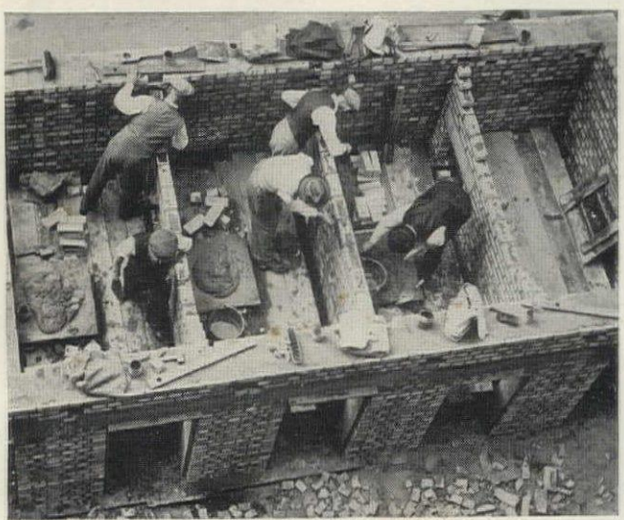

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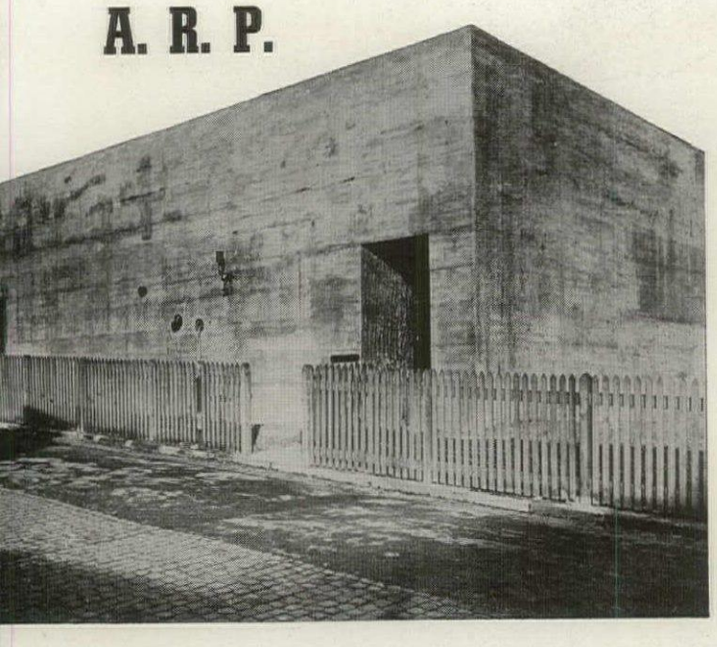
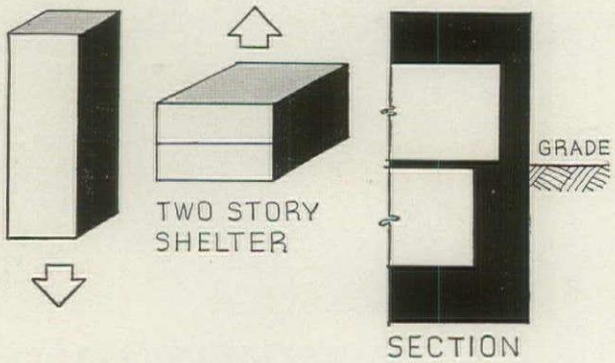
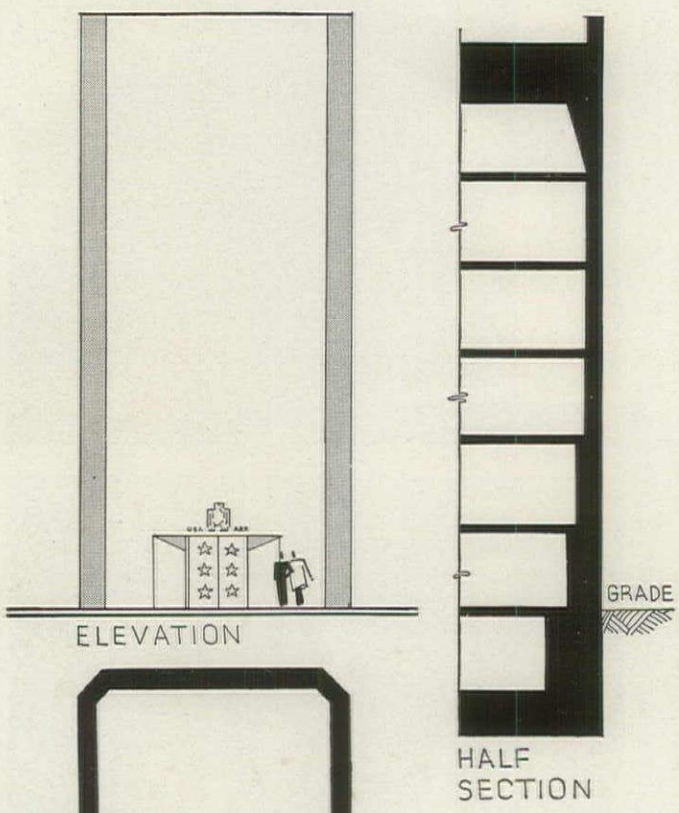
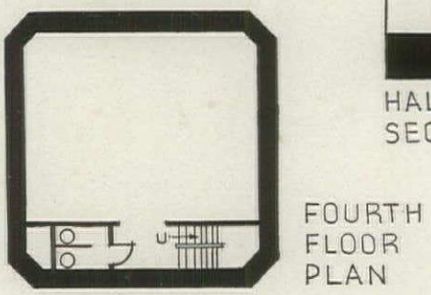
1. Associated Press, 2. Acme, 4. Fox Photos, Ltd.

A. R. P.









As in all other phases of air raid protection, the principle of spreading the risk applies to air raid shelters. Fundamental reason: If five hundred people are divided among five shelters instead of concentrated in one of equal quality, potential casualties per successful hit are reduced 80 per cent. British practice has tended to favor many small shelters over few super-shelters for the added reasons that short-notice raids require ready access to nearby shelters and it was also found quicker and cheaper to turn out a quantity of small minimum shelters rather than attempt a program of large bombproofs.

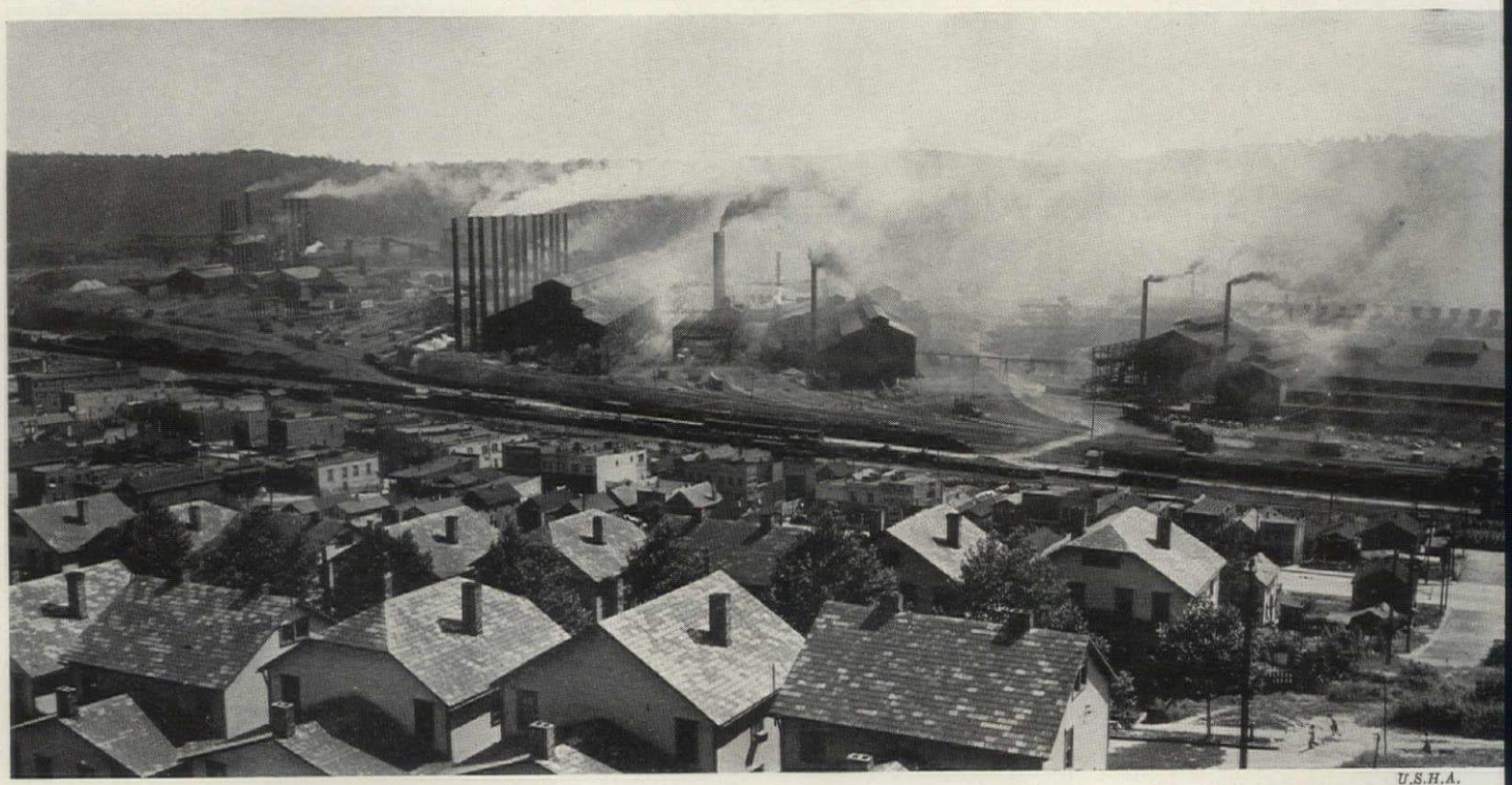
Due to a geography which guarantees advance warnings and the absence of an immediate emergency, this reasoning is not entirely applicable to the U. S. Many authorities believe that the best—and most economical—protection can be provided in this country through relatively few large shelters affording maximum safety.

As is seen on pages 435 and 436, the shelters which have been developed to date range from low cost mass production structures which afford "reasonable" protection to expansive under-ground works which aim at complete immunity.

As has been suggested with wry humor in some British periodicals, and with rather grim Utopian vision in H. G. Wells' cinema "Things to Come," the present era of civilization may presage remarkable development of subterranean living. Obviously, the air raid shelter today is in an elementary form. The ultimate development of its protective qualities, its all-important sanitary facilities, and general livability depend partly on the discovery of new materials and techniques, and partly on the competence of designers who comprehend the manifold consequences of aerial attack.

The structure illustrated at the upper left is a complete bombproof shelter with two levels, designed for 200 persons. It is safe against a direct hit by a 1000-pound bomb and required two cubic yards of reenforced concrete per person. The suggested seven-story shelter will accommodate 800 to 1,000 at less than one cubic yard per person, while its roof is safe against 2,000-pound bombs. Shelter capacity is computed at the rate of three and a half square feet of floor area per person when artificial ventilation is provided. One reason for the comparative economy of the design lies in the fact that extreme thickness of concrete is required only at the ground and roof levels. Large shelters of this type could be used in this country if need arose, because due to the great distances, there would be ample time for people to walk several blocks to a shelter after the warning signal. Such shelters could be erected in vulnerable, likely-to-be bombed areas, and could serve in peacetime as storage depots. The roof would serve as an excellent platform for anti-aircraft guns and searchlights, with space for ammunition, generator, ventilating equipment and quarters for the gun crew on the floor below. The main floor could have rooms for air-raid wardens and their equipment, and a first-aid station.

DEFENSE HOUSING



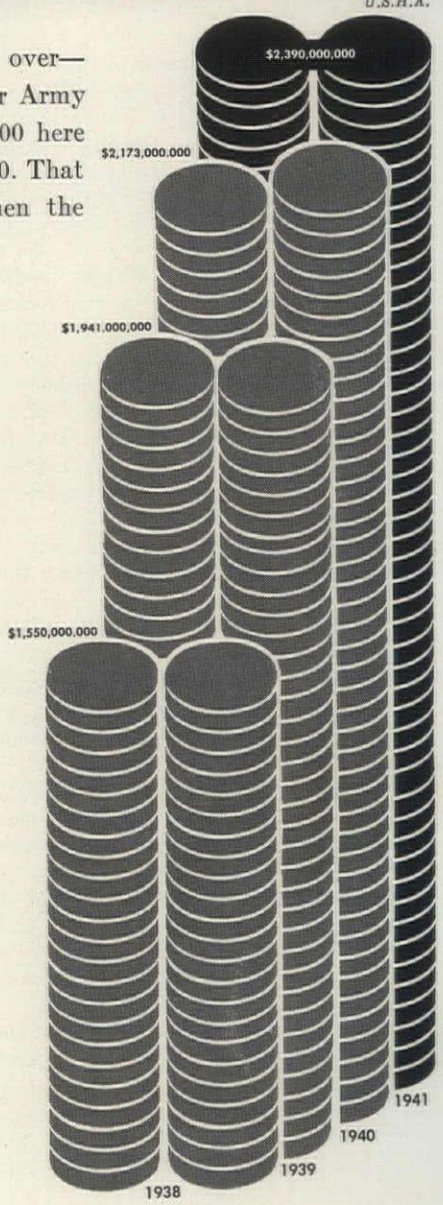
U.S.H.A.

To assure adequate and prompt defense, new housing facilities are required the country over—3,000 dwelling units for Ranger Aircraft Engine employes in Farmingdale, N. Y., 200 for Army civilian employes in Savanna, Ill., 1,500 for Navy enlisted men in Long Beach, Calif., 5,000 here and 50 there, a growing grand total now officially and conservatively estimated at 200,000. That is a lot of housing; it comes close to one-half the 475,000 total produced last year when the building industry, sparked by the biggest peacetime housing demand in history, set a ten-year production record. And, it means a lot of money—if each dwelling unit costs $3,500, it means $700 million, one-third the $1.9 billion spent on residential construction in 1939. Yet, this is only a cushion under normal housing needs which should continue about as large as ever.

Regardless of its attitude toward meeting normal needs, Building must quickly supply the defense housing demand. Otherwise, housing shortages in vital defense centers will deflate the morale of both the armed forces and the industrial workers and will provoke a high turnover in industrial labor with attendant financial loss, time wastage and production inefficiency. In the previous national emergency, some informed observers predicted that, had hostilities continued beyond 1918, the acute housing shortage would have caused a breakdown in U. S. armament production. Prime lesson of that previous emergency was that housing must be considered in conjunction *with* military and industrial expansion, not *after* it; and in many cases, construction of the former must precede the latter. So far, that lesson has not been heeded; industrial and military construction is already a leap ahead of housing.

Other lessons, however, have been heeded, for the U. S. has already acted to prevent housing from falling too far behind. Today, Government has a Defense Housing Coordinator, the beginnings of a defense housing program, $250 million with which to grease it and a half-dozen housing agencies among which to divide the money. When the apportionment is complete and the recipients have settled down to work, they will locate, design and finance about 80,000 dwelling units—all of them for rent, most of them detached, some of them temporary and, supposedly, none of them in competition with private enterprise. To the initiative of local architects, builders, and financiers is left the bigger and equally important task of producing the other 120,000 dwelling units—primarily in areas where the housing demand will exist after the emergency has passed.

While Government housers are getting squared around to the gigantic organizational job before them, Building may study the many facets of the defense housing demand (p. 438), review the legislation which will eventually drop $250 million in its corporate purse (p. 441), preview the defense housing machinery (p. 442) and consider the design and construction of two dozen housing projects which either have been developed specifically for national defense purposes or are of such a nature that they cast helpful light on the picture (p. 444-467).



For additional references on Housing, see Bibliography pages 3, 4, 10, 11, 12, 13, 16.

DEMAND

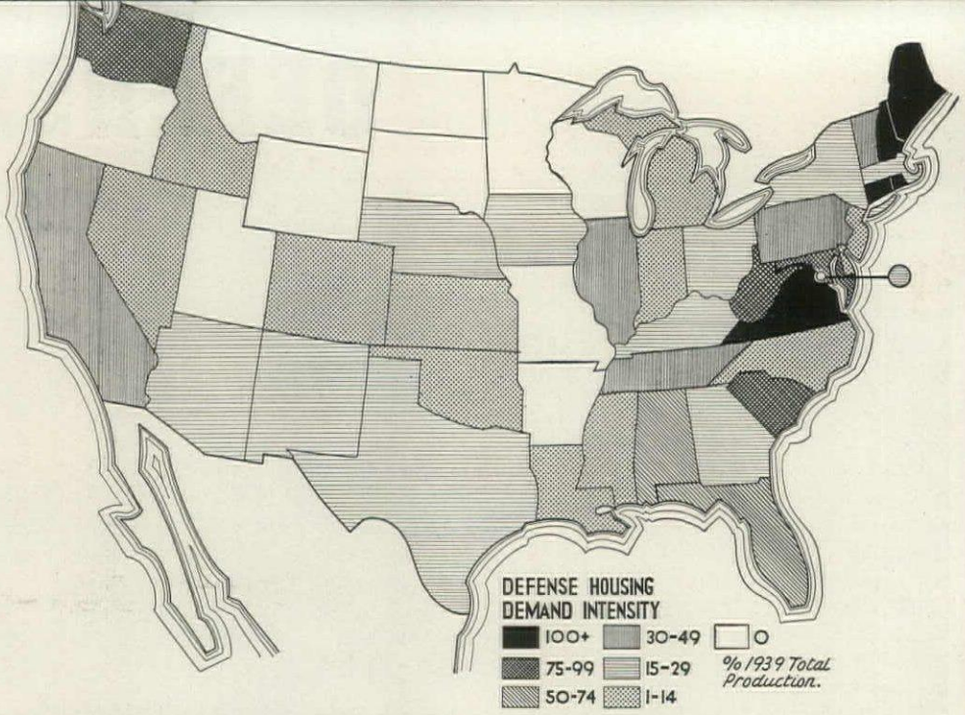
Before national defense became the topic of the day, the housing need was placed by informed economists at some 1.2 million dwelling units annually during the Forties—800,000 to provide for newlyweds, growing families and people whose houses burn down, blow away and wear out, plus 400,000 more to "pay off" the accumulated housing deficit. Two and a half times last year's production, this total is a statistical measurement of a potential demand which must be met to bring the standard of U.S. living up to pre-Depression levels. By adjusting its operations to the market and by better merchandising its products, the building industry in recent years has translated much of this potential demand into insistent demand, and this year will produce close to 525,000 new dwelling units —more than twice the average annual volume of the trying Thirties.

Today, this big, normal demand still exists. But, the national defense program, with speed as its keynote, has spotlighted the need, has shifted and concentrated it and, above all, has made it imperative that much of it be supplied immediately. As painfully proved by World War I experience, housing conditions govern the supply and turnover of labor which, in turn, govern the speed and efficiency of the nation's industrial and military machinery. Adequate housing is a prerequisite to adequate national defense.

GENESIS

Creation of the defense housing demand began with the first injection of the $13 billion shot-in-the-arm which Government is administering to the national economy. To handle defense orders, manufacturers the country over are stepping up existing production facilities; many are erecting entirely new factories. Government-operated armament plants are expanding, and new ones are being built. Moreover, to accomplish the end objective of national defense, the growing army, navy, marine and air corps are requiring bigger bases and more of them.

Were generally increased employment the only factor, defense housing would be a comparatively simple problem. But, there is another: the employment increase is spotty, not general, and entails a shifting of workers from one community to another in step with labor demand. To care for this shifted population segment is the defense housing problem. In general, it means the immediate provision of adequate shelter wherever military or industrial expansion has over-taxed the available supply. Statistically, it means the production of some 200,000 new dwelling units as well as the procurement of countless others (via remodeling, renovation, improved transportation, etc.) which already exist but are either substandard or out of reach.



DEFENSE HOUSING DEMAND BY STATES—Dwelling Units

STATE	Total DEMAND 1	To be supplied by ARMY 2	NAVY 3	USHA 4	Required BALANCE 5
Alabama	2674	250	—	624	1800
Arizona	180	180	—	—	—
California	15775	1375	2450	600	11350
Colorado	300	175	—	—	125
Connecticut	12210	—	100	1000	11110
Delaware	40	40	—	—	—
Dist. of Columbia	1600	—	—	—	1600
Florida	7500	800	550	200	5950
Georgia	1614	850	50	614	100
Idaho	100	100	—	—	—
Illinois	5200	500	200	700	3800
Indiana	535	35	—	—	500
Iowa	800	500	—	—	300
Kansas	125	125	—	—	—
Kentucky	1200	700	—	—	500
Louisiana	400	—	—	—	400
Maine	650	150	—	—	500
Maryland	3830	1130	1010	—	1690
Massachusetts	3100	500	250	—	2350
Michigan	470	380	90	—	—
Mississippi	100	50	50	—	—
Nebraska	500	—	—	—	500
Nevada	50	—	50	—	—
New Hampshire	2200	—	200	400	1600
New Jersey	6075	625	200	—	5250
New Mexico	150	100	—	—	50
New York	7720	220	30	—	7470
North Carolina	550	550	—	—	—
Ohio	2500	—	—	—	2500
Oklahoma	350	150	—	—	200
Pennsylvania	8275	—	—	—	8275
Rhode Island	3000	—	838	262	1900
South Carolina	3100	200	355	400	2145
South Dakota	50	50	—	—	—
Tennessee	2900	—	—	—	2900
Texas	5100	1050	925	250	2875
Vermont	60	60	—	—	—
Virginia	13850	550	3035	1600	8865
Washington	3400	600	150	750	1900
W. Virginia	2700	—	450	—	2250
SUB TOTAL	120,933	11,995	10,983	7,400	90,555
Alaska	325	—	—	325	—
Canal Zone	5000	—	2000	400	2600
Cuba	400	—	200	—	200
Hawaii	3550	550	500	—	2500
Philippine Is.	50	—	50	—	—
Puerto Rico	1330	530	450	—	350
Virgin Is.	100	—	50	—	50
TOTAL	131,688	13,075	14,233	8,125	96,255

1—Total reported demand as itemized on p. 440; all figures are estimates, most are conservative, a few may be excessive. 2—Officially reported distribution of units to be built by PBA with Army's $45.7 million. 3—Unofficial estimate of distribution of units to be built by Navy with its $44.0 million. 4—Actual distribution of units in 21 defense projects to be financed with $31.1 million of USHA funds. 5—Part of this "balance" will be supplied with the $150 million FWA housing fund. See "Procedure," p. 422.

Such, in brief, is the national view of defense housing needs. But, the picture does not compose that easily. Essential to a wise and rapid solution of the problem is analysis of the defense housing demand's many facets which may be classed under two all-important headings: "where"—the local sources of the spotty demand—and "for what"—the type of housing required to meet it.

WHERE

While in its assignment of defense contracts and the selection of sites for new armament plants, Government may be wisely influenced by local labor and housing conditions, it is a sure bet that most of the industrial burden will be carried by a comparatively few States—those that already have production facilities and can get under way immediately. Today, about 75 per cent of all U. S. manufacturing activity takes place in only 200 of the nation's 3,070 counties, most of which are east of the Mississippi and north of the Ohio and Potomac Rivers. It is therefore an equally sure bet that most of the industrial defense housing demand will be concentrated in this area —the U. S. machine shop comprised mainly of Connecticut, Delaware, Illinois, Massachusetts, Michigan, New Jersey, New York, Ohio and Pennsylvania. Other areas of intensified demand will be found along the seaboards where production and maintenance of a two-ocean navy must necessarily be handled. In this category fall California, Maryland, Rhode Island, South Carolina, Virginia (which along with Alabama, Indiana and Wisconsin are also manufacturing States of secondary importance), Florida, Texas and Washington. Also in this second group are three of the top-notch industrial States—New York, Pennsylvania and New Jersey —whose housing demand therefore is apt to be doubly acute. Because they are largely insular or peninsular, most U. S. Territorial possessions will also be pinched for housing under the expanded naval program.

Outside these States are other communities whose housing supply may prove inadequate for any one of a number of reasons: industrial expansion, establishment or enlargement of nearby military posts, construction of munitions plants, etc. And, a defense industrial boom in one city may sap the housing supply of its unboomed neighbors. Only a few States will escape the emergency housing demand. It now appears that Arkansas, Minnesota, Missouri, Oregon and Wisconsin will be only lightly affected; that Montana, North Dakota, Utah, and Wyoming may go scot free. (See map and tabulation left.)

Within the affected States, individual communities will experience a defense housing demand the extent of which will vary in direct proportion to the nature and capacity of its industrial production or to its strategic military importance, or both. While it is too early accurately to estimate the defense housing demand for each affected community, it is possible to spot the communities where a defense housing shortage is either acute or anticipated. A list of some of the most important of these potential trouble centers, together with an indication of the principal source of the housing demand appears on the following page. Other cities will fall in line as Government lets more of its defense contracts, spreads them over a wider base and furthers its announced intention to decentralize industry and move it inland. It is understood that the War Department favors the establishment of new industrial plants—if not the eventual re-establishment of existing production facilities—in localities at least 250 miles from either seacoast.

FOR WHAT

Just as the defense housing demand is specialized in location, it is specialized in several other aspects which determine the type, size, cost, construction and durability of the needed dwelling units and dictate whether they must be built for sale or rent, and by private enterprise or Government. Similarly, just as the quantitative demand must be measured locally for complete accuracy, its qualitative dimensions are dependent upon local factors and will vary widely in accordance with the nature of the demand. From an analysis of the demand in its broadest aspects, however, it is possible to gauge roughly the kind of housing required for national defense.

FAMILY INCOME

While workers in defense industries* earn substantially more than industrial workers as a whole (1938 average annual income: $1,430 and $1,272, respectively), their families are far from easy street. Unfortunately, they cannot afford the type of new housing which the building industry is accustomed to produce. Current wage rates in the selected defense industries average about $31 per week or $1,550 per year, assuming a full 50-week work year. The upper 30 per cent of these workers pocket an average of about $50 per week or a comfortable $2,500 per year; the middle 40 per cent, about $29 per week or $1,450 per year; the lower 30 per cent, about $20 per week or a slim $1,000 per year. Those earning less than $1,000 per year are largely unskilled workers, who are drawn from the ranks of *local* unemployed and are not, therefore, a part of the migratory group which causes the biggest housing headache.

Applying the nominal rule-of-thumb that families in these income brackets may economically spend 20 per cent of income on housing expenses (including rent or mortgage amortization and interest, maintenance costs, taxes, etc. but excluding heat, light and refrigeration), it is apparent that these three groups of industrial defense families can afford shelter costing an average of $42, $24 and $17 per month, respectively. Obviously, the lowest income group must be excluded from the market for new housing, for its annual savings (from which come down payments on purchases) are nil, and its monthly shelter allowance would barely rent two small rooms in private enterprise's cheapest new apartment project. Consequently, where new housing is required for this group, it must be supplied, as in the past, via Government subsidy.

In addition to industrial workers and their families, the shifted population segment includes the families of men in the nation's armed forces. To the 250,000-man regular army of this summer have been added 110,000 more "regulars," and soon to be called are 225,000 National Guardsmen and 800,000 draftees—a grand total of close to 1.4 million men by the middle of 1941. Most "regulars" and guardsmen under the rank of sergeant and almost all draftees will be unmarried, and their housing (tents and barracks) will be provided by the War Department on military reservations (see p. 344). Non-commissioned officers on the other hand, may be married and will require housing for their families —off the reservations in many instances. Depending upon their rank (staff, technical, master, etc. sergeants) and extent of service, these "non-coms" are paid $60 to $158 per month and are given an additional allowance for subsistence, another for rent. The latter runs about $23 per man per month. Families of commissioned officers, including "regulars," guardsmen and reserves will also call for some off-reservation housing. Their monthly salaries run from $125 (2nd Lt.) to $333 (Colonel); their monthly rent allowances from $40 to $120. (Presenting no housing problem is the army's highest paid officer, Retired General Pershing who gets $13,500 per year plus an allowance of $8,000 for "quarters, heat and light.")

Due to the instability of this Army demand, most of that part of the housing

(*Continued on page 468*)

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* Ammunition, chemical, machinery, ordnance and shipbuilding industries—the major producers and the ones which cause the greatest part of the defense housing demand.

Due to space limitations, THE FORUM *presents on these pages a necessarily brief analysis of only a few of the defense housing demand's many aspects. For a more complete study of the problem, reference is made to "Housing for Defense," a timely document for both public and private housers to be released this month by the Twentieth Century Fund. Prepared under the direction of the Fund's housing researcher, former assistant FHAdministrator Miles Lanier Colean, the text of this comprehensive 200-page book was made available to* THE FORUM *in proof form, and several of the facts and observations presented therein are mirrored on these pages without further reference to their source.*

DEFENSE HOUSING DEMAND BY CITIES

The Army and Navy have made known many of the locations of their defense housing needs, and the U. S. Housing Authority, on the basis of local surveys, has estimated some additional defense housing requirements. Housing needs in other trouble centers have been surveyed and estimated by the Defense Housing Co-ordinator's office, but it chooses to keep them secret. From all available sources, THE FORUM has compiled the following tabulation of defense housing requirements by cities. It does not purport to be entirely accurate, for the figures are based upon estimates reported by Government agencies; nor does it purport to be complete, for estimates covering many communities—particularly the larger ones—have not yet been reported. The table covers about 200 communities for which a defense housing demand of 131,688 dwelling units has been reported. (The conservatively estimated national demand exceeds 200,000 units.) Most of the units to be supplied by the $100 million Army-Navy housing fund and all those to be supplied by the $31.1 million USHA fund are included in the tabulation. (An asterisk indicates units to be supplied by the Army's share of the $100 million fund.) The letter **A** after a community indicates that the demand's source is Army enlisted men; **AC**, Army civilian employes; **N**, Navy enlisted men; **NC**, Navy civilian employes; **P**, employes in airplane and parts plants.

ALA.	Anniston (A)	50*
	Fairfield	1000
	Montgomery (A)	200*
	Montgomery	424
	Selma	500
	Tarrant	400
ARIZ.	Fort Hauchuca (A)	30*
	Tucson (A)	150*
CAL.	Bakersfield	200
	Benicia (AC)	50*
	Fort Ord (AC)	100*
	Fort Ord (A)	450*
	Fresno (A)	150*
	Long Beach (N)	1500
	Long Beach	300
	Los Angeles	800
	Mare Island (NC)	3000
	Mare Island (N)	400
	Mare Island	200
	Oakland (N)	400
	Oakland (NC)	800
	Oakland	1300
	Riverside (A)	150*
	San Diego (N)	1500
	San Diego (P)	3500
	San Diego	300
	San Rafael (A)	175*
	Santa Monica	200
	Stockton (A)	150*
	Sunnyvale (A)	150*
COLO.	Denver (A)	50*
	Lowry Field (A)	125*
CONN.	Bridgeport	510
	East Hartford (P)	5000
	Groton (NC)	200
	Hartford	2000
	New Britain	200
	New London (N)	200
	New London (NC)	200
	Stratford (P)	3500
	Waterford	400
DELA.	Delaware City (A)	40*
D. C.	Washington (N)	500
	Washington (NC)	500
	Washington	600
FLA.	Jacksonville (N)	500
	Jacksonville (NC)	500
	Jacksonville	4000
	Key West (N)	100
	Key West (NC)	100
	Orlando (A)	100*
	Pensacola (N)	300
	Pensacola (NC)	300
	Pensacola	100
	Miami (N)	400
	Miami (NC)	200
	Tallahassee (A)	100*
	Tampa (A)	300*
	Tampa	200
	West Palm Beach (A)	300*
GA.	Albany	100
	Augusta (A)	125*
	Columbus (A)	350*
	Columbus	664
	Rossville (A)	50*
	Savannah	325*
IDA.	Boise (A)	100*
ILL.	Belleville (A)	100*
	Champaign	200
	Decatur	200
	East Moline	200
	Granite City	300
	Great Lakes (N)	200
	Madison Co.	200
	Moline	300
	Peoria	300
	Rantoul (A)	200*
	Rantoul	100
	Rock Island	300
	Savanna (AC)	200*
IND.	Delaware Co.	300
	Hammond	200
	Lawrence	35*
IOWA	Davenport	300
	Croyden (A)	250*
	Leon (A)	250*
KAN.	Fort Riley (A)	125*
KY.	Ashland	200
	Louisville	300
	Fort Knox (A)	600*
	Fort Knox (AC)	100*
LA.	Baton Rouge	200
	Shreveport	175
ME.	Bath (NC)	200
	Bath	300
	Bangor (A)	150*
MD.	Aberdeen (AC)	500*
	Annapolis	300
	Baltimore (A)	100*
	Baltimore (P)	1000
	Cumberland	200
	Edgewood (A)	500*
	Hagerstown	100
	Indian Head (NC)	1000
	Odenton (A)	30*
	Piney Point (N)	100
MASS.	Chicopee (A)	200*
	Fort Devens (A)	300*
	Holyoke	500
	Quincy	2000
	Squantum (N)	100
MICH.	Battle Creek (A)	250*
	Mt. Clemens (A)	130*
MISS.	Jackson (A)	50*
NEB.	Omaha	500
NEV.	Hawthorne (N)	50
N. H.	Portsmouth (N)	200
	Portsmouth (NC)	2000
N. J.	Camden	2000
	Fort Dix (A)	100*
	Harrison (NC)	600
	Kearny	1000
	Lakehurst (N)	50
	Long Branch (A)	50*
	Long Branch (AC)	475*
	Newark	1800
	Elizabeth	
	Paterson	
	Perth Amboy	
N. M.	Albuquerque (A)	150*
N. Y.	Bethpage (P)	500
	Brooklyn (N)	200
	Buffalo (P)	1400
	Buffalo	1400
	Lackawanna	
	Tonawanda	
	Farmingdale (P)	3000
	Fishers Isl. Village (A)	20*
	Hempstead (A)	200*
	Long Island City (P)	500
	Schenectady	500
N. C.	Fayetteville (A)	550*
OHIO	Cincinnati	500
	Cleveland	500
	Steubenville	1000
	Youngstown	500
OKLA.	Fort Sill (A)	150*
PA.	Allegheny Co.	2000
	12 localities	
	Beaver Co.	800
	7 localities	
	Chester	500
	Crawford Co.	200
	Erie	175
	Fayette Co.	250
	Hattiesburg	800
	Philadelphia (N)	100
	Philadelphia (NC)	1000
	Philadelphia	900
	Reading	350
	Schuylkill Co.	200
	Westmoreland Co.	1000
	Monessen	
	New Kensington	
R. I.	Newport & Quonset Pt. (N)	500
	Newport & Quonset Pt. (NC)	2000
	Pawtucket	500
S. C.	Charleston (N)	100
	Charleston (NC)	1500
	Charleston	1000
	Columbia (A)	200*
	Greenwood	200
	Parris Is. (N)	100
S. D.	Fort Meade (A)	50*
TENN.	Alcoa (NC)	400
	Chattanooga	1500
	Knoxville	500
	Memphis	500
TEX.	Brownsville	100
	Corpus Christi (N)	1000
	Corpus Christi (NC)	1000
	Del Rio	200
	El Paso (A)	200*
	Fort Clark (A)	50*
	Fort Sam Houston (A)	200*
	Galveston	375
	Houston (A)	200*
	Orange (NC)	1000
	San Antonio (A)	300*
	San Angelo (A)	100*
	Waco	300
VT.	Essex Junction (A)	60*
VA.	Arlington (A)	35*
	Bristol	200
	Dahlgren (N)	100
	Dahlgren (NC)	300
	Hopewell	200
	Langley Field (A)	350*
	Lee Hall (A)	25*
	Newport News (NC)	4000
	Norfolk (N)	3000
	Norfolk (NC)	1000
	Norfolk (N)	500
	Phoebus (A)	90*
	Portsmouth (N)	600
	Portsmouth (NC)	1200
	Portsmouth	600
	Quantico (N)	100
	Quantico	50
	Richmond	100
	St. Juliens Creek (NC)	200
	Virginia Beach (A)	50*
	Yorktown (N)	100
WASH.	Fort Lewis (A)	225*
	Fort Lewis (AC)	25*
	Puget Sound (N)	200
	Puget Sound (NC)	1200
	Seattle (N)	200
	Seattle	100
	South Tacoma (A)	150*
	Spokane (A)	200*
	Tacoma	500
	Bremerton	600
W. VA.	Charleston	600
	Elkins	100
	Homington	600
	Morgantown	200
	South Charleston (N)	100
	South Charleston (NC)	900
	Wheeling	200
	SUB TOTAL	**120,933**
ALASKA		325
C. Z.	Balboa & Coco Solo (N)	2500
	Balboa & Coco Solo (NC)	2500
CUBA	Guantanamo (N)	200
	Guantanamo (NC)	200
T. H.	Honolulu (N)	2200
	Honolulu	800
	Island Oaku (A)	300*
	Hickam Field	250*
P. I.	Cavite (N)	50
P. R.	Aquadilla (A)	300*
	Cayey (A)	20*
	San Juan (A)	200*
	San Juan (N)	400
	San Juan (NC)	400
V. I.	St. Thomas (N)	100
	TOTAL	**131,678**

LEGISLATION

Defense housing is off to a fair start. Coincident with Germany's invasion of the Low Countries this spring, the U. S. began talking about defending itself, and some thoughtful observers immediately dusted off 25-year-old reports on the nation's previous industrial-military effort to show that a neglect of housing had slowed up the whole program. Determined that this mistake should not be repeated, the President by mid-August had appointed a Defense Housing Coordinator to assist the National Defense Advisory Commission, and various and sundry housing bills were already popping up on the floor of Congress. On the books a month ago went the last of four important defense housing acts involving, among other things, Federal appropriations totaling $250 million. And, while the pattern for the projected program is unfortunately far from complete, defense housing is actually under way in a handful of communities—seven months after defense began. (It was ten months after U. S. declaration of war in 1917 before the housing problem was even officially recognized, and it was another four months before Congress had appropriated a penny toward its solution.)

Since current Federal defense housing legislation means much more to private building than its $250 million face value, it merits an act-by-act analysis:

ACT I

USHA defense housing

Eager to adjourn temporarily for the Republican National Convention, Congress on June 28 passed without careful reading an important national defense bill labeled, "To expedite shipbuilding and for other purposes." Upon return from the Philadelphia fireworks, the House, long antagonistic to the U. S. Housing Authority, was shocked to discover that by approving the bill's "other purposes" it had given USHA power: 1) to assist with loans and subsidies its 498 cooperating local authorities in the development of housing projects for the families of army and navy enlisted men, for civilian employes of the War and Navy Departments who are assigned to duty on posts, reservations and bases and for families of defense industrial workers; 2) to develop and operate such projects itself without the cooperation of local authorities; 3) to supply funds and technical aid to the Army and Navy for the construction of (or to build directly) projects which may be purchased or leased and operated by either military agency, in this case, solely for their enlisted men or civilian employes.

In connection with all three types of projects, the new legislation lifts several important limitations set by the original USHAct: 1) for the duration of the national emergency a low annual income may no longer be a tenant eligibility rule; 2) the elimination of one sub-standard dwelling unit for each new unit built may not be required; 3) localities need not necessarily ante 10 per cent of the project's development cost—USHA may foot the entire bill; 4) USHA may now use the Federal powers of condemnation in acquiring land which it may then resell to local authorities; 5) projects for defense purposes are exempt from the original provision that no State receive more than 10 per cent of USHA's total funds. Most important, the new legislation is retroactive to the extent that any project for which USHA funds have already been earmarked or placed under loan contract may be revised to fit the new USHA defense housing program, and any project under construction may likewise be shifted.

To date, USHA has launched 21 such projects for some 8,100 families—17 of them being handled by local authorities, the other four by the Army and Navy in communities which have no housing authorities (see tabulation, p. 438). First begun, most nearly complete is a 424-unit project for the families of Army airmen near Montgomery, Ala.'s Maxwell Field. It is scheduled for completion on December 2 (see p. 458). But without additional working capital, USHA's defense housing program will not amount to much. For a few additional projects it may rescind and reallocate existing and unused earmarkings and, if it can circumvent the need for subsidies in its defense projects, it may put to work the last $150 million of its original $800 million authorization which is otherwise useless (see ARCH. FORUM, Jan. 1940, p. 4). Much to the chagrin of public housers, chances are small that USHA's barren cash register will soon be replenished by Congress. And, chances are only fair that USHA will get some of the $150 million appropriated via the FWA housing act (see below).

ACT II

Army-Navy housing

As part of the second Supplemental National Defense Appropriation Bill enacted in August, Congress gave the President $100 million for allocation principally to the War and Navy Departments for the accommodation of families of enlisted personnel and civilian employes in housing whose average cost per dwelling unit *including* land, utilities, and services may not exceed $3,500. Congress also authorized the secretaries of these Departments to "utilize such other agencies of the U. S. as they may determine upon."

With the military housing demand long since defined, the President in jig time divided the $100 million fairly evenly between the Army and Navy, serving a small slice to the Maritime Commission. Forthwith the Army, bee-busy with other housing problems (see p. 344), turned most of its $48.9 million over to Administrator John M. Carmody's Federal Works Agency which, in turn, passed it along under the nose of FWA's USHA to Commissioner W. R. Reynolds of FWA's Public Buildings Administration. Transfer of the funds permits their use under the more lenient legislation of the FWA housing act (see below). All told, the Army's money will produce about 13,900 dwelling units—13,000 by PBA, 900 by the Army.

Unlike the Army, the Navy of necessity has a slower expansion program and therefore has time to build all of its own housing. With its share of the $100 million (about $44 million) it plans to provide some 12,600 dwelling units. The funds will be used under the terms of the FWA housing act (see below).

The Maritime Commission with its $2.4 million will build, via PBA, 700 dwelling units exclusively for ship yard workers.

ACT III

RFC equity housing

From the $100 million "blank check" which Congress handed him in June, the President quickly ripped off a $10 million dollar piece, gave it to Chairman Jesse Jones' Reconstruction Finance Corp. for defense housing. With this money, Defense Homes Corp., a new RFC subsidiary, will provide equity capital for large scale rental projects set up under Section 207 of FHA's mortgage insurance program. Theory is that, where private investors are hesitant to supply the necessary 20 per cent equities in defense boomed communities, RFC will immediately step in with the necessary cash, will seek later to sell out to private investors when the projects are completed and successfully operating. As in the past, insurance companies would supply the 80 per cent balance of the projects' cost in return for 20-year FHA-insured mortgages. Thus, RFC's $10 million of ready equity money will produce $50 million worth of housing—in the neighborhood of 14,300 dwelling units. Month ago, "definite progress" was reported by RFC toward construction of projects in fourteen communities.

ACT IV

FWA housing

Biggest pile of Federal defense housing dollars was appropriated October 15 to service the so-called "Lanham Act" which the President signed the day before. Drafted by Housing Coordinator Palmer and introduced in Congress by Representative Fritz G. Lanham, this act gives FWAdministrator Carmody $150 million, requires him to hand $10 million of it over to RFC to reimburse the President for his "blank check" housing donation. Balance of the funds will be disbursed through FWA's sub-agencies for the provision of housing for the families of enlisted men, military civilian employes and industrial defense workers.

Significantly, the act states that this money shall be spent only in areas or

(Continued on page 64)

ORGANIZATION AND PROCEDURE

While they are basic, Federal laws and money alone will not give the U. S. the defense housing it needs. In between must be organization—a coordinating system centered in Washington but reaching out to include small builders in small West Coast cities. And, before defense houses are produced in the necessary quantity, there must be procedure—a definite pattern for action made known to everyone. Combined, these two necessities will foster speed and efficiency, discourage duplication and mistakes. At month's end, both the organization and procedure were still unfortunately far from completion, but had crystallized enough to permit a reasonably accurate preview of the defense housing mechanism.

ORGANIZATION

National. Unlike the local division, the national organization got under way early, should soon be ready for action. It dates back to August 19 when the National Defense Advisory Commission established the office of Defense Housing Coordinator; put in it 48-year-old Realtor Charles F. Palmer, chairman of Atlanta's local housing authority, past president of National Assn. of Housing Officials, head of a private real estate business in his home town and housing student extraordinary. Charged with the planning and prosecution of the defense housing program, "Chuck" Palmer's specific duties are: 1) to channelize and coordinate the activities of Federal agencies engaged in the program; 2) to anticipate housing needs and act to avoid housing shortages; 3) to determine via surveys whether necessary new housing be provided by private enterprise or by public agencies; 4) to review plans for industrial plant expansion in the light of the housing needs they may create; 5) to certify design and construction standards of dwellings to be financed by Government; 6) to keep his eye on building labor employment and possible shortage; 7) to recommend whatever additional legislation may be deemed essential to an adequate defense housing program.

