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The Necessity for Planning Buildings Now

THE progress and history of a manufacturing enterprise is visible and easily traced by means of the physical aspect of the property. Enterprises of this kind are seldom more than 30 to 70 years of age in this country and the vast majority of them have been in existence less than a score of years. It is easy to trace from the small beginning the expansion of a business which is expressed in added buildings and grounds. The added building may have been erected for a specific need, or an existing building not well adapted for its new purpose may have been acquired by purchase.

The building erected as an extension to the plant has too often been planned to serve the need of the day rather than to be a unit in a predetermined ultimation. The majority of these added units were erected before the value of proper lighting, heating, ventilation and sanitary equipment was realized. This uncertain method of extension has resulted in buildings of different types of construction, with floors of varying levels, poorly lighted and heated; a layout that prevents the proper routing of the product as it progresses through the plant.

Industrial enterprises initiated within the past score of years could scarcely fail to expand, if conducted with ordinary energy and intelligence. The increasing demands of consumption have seldom been oversupplied, and sales were not based on a small margin added to a low cost of production. In fact, there was a long period of time when price-fixing was freely indulged in; and under those conditions there was no competition. In a large city, located in one of the central states, the manufacturers of a certain building product organized to fix the selling price on any requirement totaling more than $1,000 in amount. Under these conditions profits were made regardless of the plant facilities of some of the manufacturers. Those who supplied the needs of state, county or municipal organizations for certain public improvements almost openly pooled the bidding, fixed the prices, and some corporations which had not the slightest indication of owning manufacturing plants participated in the bidding and received their rake-off.

With the increase in output capacity to a condition of surplus production, competition became real. The enactment and enforcement of the Sherman Act and an awakened public have forced the passing of the good old buccaneer days when undertakings were automatically profitable.

Within the past four years, however, the Government has regulated the business of manufacturing, transportation and merchandising corporations in many ways. The institution of the income tax also has a very important bearing on these matters. A maximum cost has been set for many products during the present disturbed times, and quite liberally, it appears. As both parties, the producer and the consumer, become accustomed to this state of affairs, there is a strong probability that this type of regulation will obtain, in some form, after the existing emergency has passed.

An indication of the probability of some form of regulation is strongly evidenced by the action of the Federal Trade Commission on April 19 in disposing of complaints issued against twenty-six producers of a building material. The firms were ordered "to cease the practice of giving gratuities to employees of customers, prospective customers and competitors' customers as an inducement to them to influence their employers in the purchase of their products." The gratuities included money, entertainment, liquor, cigars, meals and personal property. In their answers to the complaints the companies admitted the truth of the charges and asked the commission to rule without taking testimony.

The commission's announcement says that the blank company of blank admitted that "it had secretly given or offered to employees of its customers and its competitors' customers large sums of money to adulterate and spoil for their proper use the products sold or offered for sale by competitors."

The commission's action in the cases of the twenty-six companies clears up all but ten of the orig-

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inal thirty-nine cases. Three of the cases were disposed of some time ago. How much further and to what lengths regulation will go is an open question, but that it will exist in some form is a foregone conclusion and it will be a ruling that must be complied with.

In the event of future regulation it will be the better equipped, organized and otherwise well-qualified producer that will fix the cost of the product. The leniency displayed in fixing a cost during these times of stress will disappear and the costs will be based on normal conditions.

The manufacturers of this country are able today to supply the needs of the Government, of the inhabitants of this country, and have a large surplus for export. Production is now curtailed by lack of transportation, both by rail and water, and by lack of co-ordination among some controlling agencies of purchase and distribution. These conditions are rapidly being remedied and when the large tonnage of vessels now being constructed is free for peaceful commerce, it must be employed in the successful competing for foreign markets, which will be necessary for the prosperity and continued growth of American industry.

Cost is the sum of certain expenses. These expenses are either direct or indirect. The cost of material and the cost of the labor applied to the product are the two major direct expenses, and to these can be added minor expenses chargeable to that individual operation. Indirect charges are those which, having one or more beneficiaries, require distribution. The plant or physical property is one element in both of these expenses.