Obviously Palmer alone cannot shoulder this task. To his offices (in Washington's new RFC Building) as righthand men he has called as assistant coordinators, Jacob Crane, former assistant USHAdministrator, and R. L. MacDougall, WPAdministrator for Georgia who will soon resume his WPA duties as southeastern regional administrator; as legal adviser, Herbert S. Colton, former chief counsel for FHA's rental housing division; executive assistant, Carl H. Monsees, ex-chief of the National Assn. of Housing Officials' field service; as statistical director, Samuel J. Dennis, formerly with the Commerce Department; as program planners, Carl L. Bradt, from the executive directorship of Detroit's housing authority, and William V. Reed, former principal project planner for USHA. Volunteer consultants include: Herbert U. Nelson, executive vice president of the National Assn. of Real Estate Boards; Miles Lanier Colean, one-time assistant FHAdministrator now housing research director for the Twentieth Century Fund; S. M. Buckingham, manager of Cleveland Terminals Building Co. and representative of the National Assn. of Building Owners and Managers; and Coleman Woodbury, director of the National Assn. of Housing Officials.

Local. Largely voluntary and, as yet, sadly undeveloped, local defense housing organization is essential to accomplishment of the program. Without it, only Government-financed houses would be built with the result that Federal appropriations would have to be more than doubled to reach the estimated goal of 200,000 dwelling units.

Setting a commendable precedent for every defense-affected community in the country, a few cities have already appointed National Defense Committees which have launched exhaustive surveys of local industrial capacities, plant vacancies and sites, labor supplies, raw material sources, transportation facilities and possibilities and housing conditions. While the defense housing coordinator is naturally most interested in housing, he is also concerned with all the other factors insofar as they relate to housing. Vital as an aid to the coordinator in advising on the allocation of defense industrial contracts and in roughly appraising the housing problem is an immediate, preliminary survey of each community's industrial transportation and labor facilities; its housing vacancies classified as to type, size, condition, sales price or rental; its volume of housing now under construction similarly classified; its probable increase in employment during coming months; its probable need for importing out-of-town labor; its distribution of workers by wage groups, sex, race and family size. Corralled in short order via a sampling process, these statistics should then be checked and amplified by a comprehensive survey embracing such details as: potential increased supply of dwelling units via repair, remodeling, conversion, extension of transportation and new construction; availability of sites; labor wage and material price levels and trends; presence of building organizations equipped to handle large scale low cost housing, etc.*

With these facts in hand, the local defense committee may not only assist the national housing coordinator but also give helpful advice to local builders on the specific demand for new housing: location, type, size, cost, etc. Only with such advice can the private building industry be expected to produce the requisite amount of housing tailored to the defense market. Today, the lack of authentic sources for this advice remains the weakest link in the $700 million housing program.

PROCEDURE

Public. Of the total, $250 million have been appropriated by Congress from the U. S. Treasury via the President to the Navy, $44 million, Maritime Commission, $2.4 million, Army, $48.9 million, and Federal Works Agency, $150 million, $10 million of which goes to the RFC. (At month's end the President had yet to allocate about $4.7 million of the Army-Navy fund.)

According to long-established practice, the Navy will divide most of its share among the commanders of its far-flung bases in proportion to their emergency housing needs. They, in turn, will hire local contractors, negotiating their construction contracts under the cost-plus-fixed-fee provisions of the enabling legislation. Other details will also follow a set pattern: All designs and specifications will come from the Navy Department's architectural offices in Washington (see p. 451). Except in a few instances, therefore, private architects will not be required. While there will be adequate design variety within each project, standardization between projects will be developed to a high degree. All houses will be low cost (maximum average: $3,000 excluding land, utilities and sewers); all will be built for rent at figures established by the Navy; a large proportion will be "temporary." Total number of dwelling units: 12,640.

Defense housers. A quartet of big-wigs in the Defense Housing Coordinator's office (left to right): Assistant Coordinators R. L. MacDougall and Jacob Crane, Coordinator Charles F. Palmer and Executive Assistant Carl H. Monsees.

* In its book, "Housing for Defense," the Twentieth-Century Fund outlines in complete detail the factors to be covered in such preliminary, comprehensive and periodic surveys.

Somewhat different will be the Army approach. About $45.7 million of its $48.9 million have already gone to the Federal Works Agency's Public Building Administration for disbursement. New only in name, PBA was formerly known as the Office of the Supervising Architect, was formerly affiliated with the Treasury Department's Procurement Division and has handled the construction and operation of Federal buildings (mostly post offices) all over the country since the days of President Andrew Jackson. More familiar with its new housing assignment than most PBAsters is its 67-year-old spark plug, Architect N. Max Dunning, one-time director of PWA's long-defunct Housing Division and, before that, an officer of the U. S. Housing Corp. of World War I fame (see p. 329).

Based on Army suggestions, the average dwelling unit will consist of living room, combination dining room and kitchenette, two bedrooms and bath. Its average cost is expected to be well below the statutory maximum of $3,500—probably close to $2,800 including land, utilities and services. Present plans call for the use of both "permanent" and "temporary" or "demountable" construction—as the needs indicate. From its lengthy list of capable builders PBA will select as many as needed for each project, award them cost-plus-fixed-fee contracts and then supervise construction. Chances are that local architects will be called in on the larger projects, but only for site and utility planning.

Rentals for dwellings built on Army posts will be fixed by the Army, all others will be determined jointly by PBA and the Army. In neither case need they be equal to the economic rent necessary to put the projects on a break-even basis.

Month ago, PBA was about ready to go. The Army had asked that its $45.7 million be spent for some 13,000 dwelling units in 70 projects (28 States and two Territories) ranging in size from 20 units at Fort H. G. Wright in Fisher's Island Village, N. Y. to 700 units at Fort Knox, Ky. (see p. 440). Sites for 19 of the projects are already owned by the Army, and in anticipation of the program PBA field representatives have already made preliminary explorations toward purchase from private owners of the other 51 tracts. In addition to the 13,000 dwelling units which PBA's Army program will produce, it is estimated that another 900 will be built directly by the Army with the $3.2 million which were not given to PBA.

Like the Army, the Maritime Commission, with only about $2.4 million to spend, has entrusted the building of its 700 dwelling units to PBA.

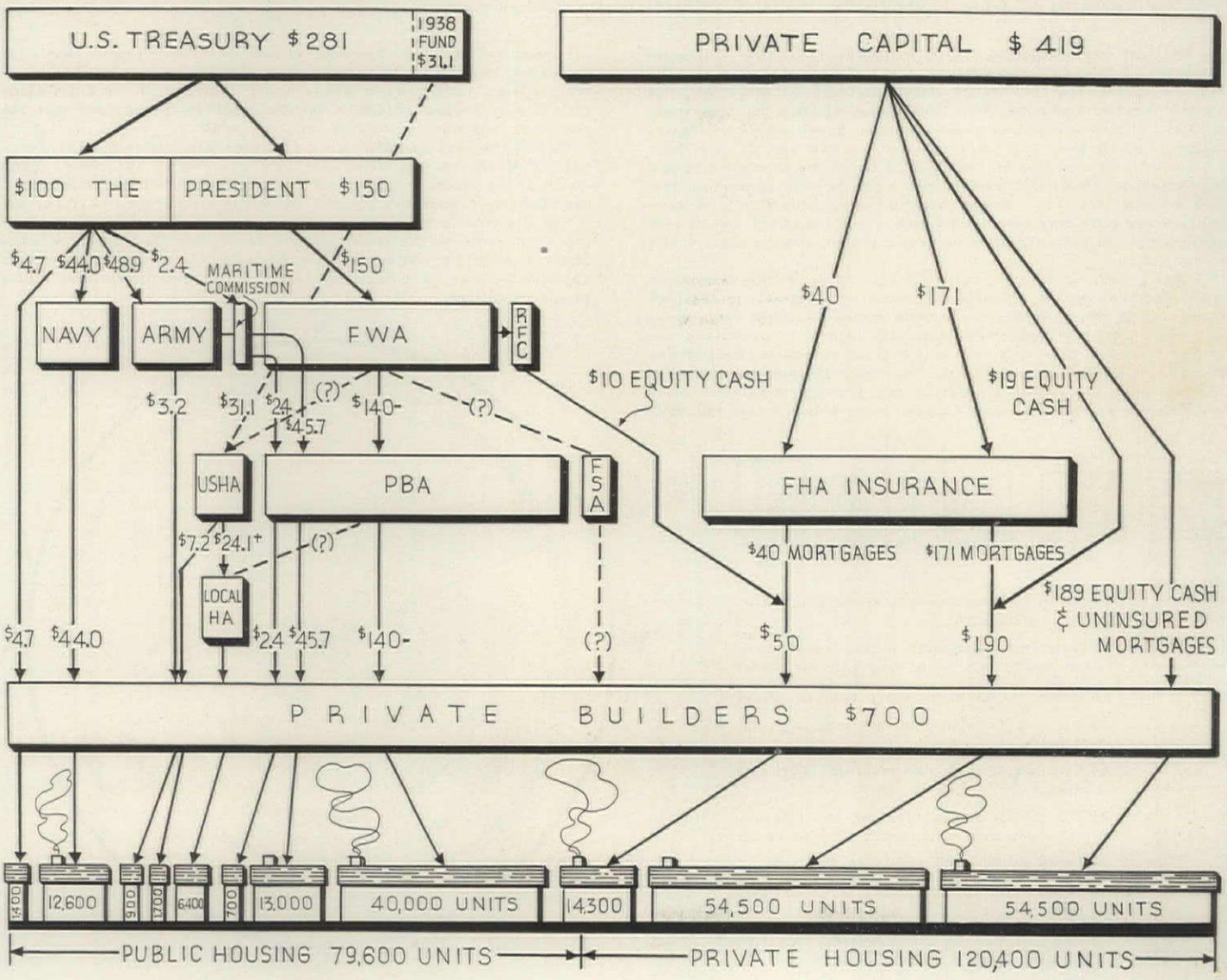
Under a different act (see "Act IV," p. 441), FWA has $140 million with which to supply local defense housing demands upon orders from Defense Housing Coordinator Palmer via the President. Chances are that a large part of the funds will go toward already requested Army and Navy rental projects not covered by the $100 million appropriation discussed above. Another sizable chunk will answer demands brought to Palmer's attention by other members of the National Defense Advisory Commission, by the owners of booming manufacturing plants suffering from high labor turnover, by local housing authorities and other municipal officials and by the heads of local labor unions. Further to keep posted on present

(*Continued on page 66*)

PRODUCTION FLOW CHART 200,000 defense housing units

Graphic summary of the approximate distribution of the $700 million necessary to supply the required 200,000 dwelling units for national defense, with Federal funds as presently appropriated.

All figures are nominal; all dollar amounts are in millions. Dotted lines with (?) indicate possible but improbable channels. FHA is assumed to insure mortgages for half the privately financed housing.



THE ARCHITECTURAL

FORUM DEFENSE HOUSE by Skidmore, Owings & Merrill, Architects.

If all the low cost house designers in the country got together, compared their floor plans and combined the best features of each in one composite plan, the result would be only slightly different from most of the originals but would certainly be worth building, worth standardizing. And, standardization would permit manufacturers to concentrate their production on materials and equipment tailored to the generally accepted dimensions of this standard house. Lower costs would naturally follow.

The defense housing program needs such a house. It also needs standardization, for, above all, it demands low cost construction, lots of it and in a hurry. To this end, THE FORUM last month gave Architects Skidmore, Owings and Merrill a collection of low cost house floor plans gathered from builders in all parts of the country, asked them to study the conglomeration of ideas and resolve it into one basic house design which, in their opinion, included all of the good design details, none of the bad. Their assignment was to produce not necessarily the lowest cost house possible, but rather an economical house with the design controlled by 1) use of standard materials in standard sizes, 2) minimum FHA requirements for mortgage insurance eligibility, 3) practices acceptable to local builders as evidenced by the houses they are currently building and 4) a desire that the resultant design be adaptable either to conventional frame construction or the vertical panel system employed by leading prefabricators.

With an eye to the specific needs of the defense housing program, THE FORUM also suggested to Messrs. Skidmore, Owings and Merrill that, once devised, their basic one-level floor plan be developed further to permit: 1) access to a basement, 2) provision of one extra room in the attic, 3) two attic bedrooms, 4) two attic bedrooms and a bath with private access, 5) use of the floor plan in a double-decker two-family house and 6) repetition of all these units in a row house or garden apartment project. Theory behind variations Nos. 2, 3, and 4 is that the demand for housing by unmarried defense industrial workers will be large in many communities (sometimes as large as the demand by families—see p. 468) and that provision of extra rentable rooms in new houses will not only help meet this demand but will also give the purchasers of these houses an income which will help foot monthly mortgage costs. Since much of the defense housing demand is for low rental apartments (see p. 468), the need for low cost multi-family projects is self-evident. The row house is the cheapest form of multi-family construction.

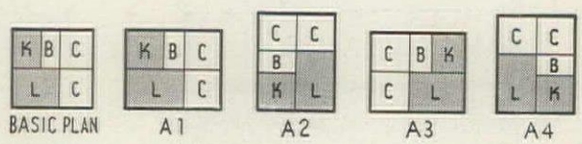
Presented on these pages is a study in low cost house planning—an analysis of the solution by Architects Skidmore, Owings and Merrill to the many-sided defense housing problem as outlined by THE FORUM. First, the governing factors behind the selected room arrangement (below); then, development of the basic plan (opposite); next, adaptation of the plan to the many different national defense requirements (p. 446-448); finally, one modified version of the basic house as conceived with a free hand by Architects Skidmore, Owings and Merrill.

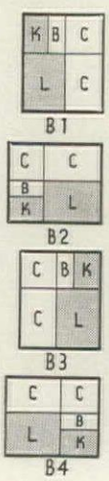
This study is intentionally incomplete; exterior design, interior details and material and equipment specifications are but a few of the many important sub-problems left to local architects to solve with their knowledge of local requirements and preferences. This presentation is, however, a much more complete planning study than most architects and builders usually give to the low cost dwelling unit—the most important housing type in the defense program. As such, it may save some valuable hours, many valuable dollars and contribute to the general improvement of low cost housing design.

Plan selection and orientation. Large majority of existing four-room houses spring from only two different types of floor plans: in one, the bathroom is between the kitchen and a bedroom, in the other it is between the two bedrooms. The former was selected for this study because: 1) location of kitchen and bathroom back-to-back facilitates plumbing installation, may save as much as $20 and 2) this room arrangement permits greater flexibility in the shape of the house and its orientation. Thus, as shown below, a square plan containing this room arrangement may be elongated in either direction and each resultant rectangle may be turned two ways on the street and in both positions may be flipped over to reverse the plan. Result: eight useful plan variations.

Further justifying selection of this basic plan is the orientation study, right. Around the compass on a hypothetical street (represented by the circle's circumference) have been placed the eight plan variations, each in its best possible location with respect to winter sun and summer breeze on the living room and kitchen exposures. Bold arrows extending from each plan designate the range of compass directions each plan may face without violating any primary orientation principles. Example: plan A4 is best faced midway between east and east-southeast (a direction nautically known as east-by-south), but with decreasing desirability it may face as far south as south-southeast, as far north as north-east. It will be noted that five of the eight plans may face in the best possible direction, south-southwest, and that one plan, A3, falls directly on this compass point.

To find the best possible plan for a given site, determine the direction in which the site faces, plot this direction on the chart, judge which of the plans is nearest the line. Example: if the lot faces west, use plan B3; if northeast, plans A1 or B1; if south, plans A2, B2 or B4. If the site is on a street intersection, place the living room of any of the eight plans to the street corner. While this chart may be used under average conditions in most parts of the U. S., it should be adjusted to local prevailing wind conditions and, in the extreme south, to sun conditions.





BASIC PLAN A square with kitchen and bathroom back-to-back

A1 Basic plan elongated across the kitchen-living room axis with long side to street

A2 Same as A1 with short side to street

A3 Same as A1 with plan reversed, long side to street

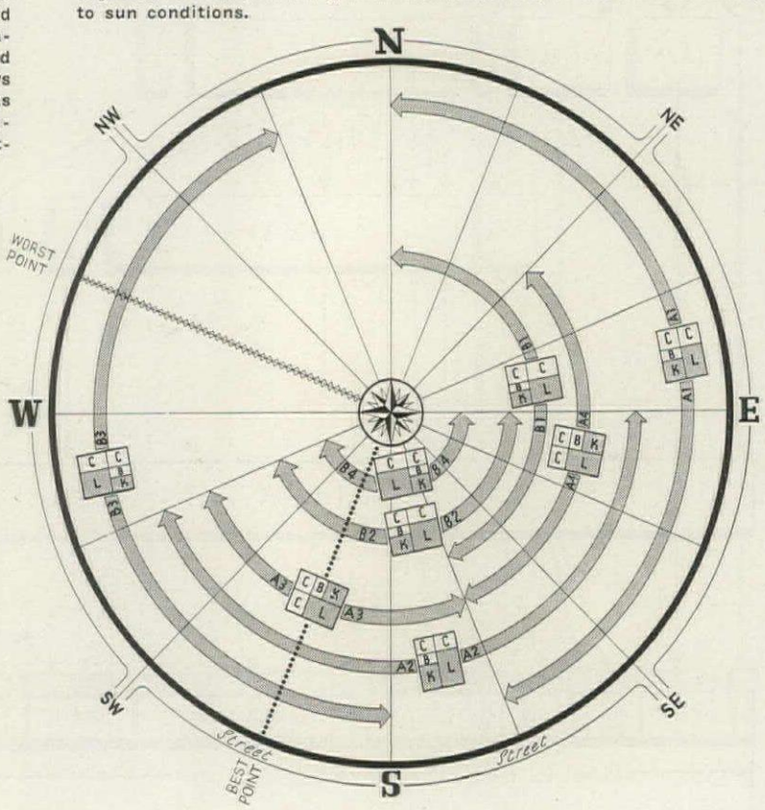
A4 Same as A2 with plan reversed, short side to street

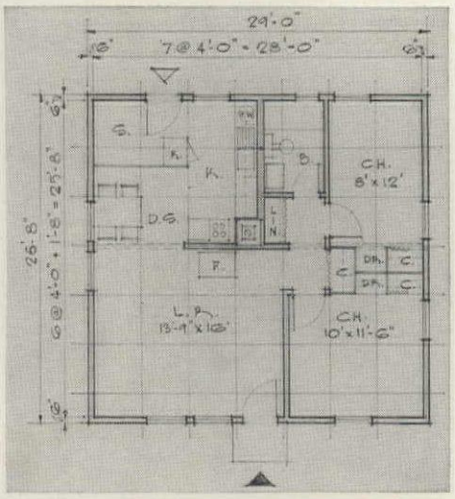
B1 Basic plan elongated along the kitchen-living room axis with short side to street

B2 Same as B1 with long side to street

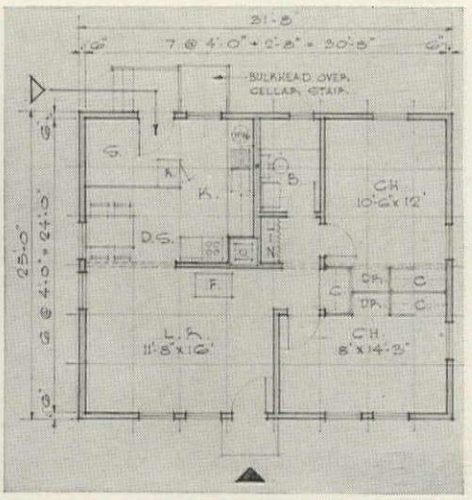
B3 Same as B1 with plan reversed, short side to street

B4 Same as B2 with plan reversed, long side to street

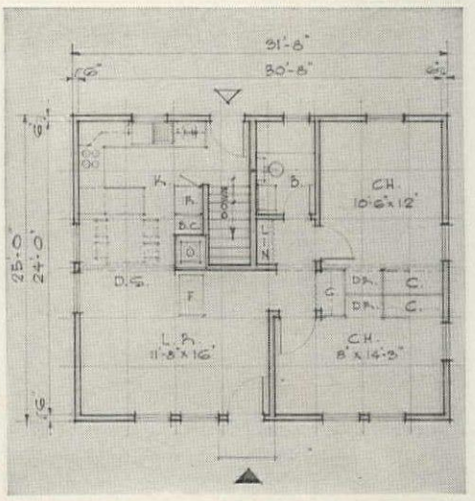




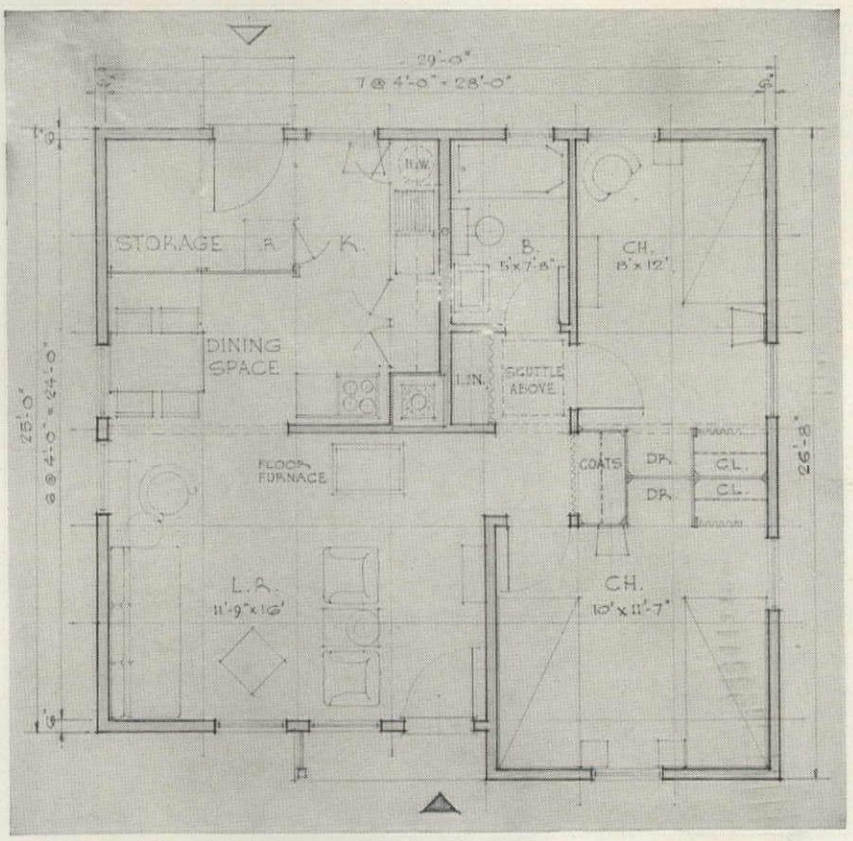
NO BASEMENT—12 AND 14 FT. JOISTS



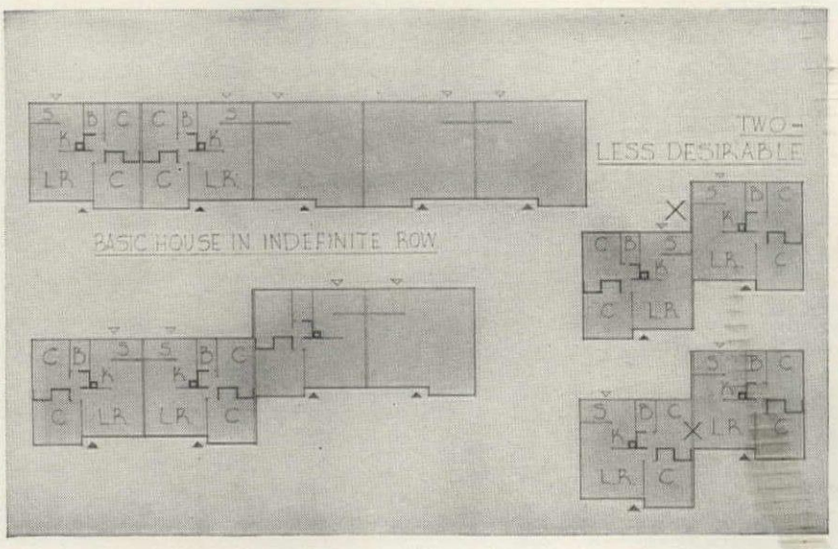
OPTIONAL BASEMENT—12 FT. JOISTS



INSIDE BASEMENT STAIRS—12 FT. JOISTS



BROKEN FACADE—NO STAIRS—12 AND 14 FT. JOISTS



BASIC PLAN

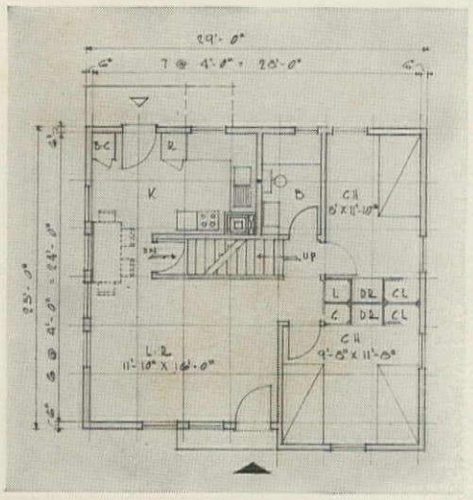
Developed by Architects Skidmore, Owings and Merrill as the basic layout for the FORUM Defense House, the large scale plan to the left displays improvement over each of the three flush-facade studies above. Actually, it is a combination of the right half of the first plan and the left half of the second. While the bedroom projection violates the modular planning principle to a minor extent and requires 14 ft. joists, it produces a better shaped room, a more interesting entrance and, when the basic units are combined in rows (left, below), a less monotonous facade.

Essentially the general pattern being followed by low cost house builders the country over, the basic plan veers from tradition in only two respects—and both have their merits: First, between the bedrooms, plywood walls create three curtained closets and two dresser recesses, increasing the total closet area at no sacrifice of usable bedroom area. Second, open planning at the other end of the house permits a flow of space and easy circulation between living, dining and kitchen units. A space-saving plywood partition shields the rear entrance, creates valuable storage space which may also be used as a workshop—particularly desirable in industrial communities where home invention is encouraged. Those who object to the open plan might be satisfied by provision of a curtain or folding-wall between the ends of the plywood partition and the kitchen-living room spur wall.

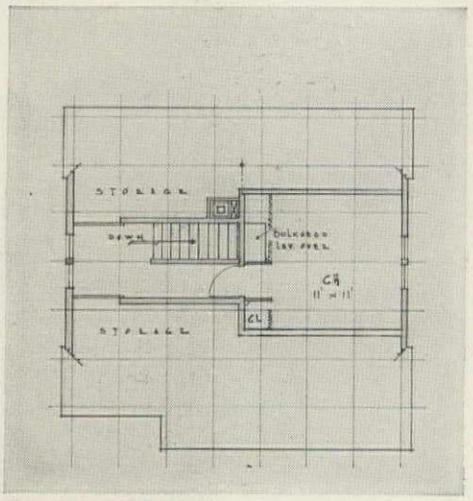
Note that the design lends itself readily to prefabricated construction; 26 standard 4 ft. panels (twelve of them with windows or doors) and two smaller units will wall the entire house. The second and third plans (above) would require only 4 ft. panels.

Attached to produce row house buildings (left), the basic plan requires no alteration, but in interior dwelling units the substitution of a glass screen for the plywood partition would improve the lighting of the dining space. Bedroom ventilation is improved by arranging the units in offset rows. In all row house projects, units should be paired with rooms of the same function arranged back-to-back; otherwise, undesirable conditions will result—dining space overlooking a kitchen entry (near left, above) or living room noise disturbing the occupants of an adjacent bedroom (near left, below).

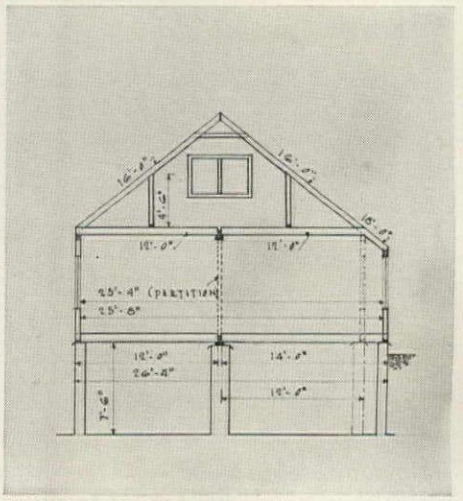
FORUM DEFENSE HOUSE by Skidmore, Owings & Merrill, Architects



BASIC PLAN WITH STAIRS TO . . .

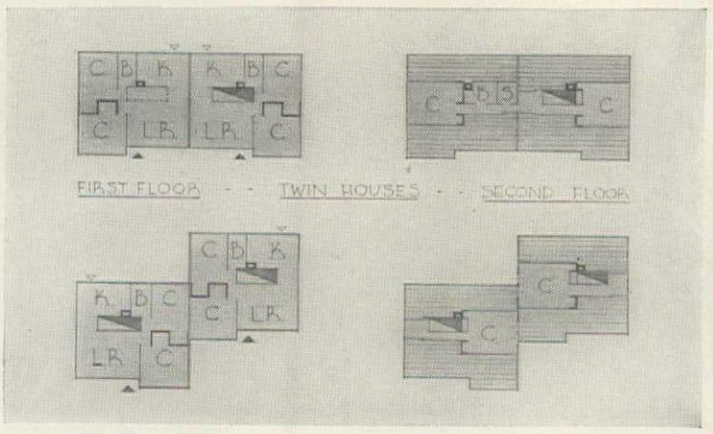


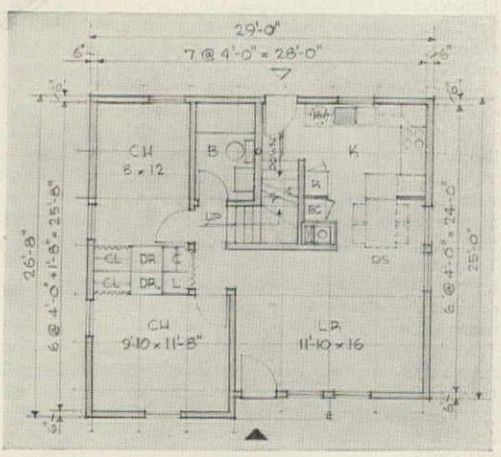
ONE ATTIC BEDROOM . . .



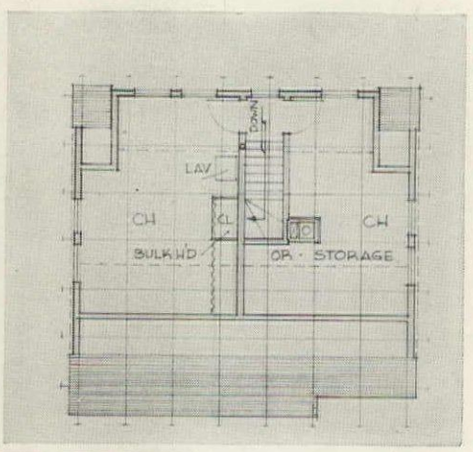
REQUIRES NO DORMER

Least expensive way to produce an attic bedroom for a larger family or for a roomer is to run the stairs parallel to the roof ridge, thus obviating the necessity for a dormer. Noteworthy details: stairs rise from the hall, connecting second floor bedroom with first floor bath; dining table folds down below window, clearing way to basement stairs (or closet); sliding plywood panels close off attic storage space; lavatory over stair bulkhead in attic bedroom; use of standard length framing members as shown in section. Because the attic is lighted and ventilated only at the ends of the house, this variation of the basic plan may be repeated only in twin houses (right). Combination of two attics produces one two-bedroom unit, one four-bedroom unit. The owner might occupy the latter, rent the attic to two roomers, the adjacent first floor (in which the stairs become a closet) to another family.

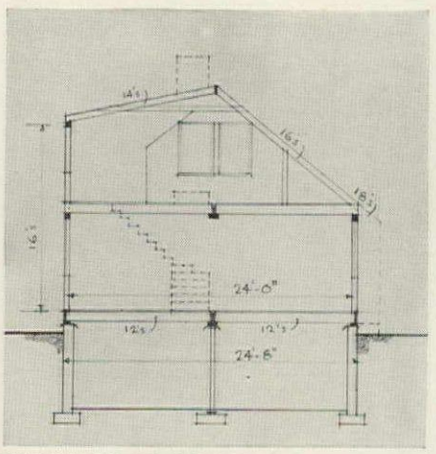




BASIC PLAN WITH STAIRS TO . . .

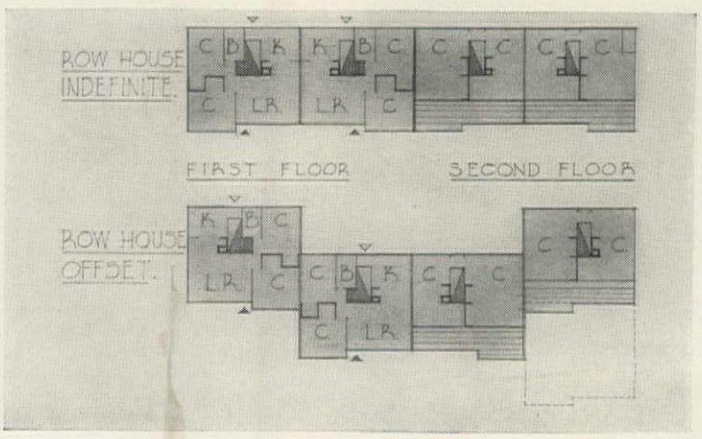


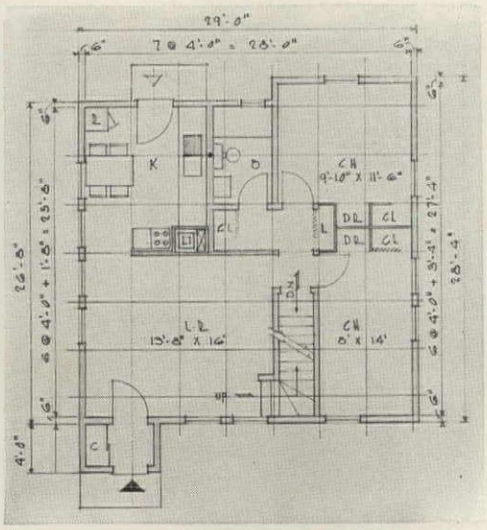
TWO ATTIC ROOMS . . .



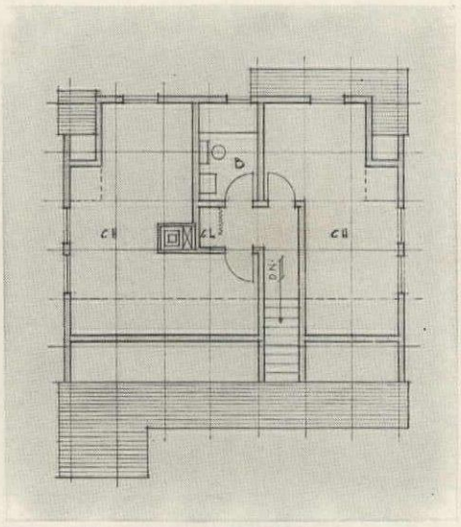
REQUIRES REAR DORMER

By introducing a staircase with winders, the basic plan is modified to provide two extra rooms in the attic, one of which is a large bedroom, the other storage space (or, in a pinch, another bedroom). Extension of the necessarily large dormer to the full length of the house would improve the attic interior, but, as in all small "salt box" houses, would present a difficult exterior design problem. Noteworthy details: stairs connect attic bedrooms with first floor bath; one attic room is readily provided with a lavatory; use of standard length framing members as shown in section; dining table folds up to mask kitchen (see detail drawing, next page). While indefinite repetition of the unit in a straight row eliminates cross ventilation in all bedrooms, offset arrangement permits retention of double attic windows—at both ends of each unit when a continuous offset pattern is followed. And, with the exception of the end units (which for appearance's sake might contain only one attic bedroom), all units in a row house would have full-length dormers and, therefore, better shaped rooms.

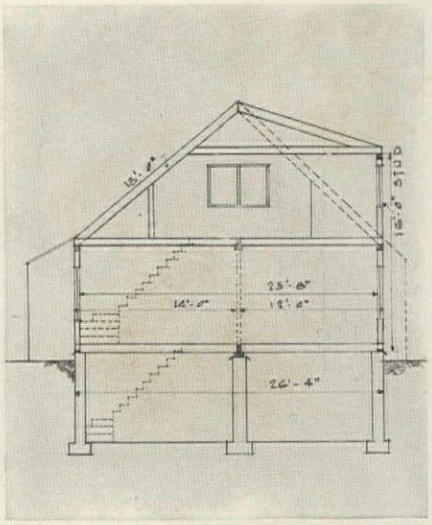




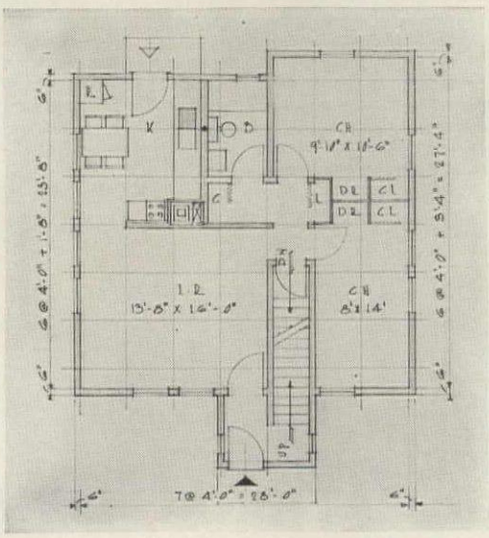
VARIATION WITH LIVING ROOM STAIRS TO . . .

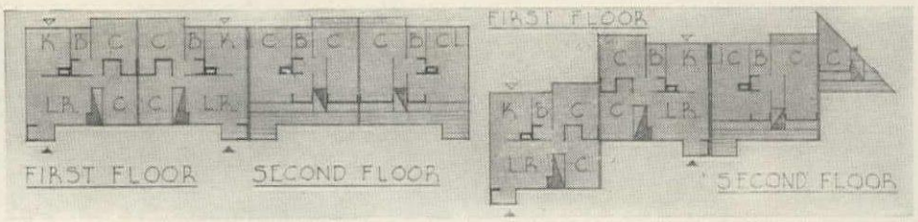


TWO ATTIC ROOMS AND BATH . . .



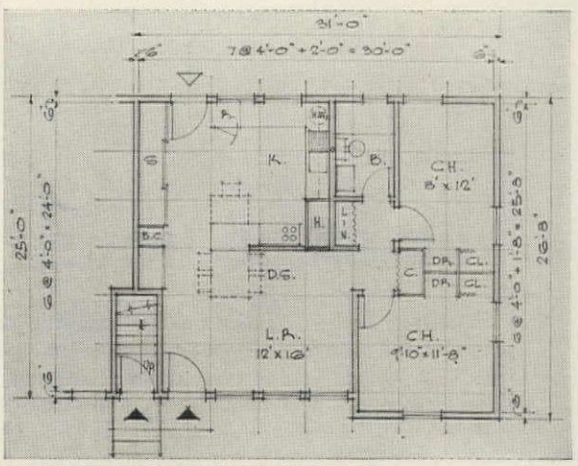
REQUIRES REAR DORMER AND BAY





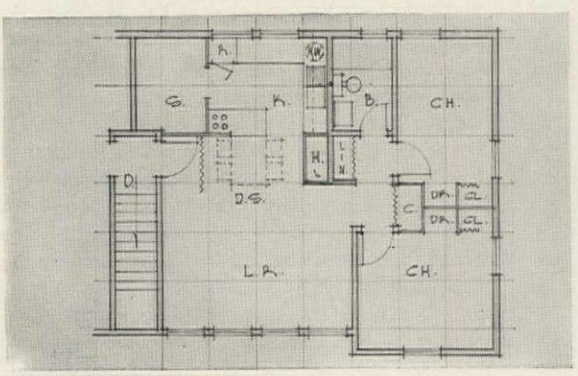
VARIATION WITH PRIVATE STAIRS TO ATTIC APARTMENT

Above. Basic plan (top), varied by shifting bedroom projection to the rear, provides access to two attic bedrooms (one of which might easily be fitted with a kitchenette) and an extra bathroom; stairway rising from living room is, therefore, permissible. Protruding entrance vestibule in lower plan permits private access to attic apartment; in upper plan it is not essential and is unsightly in a detached house. Its appearance is improved when units are combined in rows.

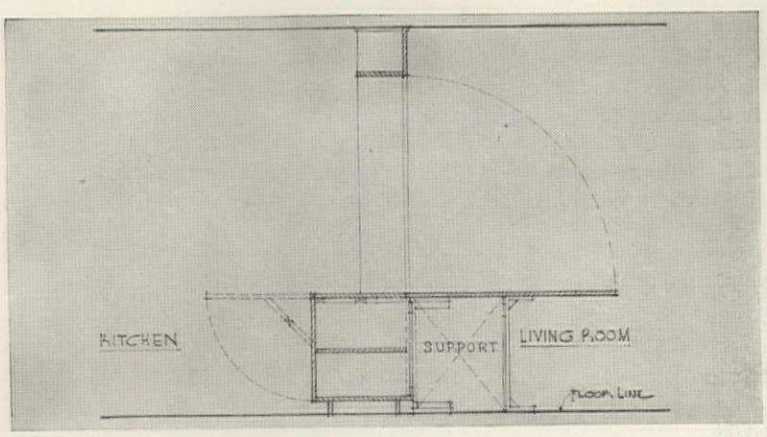


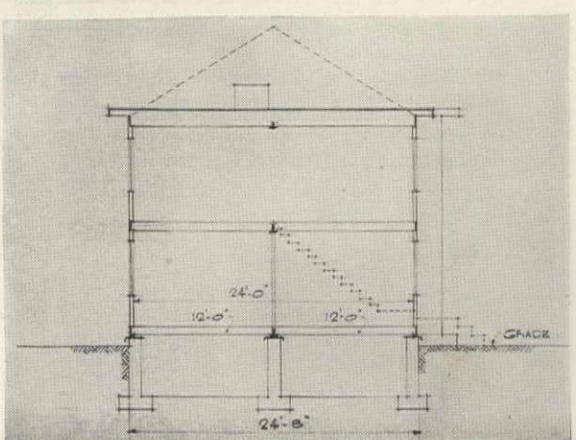
VARIATION WITH PRIVATE STAIRS TO . . .

Right. Insertion of a 4 ft. section between basic plans provides private access to full second floor flats in a four-family building, also increases the storage space in each unit. Four-family buildings may be repeated in straight rows or cut in two (entailing a slight shift of one wall) to produce two-family double-deckers. Living room table folds up to mask kitchen; kitchen table folds down when not needed as extra counter (below). They may be combined for party use.



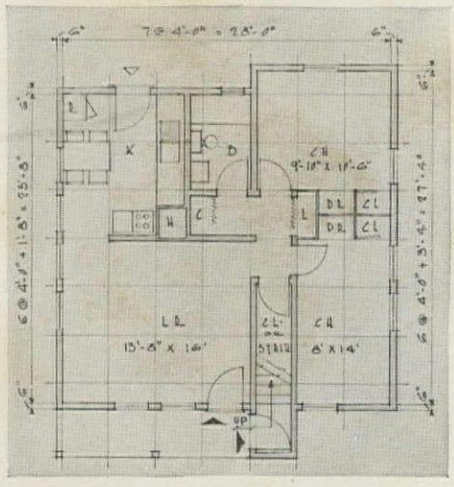
FULL SECOND FLOOR FLAT



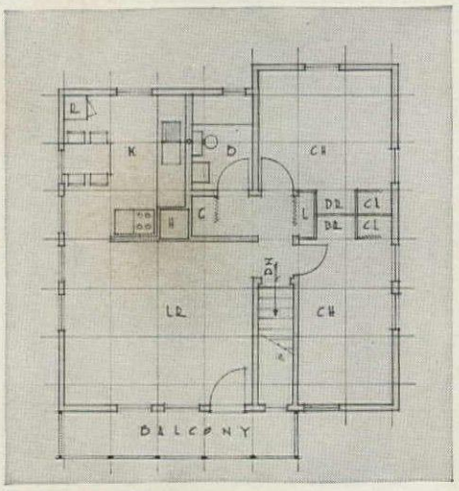


THE ARCHITECTURAL

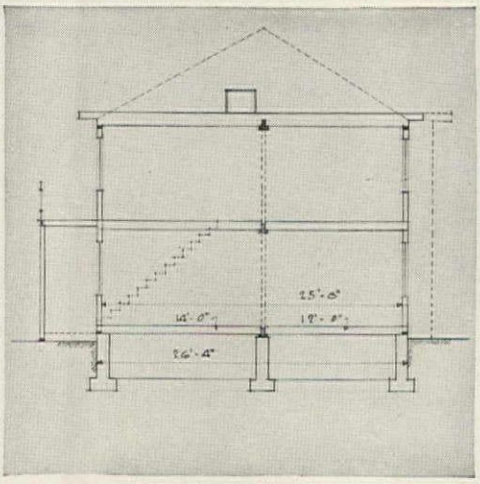
FORUM DEFENSE HOUSE by Skidmore, Owings & Merrill, Architects



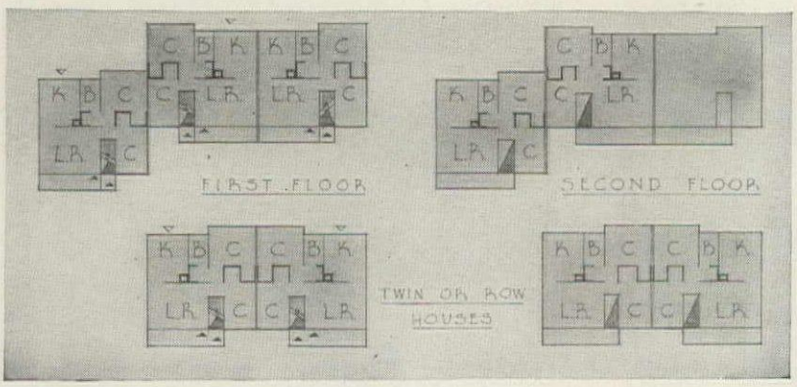
VARIATION WITH PRIVATE STAIRS TO . . .



FULL SECOND FLOOR FLAT . . .



WITH BALCONY OVER PORCH



By increasing the depth of the basic plan, it is possible to introduce a private interior stairway to the full second-floor flat, accomplishing with less cubage to same type of two-family house discussed on the preceding page. In-swinging front door to upper flat requires a "dog house" whose appearance is improved by the long porch and balcony. The plan is readily adaptable to four-family "twin" use and, as such, may be repeated indefinitely in straight or offset rows.

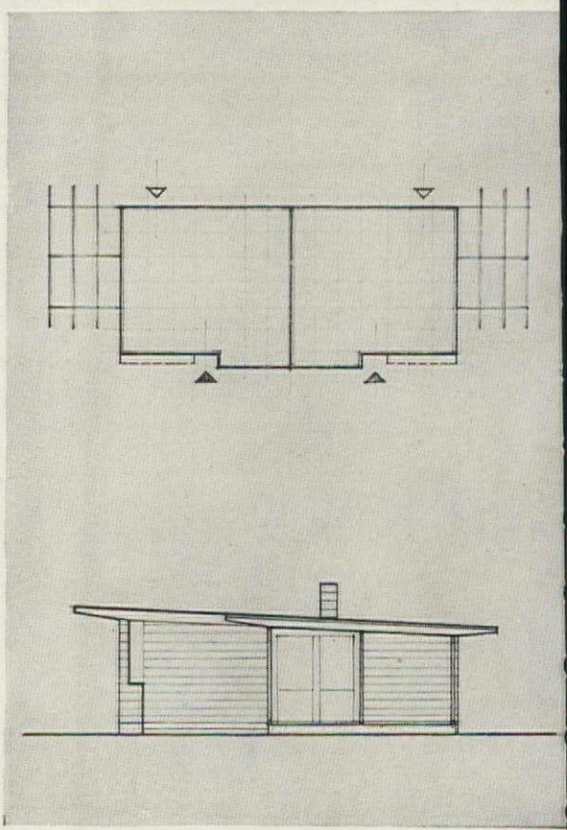
THE BASIC HOUSE IMPROVED FOR RATIONAL LIVIN

Plan and section studies on the foregoing pages have been two small steps ahead of conventional practice in that planning of the living areas has been opened and certain details have been built-in to conserve space. Designed with a free hand by Architects Skidmore, Owings and Merrill, the house to the right is still more forward looking, for form, fenestration and detail of the usual low cost house have been discarded in favor of more modern design principles.

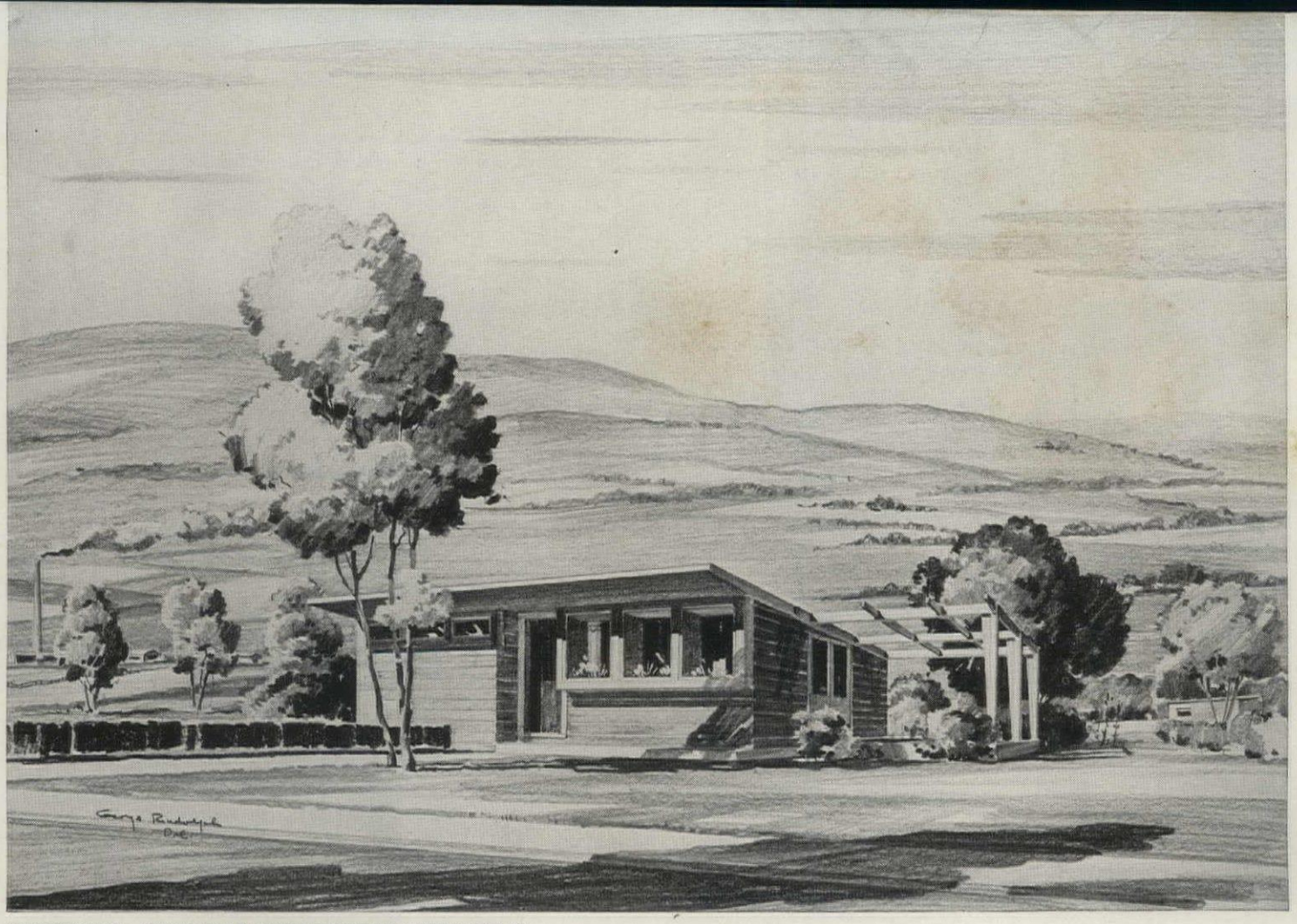
Living spaces have been zoned to facilitate desk work at home, study or reading, conversation, dining and entertainment. Partitions are of thin, structural insulating panels which conserve space and decrease the sound transmission between rooms. Windows of living room are projected to form an interior flower shelf. Deep vertical divisions of this projection and the cantilevered shed roof above it improve diffusion of light.

Connected to both the living and dining areas is a large terrace for outdoor living. Framing of the trellis is designed eventually to take a roof, in the meantime may be covered with a summer awning. Once roofed, it may be used as either a porch or an automobile shelter.

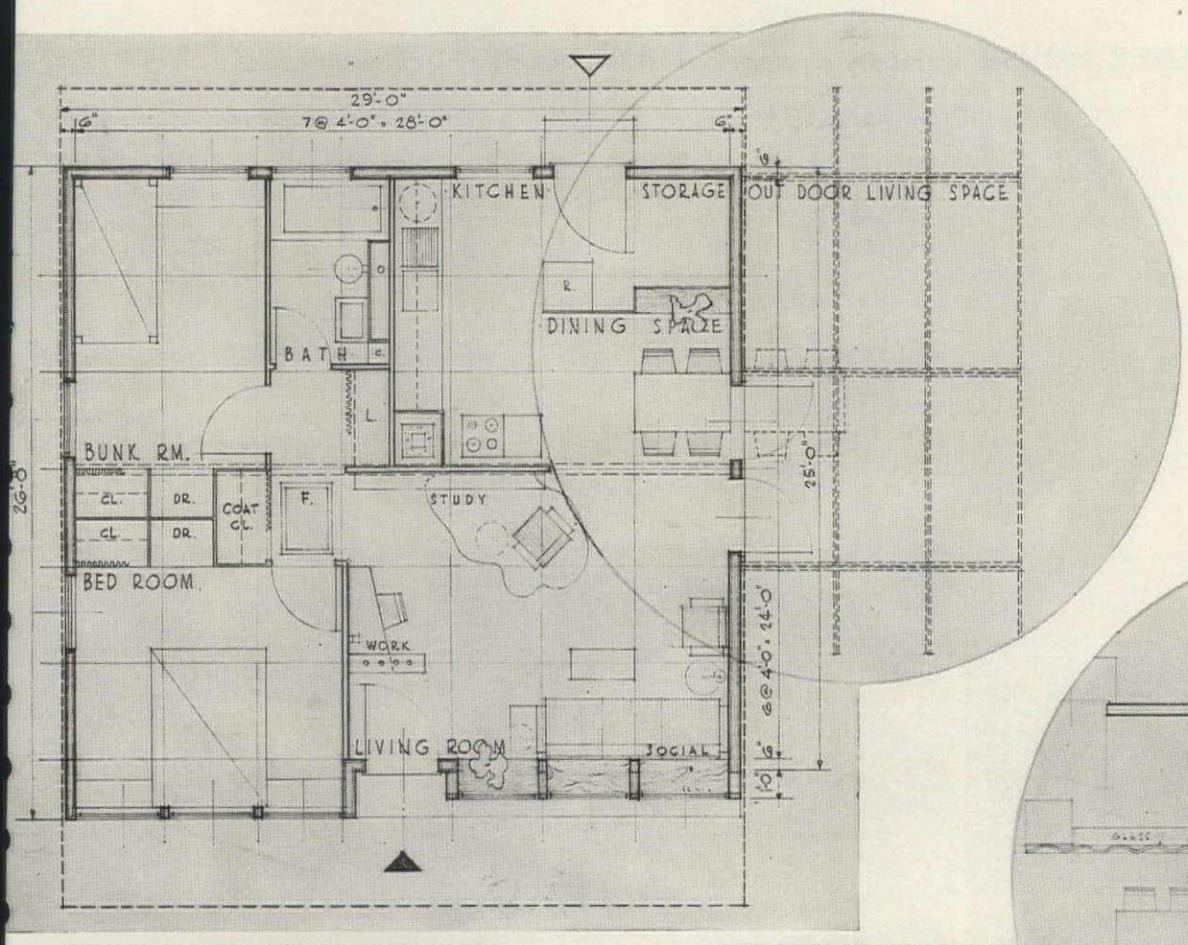
Most important, this extra space may be readily enclosed and converted into guest quarters or a rentable apartment—entirely private but connected with one door to the original house. (The other doorway would be blocked up, the door and frame being used for exterior access to the new apartment.) Closets and bathroom in the smaller unit act as buffers against noises in the adjacent dining and kitchen areas of the larger unit. Heat in the smaller unit would be supplied by a space heater. When the addition is made, shutting off light from the original dining space, the temporary partition between this space and the storage room would be replaced by a glass screen. Note that the floor plan lends itself readily to duplication in a two-family twin house.



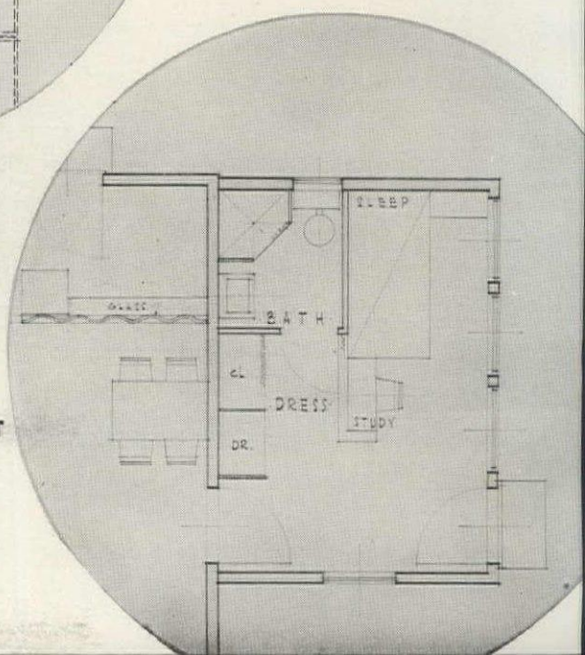
TWIN HOUSE AND END ELEVATION FOR . . .



PERSPECTIVE—BASIC PLAN WITH OUTDOOR LIVING SPACE

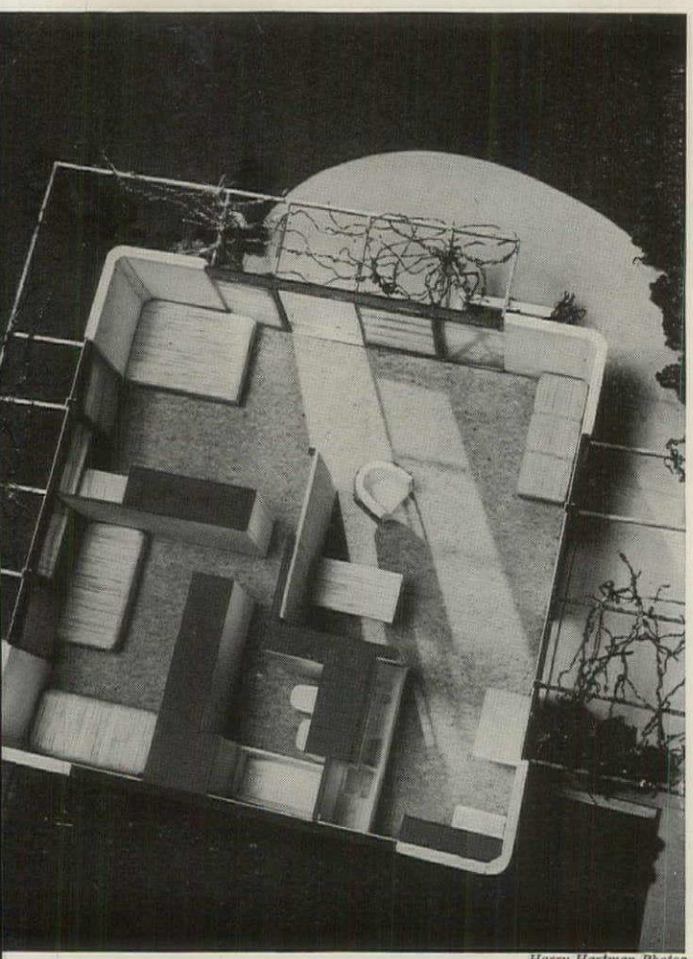


BASIC PLAN WITH OUTDOOR LIVING SPACE . . .



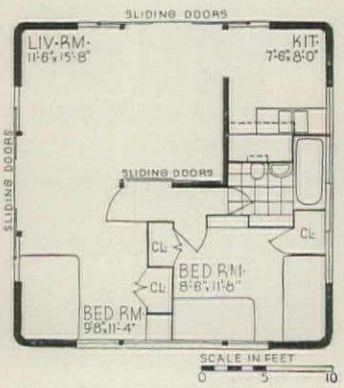
CONVERTED INTO APARTMENT

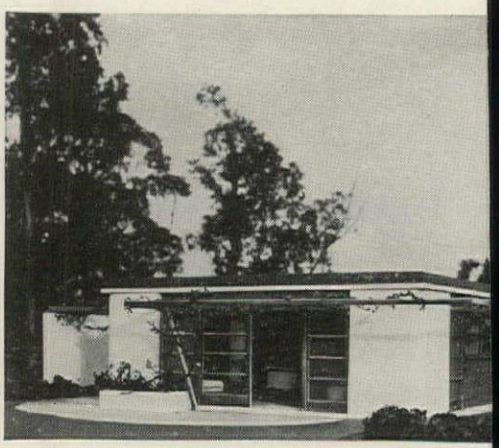
ONE-FAMILY DEFENSE HOUSE project designed by Architect Gregory Ain.



Harry Hartman Photos

Working on a Guggenheim fellowship in low cost housing, California Architect Gregory Ain in collaboration with Partner Joseph Allen Stein last month developed this unusual design specifically for defense housing purposes, claimed that in volume production the house could be completed in six working days at a Southern California cost of $1,000. A 24 ft. square, the plan is divided into three 8 ft. bays spanned with 4 x 8 ft. plywood box girders which first serve as forms for the L-shaped concrete pylons at the corners. Other features: compact plumbing assembly, an open flexible plan divided into rooms by shop-built closets and a sliding bedroom-living room wall panel, ample fenestration, trellises to improve the boxlike appearance and permit easy camouflage. Major material requirements: 9 cu. yds. of concrete for 600 sq. ft. of floor slab and for corner pylons; 135 lbs. of steel; 1,200 bd. ft. of lumber, 1,570 sq. ft. of plywood; 200 sq. ft. of sheet metal; 600 sq. ft. of roofing; four exterior sliding doors; two hinged interior doors and a sliding panel; eleven windows; cabinets comprised of 640 sq. ft. of plywood and 150 bd. ft. of lumber.



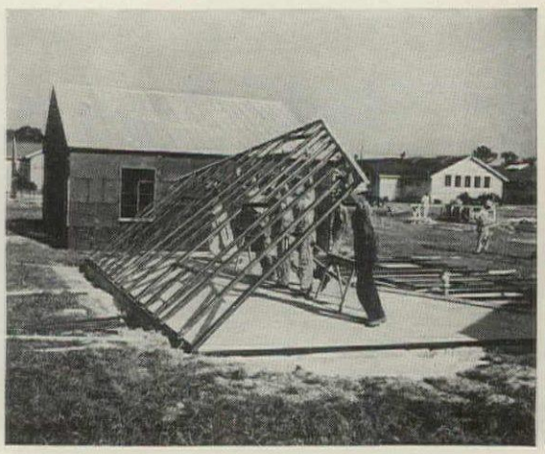


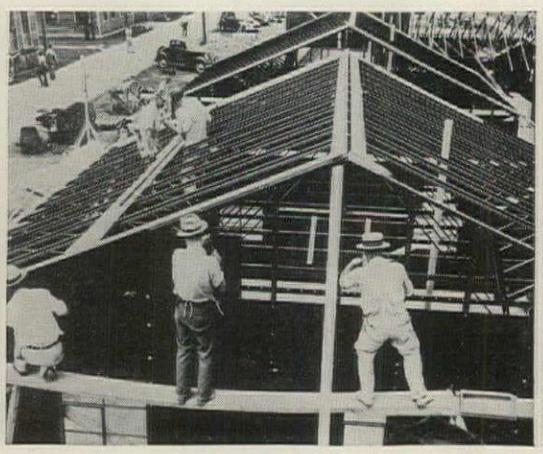
ONE-FAMILY DEFENSE HOUSE partially prefabricated for the Navy in Norfolk, Va.

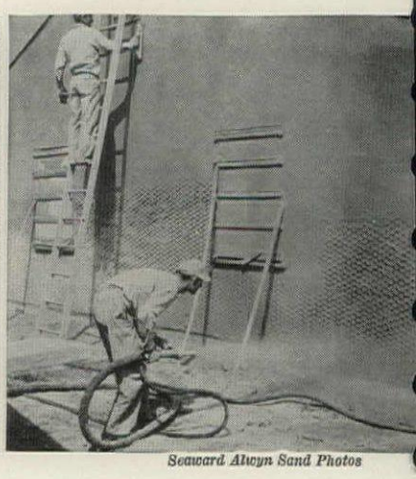
"Fifty one-family units are now being built by the Navy at the Naval Base, Norfolk, Va., as a 'trial run' to see how cheap and fast housing to meet naval requirements can be built. These houses (following the plan on the opposite page) are equipped with a combination gas house heater and hot water heater, a gas cooking stove, an electric ice box, metal kitchen cabinets and shelves, etc. With ordinary care and maintenance they should last 30 years. The original estimate of cost was $1,993 per house, and progress . . . indicates . . . a somewhat lower figure. It is anticipated that 50 houses will be completed and ready for occupancy 50 days after the contract was let." Thus, before a recent Congressional hearing testified Rear Admiral Ben Moreell, Chief of the Navy Department's Bureau of Yards and Docks, concerning the project pictured below and right. Representing a compromise between prefabricated and in-place construction, these houses are built of preassembled steel frame,* covered on the exterior with fiber board, chicken wire and sprayed gunnite; on the interior with large insulating boards† precut to exact wall and ceiling dimensions. Plumbing "roughing in" is preassembled with sweat fillings, can be completely set in one operation. Admiral Moreell said that his contractor, having set up his jigs and trained his men on the initial 50 houses, could handle a bigger order at the rate of twenty units per day. Builder: Byrne Organization of Dallas, Tex., which last month was awarded a contract for more than 1,000 additional houses at Norfolk.

* Stran Steel Division of the Great Lakes Steel Corp.

† The Upson Co.

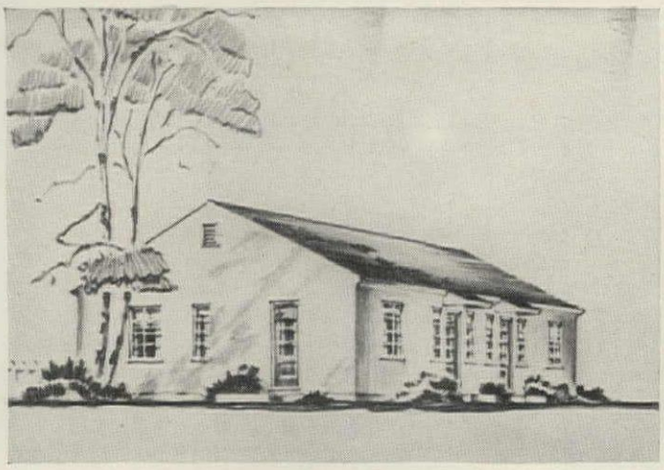


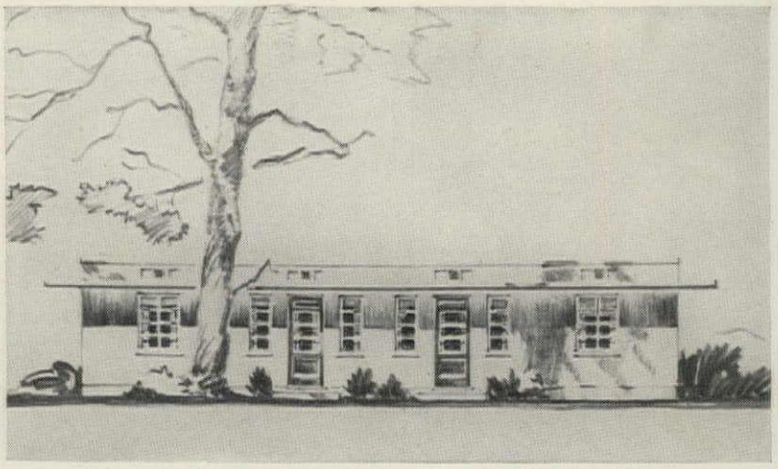




Seaward Alwyn Sand Photos

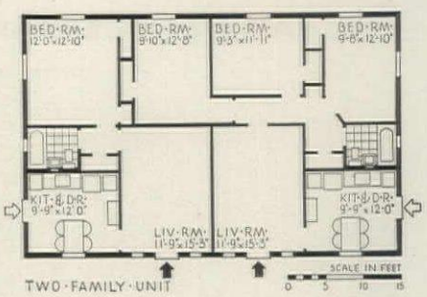
ONE- AND TWO-FAMILY DEFENSE HOUSES by the Navy for the U. S. and the Tropics.



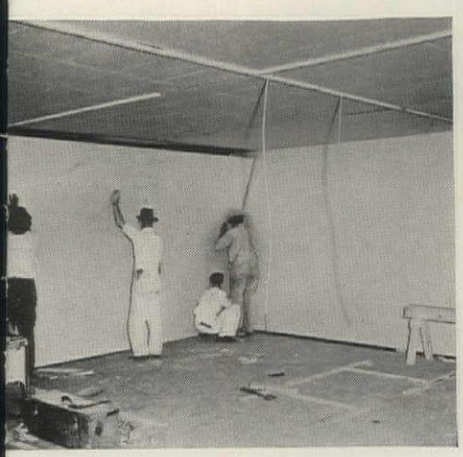


When Rear Admiral Moreell described to Congressmen his Norfolk, Va. project (see text, p. 450), he also talked about these designs which will be used over and over again when the Navy spends its $44 million for housing the families of enlisted personnel, Navy civilian employes and defense industrial workers (see p. 442). Said Moreell: "The Bureau of Yards and Docks of the Navy Department has developed standard floor plans for single-family and two-family units. By minor changes in partition arrangements, the two-family units can give combinations of one bedroom, two bedrooms or three bedrooms, which should meet the requirements of most families. Various exterior treatments can be used with pitched roof or flat roof, and an adaptation for the Tropics has been developed with the house set up on posts, and a wide-eaved roof, screened porch and so forth. These houses are standardized as to floor plans, equipment and accessories, but can be built using frame construction, metal-lumber construction (as below), prefabricated steel panels, concrete or numerous other materials. . . . The Bureau is prepared to furnish complete detailed contract drawings and specifications for these one-family and/or two-family standard houses within 48 hours after receipt of final information as to type of substructure, roof and construction."

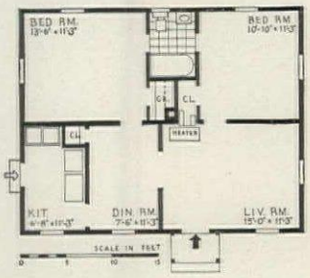
ONE-FAMILY-UNIT



TWO-FAMILY-UNIT

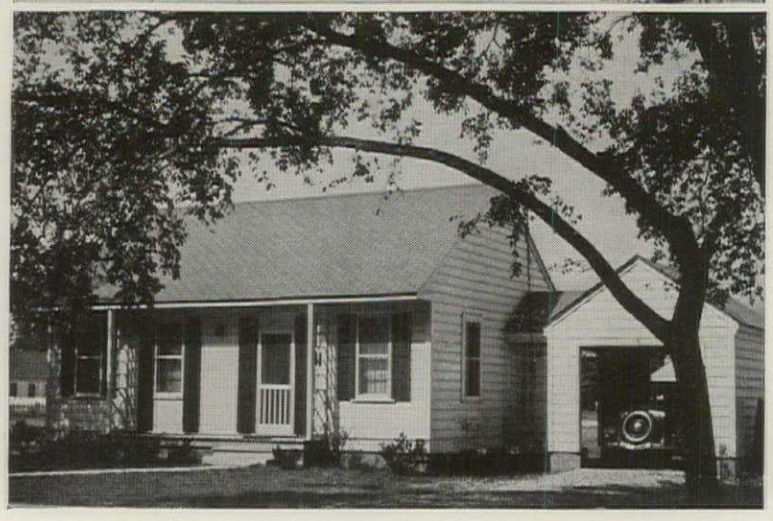


ONE-FAMILY HOUSES sold in Maryland for $150 cash down payments.



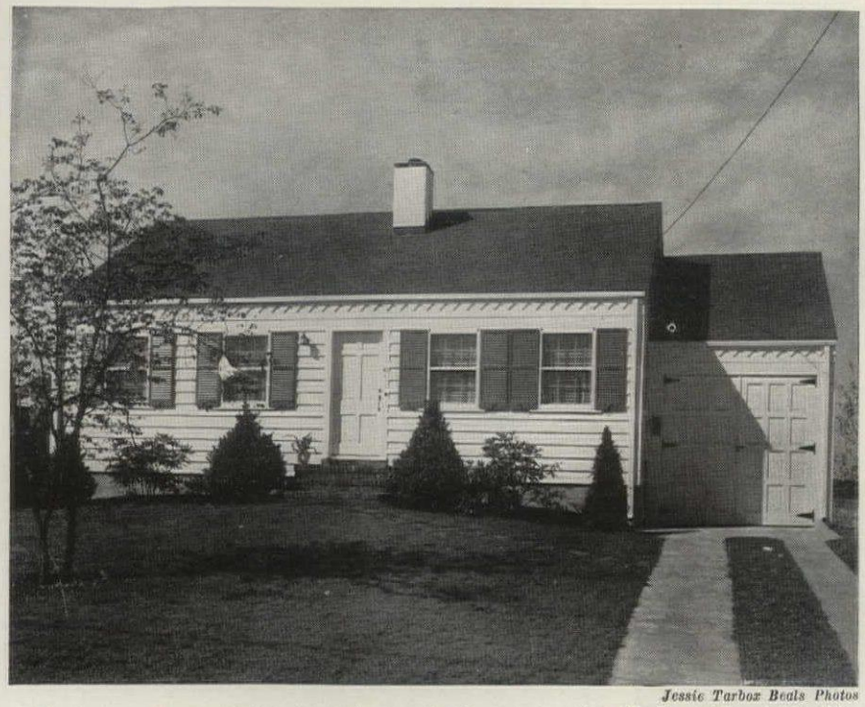
One of the most attractive low cost projects in the U. S., this Bladensburg, Md. subdivision of 46 houses was sold out this Spring in 30 days at a price of $2,990 per unit and at an advertising cost of under $50. Major attraction: a 5 per cent ($150) cash down payment made possible by 30-year ground leases with options to purchase the 55 x 90 ft. lots at $340. Annual ground rent is 6 per cent, or $20.40 per year, $1.60 per month. Other monthly costs, primarily debt service on a $2,500 FHA-insured 15-year Title I loan, taxes and insurance, total $25.90. Cost breakdown: labor, materials and equipment, $2,245; fees, permits, insurance, etc., $205; contractor's profit, $195. Subdivision: Newton Village. Subdivider: Park Properties, Inc. Architect: Fred E. Taylor. Contractor: Schuyler, Inc.

ONE-FAMILY HOUSES at $2,550 with lot in Jackson, Miss.

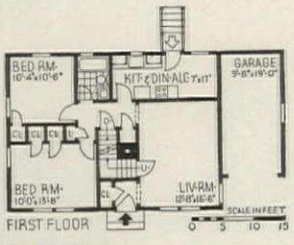


Another low cost subdivision to which FHA points with particular pride—Colonial Courts in Jackson, Miss., by Architects Fort and White (Frank and Dudley H., respectively). Each of the 60 houses (22 have already been built and sold) springs from the same floor plan, but exterior variations are achieved via alternate roof treatments, colors and garage and porch locations. Standard $2,550 sales price includes land, concrete walks, gravel drives, garage, grading, landscaping, closing costs and real estate commission. Cash down payment: $250. Mortgage: $2,300 FHA-insured under Title II, 20 years. All inclusive monthly payments: $17, first year; $19.90 thereafter. Construction features: reenforced concrete footings; brick piers with 4 in. curtain wall across front; frame walls and ceilings covered with canvas and paper; each room piped for gas space heaters. Builder: G. H. Harris.

ONE-FAMILY HOUSES by Long Island's busiest architect.

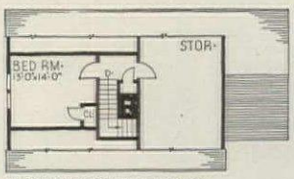


Jessie Tarbox Beals Photos

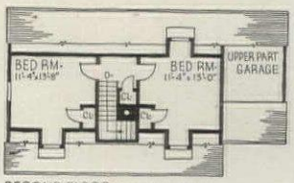


FIRST FLOOR

CAPE COD



SECOND FLOOR ONE BED ROOM



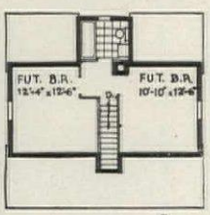
SECOND FLOOR TWO BED ROOMS

DUTCH COLONIAL

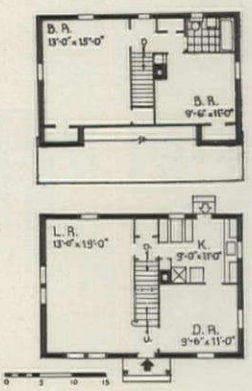
Designer of some 22,000 small houses in the most active U. S. residential building center, Long Island, N. Y., Architect Arthur E. Allen is now assigned to the Army Industrial College at Washington as a Reserve Officer. Before he was called to active duty, Major Allen designed these houses for Subdivider W. R. Gibson's Sunbury-at-Hewlett development. In this project, as in most of its Long Island neighbors, standardization has been carried to an economical extreme—only two first floor plans are used, and their single difference is the omission or inclusion of a fireplace. Exterior variations, however, run into the dozens, three of which are presented here. The one-story Cape Cod model sells for $4,900 plus land at $900 and may be expanded with a finished attic room (see plan) for about $500 more. A Dutch Colonial roof provides more attic headroom.

ONE-FAMILY HOUSES of moderate cost for well-paid Hartford defense workers.

Hiland Dale Holt



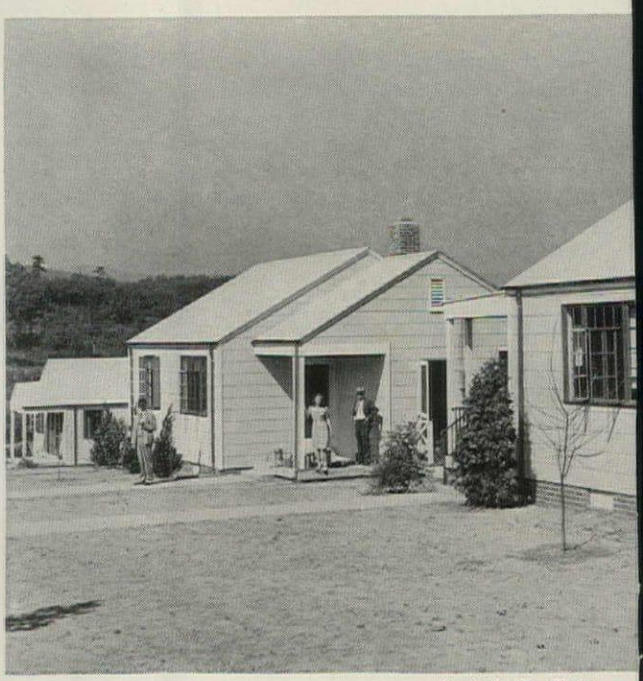
CAPE COD



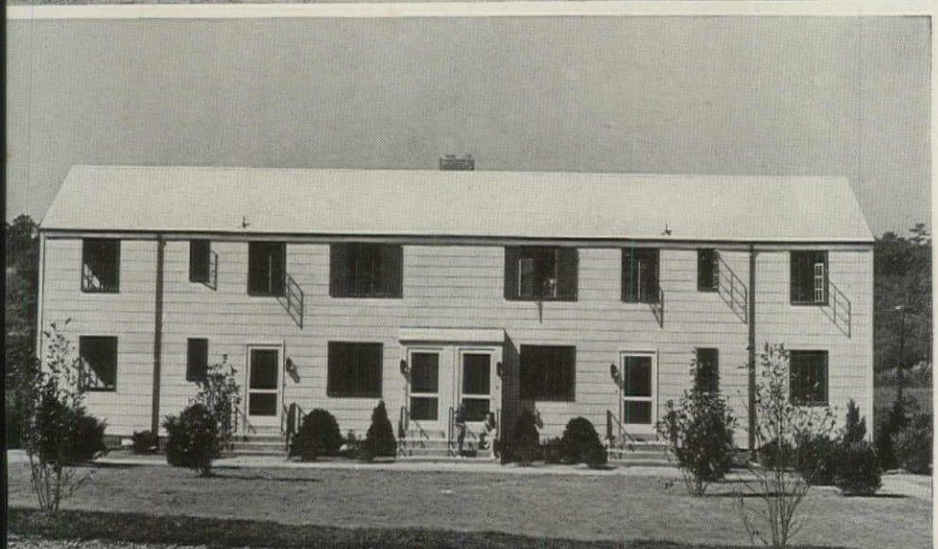
SALT BOX

Claiming "we have housed over 10,000 persons," experienced Subdivider N. K. Winston Co. is building these houses in its Hillside Homes development for employes of Hartford's booming defense industries—Hamilton Propeller, United Aircraft and Colt's Patent Fire Arms. And, some purchasers work in Pratt & Whitney's small tool plant in West Hartford. One-story house (Cape Cod design with barn red walls and yellow blinds) sells for $5,000, has finished stairway and water, waste and electric lines already installed in roomy attic for future expansion. Note that one-and-one-half story house, selling for $5,350, is of famous "salt box" design. Both prices include 52 x 150 ft. lots and these selling details: dining alcoves with upholstered seats, built-in kitchen radios; brass water pipes; copper screens and leaders; full insulation. Architects: Ruben Henri Bowden and W. M. Dowling.

ONE- TO SIX-FAMILY HOUSES combine to solve an industrial housing problem in Front Royal, V

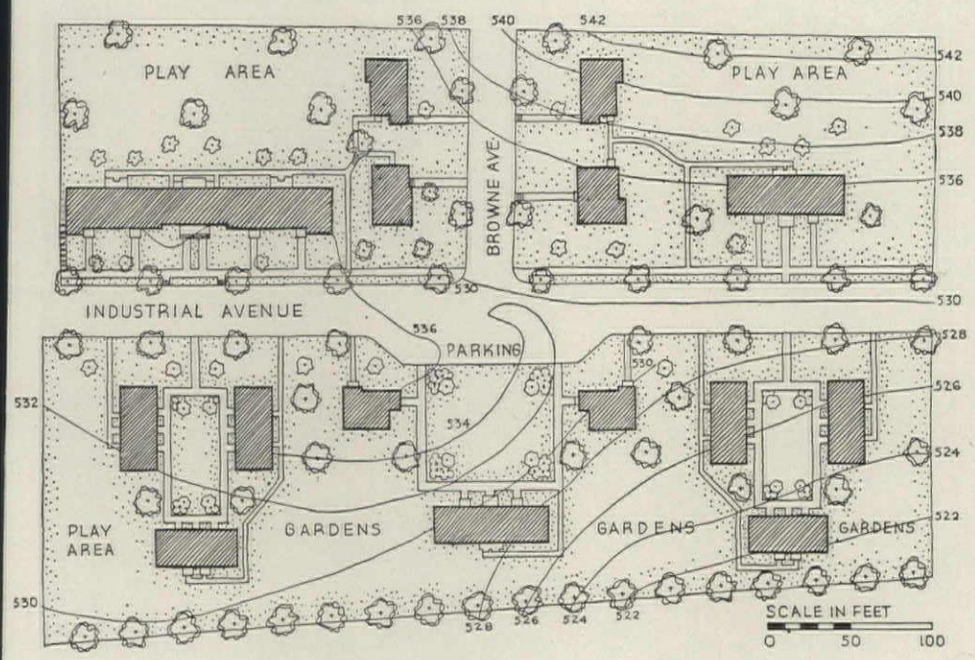


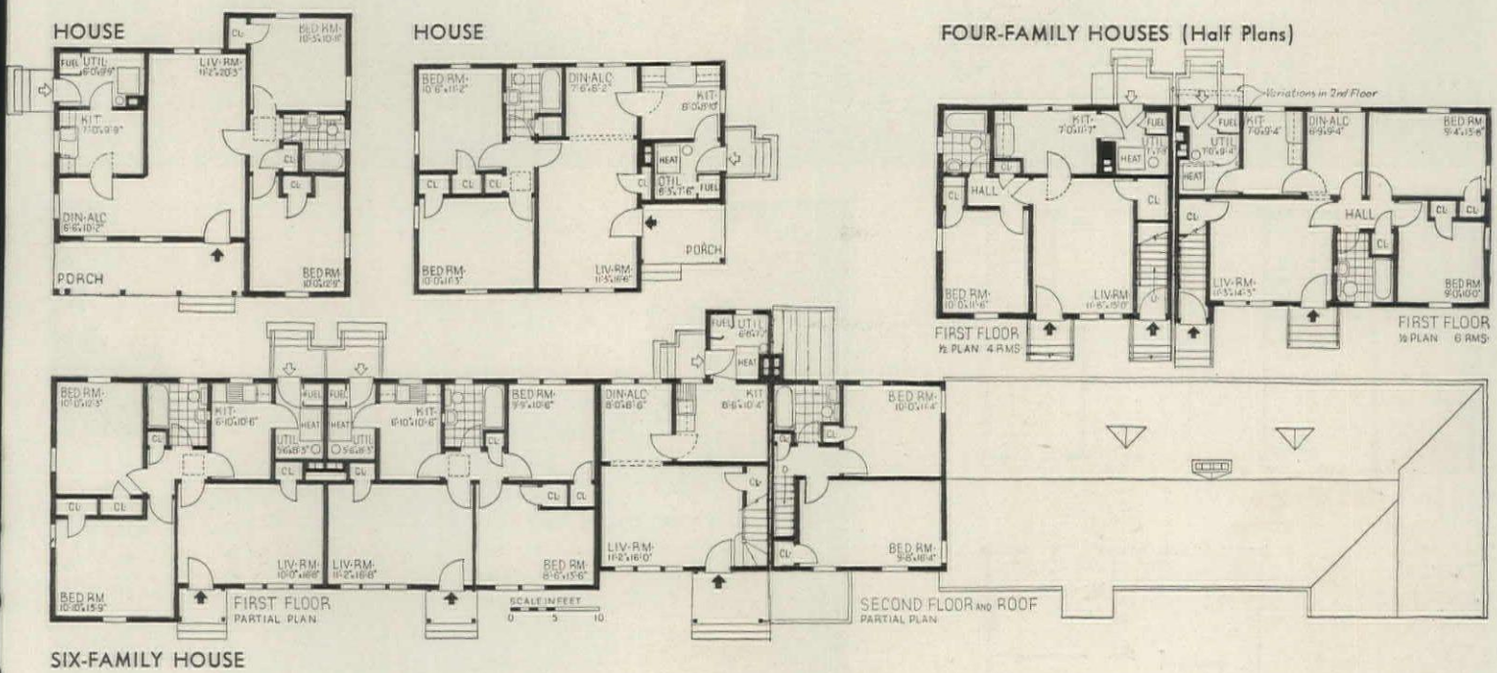
Lewis E. Allen Photos



With the aid of FHA mortgage insurance private enterprise has built close to 300 garden apartment projects. On the average they have provided about 130 dwelling units each, have been valued at about $5,000 per unit and have been rented for about $14.50 per room per month—far above the financial reach of the defense housing market. Pulling these averages down is this significant rental project in the industrial (American Viscose Co.) town of Front Royal, Va.—about 65 miles southwest of Washington, D. C. Smaller in every respect, Front Royal Gardens contains 44 dwelling units, is valued at $134,400, or $3,054 per dwelling unit,

feature white roofs and low rents.