The influence of the building on these charges is varied. Labor charge is affected by a badly planned layout in which the natural routing of the product, according to the requirements of the process, is interfered with. This condition requires an extra expenditure of labor and a slowing up of the process, which is a useless and preventable charge. Inadequate light, both artificial and natural, coupled with insufficient heating, ventilating and sanitary apparatus, reduces the effectiveness of the workmen, and from this follows an unnecessary charge. The operation of an improperly designed and installed power plant and mechanical equipment requires excessive fuel consumption and other wastes, which are preventable charges.

Fire insurance is a necessary indirect charge and is largely governed by the character of the building construction and its equipment. This charge is based on the fire-resisting qualities of the building and its fire-preventing apparatus and is applied both to the building, its equipment and its contents in process of manufacture or in storage awaiting shipment. It is the building that controls the rate always, subject, of course, to its equipment and to the exterior hazard of adjoining buildings. In THE AMERICAN ARCHITECT of April 10, page 448, there is described an iron-working plant which carries a rate on the buildings of 4½ cents per hundred dollars. Plants of this kind often carry rates from 32 to 160 cents.

Depreciation is generally considered to comprehend the wear and tear due to the occupancy and the deterioration due to the action of the elements. This is generally taken care of by "charging off" a certain sum from the assets of the business. This procedure is improper because depreciation is not an expense but rather a contingency. There are three main causes of depreciation. They are obsolescence, inutility, and wear-and-tear. The least of these is wear-and-tear.

The building may be in first-class physical condition and be an actual liability, because it is out of date, ill adapted for its occupancy, and the conduct of the process within it so unprofitable in competition with those housed in properly designed buildings that its use creates a loss—(a preventable charge is a loss always). A building may be in perfect condition and well adapted to its purposes, but the demand for its product may cease so that it cannot be profitably utilized; and it then becomes a liability rather than an asset. If a building has become worn out by use and the action of the elements, or if the business has outgrown its capacity and its product has been intelligently priced and sold, a reserve has been provided for its replacement or for a new plant, in which case neither loss nor liability is created. Depreciation is a contingency which intelligent management foresees and provides for by creating a reserve for replacement and not by the makeshift of a depreciation account.

The new order approaches and, while many manufacturers are prepared to cope successfully with the contingency, many more are not so situated. To compete successfully with the cost price to be established by governmental act, they must prepare themselves so as to make it possible. In the matter of income taxation, it may come to pass that the Government will inquire into the cost of production and decide what the net income should be, based on the performance of others better equipped for production. In this event the poorly prepared producer not only has to compete with a fixed cost that he cannot meet, but pays an income tax on a profit that does not exist, thus paying a double penalty for his state of unpreparedness.

All of these things are possible in view of the present trend of affairs.

The influence of the building on the cost of production has been shown, and this applies in some

measure to the industries of merchandising and warehousing also.

The architect has his wares to sell also—wares that consist of his knowledge, organization and administrative ability. Of these elements there is an ample stock in this country, and it is a stock that must be merchandised.

It can be done in this way: The owner of an existing plant can be shown the inadequacy of his plant to cope with the new order of things, if that condition really exists, and how this handicap can be overcome, either by the construction of a new plant or by the alteration of the existing plant; that the price of building materials and labor will remain at their present levels until the supply of money in this country is reduced; and that it will be several years after the declaration of peace before there will be any material reduction in the money cost of building construction. This is always true when an inflation of the currency has resulted from war-time conditions.

A survey of the conditions affecting the building industry by a very large statistical organization discloses the fact that governmental restriction of building construction which could be postponed until after the war has slowed up work to the point where there is now a surplus of building laborers and craftsmen, and also of materials that cannot be applied to winning the war. It then follows that, insofar as we have the men and the material now idle, any work that we can do in the present is an economic necessity and a patriotic duty.