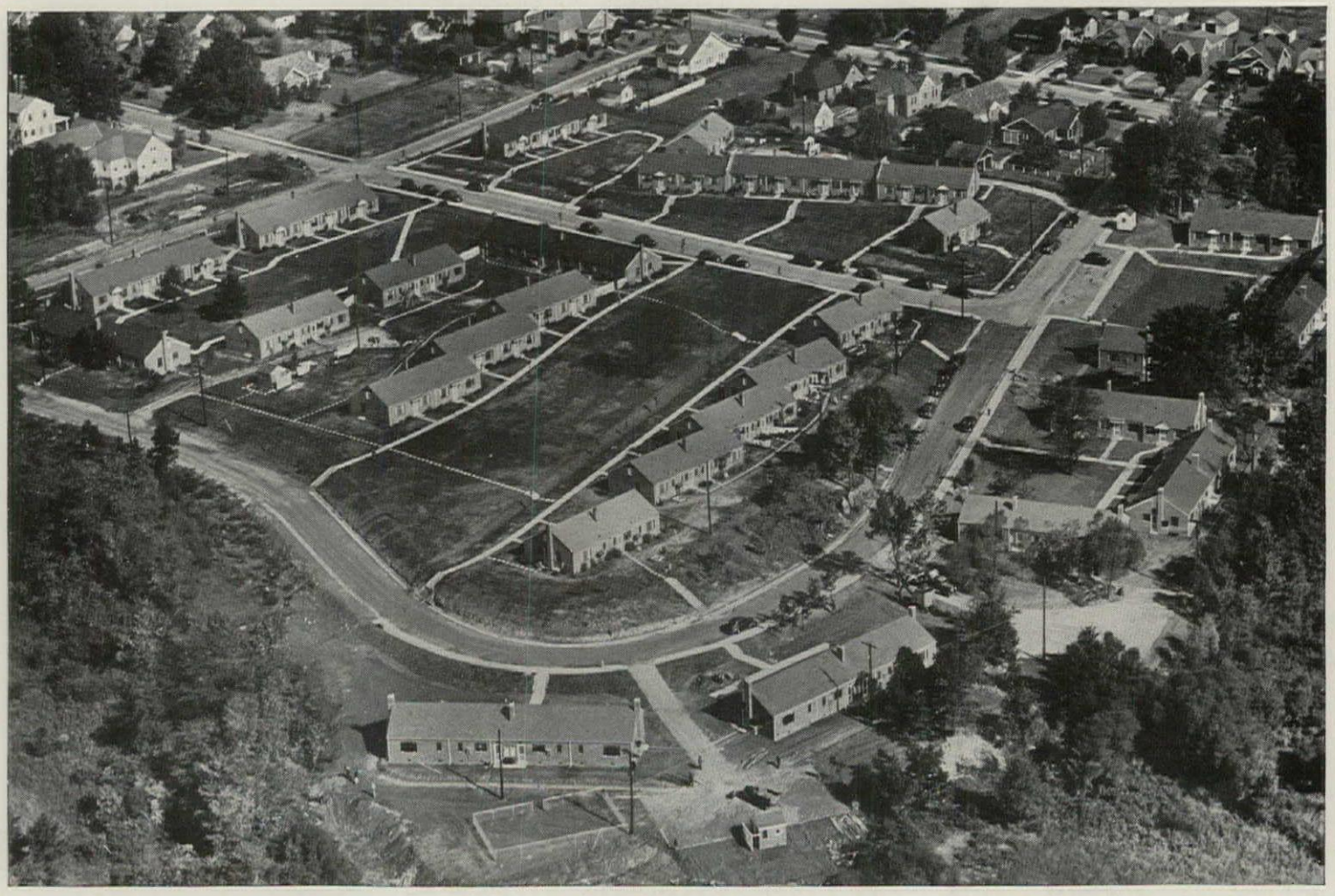
SIX-FAMILY HOUSE

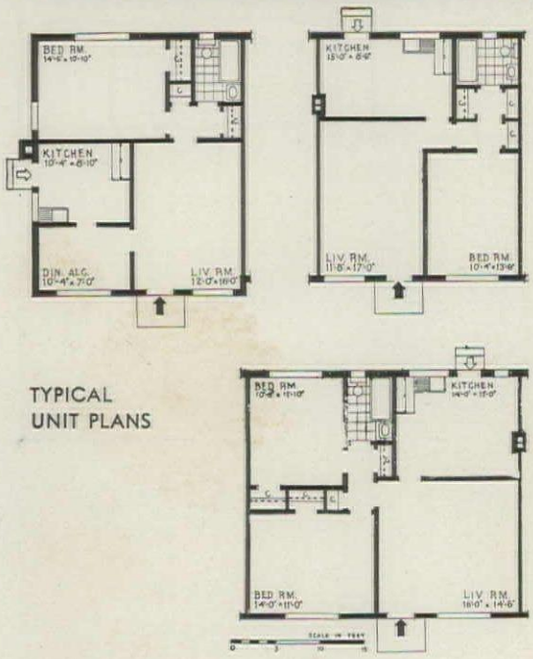
and rents for only $8.12 per room—a near record for the entire FHA program.

Situated on a 3.75 acre site with a 20 ft. drop along its narrowest (320 ft.) dimension, the project illustrates an interesting use of several building sizes. There are six one-family detached houses which spring from four basic plans, eight four-family buildings which spring from two basic plans, and one six-family building. The fact that six of the four-family units are comprised solely of one-bedroom flats contributes importantly to the project's low cost. In addition there are eight four-room units, twelve four-and-a-half room units.

Construction outline: foundations, 8 in. brick walls and 12 in. piers on concrete footings; exterior walls, typical stud construction finished on the outside with asbestos siding, on the inside with lath and plaster; roof, asbestos shingles (note snow covered appearance of roofs, left) atop 30 lb. felt; insulation, 4 in. rockwool in top floor ceilings. Each dwelling unit is individually heated, the equipment being housed in a utility room. There are no basements. Architect: A. R. Clas. Contractor: E. Newton Snider. The Federal National Mortgage Assn. holds the FHA-insured mortgage originally amounting to $104,000—about 77 per cent of the project's value.

ONE-STORY ROW HOUSES rent without subsidy for $9.50 per room in Charlotte, N. C.





TYPICAL UNIT PLANS

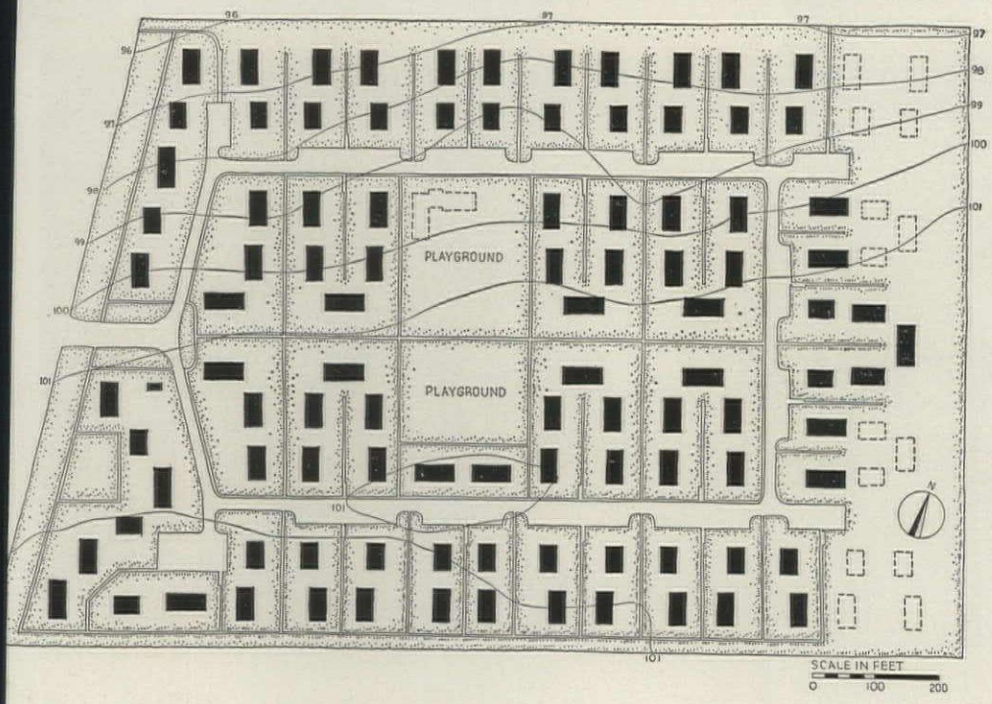
Duke Photos

One of the lowest rent projects ever built without public subsidy, this 10-acre, 82-family row house development was sponsored by Little Homes, Inc., financed by two life insurance companies with $215,000 of FHA-insured mortgages covering about 73 per cent of its $295,000 value. Its uncommonly low rents, averaging $9.50 per room per month, contributed to the fact that the 82-family dwelling units were 100 per cent rented prior to completion last Spring.

Ranging in size from two to eight units, Little Homes' 25 buildings contain 29 three-room units which rent for $30, 30 three-and-one-half-room units at $34.50, 23 four-room units at $37.50. The site also makes room for adequate parking space, pre-school playgrounds, and utility houses for maid service. Rents exclude the cost of electricity for cooking, refrigeration and lighting and fuel oil for the individual recirculating forced air heating system with which each apartment is equipped.

Low costs resulted from heady planning and design rather than from the material used, a point readily proved by these construction details: foundations of 8 in. concrete blocks atop concrete footings; exterior walls of 4 in. cinder block tile veneered with 4 in. brick; lath and plaster ceilings insulated with rockwool; steel casements screened outside with bronze mesh in metal frames; inside with Venetian blinds; copper tubing for water lines. Each of the 82 dwelling units cost about $3,600 including land. Architect: Chas. W. Connelly. Contractor: Blythe Bros. Construction Co.

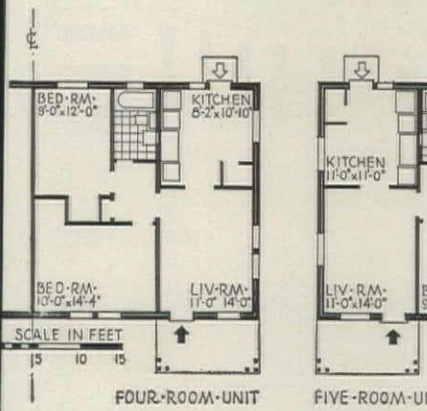
TWO-FAMILY DEFENSE HOUSES built with USHA funds for Pensacola, Fla., naval airmen.



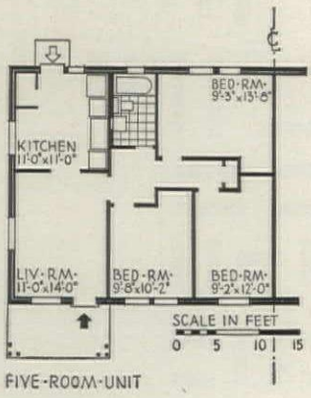
Scheduled for completion on December 4, eighteen weeks after its approval by the President, Moreno Court will be the second of the USHA's 21 defense housing projects to be completed under forced draft by construction crews working day and night. (For defense project No. 1, see p. 458). Its occupants will be the families of Navy civilian employes in nearby shipyards, and despite the absence of Federal subsidies, will pay an estimated monthly rent of only $16.40 per dwelling unit plus $4.48 for utilities.

Comprised of 100 one-story two-family buildings, the project covers 26 acres of formerly vacant land purchased by the local housing authority for $15,500 or $594 per acre. Total cost of the project including land will approximate $646,211, or $3,231 per dwelling unit.

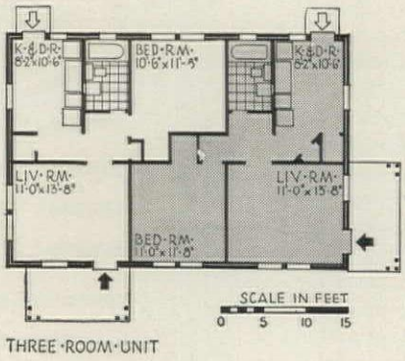
Construction outline: foundations, 8 in. brick; first floor, concrete slab on fill; exterior walls, 8 in. cavity brick (4 in. brick on exterior, 2 in. air space and 2 in. brick plastered on interior); roof, 2 x 6 in. wood trusses, asbestos cement shingles; partitions plastered gypsum board on strips nailed to bottom chord of trusses; heating equipment, individual gas-fired space heaters and hot water heaters. Architects: Yonge & Hart. Contractor: Dyson & Co.



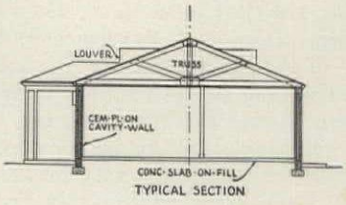
FOUR-ROOM-UNIT



FIVE-ROOM-UNIT

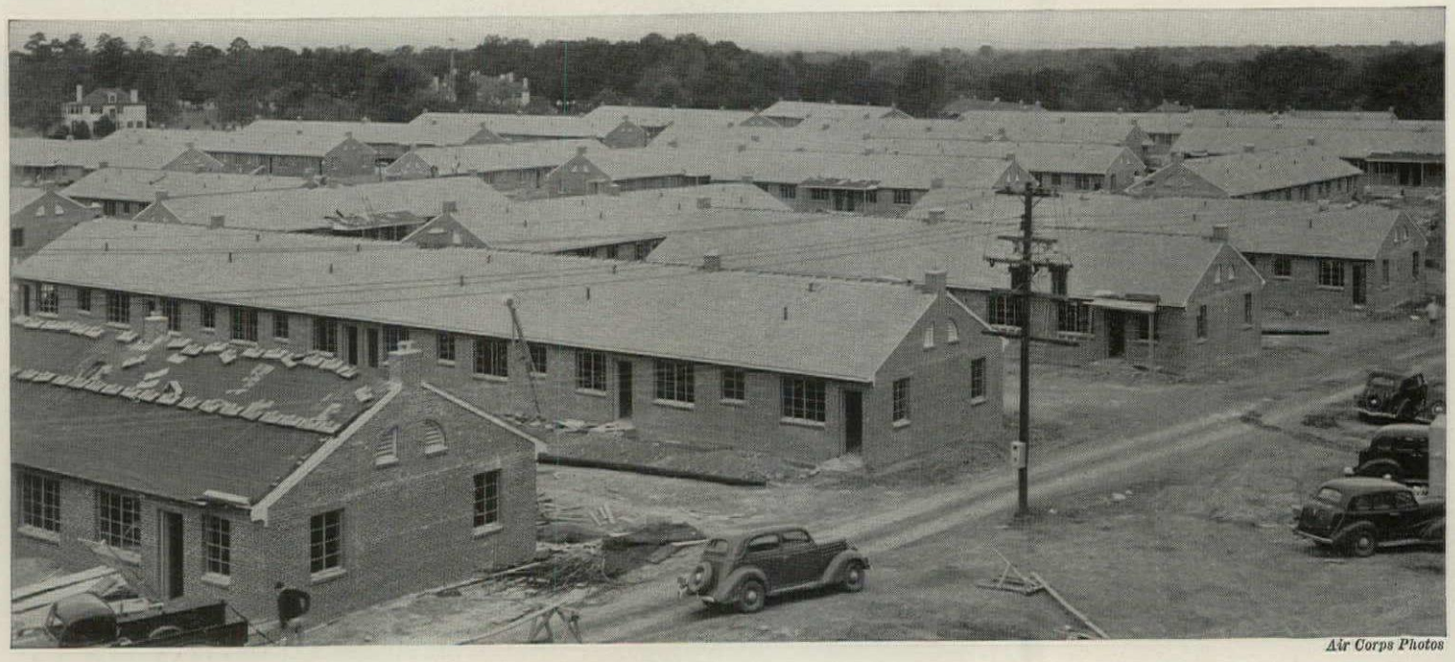


THREE-ROOM-UNIT



TYPICAL SECTION

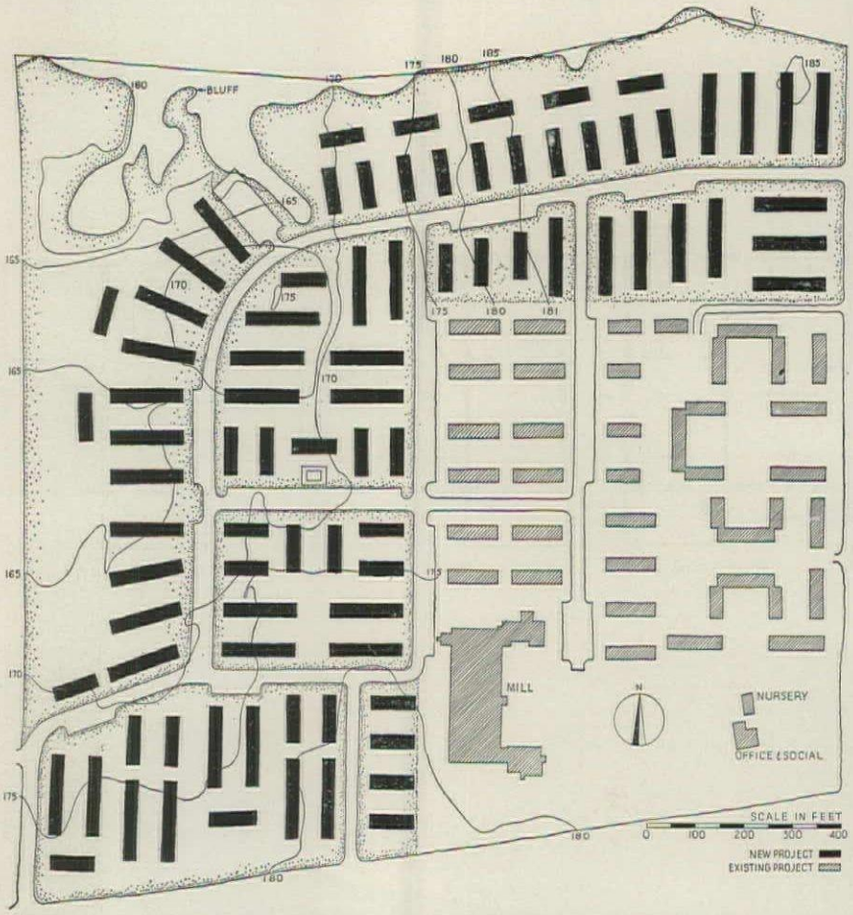
ONE-STORY ROW HOUSES in first USHA defense project for Montgomery, Ala., army airmen.

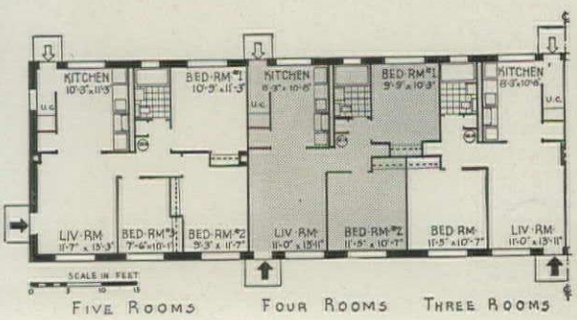


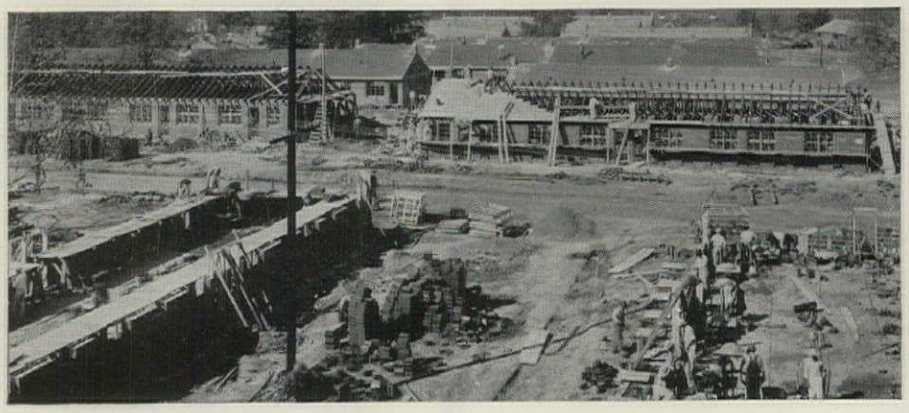
Air Corps Photos

Congress gave USHA authority to develop defense housing projects on June 28 by modifying the legislation behind its slum clearance program (see p. 441). One month later ground was broken in Montgomery, Ala. for the first such project, and its first units were opened last week to accommodate families of the increasing personnel of the Army's nearby Maxwell Field. A 424-family, 45.4 acre addition to a previous low rent project (Riverside Heights—see site plan, right) undertaken by the local housing authority with USHA financial assistance, the defense project is called "Cleveland Courts," contains 170 three-room units, 170 four-and-a-half-room units and 84 five-and-a-half-room units—all of them in one-story row houses ranging in size from two to six units. Reflecting the complete absence of Federal subsidy, estimated rents will average $18.86 per unit per month plus $3.84 for water, electricity for lighting and gas for cooking, individual space heaters and hot water heaters.

Construction outline: foundations, terra cotta tile; exterior walls, 6 in. speed tile veneered with 4 in. brick damp-proofed and plastered inside; floor, concrete slab on fill; roof, asbestos shingles; partitions, 2 in. solid plaster, ceiling, metal lath and plaster. Total estimated cost, including $151,120 for site acquisition: $1,573,835, or $3,712 per dwelling unit. Architect: Moreland Griffith Smith. Builder: Algernon Blair.





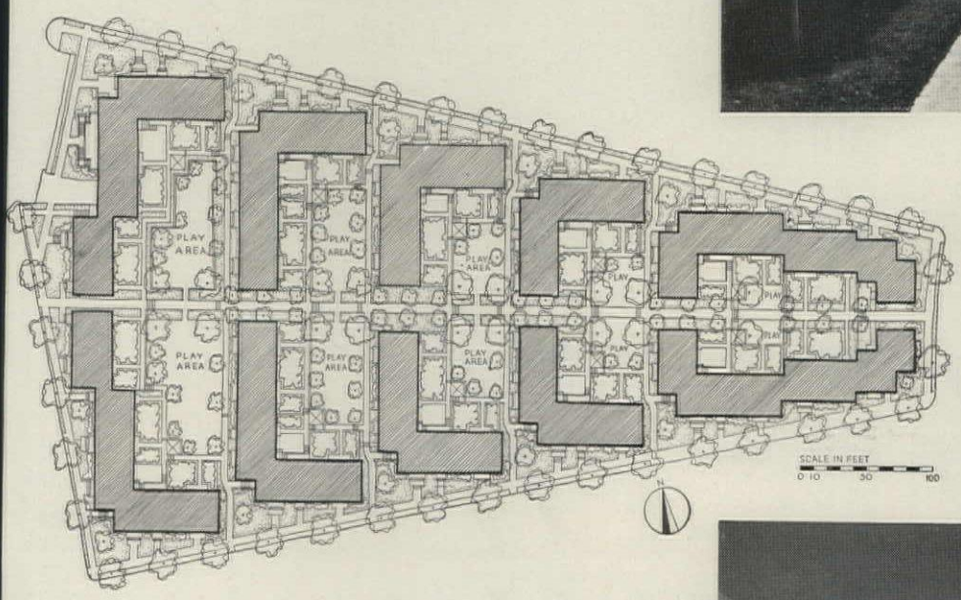


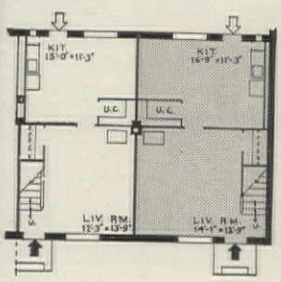
TWO-STORY ROWS AND FLATS

of unusual construction in the first West Coast public housing project.

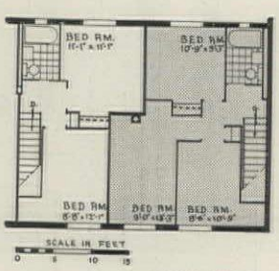
Not a defense project, San Francisco's Holly Park is significant because: 1) it is the first USHA project to be completed (June 1940) west of the Rockies; 2) it admirably solves the problem posed by a steeply sloping site; 3) it is of reenforced concrete construction; and 4) its exterior treatment has a refreshing Modern flavor.

Only about 36.5 per cent of the small (2.68-acre) formerly vacant site is covered with the ten two-story buildings, but the project makes room for 118 families in three-and-one-half, four-and-a-half and five-and-a-half room flats and row houses. Construction outline: foundation, 8 in. concrete; exterior walls, reenforced concrete (8 in. first story, 7 in. second story) with furred metal lath and plaster inside; first floor, 5 in. framed solid slab; roof, flat wood truss; partitions, 2 in. solid plaster; floor finish, asphalt tile and linoleum. Total cost, including $70,615 site acquisition: $548,772, or $4,651 per dwelling unit. Rents: $13.78 per unit plus $5.34 for water, electricity for lighting and gas for individual space heaters, hot water heaters and cooking. Architect: Arthur Brown, Jr. Contractors: Barrett and Hilp.

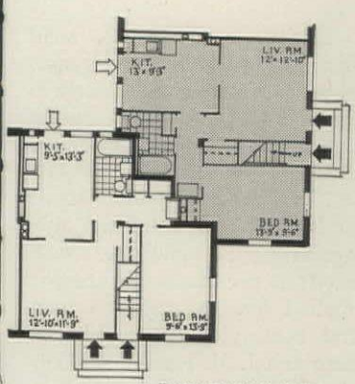




FIRST FLOOR

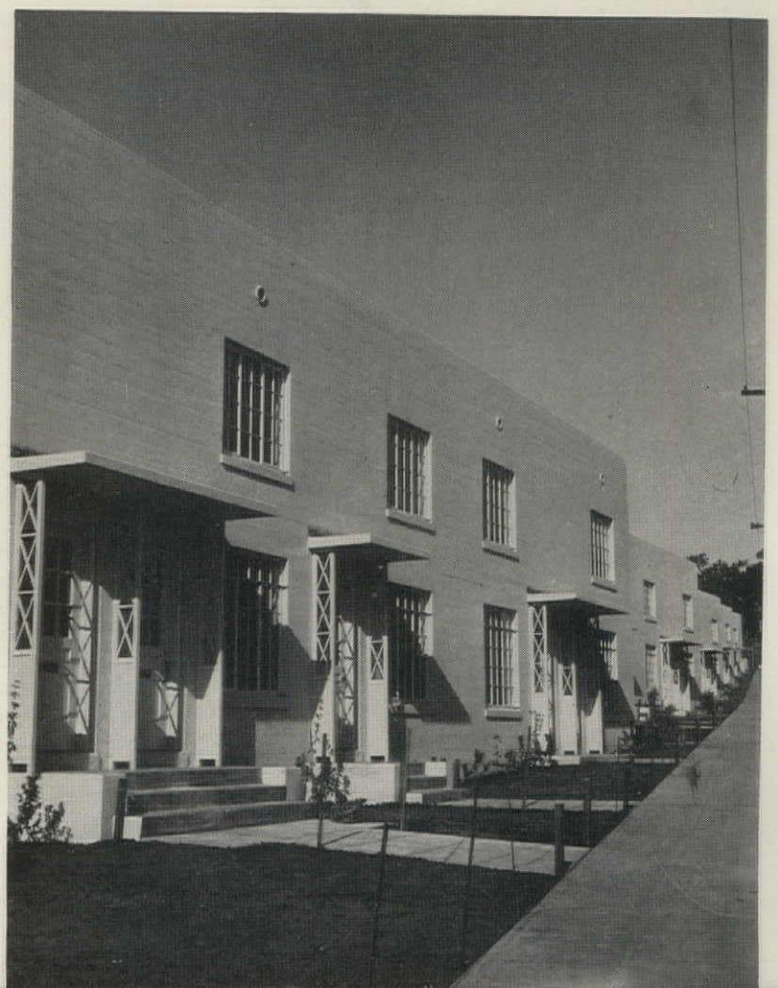


SECOND FLOOR



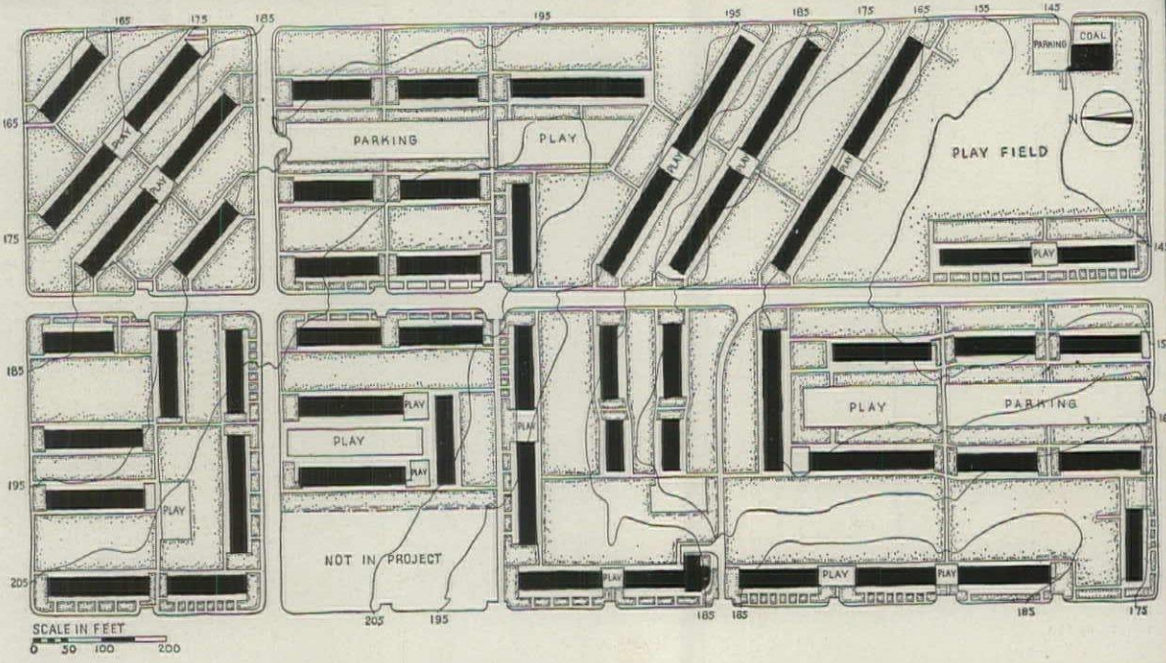
FOUR FAMILY UNIT.

TYPICAL UNIT PLANS



TWO-STORY ROW HOUSES AND FLATS in Omaha, Neb. A 522-family USHA project with

Louis R. Bostwick P

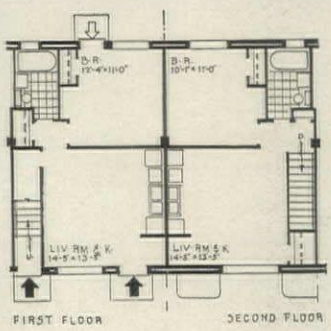


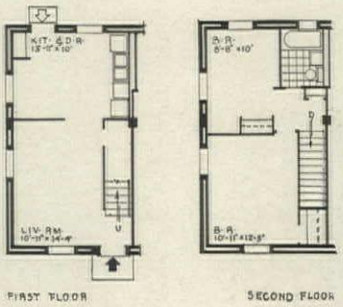
Admirably adapted to the gently sloping site from which it takes its name, South Side Terrace is one of the largest low rent slum clearance projects built under the USHA program. Its 522 dwelling units are contained in 54 two-story buildings aligned, for the most part, parallel to the contours of the 26.2-acre site. Unit floor plans (right) are repeated to produce:

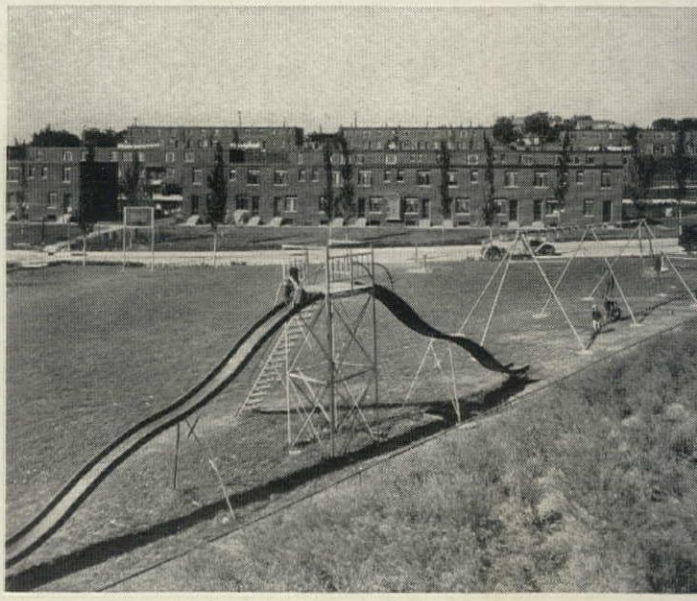
20 2-room flats
152 3½-room flats
244 4½-room row houses
90 5½-room row houses
16 6½-room row houses

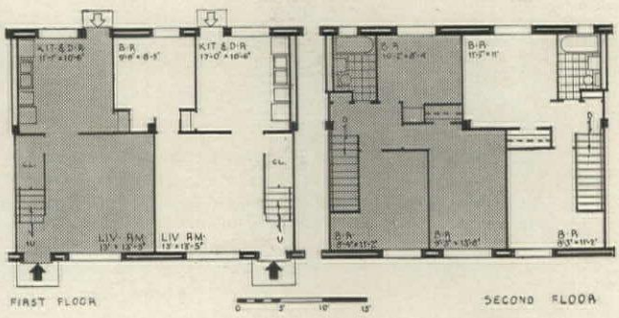
Cost saving site plan details worth noting in the panorama above: 1) location of service walks close to buildings, eliminating connecting walks to front and rear stoops, 2) continuous clothes lines parallel and adjacent to rear service walks, 3) central garbage collection stations to which tenants must bring their refuse. Construction outline: exterior walls 4 in. double-size brick, 4 in. air space, 4 in. tile (or concrete block in basement) plastered direct; floors, steel joists, hollow tile and concrete on continuous wall beam covered with asphalt tile (except kitchens and bathrooms, linoleum); partitions, solid plaster; roofs, flat, 4-ply tar and gravel with 16 oz. copper cornice. Formerly a "partial" slum, the site cost the Omaha Housing Authority $293,364, helped to boost the total project cost to $2,679,416, or about $5,130 per dwelling unit. Rents reflect large Federal and municipal subsidies, average $13.35 per month per dwelling unit, plus $7.82 per month for utilities. Heat is supplied from a coal-fired four-boiler central heating plant. Architects: N. R. Brigham and J. M. Nachtigall. Contractor: Peter Kiewit Sons Co.

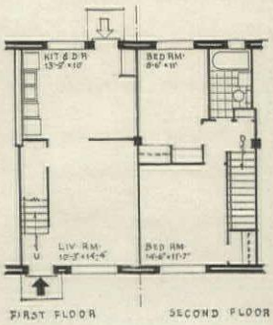
ue wall construction provides five apartment sizes.







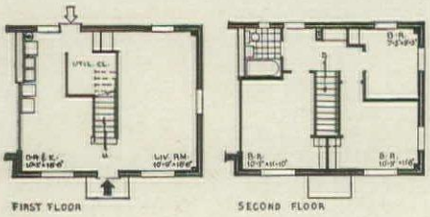


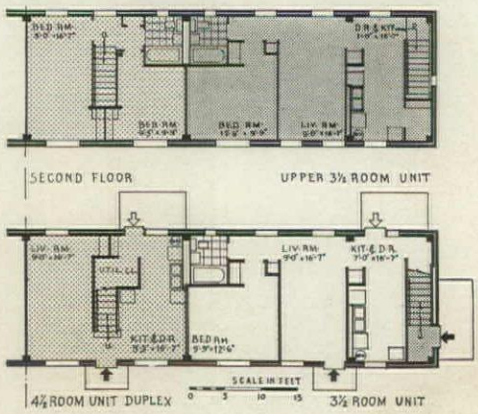


TYPICAL UNIT PLANS

TWO-STORY ROWS AND FLATS cut a well-studied site pattern in Houston, Texas.

Harry L. Starnes

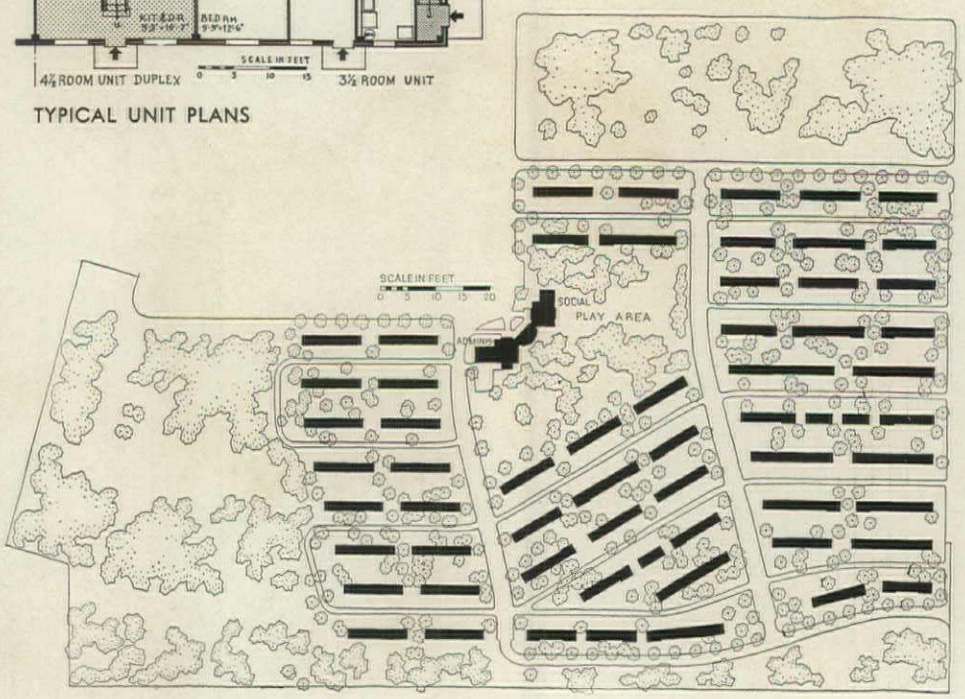




TYPICAL UNIT PLANS

Convincing proof that the most economical form of housing—the two-story row house—can also be an attractive form is Houston's USHA project, "Cuney Homes." Of course, the buildings' admirable clean facades are complimented by the large trees which already graced the formerly vacant site, but good architecture contributes much to the pleasing overall appearance. Layout of the 62 buildings was influenced strongly by local wind and sun conditions. Thus, during spring months the prevailing breeze is from the south; during summer months, from the southeast. Since all buildings face generally north and south, they capitalize on this wind condition.

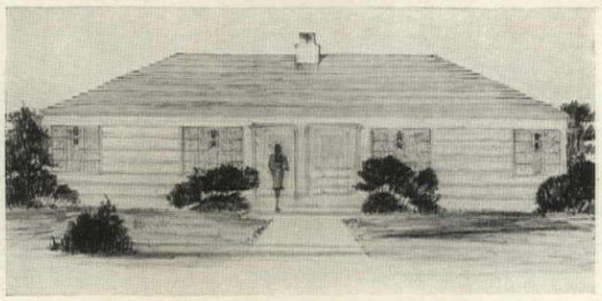
The project's 360 dwelling units are comprised of 108 three-and-a-half-room flats, 146 four-and-a-half-room duplexes, and 34 five-and-a-half-room duplexes. Rents average $13.03 per unit plus $2.16 for water, electricity and gas fuel for individual space heaters, hot water heaters and ranges. Total cost, including $79,850 for site acquisition: $1,498,143, or $4,162 per dwelling unit. Architects: Stayton Nunn-Milton McGinty. Contractor: R. F. Ball Construction Co.

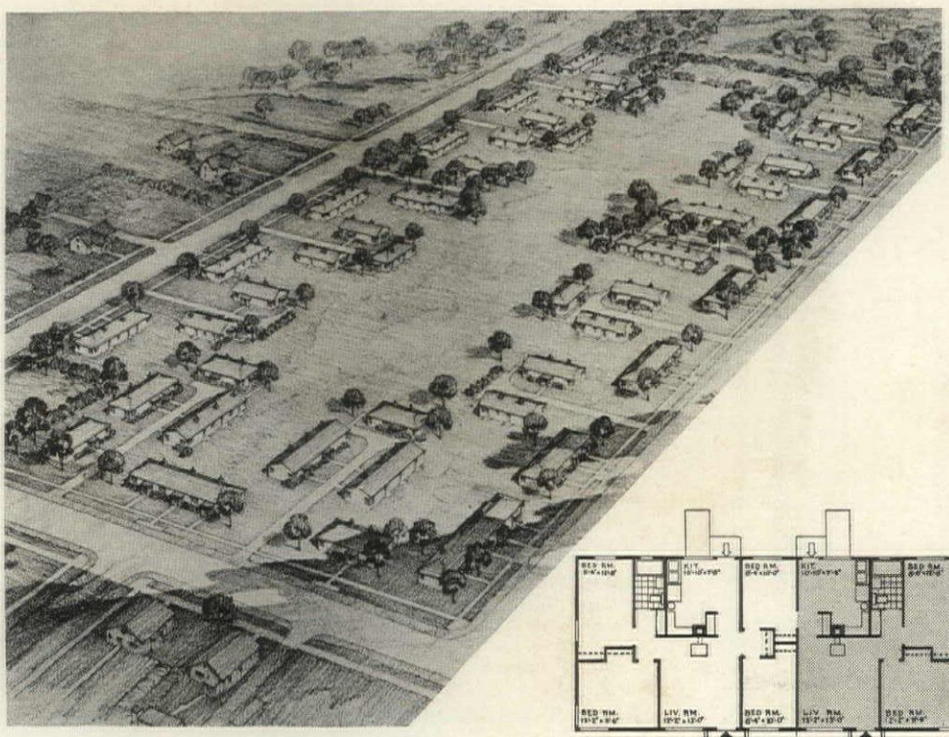


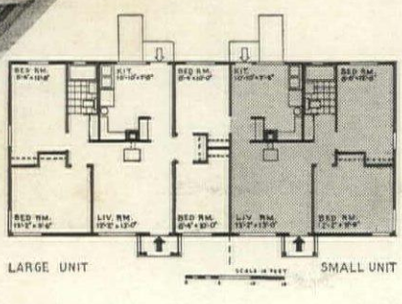
Harry L. Starnes

Construction outline: foundations, concrete grade beams; exterior walls, 4 in. clay tile veneered with 4 in. brick plastered (except in bathrooms) above 4 ft. 6 in. height on inside; first floor, concrete joists and slab; roof, flat five-ply composition; partitions, 4 ft. 6 in. wainscot of terra cotta tile with plastered 3 in. tile above; ceilings, painted concrete. Note cantilevered entrance hoods and stoops in photograph, left.

ONE-STORY ROW AND TWIN HOUSES in USHA's lowest cost Northern project.





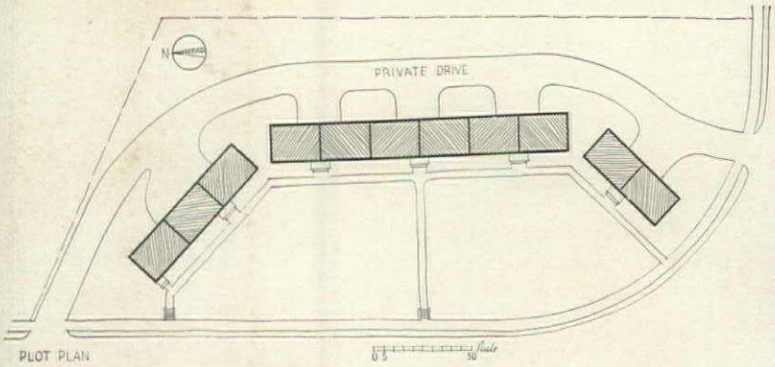


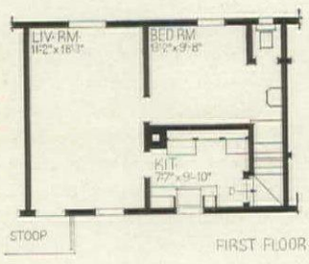
On the basis of the construction contract awarded two months ago, the Fort Wayne (Ind.) Housing Authority is building the lowest cost USHA project in the North. Total cost of the 120-family development, including the $4,260 acquisition cost of the 17.5-acre site, will come to $335,066, or only $2,792 per unit.

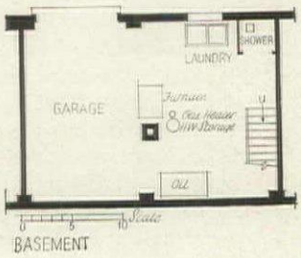
Strict economy began with the site planning. To take the greatest advantage of existing city streets which surround the site and to minimize the length of new interior streets, sidewalks, driveways and utility lines, the dwelling units were laid out in groups around the site's perimeter, leaving the central portion for recreational and garden space. Another major cost saver is omission of foundations except for a few buildings which are located on uneven grade. Instead, reenforced concrete floors with integral footings are set directly on ground fill. Typical wall section, inside-out: unpainted, tinted plaster, gypsum lath, 2 x 4 in. studs, waterproof insulating board, asbestos siding factory-cut from large standard sheets into wider-than-average "clapboards." Roof: heavy asphalt shingles.

Repetition of one basic plan has produced 27 two-family buildings, eighteen three-family buildings and three four-family buildings. And, in several buildings a two-bedroom addition has been sandwiched between two basic units (see plan, left). Communicating doors between all dwelling units permit considerable flexibility in apartment sizes—from three to seven rooms in conjunction with the two-bedroom addition. Architect: A. M. Strauss. Contractor: Max Irmscher & Sons.

COMPANY HOUSING in Bayport, Minn., costs $2,180 per unit, rents for about $7.10 per room.



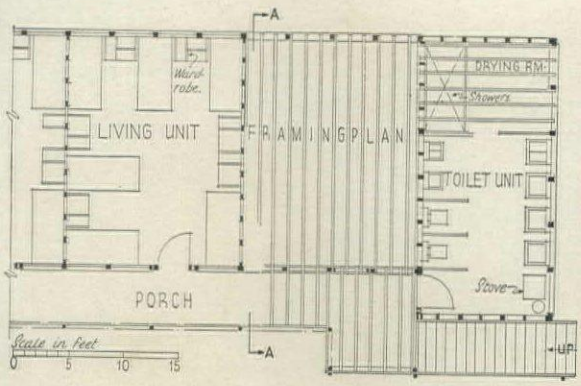


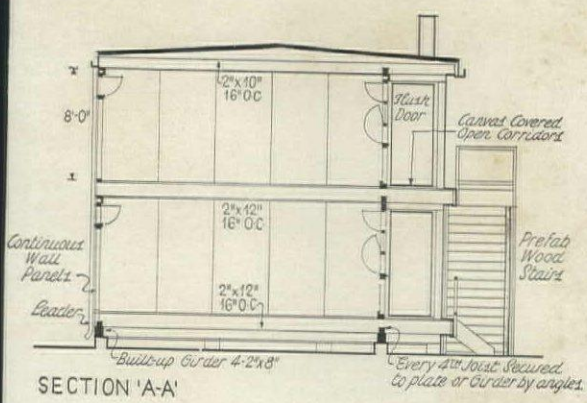


Due to poor planning and paternalism, company housing has suffered much criticism, has become almost a thing of the past. Last year, however, in the one-industry (window making Andersen Corp.) town of Bayport, Minn., it was revived in a new and improved form. Andersen's President Fred Andersen interested a group of local businessmen in his housing idea, formed Bayport Realty Co., raised $24,000 via common stock sales to 100-odd residents and a $14,000 ten-year loan at 5 per cent, then spent the money on an eleven-unit housing project designed by St. Paul Architects Slifer and Cone. The 150 x 340 lot cost $700. Unusual in design (the shower is in the basement along with a pot-type oil-fired hot air heating unit and a one-car garage), the units are all identical but rent for $20.50 to $22.50 per month depending on location, produce a gross annual income of $2,820—enough to pay the sponsoring company a comfortable net return. Stockholders have agreed that no dividends will be paid until the mortgage, requiring $100 monthly interest and amortization payments, is at least 50 per cent retired.

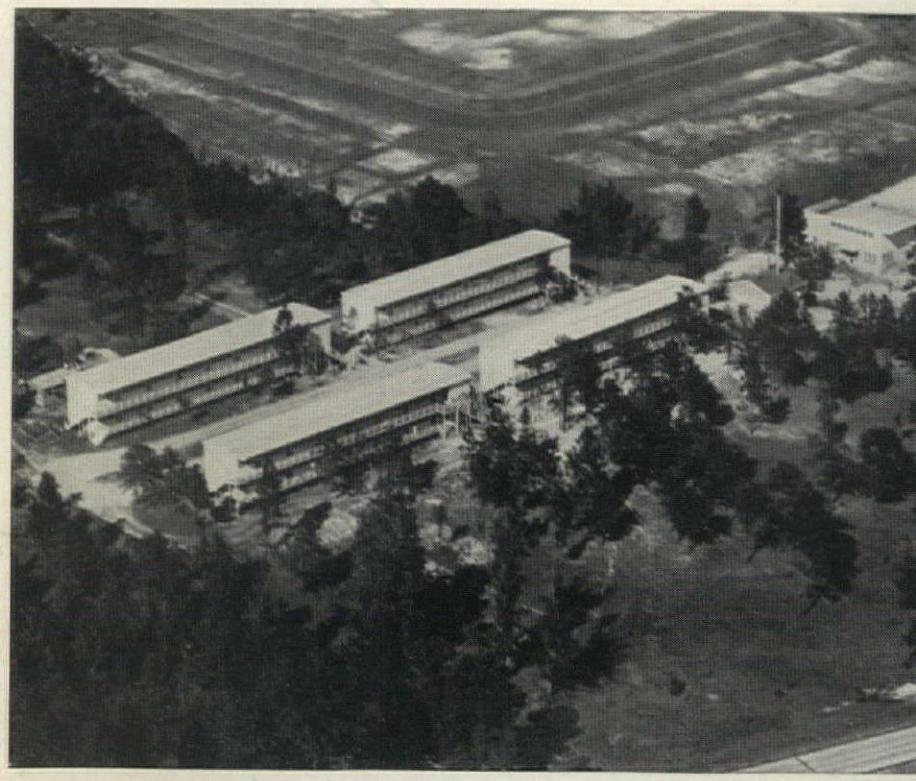
The buildings are of typical wood frame construction atop concrete block foundations. Builder: C. A. Anderson & Son.

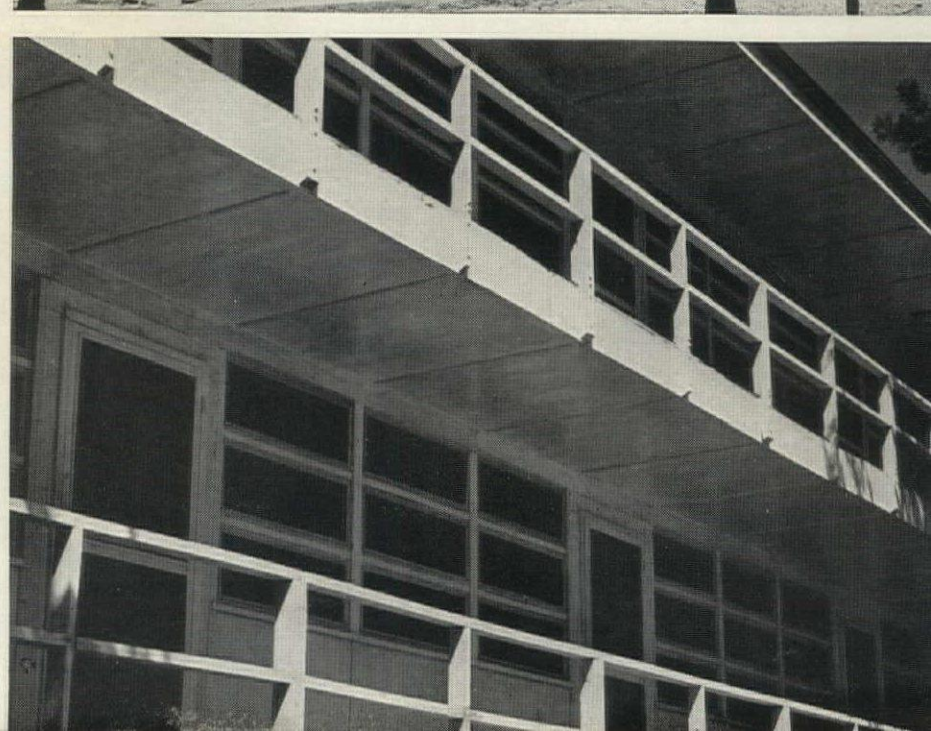
DORMITORIES house National Youth in Hattiesburg, Miss.





SECTION 'A-A'





With the exception of costly college buildings, dormitories are few and far between. However, the national defense program will call for many of them, particularly where temporarily employed, unmarried industrial workers demand "temporary" housing (see p. 468). In Southern States, such a demand might well be met by buildings similar to these, built by the National Youth Administration at its Resident Center in Hattiesburg, Miss.

As shown in the airview, the four dormitories are only part of a larger project including shop buildings, a mess hall, library-classroom, and administration building. Accommodating 42 persons each, the dormitories are identical and were field prefabricated and erected at a labor, material and supervision cost of about $9,420 each. The labor was youth. Construction outline: foundations, concrete piers 8 ft. o.c.; structure, 4 x 6 in. wood columns over piers; exterior walls, prefabricated demountable plywood panels 4 ft. wide; roof, low pitched panel construction covered with glue, canvas and white lead. Exterior balconies take the place of interior corridors which would have cut off light and air circulation; second floor balconies also perform the function of projecting roofs protecting the continuous fenestration on the buildings' south sides from direct summer sun. The pleasing modern appearance of the dormitories results naturally from their simple construction.

Chief architect and director of NYA's construction program is David R. Williams, who, through his modern architecture, is attempting to "make 'youth' and 'modern' synonymous." A more complete presentation of this program's accomplishments is scheduled for a subsequent issue of THE FORUM.

A PLANNED COMMUNITY in Ohio provides housing, shopping, school and recreation facilities.

When, for reasons of military strategy and civilian safety, Government decides to erect a huge arsenal or a powder loading plant at a sizable distance from a population center, it may be forced to develop a complete community to go with it. If the plant is to serve solely an emergency purpose, the community would logically be "temporary" and its construction would be of the same character. If, however, the plant is a permanent part of a long-range plan to maintain military preparedness, the community might well be of a more substantial form—not unlike Greenhills, Ohio, pictured to the right.

Situated about 11 miles north of Cincinnati in the direction of the machine tool city's industrial growth, Greenhills is the result of an experiment conducted on three fronts (the other two: Greenbelt, Md. and Greendale, Wis.) by the Resettlement Division of the Farm Security Administration. It was built during 1936, 1937 and 1938 with relief money as part of the New Deal's huge relief program and, as such, its primary goal was to put men to work and its ultimate cost was skyhigh and meaningless. (Total cost less FSA-estimated relief labor allowance: $9.9 million. Dwelling facility cost per unit, excluding utilities and landscaping: $6,780.) Incidental accomplishments include, 1) the development of an interesting community plan unrestricted by land costs and dimensions and 2) the construction of 676 dwelling units and community buildings ranging in size from a small bath house to a three-story school. The project was aimed at comparatively low incomers who might fill any of the 80,000 jobs estimated to be within a 40-minute radius. It hits the target with the aid of heavily subsidized rents averaging $27.62 per dwelling unit, or $5.52 per room per month, excluding heat and water.

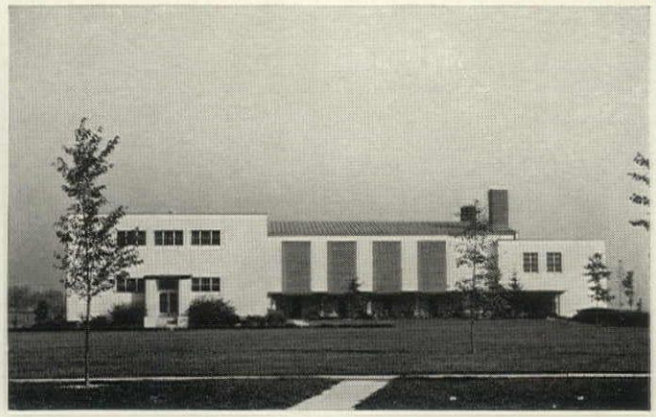
Due to a shortage of funds, Greenhills' construction program was cut short when only 676 dwelling units plus a school, a swimming pool and half the shopping center had been completed. As shown in the complete site plan, right, there is room for several times as many buildings.

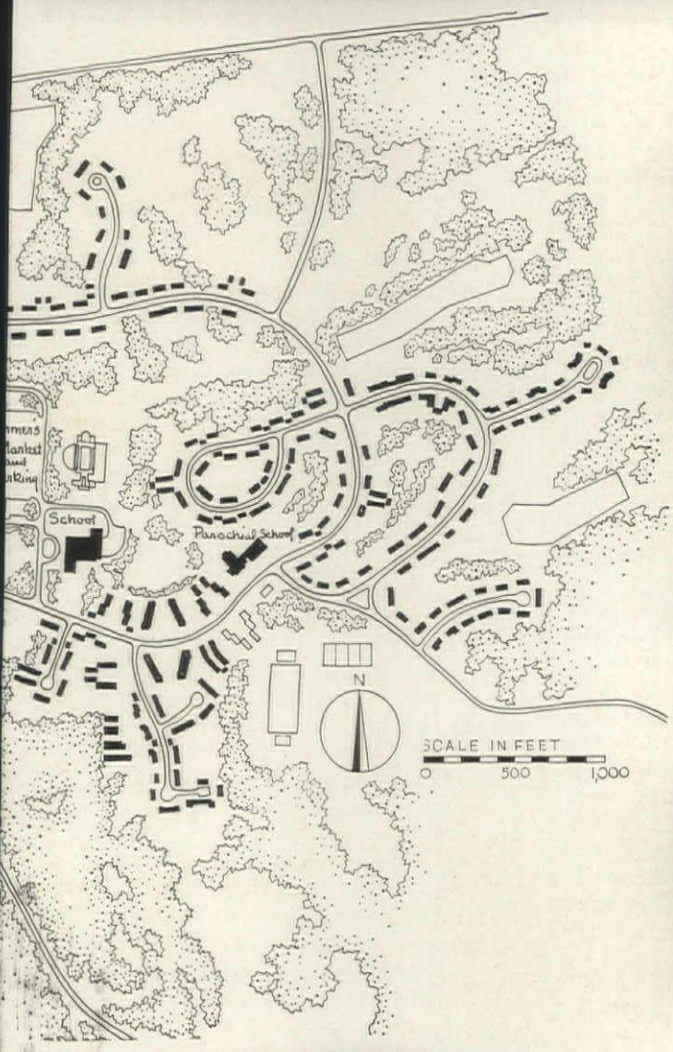
The entire proposed site plan, however, is the most significant part of the project. It shows that, to minimize the traffic hazard, only one through highway was permitted to pass through the 5,930-acre tract and that but few project streets intersect this highway. A circuit road provides access to all the best building areas within the community's corporate limits (a 782-acre area—the balance of the acreage is in the surrounding protective "greenbelt") while secondary roads and cul-de-sacs reach in to service individual building sites. Note that all residential buildings were placed close to these arteries to minimize utility line costs and create maximum interior block park areas upon which all buildings face.

Town planners: Justin B. Hartzog and William A. Strong. Architects: Roland A. Wank and G. Frank Cordner. Chief Engineer: William G. Powell. Coordinator: Albert L. Miller.

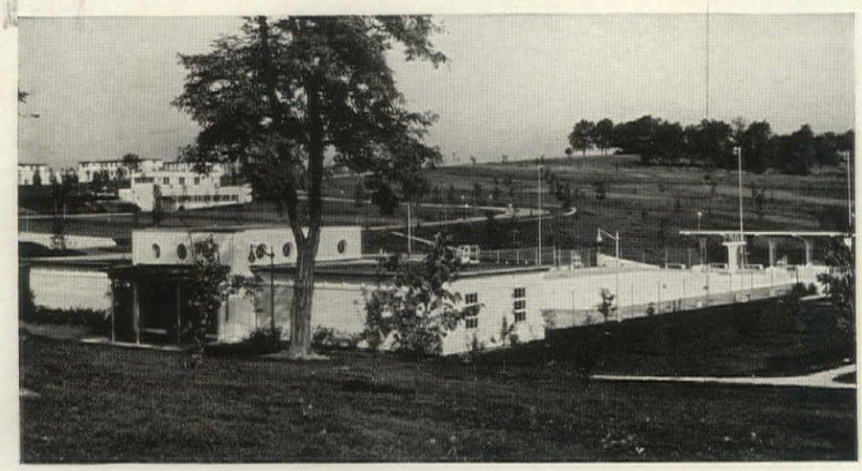
Goetz Photos

SCHOOL





SHOPPING CENTER



RECREATION

HOUSING DEMAND

(*Continued from page 439*)

that is not provided on reservations by the War Department will be built in its behalf by other Government agencies. Private capital will supply only a comparatively small part. The same is largely true for the housing of families of naval and flying officers. And, in these cases the whole housing problem is less acute, for the officers as a rule are better paid and are much smaller in number than in the Army. Moreover, the biggest part of the Navy's housing demand comes from the families of civilian employes who fall in the industrial defense category discussed above.

RENTS AND PRICES

In view of these average income statistics, private enterprise to serve the defense housing market must build for rentals (covering at least a two-bedroom unit but excluding the cost of light and fuel) between $20 and $35; for sales prices (complete with land) between $2,500 and $4,000. Within this sales price bracket, monthly mortgage payments under the FHA insurance program run from about $13 to $21 including mortgage insurance, interest and amortization on maximum 90 per cent, 25-year loans. Under average conditions, the additional monthly cost of taxes and heat within this price bracket ranges from $9 to $13.

WORKER VS. FAMILY

In most instances analysis of local industrial defense housing markets will show that bulk of the demand comes from married workers, that the need is predominantly for complete dwelling units rather than individual rooms. And since the majority of these couples are over 25 years of age, they will usually require dwelling facilities for at least one child per family. Normally, the ratio of married to single workers is about two to one. In particularly congested areas, however, where the labor market has boomed the greatest and the housing shortage is the severest, the ratio may reach one to one. These conditions usually arise where a large but temporary source of labor such as a construction job or an out-and-out "war baby" attracts workers by its high wages.

With reasonable assurance of a steady market, unassisted private enterprise will meet the housing needs of industrial families. Here the demand is for low cost houses and low rent apartments. In its houses for families private enterprise may help solve the single-worker problem by including one or two extra rooms whose extra cost to the purchaser would be more than offset by rental income.

Where the demand will obviously disappear with the accomplishment of national defense and where there is a lopsided need for single-worker housing, the program must necessarily be greased with Government funds. In both cases the demand is for "temporary" housing (see below); in the latter case it would probably mean the construction of dormitories.

RENTAL VS. SALE

Under normal conditions, about four out of ten families in the $1,000-$2,000 annual income group own their homes. Among industrial families the percentage is probably smaller. Thus, despite the recent trend toward home ownership, it is safe to say that the biggest part of the current defense housing demand is for rental housing. High incomers may buy real estate as a hedge against inflation, but the instability of employment for industrial defense workers will prompt them to rent rather than buy. All Government-financed defense housing will be built for rent.

TEMPORARY VS. PERMANENT

Since the defense housing problem arises from population shifts, it follows that when the emergency is over some of these families will shift back to their original home towns, carrying with them the housing demand. In other words, part of the present defense housing demand is of a temporary, unstable nature, and "temporary" housing is the logical solution to the problem. This type of demand occurs predominantly in localities whose industries are almost exclusively of the real "war baby" (powder production, shell loading, etc.) variety.

Despite its widespread use, the term "temporary housing" is a misnomer. What this specialized demand calls for is housing which can be built quicker, more cheaply and with a higher salvage value than ordinary housing. It should be either unfinished housing which may be completed at a later date to serve an ordinary housing market or it should be demountable housing which may eventually be knocked down, reassembled to serve another market. In the former case, the initial short life of the housing might dictate the temporary use of soft wood floors, roll roofing, painted but uncovered wallboard on the exterior, post foundations in certain areas, omission of interior paint and trim, etc. In the latter case, prefabricated construction would appear to be the logical answer. In both cases, "temporary" housing will be built almost universally with Government funds.

Bulk of the industrial defense housing need, however, may be supplied with "permanent" construction, for, defense program or no, there will always be a demand in well-established industrial communities for good low rent and low cost housing.

NEW VS. OLD

Contrary to the beliefs of some, the demand is not for new housing but housing—old and new. It is obviously important that the existing supply of suitable dwellings be used to the utmost prior to any new building. There are some 26.5 million dwelling units in the country today, and, although there are more than enough families to go around, some of them are "doubled up" (two or more families to a unit) with the result that many dwelling units are vacant. If preliminary U. S. Housing Census statistics (covering 357 cities) hold true for the country as a whole, 1.3 million units, 4.8 per cent of the total, were vacant on April 1, 1940. But, this is an unreal picture of housing conditions. In the first place, due to defense-inspired increases in employment, wages, marriages, family "undoubling," etc., the general backlog of vacancies has diminished considerably since the census was taken eight months ago. (Some dwelling units will come back into the market temporarily as 800,000 draftees are called to the colors, and in many cases may be used to cushion the impact of the defense program on housing.) Also distorting the housing supply picture is the fact that the Census statistics include resort and other seasonally occupied houses, many of which were normally vacant in early April. Moreover, according to real property inventories conducted between 1934 and 1936 in some 200 representative communities, 10 per cent of all vacant units are unfit for use and another 24 per cent are in need of major repairs to prevent them from becoming uninhabitable. Finally and unfortunately, these vacancies are spread all over the country, not concentrated in defense communities, and most of them are above the financial reach of defense workers.

Nevertheless, a substantial part of the defense housing demand should and can be met by filling vacant dwellings, both in and near the boomed communities. During World War I, some 70,000 workers were housed in this way, Government commutation subsidy being provided in many cases to tap vacancies in outlying areas. Today, vacancies in still greater radii may be tapped, for the number of automobiles has increased from 2.3 million in 1915 to 26.2 million in 1939, the length of surfaced roads from 257,300 to 1.2 million miles, and local public transit facilities (street cars and buses) from less than 32,000 to more than 59,000 miles.

The cheapest part of the defense housing program will be the immediate filling of suitable vacant units and the rehabilitation of substandard units. Since it will also be the quickest part, it obviously should be tackled first.

Rapid, efficient national defense, however, will require much more than the saturation of existing housing. Even in a community whose vacant units will meet the entire local need, it may be necessary to launch new construction. For instance, defense industries in this particular community might find it difficult to attract

(*Continued on page 58*)

FLOOR SHOW

IN THEATRE LOBBY

STARRING

Terrazzo

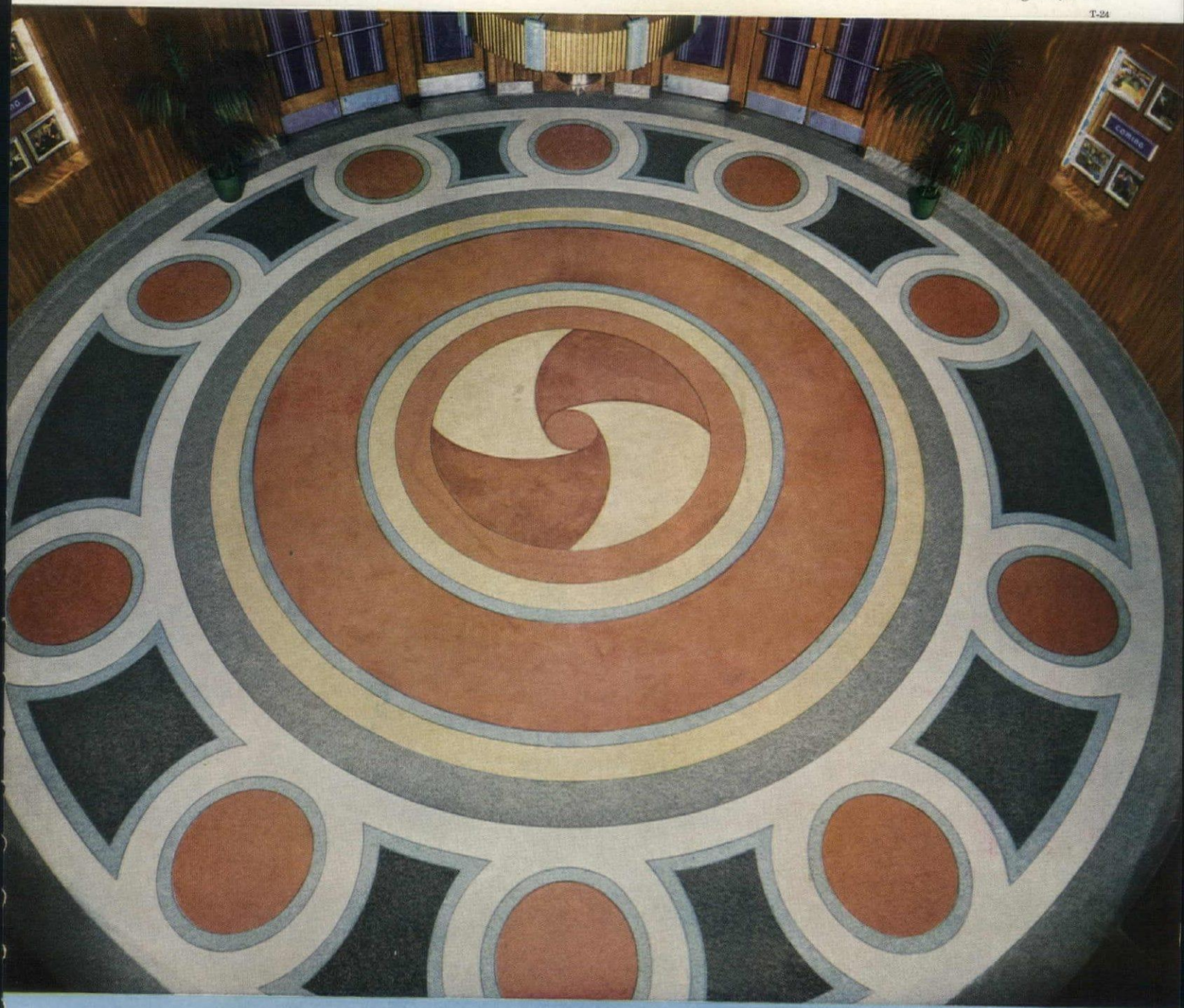
● A new floor show stars in the lobby of the Senator Theatre, Baltimore. It gives a continuous performance that will go on and on for years and years. Yet—with all the scuffing and scraping it's bound to take—you can be sure it will stay just as fresh, just as inviting as you see it now. That's *Fine Terrazzo* made with Atlas White portland cement!

Fine Terrazzo will catch and hold *any* design you create, any color you specify. It goes equally well in theatre, office building, school or hospital decoration schemes, whether for new work or remodeling. And its low upkeep cost is welcome news to any client!

So—for your next floor—plan on *Fine Terrazzo*. And for it specify Atlas White cement, plain or waterproofed. For more details, see Sweet's Catalog. Or write us for free book with 24 true-color specimens of *Fine Terrazzo*. Universal Atlas Cement Co. (United States Steel Corp. Subsidiary), Chrysler Bldg., N. Y. C.

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

T-24

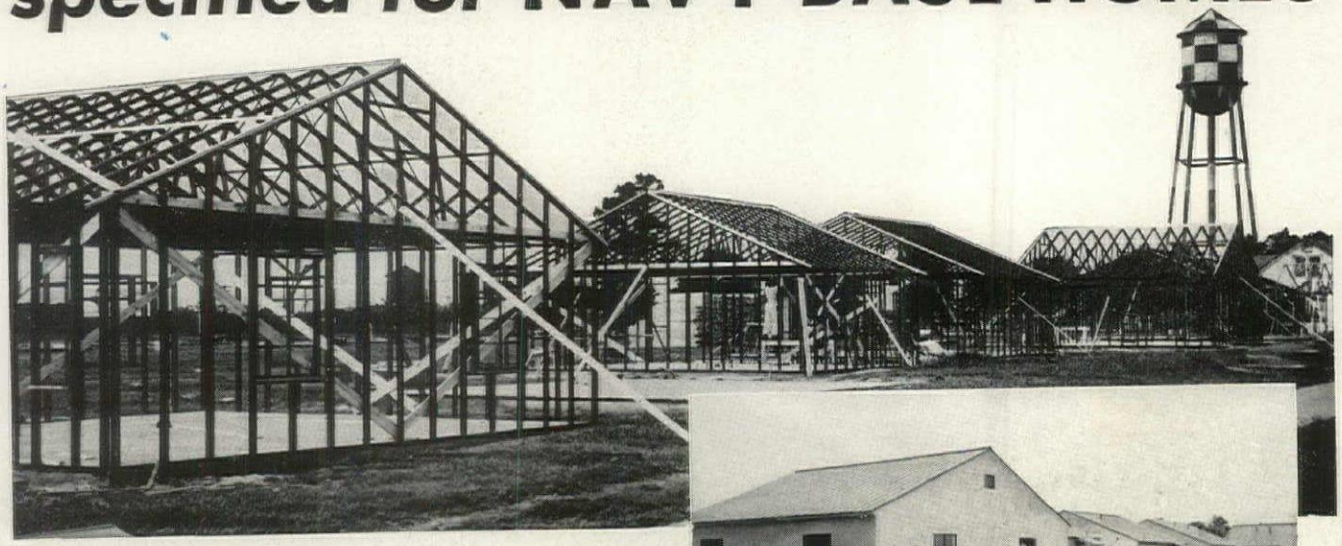


● *Fine Terrazzo* stars in lobby of the Senator Theatre, Baltimore. Colors are supplied by combination of aggregates, color pigment, and Atlas White cement. Architect, John J. Zink; General Contractor, E. Eyring & Sons; Terrazzo Contractor, Acme Tile Co.—all of Baltimore.

FOR *FINE TERRAZZO* SPECIFY 

ATLAS WHITE PORTLAND CEMENT

STRAN-STEEL FRAMES *specified for* NAVY BASE HOMES



Sixteen men working sixty minutes quickly completed the steelwork of each home. Stran-Steel "chassis" is designed for fast erection and rigidity.

Sound construction is clearly indicated in these views of the new five-room homes. Gunite exterior has just been applied.

The first fifty low-cost houses to be built for the Navy Department under the National Defense Program have Stran-Steel frames! They are homes being erected for Navy married enlisted personnel at the Naval Operating Base at Norfolk, Virginia.

Speed of construction and the fundamental durability of steel were some of the reasons for the Navy's choice of Stran-Steel as the framing material. The exclusive Stran-Steel nailing groove permitted the application of all the collateral materials direct to the steel studs and roof rafters. Insulation board and gunite exteriors are other modern features found in these well-built, smartly-styled buildings.

Stran-Steel has consistently demonstrated its superiority as an efficient, low-cost building material in many types of construction. Stran-Steel members are formed from high-grade copper-bearing steel. Studs and joists are formed from two pieces welded together—the space between becoming the nailing groove that permits rapid erection of collateral materials with ordinary hammer-and-nails methods. Wherever speed, permanence and low cost are important considerations in any building program, Stran-Steel provides the most efficient answer. Write for additional information and descriptive literature on Stran-Steel today. For specific technical data and advice, a complete engineering and architectural department is at your service.

COMPLETE STEEL FRAME IN SIXTY MINUTES

A crew of sixteen men erected the entire steel framework of each five-room Navy home in one hour. This building speed is made possible by the efficient, simple design and easy handling of Stran-Steel members. Roof trusses and window panels were assembled by welding—studs were attached to plates by regular screws. Insulation boards were *nailed* to the Stran-Steel studs by means of the nailing groove. Stran-Steel was shipped to the job site in exact lengths, further increasing the erection speed of the Stran-Steel frame.

STRAN STEEL

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DIVISION OF GREAT LAKES STEEL CORPORATION

UNIT OF NATIONAL STEEL CORPORATION

Double . . .
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TIME TESTED and GUARANTEED WATERPROOFING

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Royal York Hotel
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Canadian Pacific Ry.
Largest Hotel in
Canada
15 tons of Truscon
Waterproofing
Paste Used.

25 YEAR GUARANTEE *with* TRUSCON *Zilicon* WATERPROOFING PASTE

Fisher Building, Detroit, Mich. Albert Kahn, Inc., Architect. H. G. Christman-Burke Co., Contractors. Basement Walls Waterproofed with Truscon Waterproofing Paste.

First and foremost—although it has been used throughout the world in hundreds of thousands of buildings and in every type of concrete construction—Truscon Waterproofing Paste has never registered a failure. America's proudest structures offer dramatic testimony to the enduring efficiency of this outstanding product. Its record in itself is protection to architects, engineers, builders and owners. And now—to make waterproofing protection doubly sure—Truscon offers a 25 Year guarantee. Behind this guarantee are the high standing and financial responsibility of the Truscon institution—matters of public record for more than thirty years.

Write for a copy of our guarantee and learn of the protection offered by Truscon Zilicon Waterproofing Paste.

IMPROVED WORKABILITY

Truscon Zilicon Waterproofing Paste now contains the remarkable chemical achievement—Zilicon—which incorporates into concrete all the most modern scientific advances, including: (1) use of less water; (2) shrinkage reduction; (3) strength increase; (4) Puzzuolanic properties; (5) corrosion resistance. Always excellent, Truscon Waterproofing Paste is now even better.

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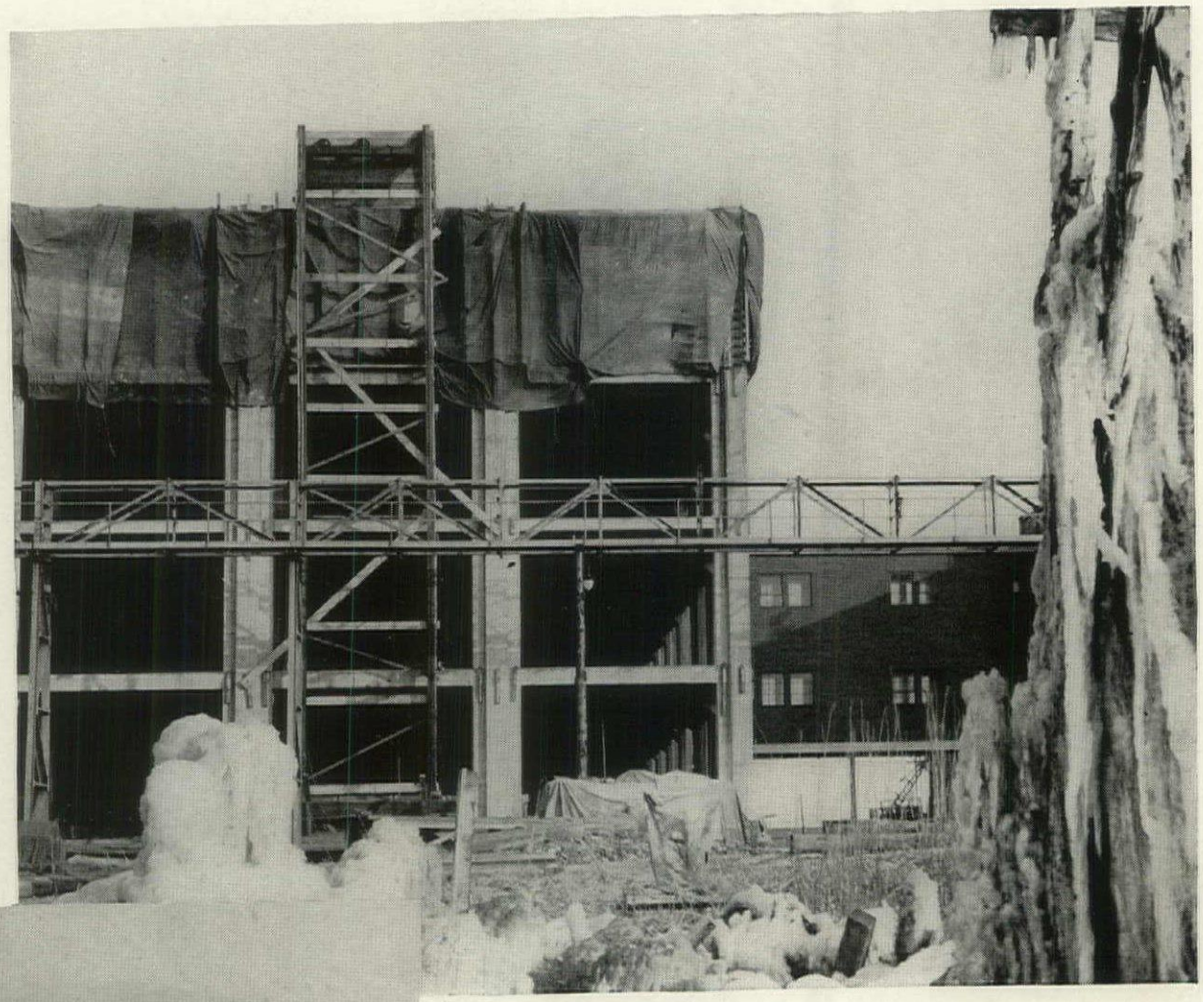


NORMAL SPEED IN DEAD OF WINTER

MAKE every day count this winter—push construction ahead on normal schedules, even in sub-freezing weather. Save time, and money, by using 'Incor' 24-Hour Cement.

With temperatures as low as 9° above zero last winter, White Construction Co., New York, general contractors, used 'Incor' in erecting 5-story addition to General Aniline Works Building No. 48, Grasselli, N. J. With minimum heat protection, 'Incor' concrete was stripped in two days, without reshores. Construction proceeded steadily throughout the winter—the building was in use weeks sooner.

'Incor'* cures and hardens in one-third the usual time—is service strong, safe from freezing, that much sooner. Heat-protection costs are 50 to 60 percent lower. Form costs are reduced—one set does the work of two or three. Earlier completion cuts overhead or time costs.

Specify 'Incor' 24-Hour Cement for earlier occupancy, at lower cost. Write for copy of "Cold Weather Concreting." Lone Star Cement Corporation, Room 2294, 342 Madison Avenue, New York.

*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

MAKERS OF LONE STAR CEMENT • • • 'INCOR' 24-HOUR CEMENT

"Fluorescent in Certified* FLEUR-O-LIERS, of course... and here are the reasons why:"

For Modernizing or new building . . . specify "WINDOWS OF DAYLIGHT"

1. Fluorescent gives you cool, higher levels of indoor daylight. That means easier seeing—faster work in offices and factories . . . better display—quicker selling in stores.

2. Certified★ FLEUR-O-LIERS are made by 35 leading fixture manufacturers . . . *certified* by Electrical Testing Laboratories as meeting over 50 rigid specifications for good light—good service set up by MAZDA lamp manufacturers. When you specify Certified★ FLEUR-O-LIERS, you're getting fluorescent lighting at its very best!

3. Certified★ FLEUR-O-LIERS are available in a wide variety of prices and designs . . . in industrial and commercial units.

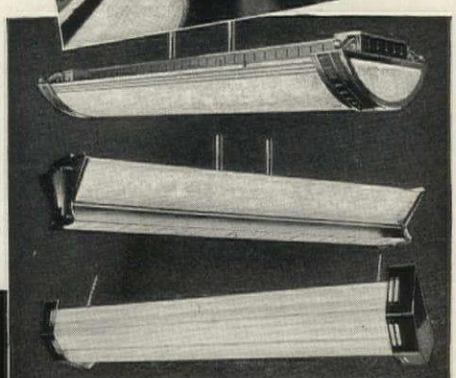
Your lighting company will be glad to supply technical information to help you plan better seeing conditions for your clients. For complete information about Certified★ FLEUR-O-LIERS, ask your electrical distributor or write to FLEUR-O-LIER MANUFACTURERS, 2119 Keith Building, Cleveland, Ohio.

"LOOK FOR THIS LABEL!"

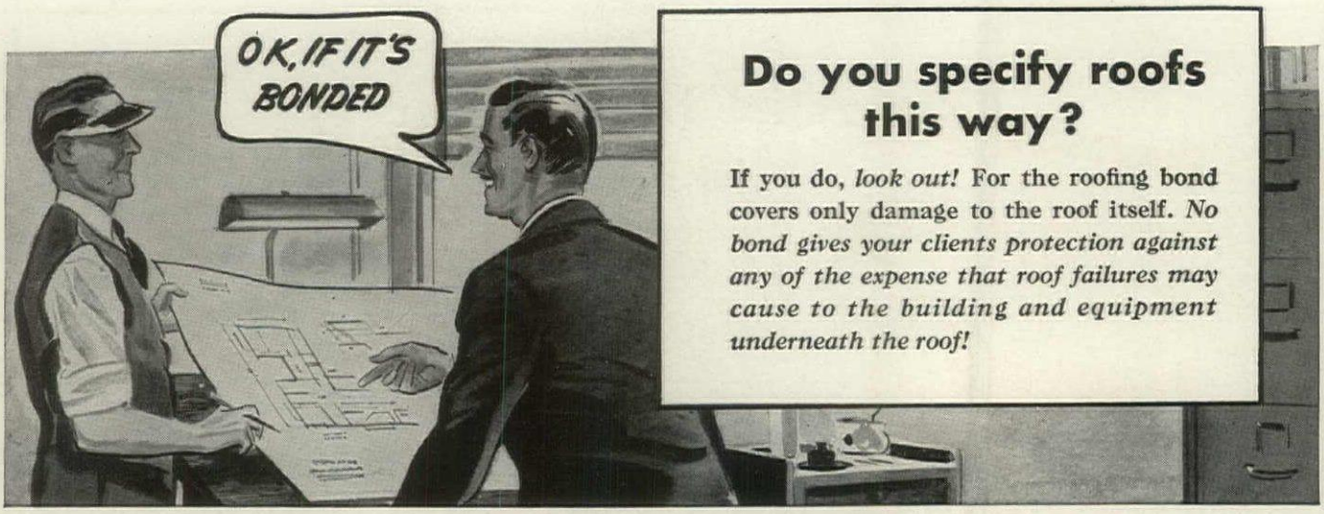
Look for this label... Electrical Testing Laboratories certify that FLEUR-O-LIERS have met with over 50 rigid specifications for good light—good service, as set up by MAZDA lamp manufacturers. All Certified★ FLEUR-O-LIERS must be equipped with auxiliaries (ballasts and starters) certified by E. T. L.

FLEUR-O-LIER *Manufacturers*

Whenever you buy fluorescent lighting...Insist on CERTIFIED FLEUR-O-LIERS



Here are some of the many industrial and commercial types of FLEUR-O-LIERS now available in a wide range of prices and sizes.



Do you specify roofs this way?

If you do, *look out!* For the roofing bond covers only damage to the roof itself. *No bond gives your clients protection against any of the expense that roof failures may cause to the building and equipment underneath the roof!*

DON'T GAMBLE! Give your clients the roof with the SAFETY FACTOR

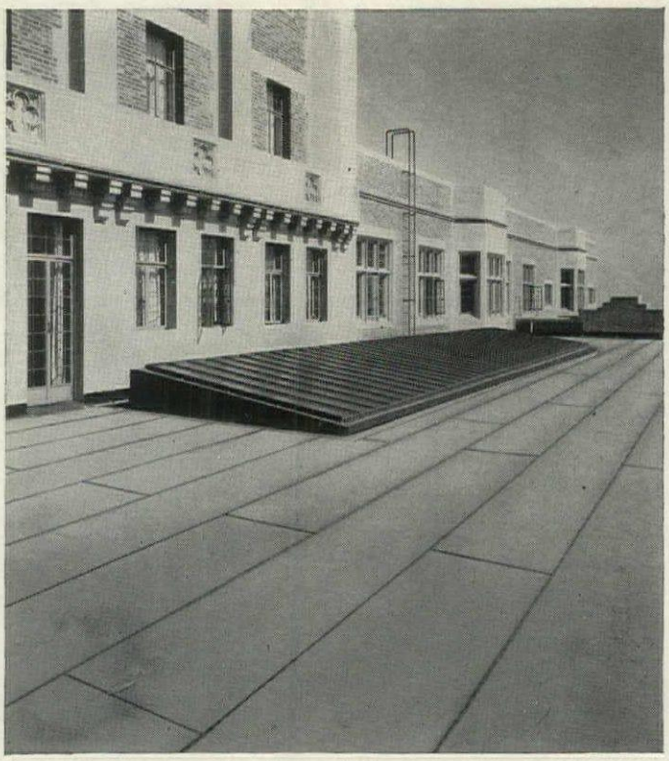
NO architect would specify steelwork or foundations just because they were bonded. It's the actual materials and the way they're applied that count . . . *plus an extra factor of safety at all critical points.*

Today, architects are applying exactly these principles to roofs. And the roofs they find meet every test are J-M Smooth-Surfaced Asbestos Roofs.

That's because J-M Roofs are *engineered* like all other vital building materials. At flashings, drains, copings, skylights and angle supports—where 75% of all leaks start—J-M specifications provide a generous margin of safety. This engineering is far more important than any roofing bond . . . for it gives clients full and real protection to *both* building and equipment.

And remember, J-M Smooth-Surfaced Roofs are built up with *asbestos* felts. These felts, products of more than 60 years' research and experience, can't burn or rot . . . won't dry out. No wonder so many J-M Roofs have passed the twenty-five-year mark with no signs of failure!

It will pay you to get details and specifications on J-M Smooth-Surfaced Asbestos Roofs. Write Johns-Manville, 22 East 40th Street, New York, N. Y.



MORE IMPORTANT than any bond is the "safety factor" built into this J-M Asbestos Roof that protects the Student Union Building, University of California at Los Angeles, Los Angeles, Calif. As is true with all Johns-Manville Roofs, this engineering feature not only guards against roofing failure . . . but also safeguards the building structure and the equipment underneath the roof.

JM JOHNS-MANVILLE
Smooth-Surfaced ASBESTOS BUILT-UP ROOFS

THE ROOF WITH THE SAFETY FACTOR

The Long-Span joists pre-fabricated for the job to span from girder to girder or truss to truss can be quickly welded into a rigid deck. The men work from the top of the deck as shown here.

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LONG-SPAN
STEEL FLOOR AND ROOF SYSTEM

Speeds Construction and Cuts Erection Costs!