The first step, of course, is to prepare the plan and specification, which, in view of the present costs, must be done with the utmost consideration and study. The proper study of the problem will undoubtedly lead to new and unusual methods which, taken as a whole, will mark a distinct and well-defined advance in the building art. Indications of these advances are noted in THE AMERICAN ARCHITECT of February 27 and March 6, wherein it is shown that necessity established the fact that a 39 foot wide shoe factory is more desirable than one 60 feet wide, and that a floor construction can be used for storage purposes on both its upper and lower surfaces. These are cited merely to show that economic necessity is developing that imagination and ingenuity that all real architects must possess in connection with the ability to work.

The present preparation of the plan is all important, inasmuch as it employs the architect and his organization under conditions when deserved study can be given to the problem, which cannot be done so readily under the conditions of expeditious work that must come later. This same statement will apply to the owner also, who is now busy but will be more so in days to come.

An illustration of the desirability of this procedure is apparent in the recent experience of a New York architect. During the past winter this architect was commissioned to plan a quasi-public institution by its board of directors. These directors had no intention of proceeding with the work until the war was over and prices reduced. However, the plans were carefully prepared, and to the satisfaction of the directors. As estimates of cost could be procured without expense, proposals were solicited and received. The cost exceeded the funds available, but the architect, with the co-operation of the contractors and material men, made such changes that a suitable building was possible at a satisfactory price, and, acting on a "why wait" policy, the work was contracted for and is under way.

The necessities of the manufacturer confront him at the present time whether he is aware of the fact or not; labor and materials are at hand in abundant quantity; economic conditions demand the utilization of all effort not required for war needs, and the architect needs the work of plan preparation at this time as never before.

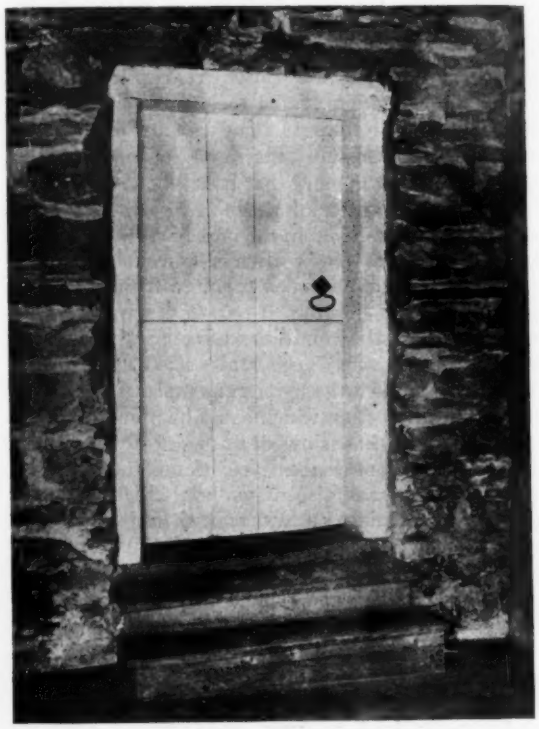
Now is the time for the architect to sell his service, and to do so he can well enlist the contractor, material producer and labor organizations in a drive for the planning of new buildings, the remodeling of old buildings, and the construction work that will surely follow the planning.

The Development of the American Doorway

By Charles S. Keefe

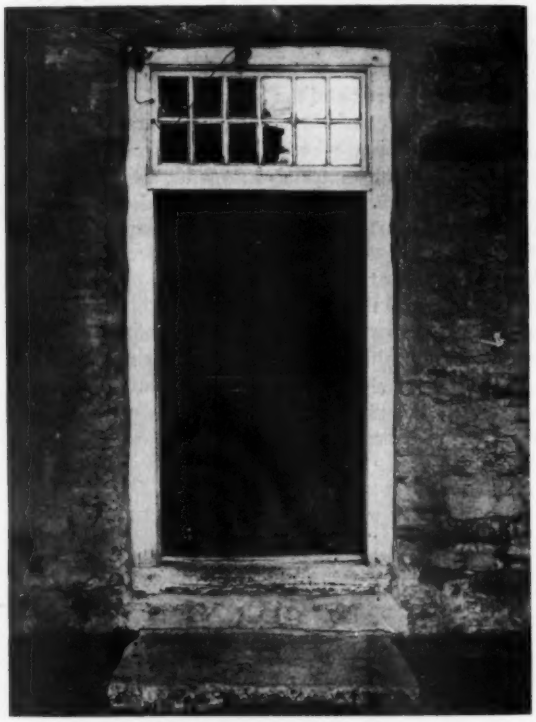
WHILE the doorways of most of our old houses reflect the good or bad taste of their builders, the greatest factors in determining their forms were the conditions under which they were built. As the conditions in the homes changed, so changed the doorways, and a study of the different phases of the American home from Colonial days to the present time gives one a clear idea of the reasons for the different types that have survived.