SAVE time, wages and scaffolding on multiple story buildings! Construct floor, roofs and ramps with the Wheeling Long Span Steel Floor and Roof System. Its channel-shaped COP-R-LOY joists can be readily welded into a rigid fireproof deck that provides a working platform for masons, steam fitters, electricians and other tradesmen. Nothing to dry or cure. All units are pre-fabricated for the job of the proper length to span from girder to girder or from truss to truss.

REDUCE material costs and maintenance expense! Because of its light weight, Wheeling Long-Span Steel Floor and Roof System permits a lighter and lower cost steel superstructure. Made of COP-R-LOY—Wheeling's famous rust resisting metal, this modern system produces a rigid fireproof deck that will not warp, sag or crack. Write for illustrated literature today.

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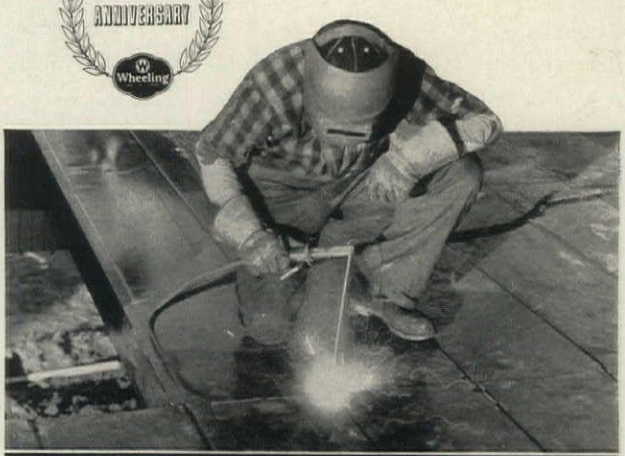

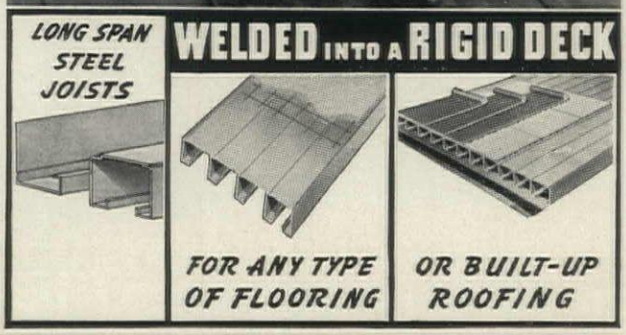

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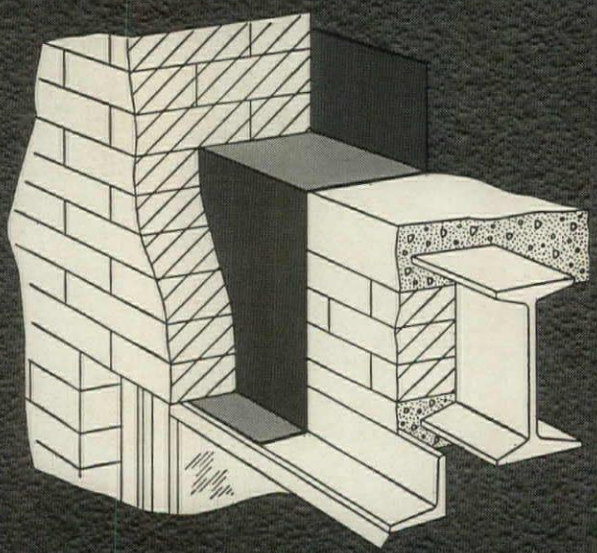

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Anaconda "Electro-Sheet" Copper is rust-proof, and impervious to water penetration. Bonded to high-grade building papers, fabric, or asphaltic compounds, "Electro-Sheet" Copper is extremely flexible and easy to install. The copper is supplied in thicknesses of .0013", .0027" and .004" (1 oz., 2 oz. and 3 oz. per square foot).

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Examine Reinforced "Electro-Sheet" products for yourself. Just ask for free samples and names of manufacturers who supply this material in rolls of various lengths and in widths up to 60".

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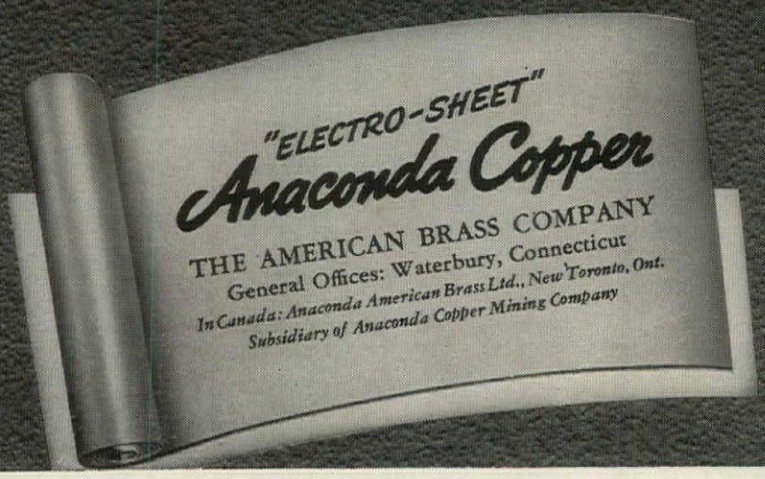

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TODAY'S HIGH SPEED building program *needs* Speedwall Board. For this jumbo-size interior board clips construction time right down the line. Gone are slow lath and plaster methods, with consequent moisture, mess, delay, cracks. Gone the tedious, unsatisfactory joint-making in the field with old-fashioned wallboards. Gone the difficult decorating.

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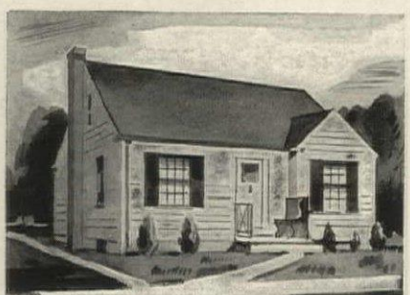

Housing projects—prefabrication, commercial, industrial, defense construction—complete in record time with Speedwall giant board. So specify Speedwall on your next job!

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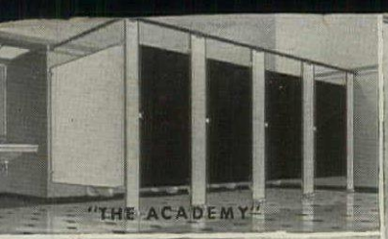
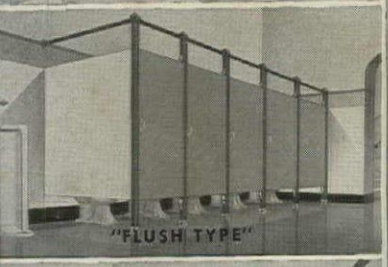
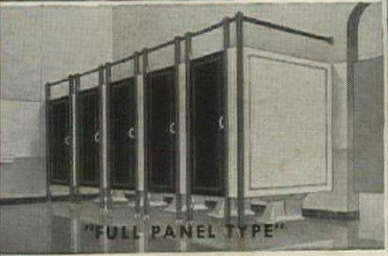
**Also available as "bareboard" without fabric . . . or for exterior use with EXT-DFPA plywood. Both ways, it comes in sizes up to 8'x20'.*







Porcena
(porcelain enamel finish)
TOILET PARTITIONS
possess the natural structural strength of steel (not one sheet, but two 16-gauge sheets, each securely bonded on opposite sides to dense insulating core); strengthened by porcelain enameling (four layers on each sheet) which provides a non-porous, flint-hard, glass-smooth surface that is positively impervious to odors, acids, and moisture.

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To provide modern sanitary conveniences is not enough. Consider the influence toilet compartments can exert upon a toilet room environment. The primary function of toilet compartments, which is to provide privacy, frequently becomes secondary to the fact that the right type and finish of toilet compartments emphasize the modernity and convenience and suitability of toilet facilities.

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Innovations lower slab cost on Red Hook houses; use of twisted bar reinforcement and vacuumized concrete. il. *Engineering News-Record* July 6 '39, 18

Light weight structural fabrication. E. J.

W. Ragsdale. *Metal Progress* Oct '39, 545

Low-cost factory building; using unique erection procedure, all-steel-and-glass building is constructed. diags. *Steel* Dec 26 '38, 34-5

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New structural system; light steel-truss reinforcement bonded into joints of special interlocking fiber blocks. diags. *The Architectural Record* Oct '39, 49

Office building completed in 79 working days; use of special cellular steel floor, roof and partition sections, bonded metal paneling for walls; H. H. Robertson Co. H. B. Winslow. il diags. *Steel* Feb 19 ,40, 46-8

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Precast cylinders support new wharf; unusual construction of caissons and timber piles used in rebuilding Saint John, New Brunswick, harbor facilities. il. *Canadian Engineer* Aug 1 '39, 2-4

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Stainless steel lumber enters the construction field; Ludlite Bord. il. *Steel* Sept 11 '39, 38-41

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Timber trusses support roofs over 2½ acres of shops; Seattle-Tacoma Shipbuilding Corp. il diags. *Engineering News-Record* July 18 '40, 85

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AIR RAID PROTECTION

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Alloy steel house developed by Youngstown Sheet & Tube Co. il. *Steel* Apr 10 '39, 75

Factory-built steel houses in production by R. G. LeTourneau, Inc. H. W. Perry. il. *Iron Age* Dec 15 '38, 35-6

Factory Houses for $2,995 appear in Chicago suburb. Standard Houses Corp. makes a five-house debut, shows prefabricated plywood houses. floor plans ils. *The Architectural Forum.* Jan '40, 66-7, 36

FHA-insured Gunnison Housing Corp. project. Lumber and plywood panels, compared with conventional construction used on half the project. plans construction outline ils. *The Architectural Forum* Sept '38, 236-8

Fifty plywood-panel houses built by FHA one a day at Fort Wayne, Ind. il plan. *The Architectural Record* March '39, 38-40

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Home (furnished), $2,000; prefabricated plywood. il. *Business Week* Sept 16 '39, 22

How complete wall sections are made horizontally on the job by a builder in Washington, D. C. il diag plan. *American Builder* July '40, 64-5

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Maisons préfabriquées (French, American, English in wood and metal). plans il details. *L'Architecture d'Aujourd'hui* Feb '39, 54-56

More integration, less prefabrication spell success for American Houses Inc. $2,750 houses $20-per-room apartments come from a factory. plans il. *The Architectural Forum* July '40, 69-72, 54

PHC Housing Corp's new prefabrication technique. *The Architectural Forum* Aug '40, 2

Pioneer prefabricator introduces a new panel unit in four models priced below $1,000 a room. General Houses, Inc. opens model houses in Chicago. Steel frame, asbestos cement board and plywood. Plan construction outline ils. *The Architectural Forum* June '36, 524, 526

Progress review of the prefabrication year. Plywood, steel, concrete. sections ils. *The Architectural Forum* Oct '36, 19, 22, 26, 30

Research Develops a $2,600 House. John B. Pierce Foundation builds with pre-assembled plywood panels. ils plans sections construction outline. *The Architectural Forum* May '40, 365-9, 56

Rockefeller builds again in Cleveland, introducing a new steel frame. Arcy module system susceptible of mass production. *The Architectural Forum* July '36, 70

Steel-panel prefabricated farm buildings erected in the South by Tennessee Coal, Iron & Railway Co. il diags plans. *The Architectural Record* Jan '39, 38-9

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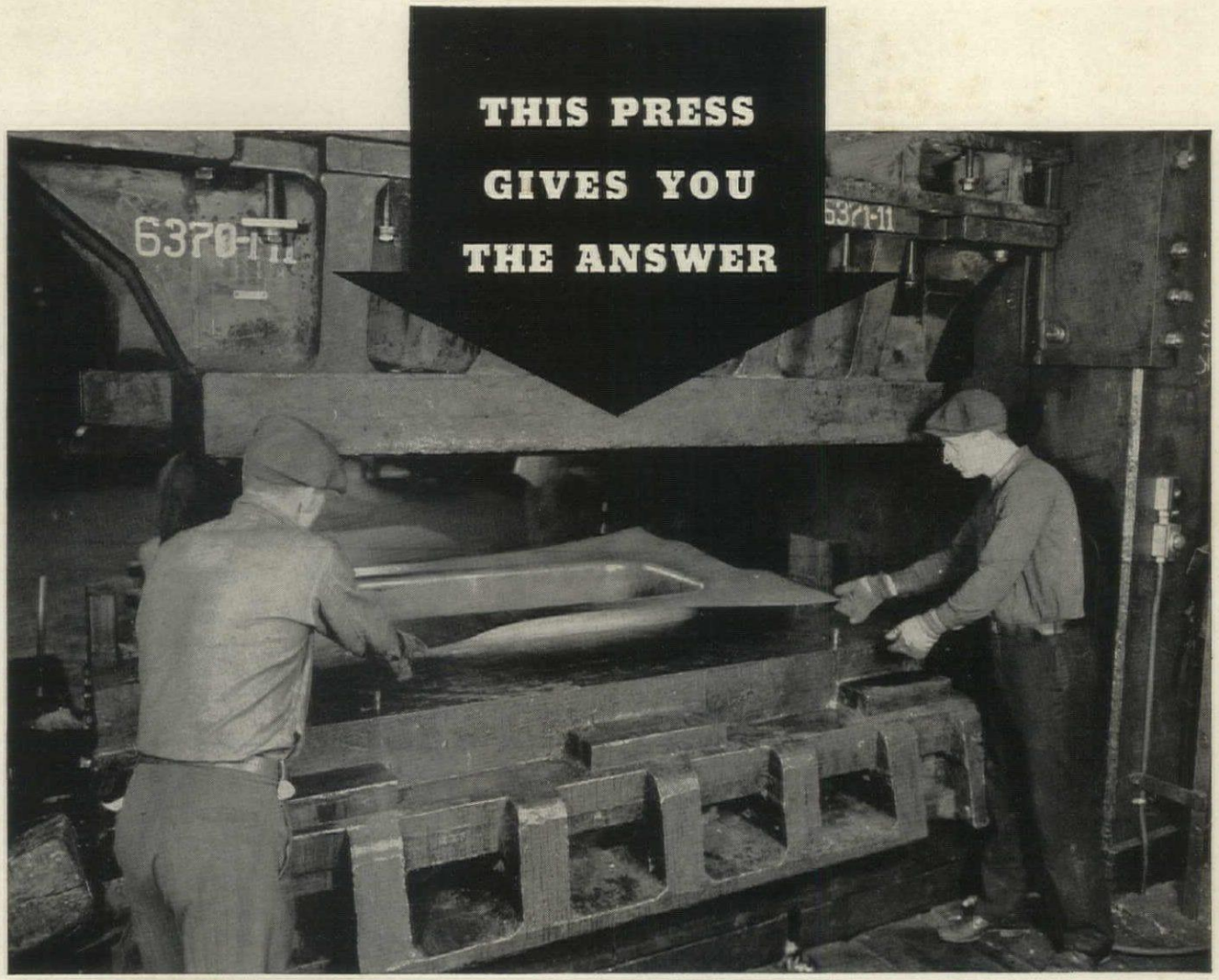

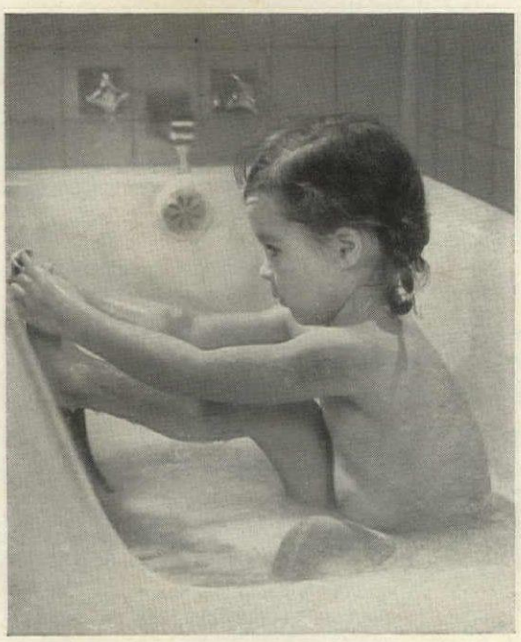

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HOUSING DEMAND

(*Continued from page 468*)

and retain sufficient labor if another nearby industrial center, in bidding for the same kind of labor, can offer the workers new housing. The former would require new housing to meet the competition.

PUBLIC VS. PRIVATE

In addition to supplying practically all the existing housing that can be used, private enterprise will be called on to finance the great bulk of the new construction. And, of course, private builders will handle all the actual construction whether publicly or privately financed. To fill its part of the estimated total need of 200,000 dwelling units, Government has appropriated only $250 million. Along with about $31 million of old USHA money this is enough to pay for only about 80,000 dwelling units at an average cost of $3,500. To private capital's initiative is entrusted the remaining 120,000 new dwelling units which, on the same basis, would involve a total investment of $420 million. In brief, the projected defense housing program of new construction as presently visioned is about 40 per cent public, 60 per cent private.

Unless private enterprise cannot or will not do its part, Government will supply only that part of the demand that is of a "temporary" or special nature—housing in which private money is not interested. In the main, Government's field includes housing for families of Army and Navy men, families of really low income defense industrial workers and families whose housing demand is 100 per cent "temporary." Private capital's field includes houses for the great majority of workers who can afford its prices and rents in communities whose housing demand is stable.

HOUSING TYPES

As mentioned above, to meet the demand, housing must be offered at low prices or rents, and must therefore be built at low costs. This, in turn, defines the size and types of housing to be built. Except in isolated instances, the program calls for dwelling units containing a living room, a kitchen, dining space, which for economy's sake will usually be combined with either the living room or the kitchen (where rock bottom costs are necessary, space for all three functions may be combined), plus one, two or three bedrooms. Biggest part of the demand in both rental and sale housing will be for two-bedroom units ("Worker vs. Family," p. 468). As far as private housing is concerned, dimensions of all these rooms as well as construction details will be ruled largely by FHA's loan insurance requirements.

(*Continued on page 60*)

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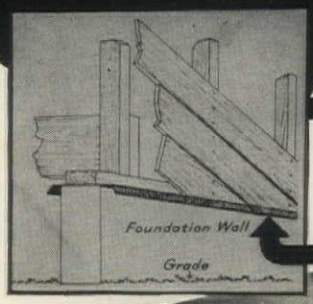

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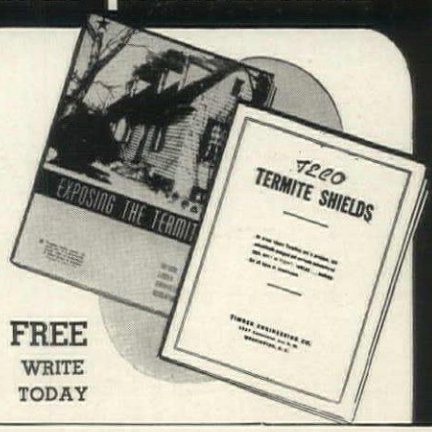

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HOUSING DEMAND

(*Continued from page 58*)

Into the vast defense housing pattern fits practically every type of housing. Most builders have at least a passing acquaintance with all types. Only a few are familiar with the low cost variety of each type—the variety required by the defense program. Herewith a discussion of the types:

▶ One-family house—Of prime importance in defense industrial areas where the demand is stable, this type will be built primarily for sale. However, private capital will do well to reconsider its use in predominantly rental markets—a practice which has been largely discontinued during the past decade. While, from a cost standpoint, size of the basic dwelling unit should be kept to a minimum (usually four rooms and a bath on one floor), in many cases it may be wise to include one or two extra bedrooms which the purchaser may temporarily rent to roomers. Reasons: 1) the rent will offset part of the purchaser's monthly costs; 2) one or two unmarried defense workers will be supplied with housing—at least a step toward the solution of a tough problem; 3) the extra finished space is a hedge against increases of the purchaser's family. While it is more economical to build a two-bedroom house (with second floor bathroom) on two full stories, current design trends will probably dictate that the extra rooms be provided in the attic of a one-story unit. (For examples, see pp. 444-455.)

▶ Two-family house—If the reasoning behind the extra space in a one-family house is carried further, it naturally leads to a two-family house in which the dwelling units are either side by side or one atop the other. Chances are that the defense housing demand will revive the popularity of this building type, boost it up closer to the prominent position it enjoyed during the Twenties. In that decade the two-family house accounted for about 16.5 per cent of each year's crop of dwelling units in a representative sample of 257 cities; in booming 1924 the ratio went to a peak of 21.4 per cent. Depression cut it sharply to a low of 4.5 per cent in 1936 from which it bounced to 6.3 per cent in the recovery year of 1937. This year's statistics will probably show another advance—to at least 7 per cent—and the expected inflation of national defense economy should continue the upward cycle. (For examples, see pp. 447, 448, 457 and 463.)

▶ Row house—In addition to being the common form of sale housing in many communities (notably Philadelphia and Baltimore), the row house is the most satisfactory building type for low rental housing. Reasons: it is economical to

(*Continued on page 62*)

FOR EVERY *Better Light-Better Sight* PROGRAM

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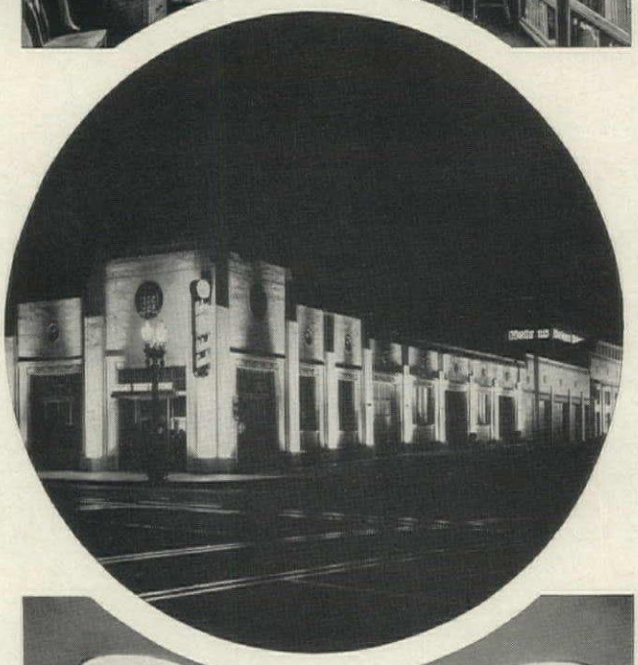
ALUMINUM
REFLECTORS



Reflecting surfaces that meet the requirements of every lighting job; you can get them with Alzak Aluminum Reflectors, with diffuse or specular surfaces, and combinations of the two. There are no limitations on reflector shapes.

Alzak Reflectors give you the most in lighting efficiency. A lasting, high reflectivity is obtained by a special electrolytic treatment of Aluminum sheet. The smooth, oxide coating of glass-like hardness will not chip and doesn't scratch easily. Cleaning is no problem; simply wash with soap and water.

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We do not manufacture reflectors. Manufacturers who are licensed under Aluminum Company of America patents can advise you and supply your needs.

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ALUMINUM COMPANY OF AMERICA
1944 GULF BUILDING • PITTSBURGH, PA.

HOUSING DEMAND

(*Continued from page 60*)

build; economical to operate. (For examples, see pp. 456-467.)

▶ Garden apartments—A comparatively new type of housing, the low-lying garden apartment project has quickly become the accepted pattern for moderate to low rent private housing and should play a big part in the defense program. Essentially a super-block grouping of row house buildings, it enjoys the construction and operation economics of its component parts and offers tenants many amenities not obtained in multi-story projects. (For examples, see pp. 454-456.)

▶ Multi-story apartments—Because dwelling units in multi-story apartments cost more, take longer to build and involve comparatively high operation and maintenance costs, they will not figure importantly in the defense housing program. Exception: where high land costs dictate high densities and where high wages prevail, higher buildings and higher rents may be warranted.

▶ Dormitories—To supply quickly an urgent but temporary need for single worker housing, Government may be forced to build some dormitories. They will surely be of a "temporary" nature, will probably be of prefabricated, demountable construction. (For example, see p. 465.)

▶ Company housing—Although provision of housing by manufacturers for their employes has almost become a forgotten practice during Depression, there is a definite place for it in the defense program. Whether for sale or rent, with or without subsidy, this form of housing eliminates speculation, entails small profits and is therefore cheap. Moreover, it is undoubtedly the surest way for a manufacturer to get housing for his employes and to insure small labor turnover. Such projects may include any or all of the various building types already discussed. (For example, see p. 464.)

▶ Communities—In isolated instances it may be necessary to plan and erect an entire community with shopping, recreation and administration facilities to service a wide range of housing types. Need for such a community might arise through Government's announced intention to foster the decentralization of industry—for instance, a sparsely populated part of Texas might well be chosen as a strategic location of a nest of defense industries. If their existence were planned as temporary, the community would obviously be of the same nature and would logically be built with Government financing. On the other hand, if the industries offered long range employment, construction of the town might prove inviting to private capital. (For example, see p. 466.)

The new home of TIFFANY & CO., 5th Avenue at 57th Street.

Beauty underfoot, too!

TIFFANY & CO. chooses Bigelow Carpet for the 2nd and 3rd selling floors

Carpet Counsel is proud to have cooperated with Cross & Cross of New York, architects for the handsome new home of Tiffany & Co., at Fifth Avenue and 57th Street. For two of the selling floors they chose Gropoint Lokweave in a three-tone moresque weave. The carpet was supplied through John McCagney of New York.

The distinguished name of Tiffany is thus added to an enviable roster of retail establishments which are Bigelow-carpeted.

For *your* next contract carpet requirements, we offer the expert services and experience of Carpet Counsel. It includes help in the selection of the right grades to fit your spaces and your budget—special designs, weaves and colors. Consult your dealer who will bring you to us. There are contract specialists available in Bigelow offices from coast to coast... Bigelow-Sanford Carpet Co., Inc., 140 Madison Avenue, New York, N. Y.

CARPET COUNSEL

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THINK OF CARPET . . . . THINK OF BIGELOW

HOUSING LEGISLATION

(Continued from page 441)

localities where the President (presumably upon advice of the Defense Housing Coordinator and perhaps the Federal Housing Administrator) has determined that the needed housing "would not be provided by private capital." Other strings attached to the legislation will require that contracts with builders be of the cost-plus-fixed-fee form, that the maximum average cost per dwelling unit be $3,000 ($4,000 outside continental U. S.) *exclusive* of expenses for administration, land acquisition, public utilities and community facilities, that the cost of no single family dwelling unit exceed $3,950 ($4,750 outside) exclusive of the same expenses, that the community facilities in each project be limited in cost to 3 per cent of the project's total, and that labor be paid prevailing wages with time-and-a-half pay for work in excess of eight hours per day.

After construction of the projects, the FWAdministrator is authorized to let Government personnel, private companies or local public agencies maintain, operate and administer and eventually dispose of them. In all cases, however, FWA will fix the rentals which must be within financial reach of defense employed families, but need not equal the projects' economic rents. To the extent that they do not, the FWA housing program will be Government-subsidized. Probability is that PBA will handle the bulk of the $140 million program which, all told, is expected to produce some 40,000 dwelling units. Possible but not probable, however, is the participation of both USHA and Farm Security Administration (Government's experienced specialist in low cost rural and prefabricated construction) as well as the Army and Navy in FWA's distribution of the $140 million. From all indications, it is equally improbable that any of this money will be used for rehabilitation of existing housing, despite Congress' authorization of such a program.

The act also permits FWA 1) to place under this legislation any funds that other Federal agencies may wish to turn over to it and, conversely, 2) to distribute any of its funds to other agencies for defense housing purposes. As already mentioned, this open door has been used to advantage by both the Army and Navy—the former gave $45.7 of its funds to FWA for keeps, the latter gave all of its $44 million to FWA only to get it back again. Net effect: practically all of the $100 million Army-Navy housing funds, as well as the $140 million FWA housing funds will be disbursed under the more lenient terms (particularly with respect to maximum unit costs) of the FWA housing act. Terms of the Army-Navy housing act have been cleverly sidestepped and therefore mean nothing.

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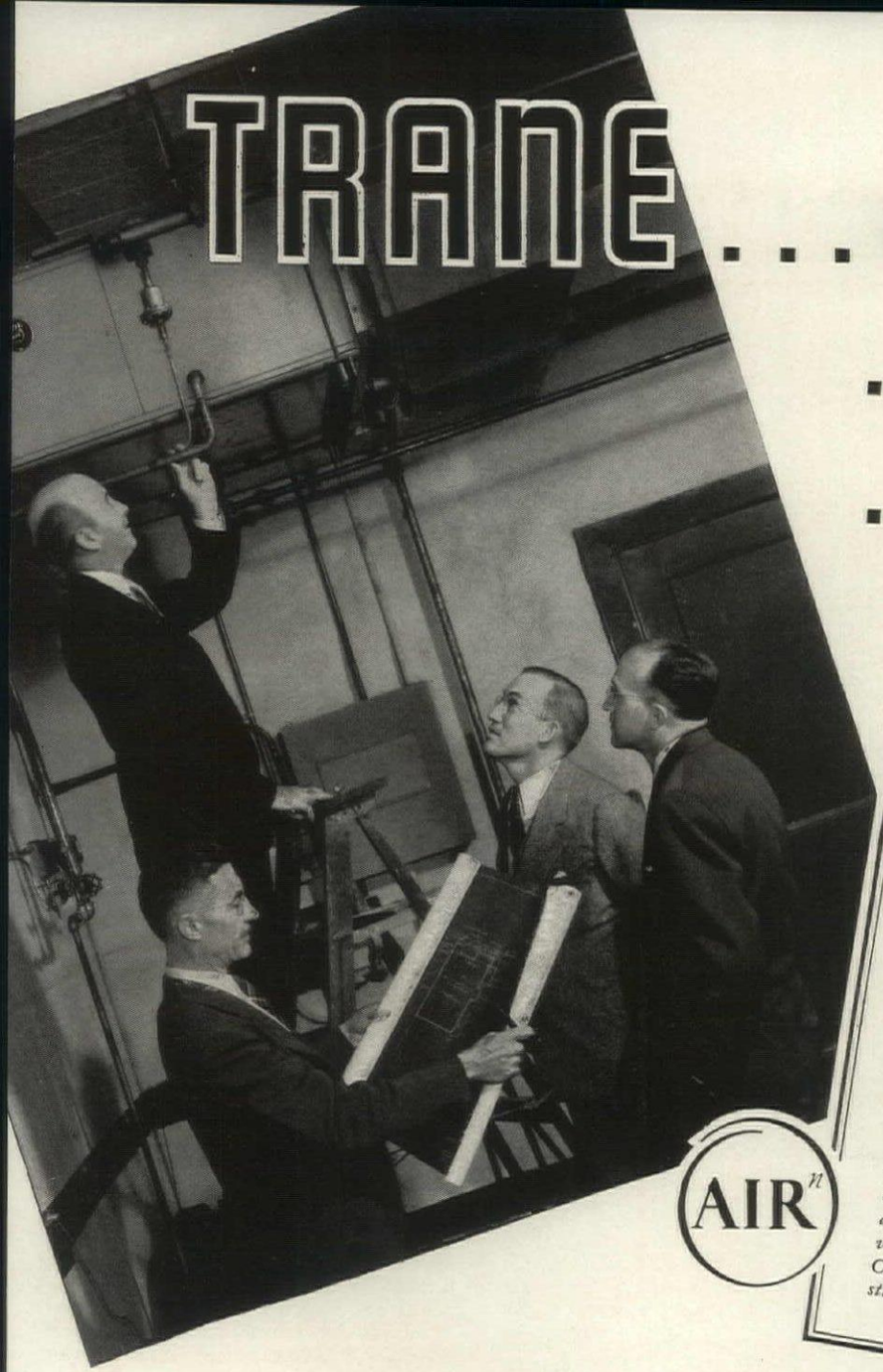

TRANE TEAMWORK *in a Historical Background*

COLORFUL Henry Watterson edited the Courier Journal in the rough and ready days of journalism. The late Hon. Robert Bingham, former ambassador to Great Britain, was owner and publisher. His son, Mr. Barry Bingham, now publishes the Courier Journal and the Louisville Times.

Trane Climate Changers and Trane Water Cooling Coils are a part of the Courier Journal Building's air conditioning system. Looking over a ceiling suspended Trane Climate Changer are Mr. George Jackson (standing on ladder) of the Liberty Engineering and Manufacturing Company, the contractors; Mr. J. Clifford Lewis (holding blueprint) of Lewis Engineering Company, Inc., the engineers; and (left to right) Mr. C. J. Roberts, Trane Louisville representative, and Mr. T. A. Corcoran, the Courier Journal purchasing agent. Another outstanding example of Trane teamwork!

TRANE is ready for the biggest heating, cooling, and air conditioning period in history! The farflung Trane field organization is geared to offer teamwork on the spot —to help you. Trane manufacturing facilities are ready to meet your requirements. The complete Trane line of heating, cooling, and air conditioning equipment—the largest line commercially available — includes exactly what you need for the jobs you have at hand. Trane service when you need it most!

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The demands of national defense as well as normal residential, commercial, and industrial requirements are best served by an organization trained to cooperate with architects, engineers, and contractors.

That's why Trane Unit Heaters are going into the expanding plants of American industry. That's why Trane Convectors and Trane Heating Specialties are creating comfort in new Army and Navy Air Bases. That's why Trane Coils and Trane Climate Changers are being selected for a host of comfort and process applications. Nothing typifies speed more than the great newspapers of the country which give the public news while it's still hot. Accustomed to giving service, newspapers expect it, too. The Louisville Courier Journal and the Louisville Times, two of the South's great newspapers, selected Trane air conditioning equipment.

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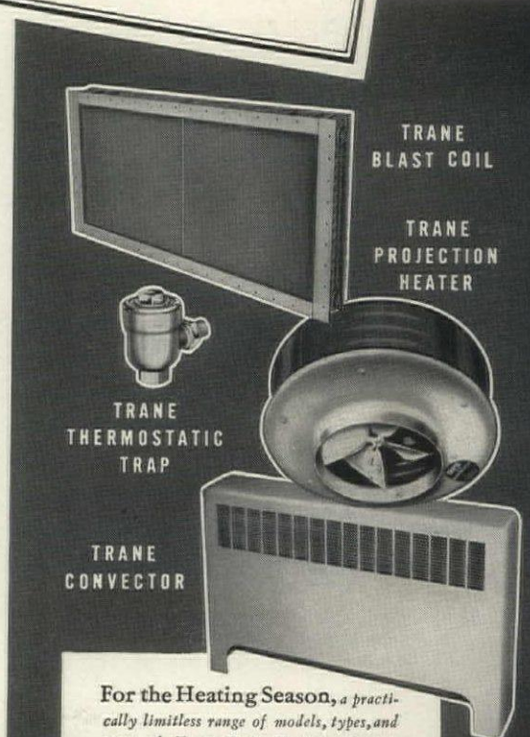

For the Heating Season, *a practically limitless range of models, types, and sizes of Trane Unit Heaters, Convectors, Coils, Climate Changers and Heating Specialties—the nation's number one complete line to give you superior service.*

HOUSING PROCEDURE

(*Continued from page 443*)

and prospective housing bottlenecks, the housing coordinator's hirelings, pending development of local organization, spent last month totaling defense contracts awarded in each U. S. city, comparing the sum with the city's industrial capacity as shown in the 1937 Census of Manufacturers, and flashing to Boss Palmer as a potential housing trouble center the name of any city in which the defense contract total reached 25 per cent of manufacturing capacity. Forthwith, a housing investigation is launched either by local authorities or by a special trouble shooter dispatched from the Coordinator's office.

When the necessity for new housing is officially established, FWA moves into the picture, disperses some of its $140 million through any one of four separate channels: 1) construction by the Army or Navy, 2) construction by USHA, either directly or through local housing authorities, 3) construction by the Farm Security Administration or 4) construction by PBA, either direct or through local housing authorities. While Washington defense housers were still in a fog fortnight ago as to how the $140 million would be spent, good guess is that channel No. 4 will be used almost to the exclusion of the other three and that most of the money will go directly through PBA to private builders without the intermediate assistance of local housing authorities. (Thus, the pattern for this 40,000-unit program would be similar to PBA's Army housing assignment—see above.) To help clear the fog, FWAdministrator Carmody at month's end asked his Assistant WPA Commissioner, Col. Lawrence Westbrook, to serve as director of FWA's defense housing program.

Private enterprise has 60 per cent of the defense housing problem—an estimated $420 million worth—to solve, but, for lack of local organization (see p. 442), has no established procedure to aid it. Unless and until local housing surveys are complete and the resultant facts are in the hands of a local central committee (as well as the national coordinator), the local architect, builder, realtor, material dealer and financier must rely largely on his own initiative to help the program along and help himself. Some needed advice may be had from local manufacturers, Army and Navy officials and municipal housing authorities. Moreover, in some communities the defense housing demand is so acute that even the uninformed can recognize its size and character.

Next to the lack of local defense housing organization, the absence of Government cooperation and coordination in the production of the 120,000 dwelling units required of private enterprise is the biggest bottleneck in the housing program.

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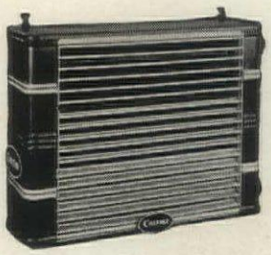

For Small Spaces — 22 sizes — 24,000 BTU to 450,000 BTU.

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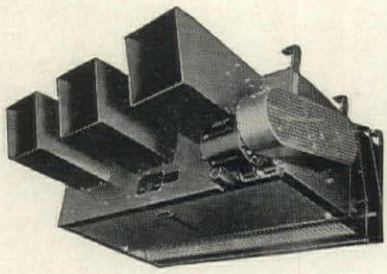

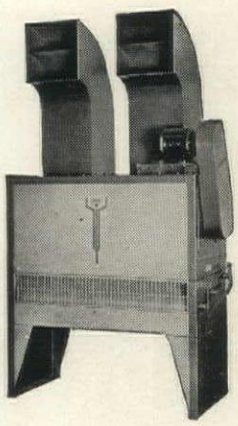

For Large Spaces — 20 sizes — 110,000 BTU to 900,000 BTU. Models for floor or ceiling installation.

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- ★ ***Balanced Fan Assemblies***—low operating speeds, sound-and-vibration-absorbing mountings.
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- ★ ***Smart Styling***—smaller models in smooth finish lacquer with aluminum trim—larger models in smooth finish two tone lacquer.
- ★ ***Variety of Sizes and Types***—4 types, ranging in capacity from 24,000 BTU to 900,000 BTU.
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COMPARED with ordinary methods of heating, Carrier Unit Heating cuts operating costs up to 25%—reduces maintenance costs as much as 25% — and frequently saves 50% or more on your original investment.

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Quick Heating—working space is heated in quick *minutes* instead of long *hours*.

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LETTERS

(Continued from page 32)

The efforts of the American Designers Institute which is in its infancy at this stage, are to prevent such occurrence and I sincerely hope that if you are planning in the future to write or publish material which affects such a significant large group of designers, that you avail yourself of the assistance of the A.D.I. which is grateful to the publishers of THE ARCHITECTURAL FORUM for focusing design on the public, but also feels that the material selected should represent a good cross-section or at least be stated that it does not represent material selected by a jury.

ALFONS BACH

New York, N. Y.

FORUM deeply regrets the many omissions of worthy material due to space limitations, but stands on its choice as representative of significant design accomplishment during the decade. Basis of choice was design excellence, not sales figures. FORUM looks and works to the day when these will be synonymous.—ED.

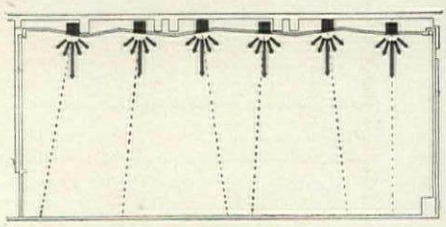
CBS New York

Forum:

Your article in the September issue ignored one of the two new and essential features of this project; the feature, moreover, without which the second feature could not have been introduced.

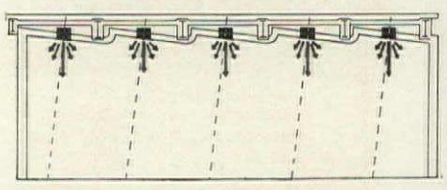
As you know, the engineers of the broadcasting industry are constantly striving to improve the quality of their product—sound. The new CBS Studios offered the opportunity to introduce a new refinement—the use of structural surfaces, no two of which would be opposed. That is, the ceiling would not be paralleled to the floor, nor to any other surface. Neither would any wall be parallel to any other, nor to any other surface.

However, greatly as the engineers wished to take advantage of the additional sound control such a construction would give them, they were unable to proceed with plans to use it until an equally new lighting system had been developed that could work as well with non-paralleled surfaces, as existing practice worked with the customary parallel surfaces.



For technical reasons too numerous to go into here, the industry has standardized on flush lens lighting. Obviously, if the ceiling is tilted the light is tilted. If two ceiling surfaces are opposed the two light distributions may come together on the floor, producing excessive light in one spot and gloom elsewhere. A new optical construction was developed to bend the light straight from the "crooked" ceiling—to compensate for the ceiling tilt and deliver the light as from a level ceiling. The diagrams will make this clear.

It was this unique solution of the lighting problem that permitted the use of the novel acoustical developments and that



turned this project from an ordinary studio group into "the last work in broadcasting studio design."

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Holophane Company
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H & H Industrial Electrical Equipment

The way to adequate WIRING specifications

NEW BUILDING to meet industrial shortages . . . plant expansion for rearmament programs . . . these call for electrical installations of new-scale COMPLETENESS. And the road to complete satisfaction, here, is *lined* with H & H Industrial Devices. Note these typical wiring items for heavy-duty service, power and light:

Left side, first above, Weatherproof Switch, Weatherproof Receptacle. Second, Type C Ceiling Pull Switch. Third, 3-wire Rubber Cord Connector. Fourth, Type C Tumbler Switch.

Right side, first above, Small Motor Starting Switch. Second, 3-wire Receptacle with Rubber Plug. Third, 2-wire 20 Ampere Duplex Receptacle with cord grip Cap. Fourth, 3-wire Flush Receptacle with Cap.

* * *

Most all new buildings (and modernizations) will be *adequately* wired for maximum production and convenient power connections. Your H & H Line is *more* than adequate; it's the line that leads to unqualified approval of wiring specifications.

HART & HEGEMAN DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

BACKDROP: WORLD WAR I

(*Continued from page 329*)

Convinced that private enterprise could not do the task without Federal assistance, the Corporation set up a housing department, started one project, promoted several improvements in transportation of workers. Lacking power to acquire land, it hesitated to go further without first getting Congressional approval. Early in January it requested a $50 million housing appropriation, went boldly ahead with a few projects as housing shortages grew more alarming.

Adding to the general legislative confusion, other Government agencies began to enter the housing scene. The Army's Ordnance Department, out of its general production appropriation, loaned money for sixteen projects located near isolated explosive and bag-loading plants. The Treasury, through its War Finance Corporation, pondered plans for industrial housing. In February the Secretary of Labor undertook to centralize all housing activities in the Labor Department, appointed Builder Eidlitz director of its new Bureau of Industrial Housing and Transportation, prepared a bill supported by the Army and Navy authorizing the President to spend $100 million for war housing (an increase of $50 million over the Defense Council's request).

Congress diddled over the legislative tangle. Finally the appropriations were made. In March 1918 the Emergency Fleet Corp. got its $50 million for housing (later increased to $75 million) plus another $20 million for improvement of transportation facilities. Early in June the Labor Department's new Housing Bureau was given $50 million plus an additional $10 million for housing Government workers in the District of Columbia. A month later this appropriation was upped $40 million and the Bureau formally became U. S. Housing Corp. Total appropriations for workers' housing: $195 million.

Funds, however, were not made available until late in July—ten months after the National Defense Council's first recommendation for Federal funds, less than four months before the Armistice. Action came too late to consolidate the housing work under a single agency.

U. S. Shipping Board. Powers voted by Congress to the Emergency Fleet Corp. were broad. It was authorized "to purchase, lease, requisition, or otherwise require, and to sell or otherwise dispose of improved or unimproved land, houses, buildings." Loans were to be made for a period not exceeding ten years. It could not take cost-plus contracts, however, without fixing the construction price in advance. Moreover, all powers were to come to an end with the war's end.

Well heeled with its $75 million appropriation, the Fleet Corp. operated like a banking house, seeking to lend funds on safe security while at the same time pushing projects forward as rapidly as possible. Although only a lender of Government money, the agency nevertheless exercised powers typical of ownership. Under each mortgage it reserved the right to control the project's rentals, sales, management. It also approved the selection of architects, engineers and contractors, besides determining the amount of their compensation.