The development of these doorways can best be traced by securing from one locality examples of all the different periods into which they naturally fall and by studying the history of that locality we can find the causes that effected the changes that are so apparent. Although local conditions will affect some of these doorways, the different stages of development follow each other more naturally than if the examples were selected from widely scattered places. If the dates for the different periods do not agree by many years with similar ones in other localities it must be remembered the ways of communication were very slow in those days and that changes did not take place very rapidly.



DOORWAY OF THE NASH HOUSE

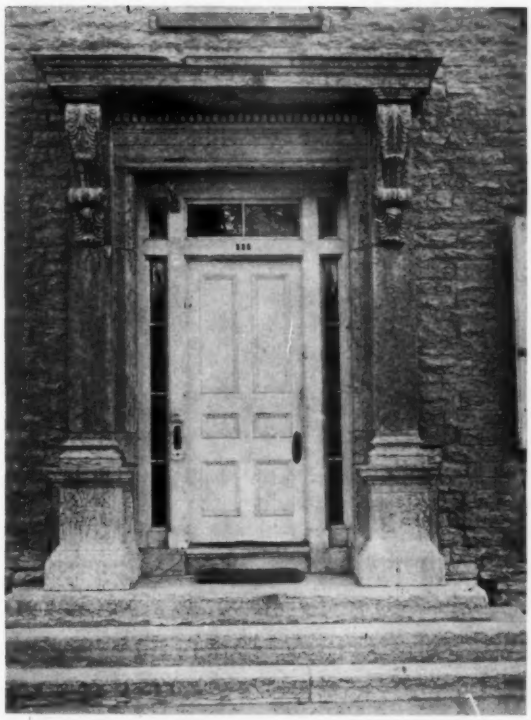
Note Heavy Wood Frame with Wooden Pins. Date at Side Placed by Present Owner. A Batten Door Without Transom

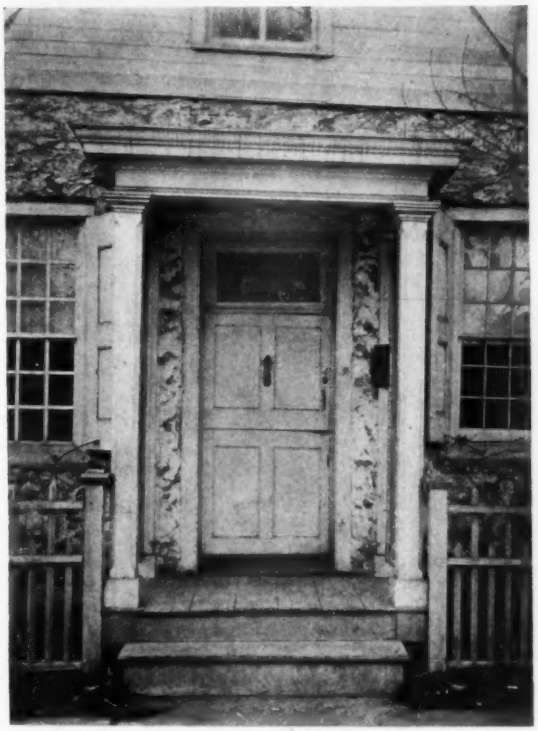


DOORWAY OF ELMENDORF HOUSE

Frame and Doorway Similar to Nash House, but a Transom Has Been Added

For purposes of illustration the doorways of Kingston, New York, were selected. This town was prominent in Colonial days, being situated on the Hudson River, one of the great early thoroughfares, subject to all the influences that have left their marks on our architecture and may be considered typical of many of the early towns in