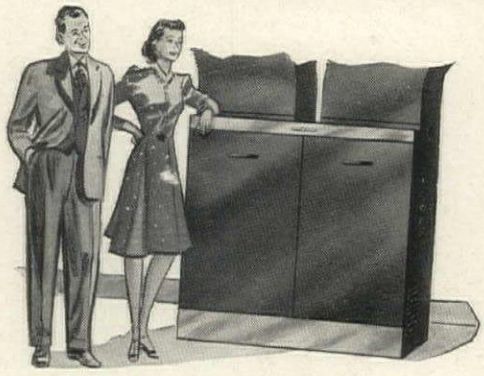
Main policy, however, was to avoid placing the Government in the building or landlord business directly. To this end the Fleet Corp. first sought to determine whether local housing shortages could be relieved by providing transportation to less densely populated areas nearby.

Schedules were revised, special trains run, street car lines extended, ferries operated. In providing such facilities, private companies did all the work. The Fleet Corp. merely advanced funds at 5 per cent, demanding repayment of 75

(*Continued on page 74*)

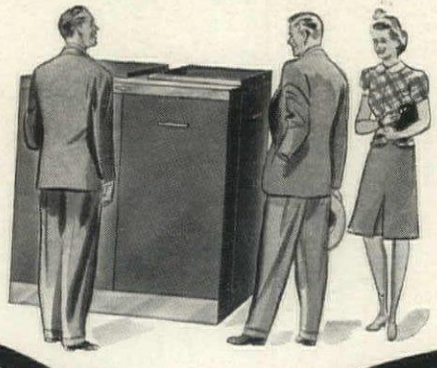
There she sat, braggin'! And you know as well as myself that practically everyone can afford G-E Automatic Heat!

GAS or OIL? Is that the question?



No matter which you and your clients choose —and no matter whether it's for radiator or warm air heat, G-E has the equipment to do the job right! A complete range of sizes offers you the correct size for every job.

Look at the G-E Winter Air Conditioners! They supply double benefits: automatic heat—either oil or gas fired—*plus* filtered, humidified air; circulated throughout the house. Complete Winter Air Conditioning in one compact unit!



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G-E Oil Furnace (for steam, hot water or vapor); compact; high heat transfer rate and low water content offer quick steaming . . . unusually economical in operation. Year 'round domestic hot water coil optional.

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G-E Water Coolers for almost every need. G-E Condensing Units available in a wide range of beverage coolers, food display cases, storage refrigerators and cube ice makers.

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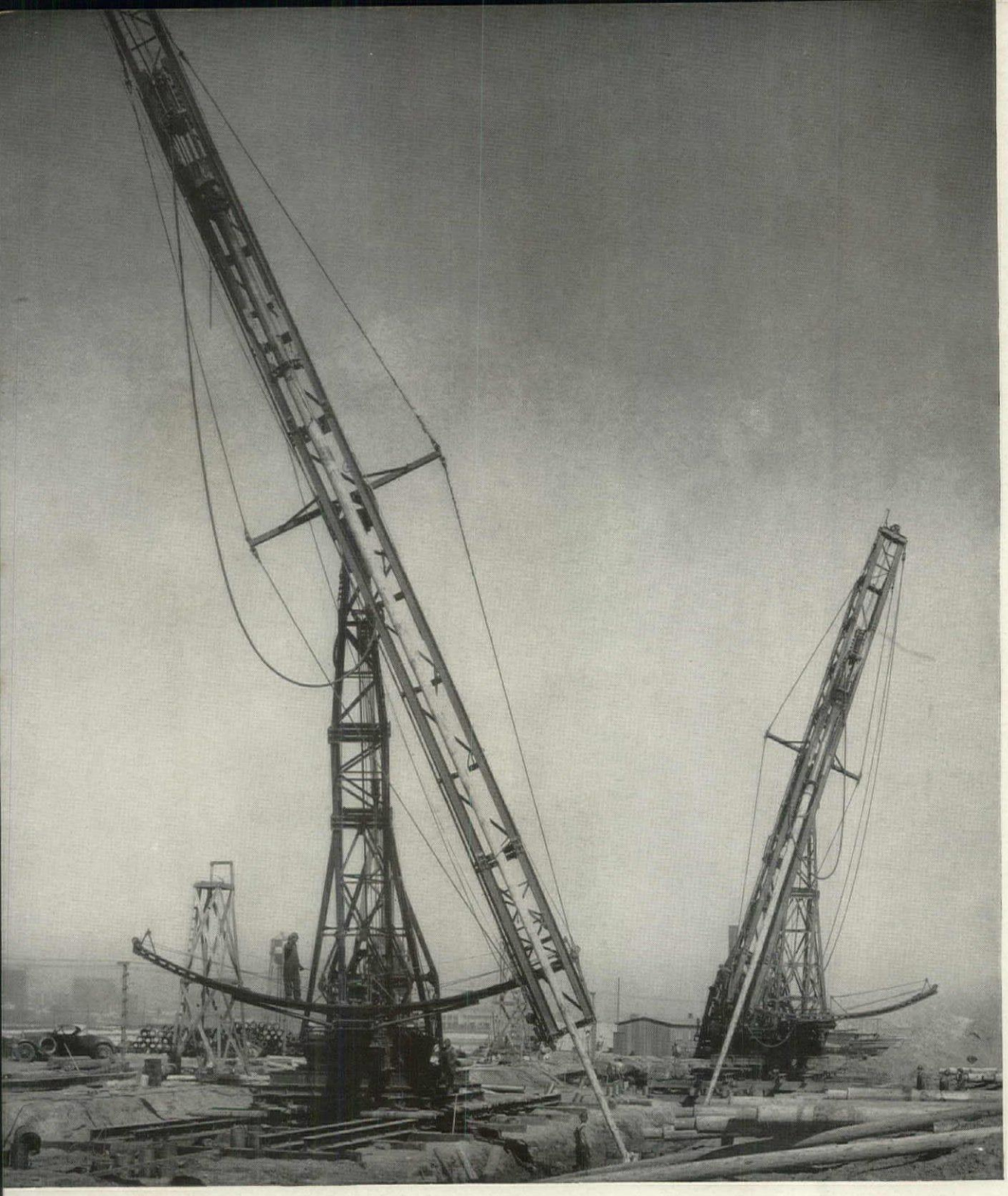

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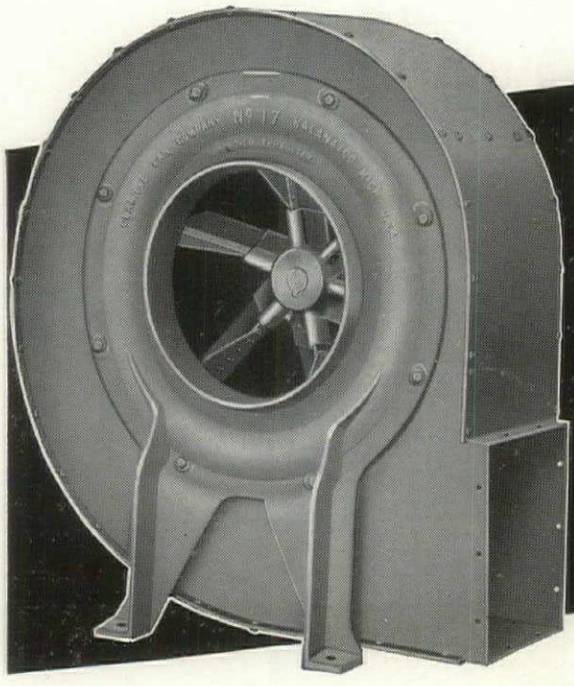

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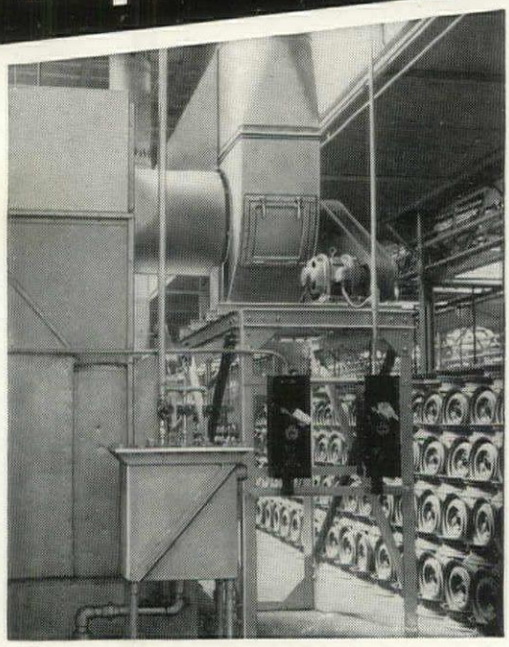
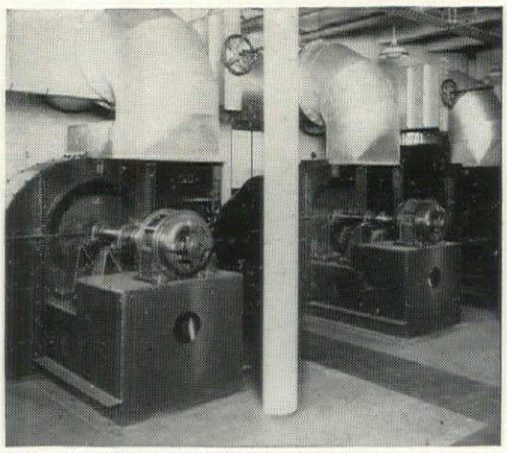


Clarage Exhaust Fans removing fumes from paint spray booths in an automobile plant.



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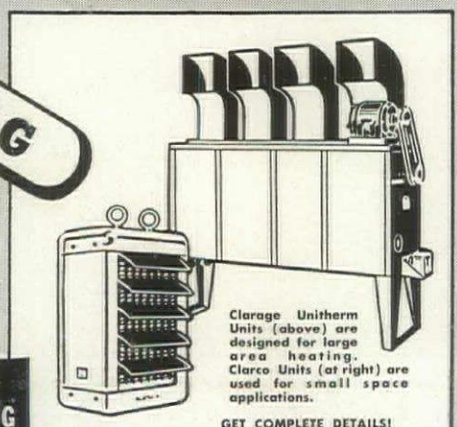

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BACKDROP: WORLD WAR I

(*Continued from page 70*)

per cent of the loan within five years after the war's close and absorbing the remainder as an outright subsidy. Its accomplishments on this approach to housing are noteworthy: ten days before the war ended some 60,000 ship workers were commuting on sponsored lines, a month later the total had more than doubled. The completed program would have accommodated 184,000 workers.

Besides arranging for shipyard employes to live at a distance, the Fleet Corp. requisitioned about 400 old houses to prevent workers being gouged by rent-greedy landlords. Only when measures like these failed to relieve the shortage was money advanced for new houses.

On each housing project a realty company served as the shipbuilder's subsidiary. Improved land usually had to be supplied by the shipbuilder and title turned over to this company. (In some cases, where the asking price was excessive or delay would have occurred, the land was requisitioned.) The realty company then mortgaged the property to the Fleet Corp. for a 10-year loan at 5 per cent, proceeded with construction and renting of dwellings. Dividends on its stock were limited to 5 per cent until the loan was repaid, to 6 per cent thereafter. If revenues were not sufficient to meet carrying charges, then the Fleet Corp. could have the property appraised within two to five years after the war and absorb a maximum write-off of 30 per cent on the mortgage in recognition of high wartime costs.

By October 1918 housing funds had been allocated to 25 shipyards and one turbine plant. A substantial number of workers were already living in new quarters. However, two of the authorized projects had not started construction when the Armistice intervened: these were canceled, two others cut down in size. Otherwise the program was carried through as originally planned. Total output: some 8,600 private houses, 850 apartments, a sprinkling of dormitories, boarding houses and hotels, accommodating altogether about 28,000 workers.

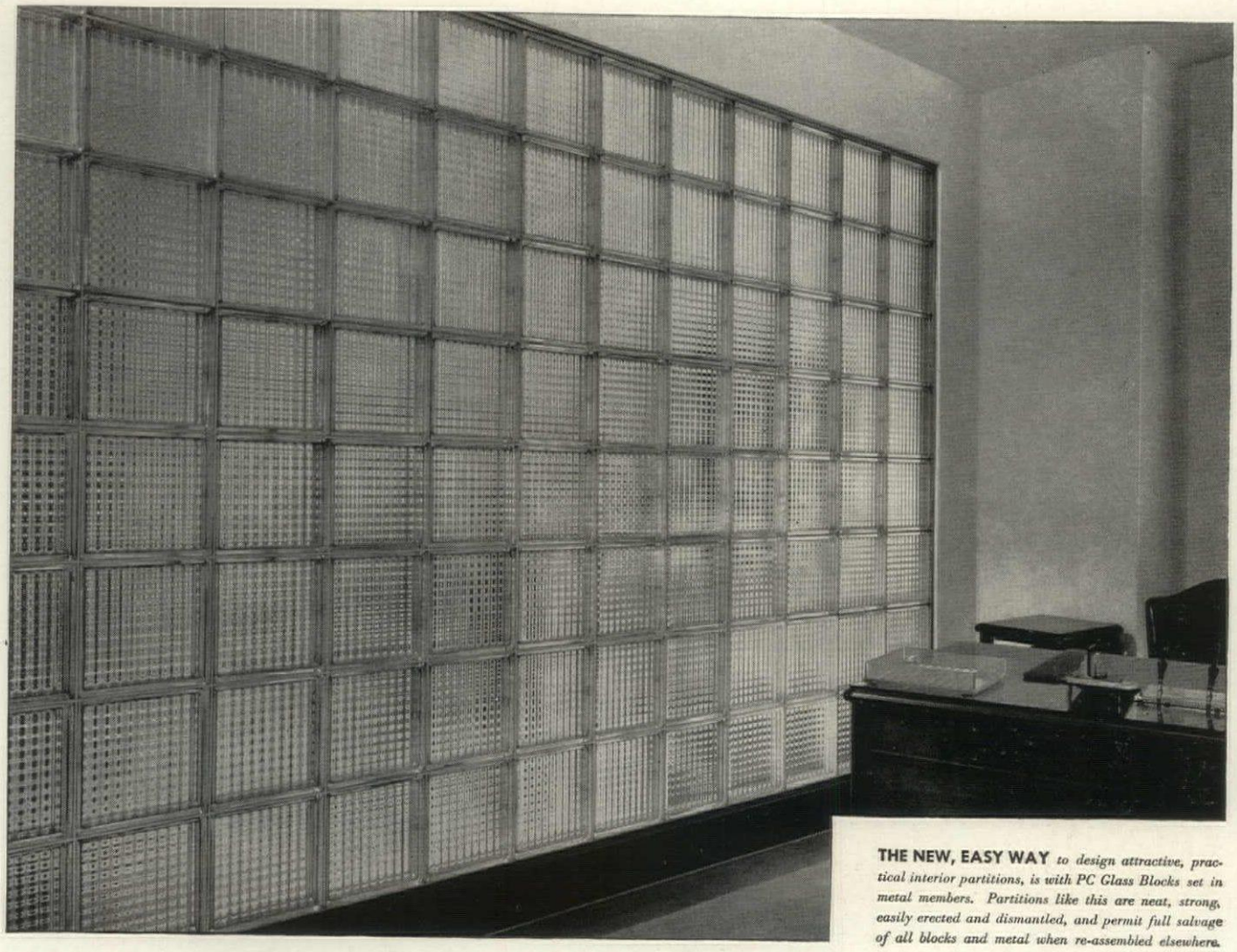
U. S. Housing Corp. Off to an even later start, the Labor Department's housing agency scored a still less impressive record despite its efforts to get workers properly sheltered before the war ended. Five months elapsed from the time the Bureau of Industrial Housing was set up until it acquired its $100 million appropriation from Congress and became incorporated under New York State laws.

Fortunately, the Bureau had obtained a $60,000 advance from the President's general fund to get together a small staff of experts, investigate housing needs, earmark allotments, draw up standard plans, propose contract forms, frame financing and operating policies. As soon as funds became available, everything was ready to start construction of houses in communities where the need was greatest.

First big question was what type of housing to build. Barracks could be thrown up quickly. Unmarried workers, it was decided, should therefore be housed in temporary dormitories fitted with individual sleeping rooms and common recreation rooms. However, manufacturers reported that it was impossible to hold married skilled workers even in the best equipped dormitories. For this group it was necessary to build houses for family occupancy. Durable rather than temporary construction of such houses was agreed on as a general policy. Reasons: less likelihood of deterioration, greater protection against weather, higher salvage value.

Next step was to draw up minimum standards covering room sizes, materials, lighting, ventilation, heating, sanitation, fire prevention. Armed with a manual of standard instructions, the Bureau's architects then prepared standard

(*Continued on page 76*)



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BACKDROP: WORLD WAR I

(*Continued from page 74*)

house plans in the hope of reducing costs through large scale construction.

Most difficult question to answer, however, was the best way to disburse the anticipated appropriations. Plans considered:

1) Supervised loans to local builders through local lending institutions. Strikingly similar to current FHA procedure, this scheme called for 15-year, 5 per cent amortized mortgages up to 80 per cent of total cost. In return for control over design, construction, sale or rental prices, the Government would assume excess war costs. Objections to plan: necessary speed could not be obtained without excessive speculation profits; supervision would be difficult; advantages of standardization and quantity production would be lost; builders might not be available in sufficient numbers; priority orders for materials, comparatively simple to handle in the case of a single large contractor, would involve almost endless complications in the case of many small local builders.

2) Supervised loans to a single housing corporation to be formed in each locality and operated with limited dividends. Resembling the Fleet Corp.'s plan, this scheme required a local equity of 20 or 30 per cent. Chief objection was the idea's newness: public housing and limited dividend companies were still virtually unknown. In many places the equity could not be raised; in others, unsuited land might be unloaded on the Government, or the manufacturer with war orders might be the only one able financially to underwrite the housing company. Workers, it was pointed out, would be likely to object to any company housing.

3) Direct Government construction and operation. Just about the time the Housing Corp.'s staff had concluded Plan 2 was the speedier and more efficient, the entire debate was cut short by the Secretary of Labor's ukase: "The Government will build, own, control and rent the houses until after the war."

New building was undertaken, however, only where it was impossible to obtain sufficient housing facilities by other means. Investigators were dispatched to find whether war contracts were being delayed because of housing shortages. Estimates indicated a need for housing almost 300,000 workers in some 70 cities. Then a Homes Registration Service, utilizing local police and mail carriers, undertook quick surveys of vacancies in about 150 communities. Rentable dwellings were listed and classified. Thus, over 70,000 workers were placed. Rent-a-room campaigns helped many others to find quarters. Local committees also cracked down on rent profiteers by threatening unfavorable publicity, helped owners of old vacant houses to make repairs, secured priority orders for materials for private builders to put up new houses.

Private enterprise was encouraged in this manner to build approximately $45 million worth of houses, accommodating roughly 30,000 workers (figuring two to each private dwelling). Vacant properties in Washington and elsewhere were requisitioned for another 2,500 workers. Transportation facilities were subsidized and improved to bring housing in neighboring areas within reach of 8,000 more. Altogether, about 110,000 workers were provided homes without the Housing Corp.'s spending any money on new construction.

Certain communities nevertheless required immediate house building. Land was appraised and bought; if delays occurred, it was requisitioned. A trio of designers—representing architecture, municipal engineering, landscape architecture—worked jointly on each project. Plans ready, the Housing Corp. then purchased price-fixed materials through

(*Continued on page 78*)

BACKDROP: WORLD WAR I

(Continued from page 76)

the Army's Construction Division, awarded contracts based on cost plus a fixed fee to the lowest bidder.

At Armistice 60 construction contracts had been let, 34 other projects were hanging over the fire. Work was ordered continued only on those undertakings where the need was still great or where the Government stood to net more salvage from the sale of finished houses than from the sale of materials on order. Fifty-four projects were abandoned, fifteen curtailed, twenty-five completed as originally planned. Later Congress ordered work stopped on all projects less than 75 per cent completed. Final figure: 27 completed projects.

First tenants moved in as the new year began, nearly two months after the war ended. The last project was not ready for occupancy until the next autumn. Total housed: about 6,000 families in individual units, about 8,000 single men and women in dormitories and hotels or as boarders in family houses.

Costs. The Emergency Fleet Corp. spent approximately $70 million on housing and loans to municipalities and utility companies while U. S. Housing Corp. disbursed about $52 million on its projects.

Directed by Congress in 1920 to dispose of its properties as soon as possible the Fleet Corp. acquired a new headache. Shipbuilding companies refused to buy the houses at cost minus the stipulated 30 per cent write-off. None had been required to guarantee repayment of loans made by the Government to the subsidiary realty companies. Foreclosure was the only solution. Sold on the open market projects brought in prices ranging from 6 to 90 per cent of their original cost. Total salvage: roughly $25 million (about 37 per cent). Losses ran still higher however since the Fleet Corp. had to accept mortgages on most of the properties sold. These mortgages were disposed of with discounts of 8 to 20 per cent.

Likewise directed to sell its dwellings at their fair market value the Housing Corp. recovered approximately $19 million (about 37 per cent). Five projects were turned over to the Army and Navy; others were sold to prospective homeowners on the basis of appraisals made by local committees. Figuring rentals, interest, return on principal, plus sales revenue, total receipts ran to about $27 million (51 per cent of cost).

Evaluation. After the war a Congressional committee was appointed to investigate housing work. Ignoring the Emergency Fleet Corp. and other Government ventures, it went a-gunning after the Housing Corp. Findings: houses were too good and too costly, operations too slow and too inefficient.

Undeniably, the housing was substantial and durable. Projects showed advances in house design and neighborhood planning exceptional for a period when quality was generally sacrificed for speed. The houses have lasted well; they still hold their own in looks.

More equitable perhaps is the verdict which appears in the Twentieth Century Fund's report (1940): "To judge war housing policy by the housing agencies' accomplishments would not give an adequate picture of the situation. The root of the matter lies in the period before these agencies were set up. The major deficiency was lack of planning. The two prerequisites to adequate planning are awareness of the problem and a body of relevant factual data, neither of which was present. . . . Prior planning might have lessened the difficulties by enabling the housing program to go hand in hand with the defense program instead of following it."

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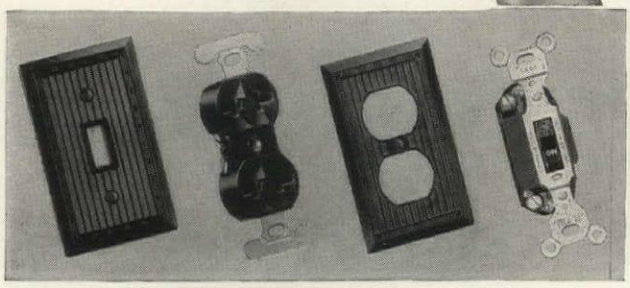

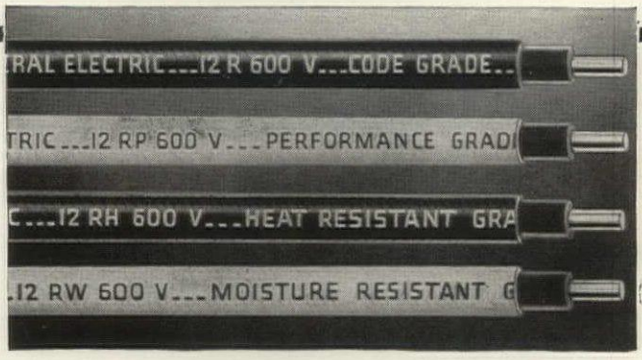

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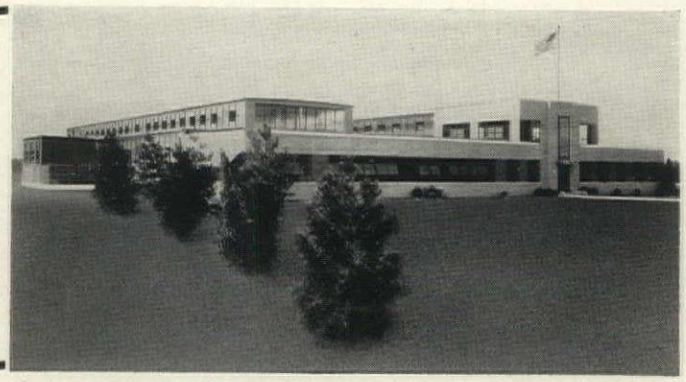

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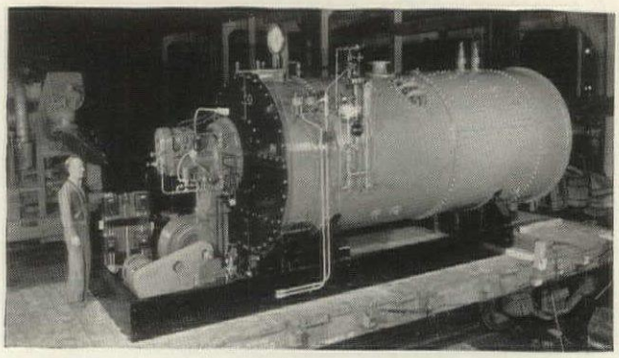

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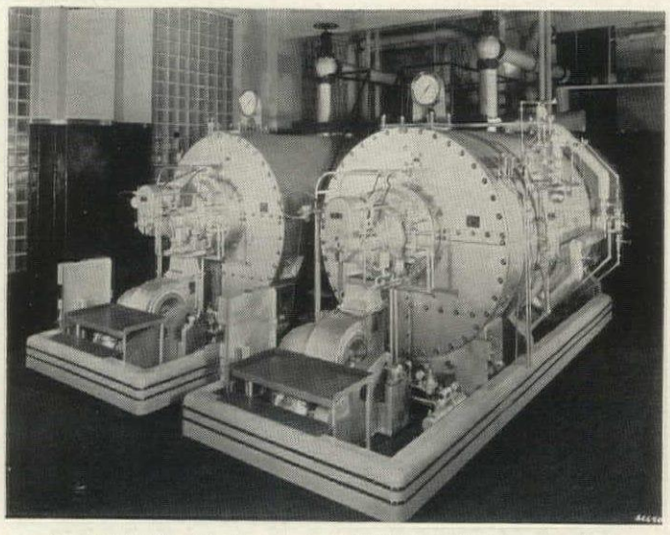

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INDUSTRIAL BUILDING

(Continued from page 374)

ernment would take title, operate the plant for its own needs, hold it in reserve, sell it to someone else or dismantle and salvage it.

Chances are that this type of plant expansion will be authorized only for the production of such actual war equipment as guns, tanks, warships, etc., and Army or Navy Department supervision of the plant's design, construction and operation will naturally be required. Most of the contracts issued under this plan will be of the negotiated "build-and-deliver" variety whereby the manufacturer agrees at a certain over-all but itemized cost to the Government to build the necessary plant and then to deliver the necessary goods.

Federal grant and lease. Under much the same conditions Government may select a manufacturer, ask him to build a plant at the Government's immediate expense and then operate and manage it under a Federal lease. Depending upon the circumstances, the manufacturer may be asked to handle the plant's design and specifications and to let the construction contracts, or he may be asked to follow plans already prepared by the Army or Navy Department. Where the manufacturer obviously knows much more about the assignment than Government—which is usually the case—he will be given the whole job, subject only to elementary supervision by Army or Navy officials. Thus, Dupont engineers will design and build in Charlestown, Ind., a $26 million explosives plant for the Government which, in turn, will lease it to Dupont "for the duration."

Direct Government construction. All arsenals and many shipyards, warehouses, etc. will be built directly by the Government. Most of them will be similarly operated, although it may prove expedient to lease a few to private interests.

Saturation and conversion. Remembering well the disastrous over-expansion of industrial production facilities which World War I provoked, the U. S. is proceeding more cautiously today. Plants which have long been idle with Depression and which lend themselves readily to modern straight-line production systems (multi-story factories usually do not qualify) are gradually going back to work. This trend is particularly noticeable in Pittsburgh. Moreover, the U. S. is literally beating its plowshares into swords by converting non-essential industrial production to more immediate needs. Several farm equipment manufacturers are now turning out gun carriages and combat wagons. The conversion program has already accounted for a partial shift from refrigerator production to the making of airplane parts, from printing presses to howitzer recoil mechanisms, from watches to time-fuses, from vacuum cleaners to gas mask parts, from lawn mowers to shrapnel cases, and from shoe machinery to artillery guns.

Even without additional Federal appropriations for defense, U. S. industry and industrial construction will hum for many months. As far as actual expenditures are concerned, construction will probably peak in September 1941, the total program in the Spring of 1942. With higher prices—and they have already started up—and with more appropriations, manufacturers either willingly or by force will continue to expand their production facilities. Last spring the nation's jaw dropped when the President mentioned $3 billion for defense; today the total is close to $13 billion; tomorrow it will probably go higher. World conditions remaining unchanged, not unlikely is an average annual defense expenditure of about $10 billion during the Forties. If so, industrial building will have to hold its hat.

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THE FORUM will cover the progress of the program,
underline its successes, not ignore its failures.
By so doing, THE FORUM hopes to serve both
Building and the National Defense.

THE EDITORS

FORUM OF EVENTS

(Continued from page 14)

AWARDS

J. ANDRE FOUILHOUX, New York architect, has been appointed chairman of the Advisory Council of the Cooper Union Art Schools.

To LILLIAN HOLM, Bloomfield Hills, Mich., an award for the best design in craftsmanship shown at the summer exhibition of the Society of Designer-Craftsmen, New York.

To ELIEL SAARINEN, EERO SAARINEN and J. ROBERT F. SWANSON for their design for the Smithsonian Institute, Washington, D. C., a Special Honor Award of the Detroit Chapter, A.I.A. This and the following Honor Awards are in resumption of the practice followed by the Detroit Chapter some years previous to 1931. To LYNDON & SMITH, Detroit architects, for their Farmington Auditorium, Farmington, Mich. To ELIEL SAARINEN for the Institute of Science, Cranbrook Academy of Art. To MARSHALL FREDERICKS, sculptor, Cranbrook Academy of Art, for his models of bronze bas-reliefs for a government building. Honorable Mentions to O'Dell & Rowland; Hewlett & Luckenbach, Detroit architects, for the Charles Housing Project, Detroit. To J. Robert F. Swanson, architect; Pipsan Saarinen Swanson, interior designer, for the Charles J. Koebel residence, Grosse Pointe. To Albert Kahn, Detroit architect, for the Steel Rolling Mill, Ford River Rouge Plant.

To JULIEN BINFORD, ESTHER WORDEN DAY and CARSON DAVENPORT the Virginia Artists Fellowships by the Virginia Museum of Fine Arts. The Fellowships, paying more than $2,000 a year, are grants-in-aid awarded on basis of merit plus need.

THOMAS C. PARKER has been appointed director of the American Federation of Arts, having resigned as deputy director of the WPA Art Program to accept the post.

To HENRY KREIS, Essex, Conn., the commission for three sculptural groups on the facade of the War Department Building. Sixty-three competitors entered models.

To HENRY KOERNER, 24 year old Viennese refugee artist now living in Brooklyn, first prize of $1,000 in the poster competition conducted by the American Society for the Control of Cancer. Eight hundred entries were received. Second prize, $500, to J. T. Ross of Pittsburgh; third prize, $250, to Herbert R. Loges of New York; fourth prize, $50, to Joseph Binder of New York; fifth prize, $25, to Henry Russell of New York.

COMPETITIONS

INDUSTRIAL DESIGN COMPETITIONS. No. 1 for residents of U.S.A., closing January 11, 1941, at midnight. Conducted by the Department of Industrial Design, Museum of Modern Art, New York. Full details of the program will be found in THE FORUM for Oct. 1940, pp. 27-30.

SIXTH AMERICAN TEXTILE DESIGN COMPETITION, closing January 10, 1941. Conducted by the Fairchild Publications, New York. Further details may be had by addressing Miss Elizabeth Crawford, Fairchild Library, 3 East 12th St.

TENTH ANNUAL ALL-AMERICAN PACKAGE COMPETITION, closing January 6, 1941. Conducted by the *Modern Packag-*

(Continued on page 90)

TO ASSURE
NATIONAL DEFENSE PRODUCTION

FLUORESCENT LIGHTING
by Westinghouse

With National Defense uppermost in the minds of Management, American Industry and Commerce now turn to the *means of obtaining* high speed production.

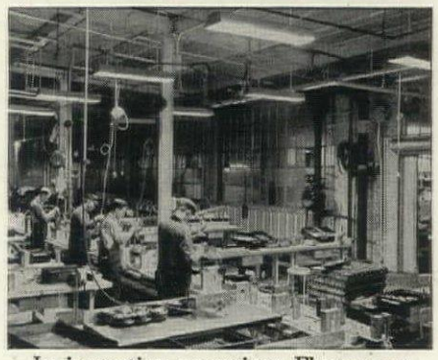
A "*Must*" among production facilities—in both plants and offices—is *sound, adequate lighting*. Westinghouse suggests to Architects and Engineers that Fluorescent Lighting aptly fits National Defense work requirements because the higher illumination levels so essential to high speed and accuracy are now made economically possible.

Fluorescent Lighting helps step up production, makes possible work with fewer errors, improves inspection operations, increases precision workmanship, and reduces rejects. Furthermore, it gives adequate visibility for *every* shift, and assures greater accuracy in delicate, light-demanding tasks.

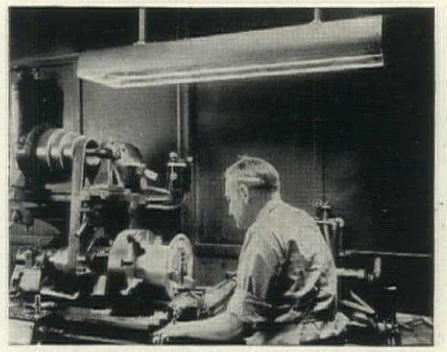
Fluorescent Lighting by Westinghouse blankets every industrial and commercial requirement. Features include rugged lamp holders, dependable starters, a variety of porcelain enameled and Alzak Aluminum reflectors and several types of mountings.

There are 117 Westinghouse Electric Supply Company offices or Independent Westinghouse Lighting Distributors to make it easy for you to obtain Fluorescent Lighting anywhere in the United States. Ask your Westinghouse Lighting Distributor today for full information. Westinghouse also makes a complete line of Mazda Lighting equipment, including Protective Floodlighting. Westinghouse Electric & Manufacturing Company, Lighting Division, Edgewater Park, Cleveland, Ohio.

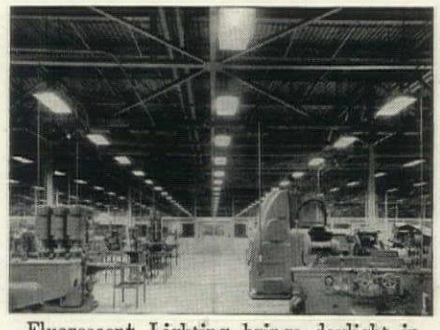
Tune in "Musical Americana," N. B. C. Red Network, Coast-to-Coast, every Thursday evening.



In inspection operations Fluorescent Lighting reduces rejects.



Adequate illumination for the finest precision operations.

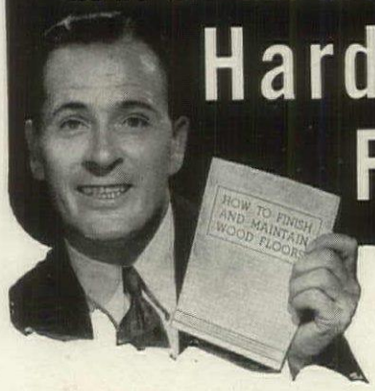


Fluorescent Lighting brings daylight in this airplane engine manufacturing plant.

Westinghouse
FLUORESCENT LIGHTING

GET YOUR COPY OF

"How to Finish and Maintain Hardwood Floors"



● It explains the methods of finishing and maintaining hardwood floors recommended by E. L. Bruce Co., famous hardwood flooring maker. Tells the secrets of getting a superior finish on both old and new floors. Tells how to save time, money and materials. And how to clean, wax and polish floors to new lustrous beauty.

Also explains the revolutionary new "Bruce-Way" finish that resists scratches. The finish penetrates and becomes a part of the wood. Produces a lustrous sheen that lasts for years. Only one application is needed instead of two or three as with other methods. Bruce Finish used in combination with Bruce Tuf-Lustre Wax produces results unequalled by any other method.

Send the coupon for your free copy of "How to Finish and Maintain Hardwood Floors." See your dealer for Bruce Floor Finish and Bruce Tuf-Lustre Wax. If he can't supply you, order direct giving your dealer's name.

THIS TEAM WORKS!

1. Bruce Floor Finish penetrates into the wood and binds the fibres with a tough elastic seal . . . sets the grain and brings out the full pattern.

2. Bruce Tuf-Lustre Floor Wax completes the job. This blend of fine waxes fortified with resins does not separate or settle out. Gives quick response to light buffing and produces a beautiful, longer-lasting finish.

SCRATCH TEST PANEL MAKES "BRUCE-WAY" JOBS EASY TO SELL

In just a flash with this "Scratch Test" Panel, you can dramatically prove the superiority of this amazing finish. Half is finished the new "Bruce-Way." The other half is finished the ordinary surface way. Scrape a coin across both finishes. See how the ordinary surface chips away while the "Bruce-Way" finish is unharmed.

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E. L. BRUCE CO.
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Gentlemen: Please send me free copy of "How to Finish and Maintain Hardwood Floors." Also "Scratch Test" Panel.

Name.....

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City.....*State*.....

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—BY ALL CONCERNED . . .

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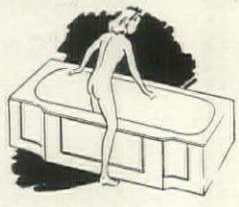
NEW "Cosmopolitan" BENCH BATH

All hands agree—here's modern styling, added utility and extra value. The Bench Bath is typically *Kohler* in design and construction—made in one piece of rigid cast iron and finished in *super-luster* enamel. Three sizes—4½, 5, 5½ feet. Harmonizes with other Kohler fixtures to make smart Matched Sets. Write TODAY for latest Kohler news on fine fixtures and fittings. . . . Kohler Co. *Founded 1873*. Kohler, Wisconsin.

FLAT RIM 6 INCHES WIDE MAKES A USEFUL BENCH



● No more high stepping! Low side, less than 16 inches above floor, makes bathing easier—especially for the young and old.

● The flat, wide bottom provides surer footing for shower bathers and extra safety for every one. . . Full-size inside space.

KOHLER OF KOHLER

PLANNED PLUMBING AND HEATING

★ NATIONAL DEFENSE CANNOT WAIT ★

NEW HOUSES NEEDED...

...as national defense puts thousands back to work!

INDUSTRY OUTGROWS AVAILABLE HOUSING

Acute Shortages Where Defense Program Revives Old Plants

More Problems When Plants Are Built in Strategic Localities

The basic fact about the defense program's impact on real estate is that it will take a lot of new plants and additions to step up this country's output by $10,000,000,000 a year in 70,000 items. But extensions of old factories are already cramping the dwelling facilities of dczens of U. S. cities.

At Rock Island, Ill., the arsenal expects to add 8,000 new employees, and to build approximately 800 new houses. But the National Executive Committee of Housing Authorities reported last month that prospective arsenal workers are already refusing jobs at Rock Island because they do not know where they could live.

In Hartford, Eastern airplane center, a local daily says the vacancy ratio in June was 1.2%. There were only 158 vacant tenements in Hartford, only 782 in Greater Hartford. It was then difficult to find monthly rents of $35 and under.

Five major airplane plants in Los Angeles employ 40,000, as against 19,000 last January. All of these plants are in districts which already had sharp shortages in housing.

DURING the rush to complete new housing, you men in the building industry must guard America against creating future slums or wasteful boom town shacks. For workers in new or enlarged defense plants, build *modern* housing, quickly and economically. Build comfortable, good looking but low priced houses that will uphold morale, minimize social problems and pay dividends in increased production.

For this vitally needed task, Flintkote pledges you wholehearted cooperation from distributors of its time-proved materials for new construction and rehabilitation of old dwellings. Strategically located Flintkote factories and warehouses assure prompt delivery of all types of roofing, siding, sheathing, wall board, insulation, sound deadening and waterproofing.

Special materials ranging from war-tested camouflage factory coverings to airport surfacings are also available. Flintkote's research facilities and reserve manufacturing capacity are at your service to develop materials or produce large orders.

Complete information is available from your nearby Flintkote branch office. Or simply airmail, wire or phone your inquiry to:

FLINTKOTE ROOFING SIDING · INSULATION

Products of the same high quality are sold by Beckman-Dawson Roofing Company and Richardson Roofing, affiliates of The Flintkote Company.

FLINTKOTE PRODUCTS:

Asphalt Shingles	Waterproofing	Sheathing Board
Roll Roofing	Rock Wool Insulation	Decoboard
Brick-Type Sidings	Asbestos Shingles	Dampproofing
Insulation Board	Asbestos Sidings	Sound Deadening

THE FLINTKOTE COMPANY

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CHICAGO ... NEW ORLEANS ... ATLANTA ...
BOSTON ... DETROIT ... WACO ... LOS ANGELES

FORUM OF EVENTS

(Continued from page 82)

ing Magazine, New York, from whom full particulars may be had.

EDUCATIONAL

COLUMBIA UNIVERSITY, NEW YORK, has adopted a program enabling graduate students in public administration, sociology and economics to take housing and city planning as a minor field of study. The new program will be administered by Professors Robert M. Haig, Robert S. Lynd, Schuyler C. Wallace and Carl Feiss.

METROPOLITAN MUSEUM OF ART, NEW YORK. Its special lecture series, "Study Hours on Color and Design," which began its 24th season in September, consists of 105 gallery talks and demonstration lectures. Lectures are given by Grace Cornell, Dean Leopold Arnaud, Nancy V. McClelland, all of New York, and Dean Joseph Hudnut of Harvard University.

HOUSING STUDY GROUP, 56 West 45th St., New York, is an organization under the leadership of Clarence Stein and Henry Churchill, and consists of men and women of the architectural profession who are interested in housing. Open forums are held about once a week with guest speakers. Jack Wahl, Secretary, 5 East 57th St. would welcome correspondence with architectural draftsmen in other cities who would form similar organizations.

PRATT INSTITUTE, BROOKLYN. Beginning October 21, courses in air raid precautions are being given in the architectural department under Erling F. Iverson who has studied air raid precautions for the past two years, both in England and in Germany.

CALENDAR

November 1-January 2, 1941 "Art Finds a Way" an exhibition in the Brooklyn Museum demonstrating the origin and development of production techniques in several fields.

November 11-December 31. Christmas Exhibition of American Designer-Craftsmen held by the Society of Designer-Craftsmen, 64 East 55th St., New York.

November 25-December 1. Art Week to be observed at 1,000 community sales-exhibits, planned to sell American paintings, sculpture and crafts to the American home.

December 2-7, Fourteenth National Power Show, Grand Central Palace, New York.

December 5. Meeting of the New York Society of Ceramic Arts, Metropolitan Museum of Art, New York. Waylande Gregory, speaker.

February 5-26, 1941. Fortieth Annual Exhibition, New York Society of Ceramic Arts, National Arts Club, 15 Gramercy Park.

PERSONAL

James T. Canizaro, architect, has moved his office to Capital National Bank Building, Jackson, Miss.

Pier L. Cherici, architect, announces the removal of his offices from 277 Broadway, New York, to 50 Court St., Brooklyn, N. Y.

Designed in CONCRETE for profits at low rent levels

Because frame, floors, walls and ornament were cast as a unit, first cost was low.

Because the enclosing walls were erected as the building rose, precious time was saved.

Because of concrete's economy of first cost and maintenance, low rentals with profit were made possible.

Because of low rentals for such a smart, modern building, high occupancy was quickly attained.

This outstanding example of Architectural Concrete construction—the Kimbrough Towers, at Memphis—was designed for John F. Kimbrough, Jr., realtor, by H. M. Burnham, architect, and H. B. Hulsey, associate architect; Gardner & Howe, structural engineers; S. & W. Construction Company, contractors (all of Memphis).

Ask your architect or engineer about the advantages of concrete. Write for illustrated booklet, *"The NEW Beauty in Walls of Architectural Concrete,"* mailed free in the U. S. or Canada, or ask for a representative to call. See Sweet's 4/48.

PORTLAND CEMENT ASSOCIATION

Dept. 11-7, 33 W. Grand Ave., Chicago, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

Architectural Concrete . . . **Combining architectural and structural functions in one firesafe, enduring material**

Missing Copies?

For those who wish to obtain back issues cited in the Bibliography of Reference Data published between pages 56 and 57 of this issue, copies of the following numbers of THE ARCHITECTURAL FORUM are available from the publishers' reserve file:

1935: April, May, June, August, September, November.

1936: January, February, March, April, May, June, July, August, September, October, December.

1937: January, February, March, May, June, July, August, September, November, December.

1938: January, March, April, June, July, August, September, October, December.

1939: January, February, March, May, June, September, October, November, December.

1940: February, April, May, July, August, September, October.

In many cases only one or two copies of an issue are available.

Orders accompanied by remittance of one dollar per copy should be sent to:

THE ARCHITECTURAL FORUM

TIME & LIFE BUILDING, ROCKEFELLER CENTER
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CONSIDER THE *SAFETY FACTOR* OF CORRUGATED WIRE GLASS CONSTRUCTION!

PHILA. NAVY YARD STRUCTURAL ASSEMBLY SHOP
68,000 sq. ft. White and Actinic C. W. G.
Sidewall Construction

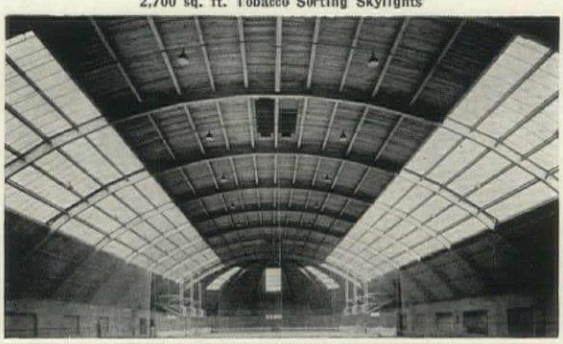
WHETHER in time of Peace or in preparation for National Defense, men responsible for America's industrial, naval and military buildings have long recognized the quality of the original solid Corrugated Wire Glass manufactured by Pennsylvania Wire Glass Company.

CWG is a corrugated sheet of glass with wire netting incorporated in it during the process of manufacture. The corrugated principle increases its strength many times over an equal thickness of flat glass.

Where the problems of adequate light, sufficient ventilation, low maintenance and the factor of safety are involved, the original solid Corrugated Wire Glass offers the solution. Specify this modern and practical material for skylights, sawtooth and side wall construction.

Our engineering service department will gladly assist you with your plans. Write for our 20-page book (A. I. A. File No. 12-J) which gives complete detailed installation drawings.

AMERICAN SUMATRA TOBACCO CO.
BLOOMFIELD, CONN.
2,700 sq. ft. Tobacco Sorting Skylights



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SWARTHMORE, PENNA.
11,000 sq. ft. Deep Angle Actinic C. W. G.; .032 Aluminum Accessories

PHILA. NAVY YARD PIPE & COPPER SHOP
31,000 sq. ft. White and Actinic C. W. G.
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PENNSYLVANIA WIRE GLASS CO.
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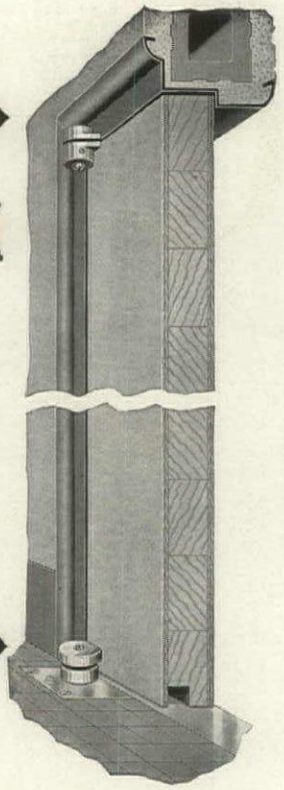
Specify

UNI-CHECK

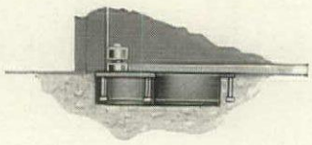
and this Is All They'll Ever See!



THE MODERN CHECK THAT GAINED NEW FRIENDS BY DROPPING OUT OF SIGHT

•

No Hinges—
No Unsightly Arms



Out of Sight... There is scarcely anything about a UNI-CHECKED door to even hint at the existence of the rugged door closing mechanism concealed at top and bottom. RIXSON UNI-CHECKS for single-acting interior doors, are the modern device that permits architects to give doors the same clean, symmetrical treatment as the rest of the building *at no cost premium over exposed type closers.*

and Out of Mind And that's not all. UNI-CHECKS are built to last—to give gentle but positive closure for long, attention-free periods. There are only 6 moving parts, no complicated adjustments. Can be installed on any interior wood or metal door in any type of floor. Require only 2 9/16" floor depth. Made in 4 capacities.

Get all the facts and a demonstration from your nearest RIXSON representative; or, write direct for data sheet.

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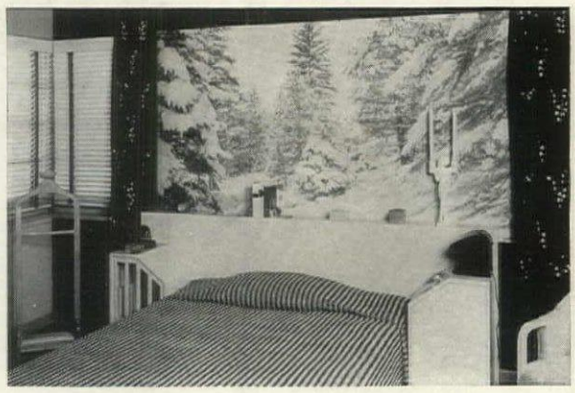
Builders' Hardware

PHOTOMURALS

by KAUFMANN AND FABRY



Snow-laden coolness of the north adds charm to a modern Florida home. Eastman Decorators, Inc., New York City, selected Kaufmann & Fabry to execute this unique treatment. A useful folder showing many beautiful applications of photomurals is yours for the asking. Write for it.

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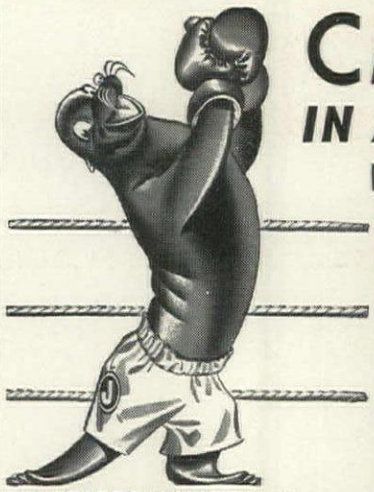
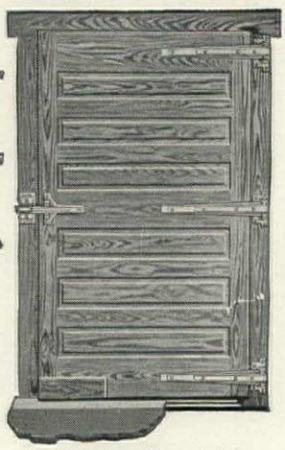
CHAMP
IN ANY PLANT





Jamison Standard Walk-in Door

● PERFORMANCE makes a champ. And just that makes Jamison-Built cold storage doors unbeatable.

Easy operation, maximum insulating qualities, seals that seal, and time-tested durability are the built-in features of Jamison-Built doors that insure their outstanding performance.

When buying doors insist that they are Jamison-Built. Their performance is your protection. Jamison Cold-Storage Door Co., Hagerstown, Md.

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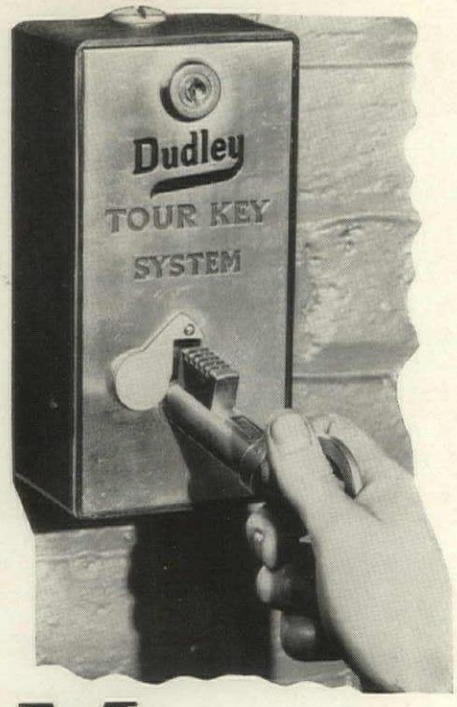
JAMISON BUILT DOORS

(See our catalog in Sweet's Catalog File)

A new Guardian for *serious* Industry

DUDLEY COMPULSORY TOUR SYSTEM — FOR WATCHMEN



Here is a new and better protection against sabotage and fifth-column activities as well as natural risks of normal and defense production and storage.

The Dudley Compulsory Tour System—for Watchmen, is meeting the new and imperative demands of executives awakened to war-time risks. It is adaptable to every kind and size of industry and is absolutely dependable, simple and inexpensive. It gives complete mechanical control over watchmen's activities. It can flash or permanently record time of inspection, and warn by alarm in emergencies.

Underwriters' Approved

The Dudley System has been examined, tested and is listed as approved equipment by Underwriters' Laboratories, Inc., and also by the Laboratories of the Associated Factory Mutual Fire Insurance Companies of Boston, Mass.

Mechanical and Electrical Recordings check, safeguard and supervise watchmen

The Dudley Recording Tour Key, carried by the watchman, operates only on a predetermined route, and only in precise station rotation. Its built-on cyclometer gives visible proof of number of stations visited. No watchman can fail to make his rounds on time without immediate detection through the operation of a delayed alarm which signals a warning at any desired location. These are exclusive, patented features.

The system is highly flexible. It can dependably fulfill the simplest watch service requirements, or by the addition of other equipment can meet the most exacting needs of defense production, arsenals, shipyards or normal extended plant protection.

It forces tours to be made on time. It is the only watchman's system that provides mechanical as well as electrical recordings, making collusion impossible. Write for complete information.

DUDLEY LOCK CORPORATION
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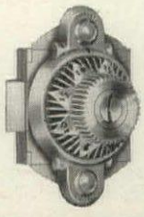
DUDLEY LOCKS FOR FACTORY LOCKERS

Dudley Lock Corporation is the largest supplier of combination locker locks for schools and industry. The combinations of built-in locks can be changed almost instantly without removing any part from the locker door. Dudley also manufactures a line of key locks considered to be the most nearly pick-proof of any on the market.



Above is shown the Dudley Combination Masterkeyed Padlock which utilizes the famous Dudley 4-in-1 key that can not be duplicated on commercial key-making machines. No key blanks are sold and absolute key control is assured. At the left is a built-in combination locker lock with the same protective features. Write for full details.

Where U. S. newsmen block

Armored car and newly completed blockhouse stand ready for action on Shanghai's "newspaper row" day and night.

DEATH BREATHES CLOSE BEHIND many a newsman today... but nowhere closer and hotter than along "newspaper row" in Shanghai.

Randall Gould, editor of the Shanghai Evening Post & Mercury, dogged resister of a puppet dictator.

Before every entrance of the old and respected Shanghai Evening Post & Mercury—American-owned and just across the street from the International Settlement—stand armored cars, pillboxes, barbed wire barricades, and guards with drawn guns.

►For the terrorists who serve either the Japanese or their Chinese puppet, Wang Ching-wei, have bombed the Post plant five times, slaughtered guards, wounded pressmen, and last July murdered Samuel H. Chang, director of the Post and its Chinese edition, the Ta Mei Wan Pao.

Cornelius V. Starr, owner, and Randall Gould, editor, have been ordered out of the country by the puppet regime. Neither paid any attention. Gould is still at his post; Starr stayed four months, came home when he got ready, plans to return soon.

And they are not alone: four other Americans and one Briton similarly threatened have dug in their toes, strapped on guns, and called the Japanese bluff.

►Why are the invaders of China trying to drive U. S. newsmen out of the country?

Because their Chinese editions reveal various heartening truths to the far-from-subjugated Chinese.

Because their English-language papers are the cement which holds together the International Settlement, which in turn props up Chinese resistance.

Because their cables let America know that the first great modern war of aggression is not yet won, that the Japanese military machine is desperately behind schedule, that there still stands a vast, stubborn, and strategic power in the mountains beyond the Yangtze.

►Thus a few resolute Americans, controlling vital news outlets from the unique and unmanageable city-state of Shanghai, stand square in the road of Japanese conquest. For Japan must control the mind and morale of its subject peoples, must direct world-thinking the Japanese way, if it is ever to realize the dream of a "Greater East Asia"—domination of China, India, the Indo-Chinese peninsula, and all the East Indies including the Philippines.

Now that Japan and her allies in Europe have formally threatened war on the U. S., if any resistance is made to such aggressive plans, it is time for the American news-reader to study as never before the dispatches of his courageous correspondents in the Far East.

Our typical attitude toward China since the Japanese invasion has been the usual friendly American sympathy for the underdog. But now our interest in China goes much further than this. Now the top dog is snarling at us, and every intelligent news-reader knows what a tight spot we shall be in if the underdog relaxes his grip.

►Most Americans are glad to find that our interests coincide with those of the Chinese people. We have grown to like them, their peaceful and philosophic way of looking at life, their tenacity and courage in misfortune, the beautiful things they make, and the humorous things they say.

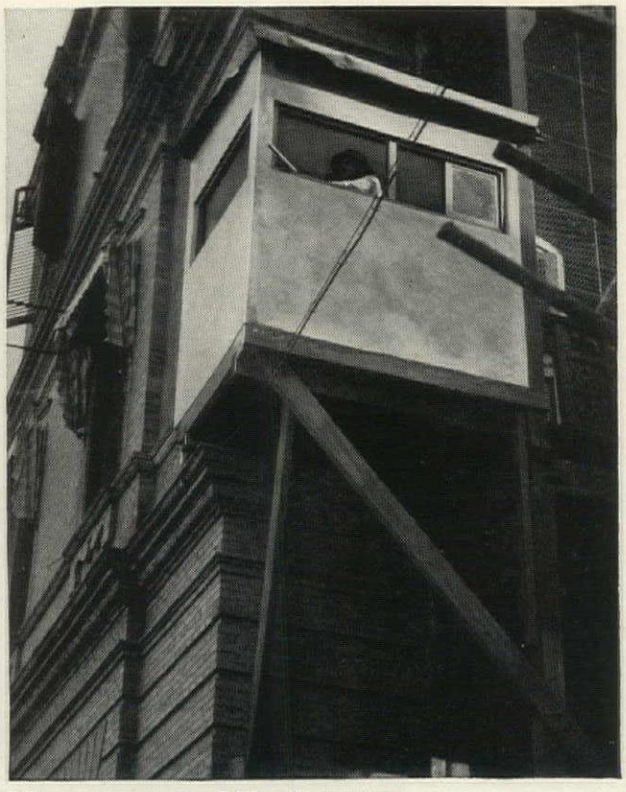
Perhaps we don't realize that the Chinese, in their turn, have grown to like us. They are grateful for the medical knowledge that has routed some of their worst diseases, for the industrial technics that have helped them put up such a good fight. Many of them are grateful for the Christian religion. They remember how we backed up their dream of building a new, strong China. And they are glad to get the things we have to sell. Contrary to popular opinion, they like the Standard Oil Co. which brings them the blessings of kerosene... and they find a thousand uses for the cans it comes in.

►Brilliant Chinese leaders by the score owe their education to American universities. Our schools of journalism have had more effect, proportionately, on Chinese newspapers than on our own.

The old notion that "You can't understand the Oriental mind" is being dispelled by able writers and journalists of both races. Lin Yutang and Mme. Chiang Kai-shek show us China from the inside—John Gunther and Carl Crow from the outside. J. B.

he road of Japanese ambition

Tough little French Annamite soldiers patrol the barricades before the Post building on King Edward VII Street.



Like a corner tower of Sing Sing prison is this hastily constructed crow's-nest which protects an American news room.

Powell continues to give us his important journal of opinion, the China Weekly Review, though he is on Wang's blacklist and has to have a bodyguard.

And just as important as the books and magazines are the day-by-day cables . . . from men like A. T. Steele of the Chicago Daily News, the N. Y. Times's Hallett Abend, and F. Tillman Durdin, and TIME's own T. H. White, who came via Harvard and the Chinese information ministry and is now on the hot spot in Indo-China.

►Sometimes readers ask why TIME devotes so much space to the Orient. It is because TIME has always believed that the day would come when an understanding of that area with its billion people, half the population of the earth, might be of the utmost importance to America.

How the good will of these people can be channelled and become a force in world strategy is a profound challenge. But on such intangibles world history has turned and tyrannies have fallen.

►This is why TIME, and its sister publications, FORTUNE and LIFE, have gathered and used such a storehouse of information on China, Japan, and the Philippines . . . and why TIME's week-by-week analyses of the Far Eastern situation seem to more thoughtful news-readers essential equipment for the decisions we face across the Pacific.

In these days of crisis, the free press is more than ever a vital force in making our democracy a living, working success. Therefore, TIME is seeking, in this series of advertisements, to give all the readers of ARCHITECTURAL FORUM a clearer picture of what the press in general, and TIME in particular, is doing to keep the people of this nation safe, strong, free, and united.

TIME

--THE WEEKLY NEWSMAGAZINE

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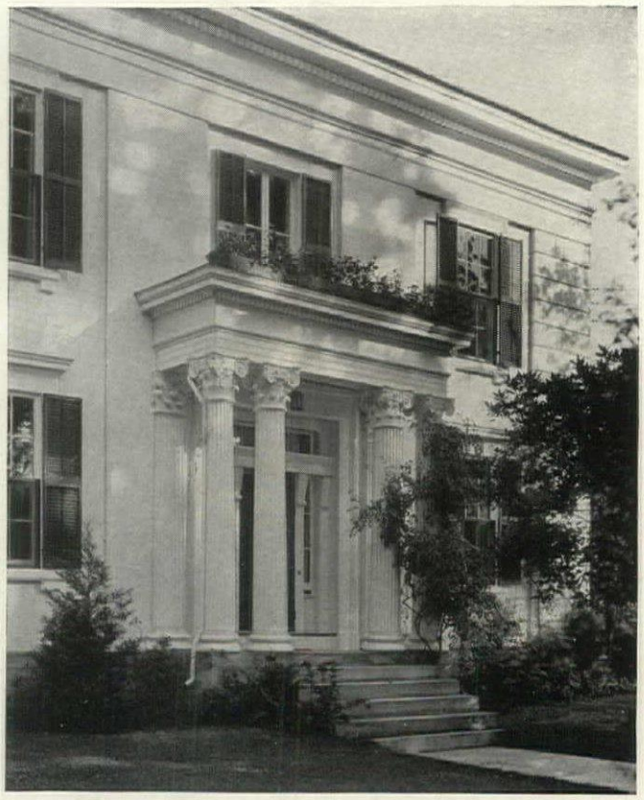

Williston Homestead (President's house) at Williston Academy at Easthampton, Mass. Built by Mr. Williston, 1843, Now painted with Cabot's DOUBLE-WHITE and Green Gloss Collopakes. Other buildings at Williston Academy are also painted with Cabot products. Write for "The White Book." Samuel Cabot, Inc., 1279 Oliver Building, Boston, Mass.

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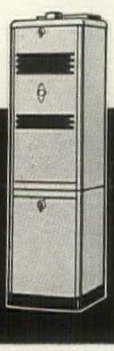

PAYNE Forced Air Unit

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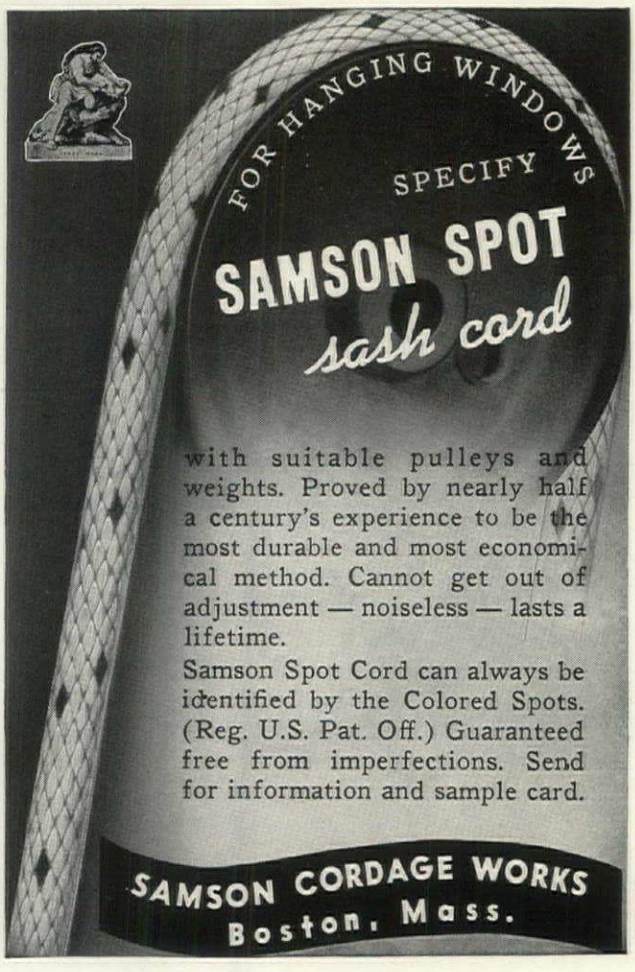

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Timber

IS MAKING ENGINEERING HISTORY

TIMBERS joined by TECO Connectors will do more work than timbers joined the old way—with many bolts, plates and angles . . . *Frequently a single 2½" TECO split ring connector will carry more load than six one-half inch bolts.*

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TECO Connectors spread the load on a timber joint over practically the entire cross section of the wood. In bolted joints this stress is localized around the bolt.

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nearly 30,000 new structures—hangars, bridges, trestles, dry docks, barracks, trusses, towers and oil derricks—have saved money by employing low-cost TECO-equipped lumber construction?

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WASHINGTON, D. C.

TIMBER ENGINEERING COMPANY, Inc., Dept. O-11
1337 Connecticut Avenue, Washington, D. C.

Please send us full technical information on the new design opportunities in timber made possible through the development of the Teco Connector system.

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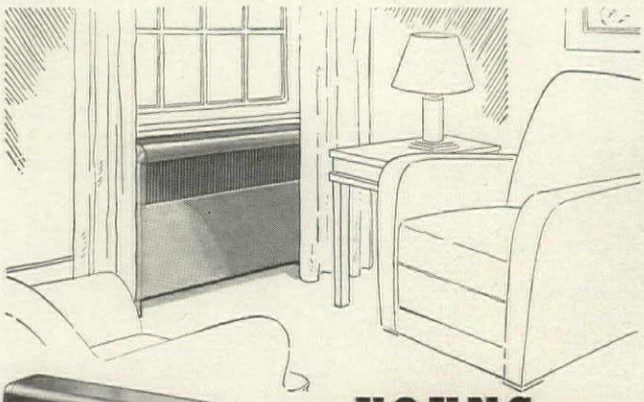

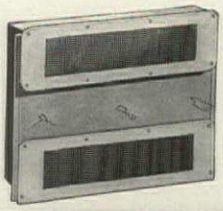

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STREAMAIRE CONVECTORS

It's good sound reasoning that's leading more and more architects to specify Young STREAMAIRE Convectors for all types of buildings. Their clean-cut, modern design combined with the most advanced engineering features make them a standout in appearance and heating performance. Including six distinct types of enclosures and many styles and grille patterns they're made to harmonize with any architectural or decorative scheme. Whether planning new buildings or modernizing old ones, specify Young STREAMAIRE Convectors and assure complete satisfaction to the building owner.

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You *save* on every type of window with CALDWELL, because this new adjustable sash balance means *faster installation—lower cost* of frame construction.

CALDWELL SASH BALANCES

The Caldwell Manufacturing Company
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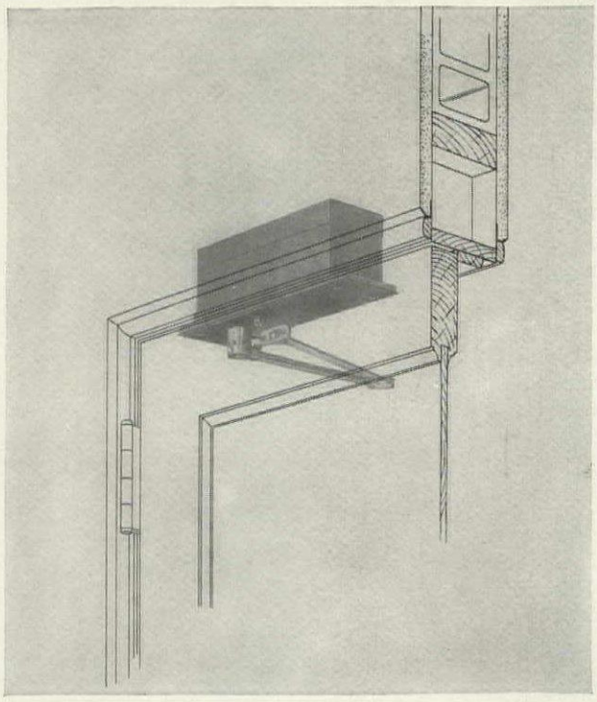

Where the Entrance Doors Have No Shelter

. . . and still you want to use modern overhead concealed door control, the LCN 500 series closer fills the bill perfectly. The mechanism is entirely hidden in the head frame with only the lever arm exposed on inner side of door. Hold-open feature optional. For other details see LCN catalog in Sweet's or send for separate catalog. Norton Lasier Company, 466 West Superior Street, Chicago, Illinois. (Makers of LCN concealed and surface door closers in 86 types and sizes.)

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Y.P.S. kitchens have that custom built look that will please the most particular client—and yet, through large quantity production, the price is so low that the architect can specify a complete Y.P.S. ensemble for about the cost of a good family size refrigerator.

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Rendering by Herbert Tyson, Mayo & Mayo

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MAYO & MAYO, Architects, Chicago :: JOSEPH MAGESKEY, General Contractor, Evanston, Ill. :: WALTER H. HEINICHEN, Painting Contractor, Chicago.

LOCATED in Willow Road, Northfield, Illinois, this recently-built home is protected inside and out with Pratt & Lambert Paint and Varnish. Included in the list are Vitralite, the Long-Life Enamel, P&L House Paint, Verdura Trim & Shutter Finish, Cement & Stucco Paint, Lyt-all, the Universal Wall Coating, "61" Quick Drying Spar Varnish and "61" Quick Drying Floor Varnish — Satin Finish.

This list is typical of many in specifications being written by architects from coast to coast. These architects have the full co-operation of the Pratt & Lambert Architectural Service Department nearest them. This timely, practical aid is extended to any architect seeking maximum decorative results.

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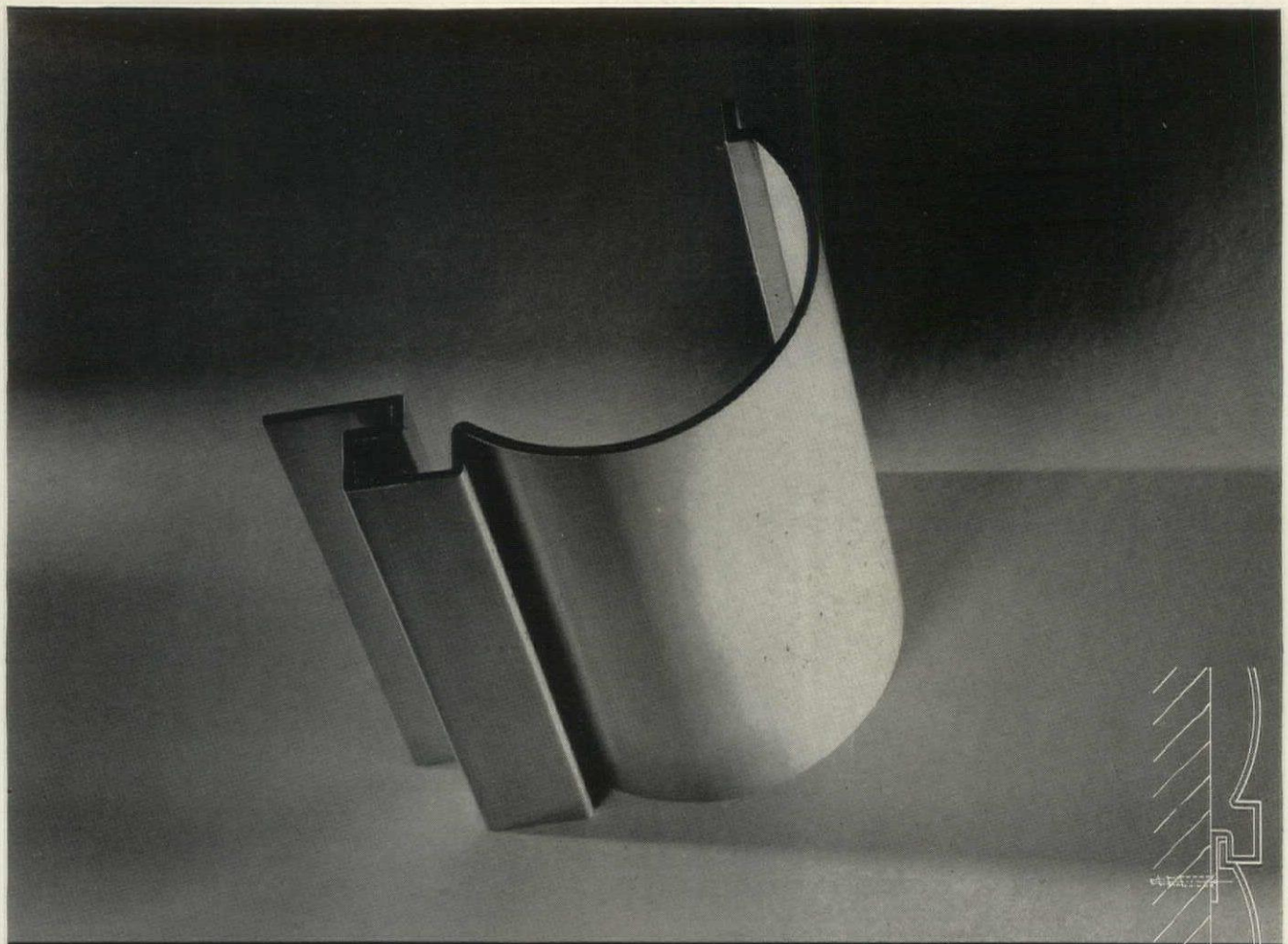
Pratt & Lambert Paint and Varnish

SPECIFICATION AND BUYING INDEX

The advertising pages of THE ARCHITECTURAL FORUM have become the recognized market place for architects and all others engaged in building. Each month these pages offer the most complete guide to materials, equipment and services to be found in any magazine. A house or any other building could be built completely of products advertised in THE FORUM. While it is not possible for a magazine to certify building products, it is possible to open its pages only to those manufacturers whose reputation merits confidence. This THE FORUM does.



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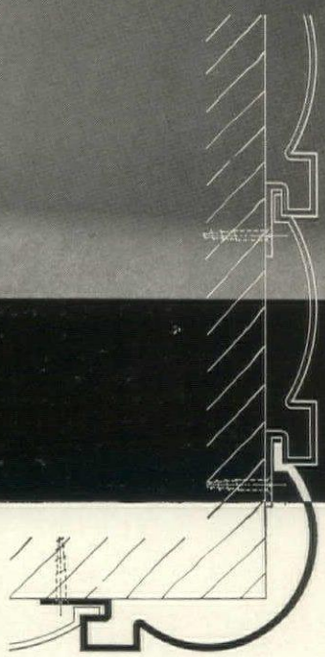
PITTCO Store Front Metal has won the hearty endorsement of architects because of its sturdy, rugged strength. This strength means that a Pittco installation retains its original appearance and usefulness year after year. It means that Pittco Metal can withstand hard usage and the effects of time to a degree impossible with metal construction which is not extruded. And the same extrusion process which gives Pittco Metal its strength is responsible also for its purity of line and its sharp, clean contours. This combination of strength with beauty permits the architect to specify Pittco Store Front Metal with perfect confidence. There is a wide variety of stock Pittco units available to meet almost every need that may be encountered. Pittsburgh Plate Glass Company, Grant Building, Pittsburgh, Pa.



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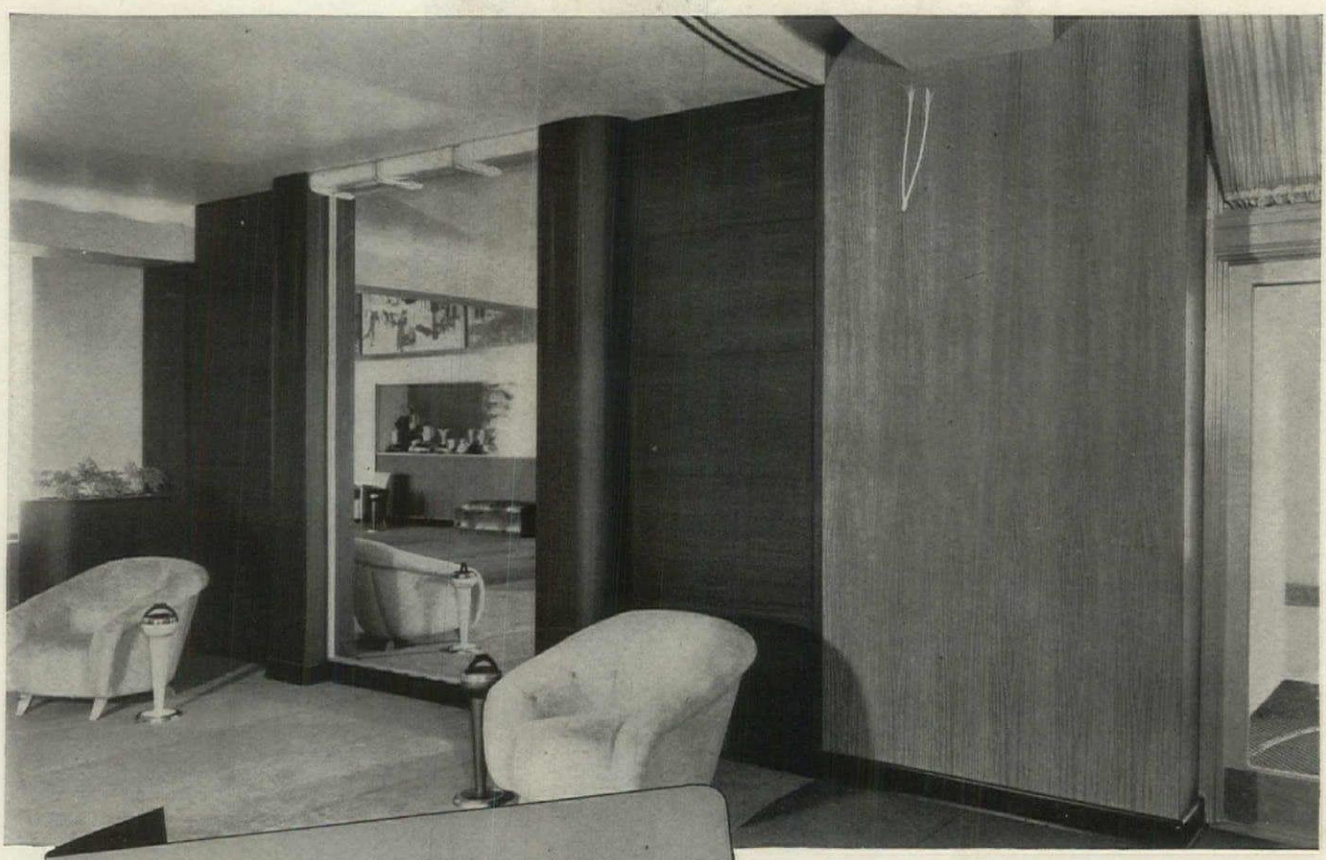
"PITTSBURGH" stands for Quality Glass

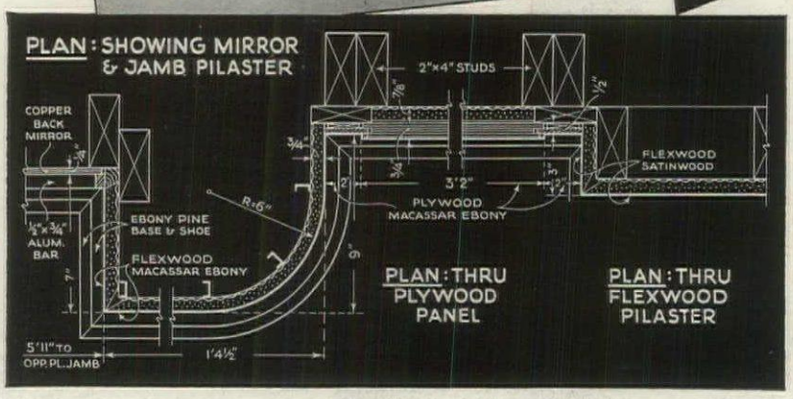
The art of modern wood treatment



Lobby, 2601 Parkway Apartments, Philadelphia, Pa., Aaron Colish, Architect.

DULL-BLACK MACASSAR EBONY AND MOLTEN-GOLD SATINWOOD

In a distinctive lobby design in Philadelphia



Here is an interesting combination of Flexwood, plywood and mirror areas. The large mirror is set between curved pilasters treated with exotic Macassar Ebony Flexwood. Plywood panels of the same rare wood abut a sheer wall section of golden-colored East Indian Satinwood Flexwood. As might be expected this strikingly-decorative lobby in one of Philadelphia's finest new apartment buildings has created much favorable comment. The design by Mr. Colish called for 1,600 sq. ft. of Flexwood, including in addition to the woods named, Sapeli, Capomo and Walnut. The ease and speed with which Flexwood is applied make it a logical choice when the luxury of real wood is desired.

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ECT: PRODUCTION OF BUILDING PRODUCTS IRED FOR NATIONAL DEFENSE PROJECTS

★ Professionals are never greatly interested in the sales success of the manufacturers whose products they specify. That certainly is not one of their responsibilities. But there do come times —like the present—when a shred or two of interest can be understood. For no architect can look with tolerance upon prolonged delay of his jobs because manufacturers of the products he has specified cannot make reasonably prompt delivery. Truscon is busy...busier than we have been since 1925-29. But Truscon has a long way to go before our enormous plant capacity has been fully reached.

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Therefore to the architects of America, Truscon offers these assurances. We have served you for over 35 years and hope never to be deprived of the privilege. We have placed at your disposal the most complete line of steel building products available from any single source. We are constantly concerned with our responsibility to continue production of products that meet your most exacting specifications. Our 57 sales-engineering offices, 5 factories, 29 warehouses offer the benefit of their facilities by day, and when necessary, by night.

Truscon is busy, but not too busy to continue these services that have made our name and trademark known throughout the world. We view our part in the National Defense Program not through rose-colored glasses, but in the sober, critical focus of pledging to do our job completely, accurately and ON TIME!

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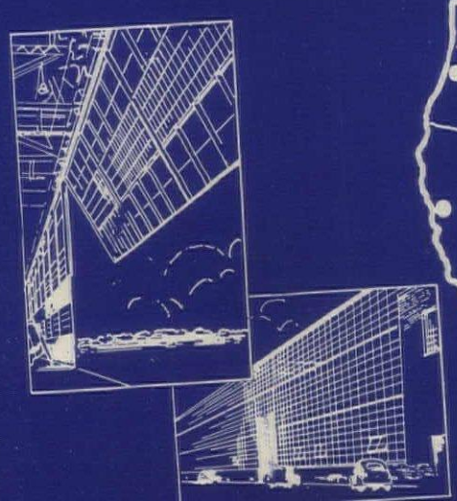

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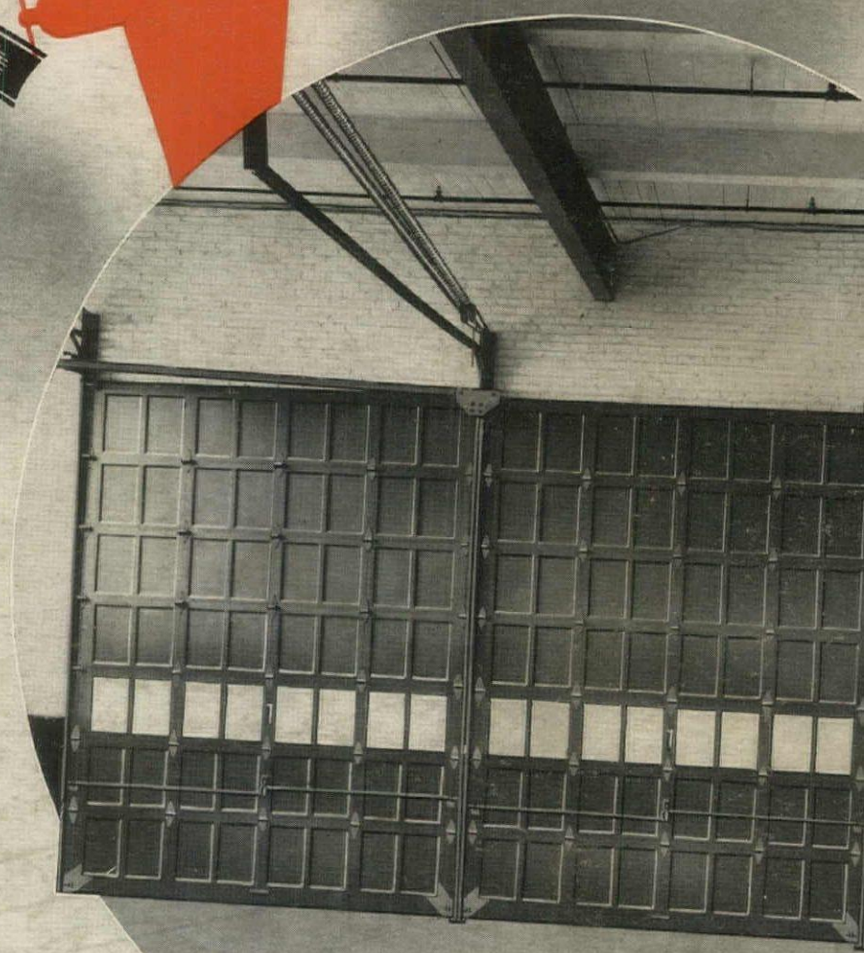
One without the other is not enough; the two work together for lasting efficiency. The "OVERHEAD DOOR" is built as a complete unit, by men who make garage doors their whole business. A single door or hundreds—we are prepared to serve you well.



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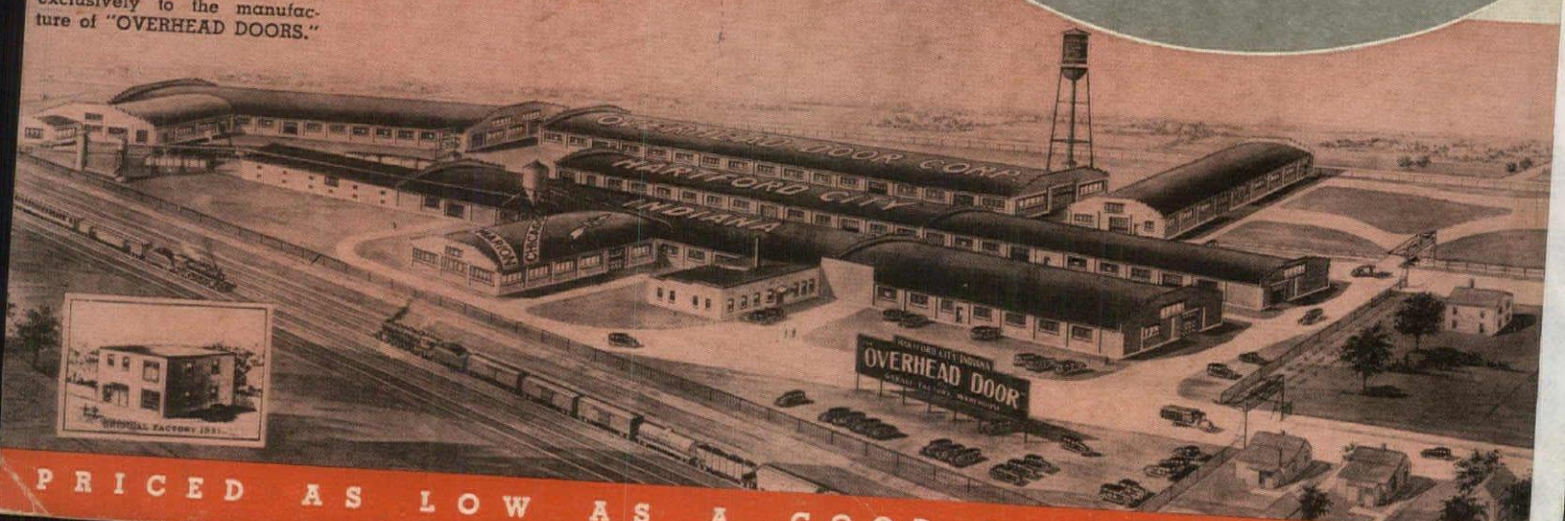

PRICED AS LOW AS A GOOD DOOR CAN BE MA