Above, at Left:

DOORWAY, HOUSE OF JUDGE ELMENDORF. BUILT OF LOCAL LIMESTONE ABOUT 1790

▽ ▽

Above, at Right:

AN ANNAPOLIS DOORWAY

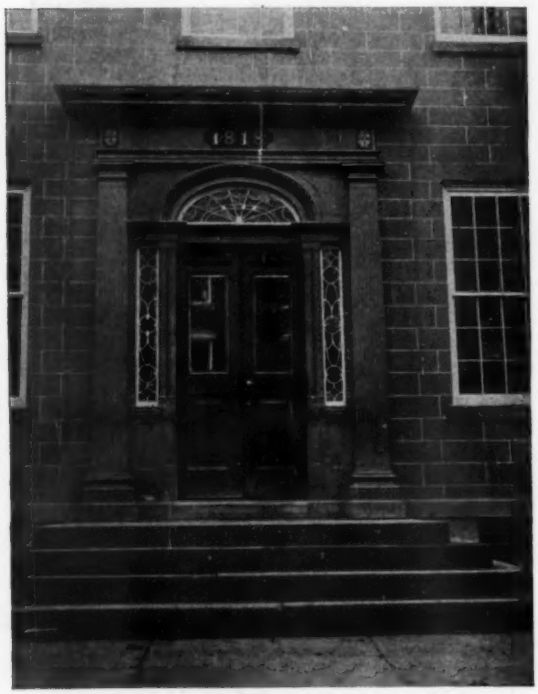
▽ ▽

Below, at Left:

DOORWAY, VAN STEENSBURGH HOUSE. A TYPICAL DOORWAY OF SECOND PERIOD. NOTE DUTCH DOOR AND SIMPLE TRANSOMS. ORIGINALLY WITHOUT THE STOOP.

America. Kingston is one of the oldest towns in New York State, having been settled in 1620.

During the summer of 1650 after various troubles with the Esopus Indians a stockade was built completely enclosing the town. As nearly as can be ascertained the houses of the first settlers extended on a single street. This was the usual arrangement to be found in the early Dutch colonies. In fact,



ENTRANCE TO COURT HOUSE
The Original Doors Have Been Replaced

Holland furnished the model for this grouping, which was planned not only for mutual protection but also for the sake of society. The barns and outbuildings were grouped about the houses and the fields were scattered here and there outside the stockade. The farmer and his laborers went from the town to the fields each day and the cows were driven forth each morning and back at night. This custom continued in peaceful times long after the stockade was removed.

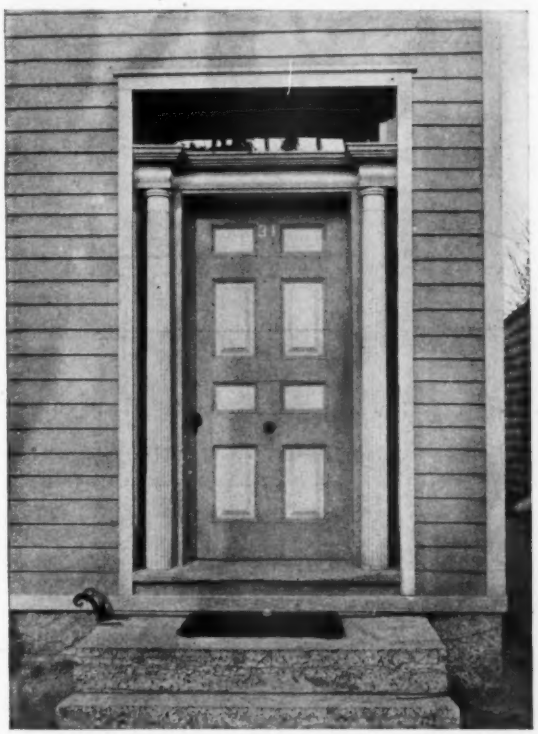
The first settlers were all people of moderate means and therefore used local materials in building their homes, importing only the brick and tile for the fireplaces. The houses of this period were very simple, being generally constructed of stone, one story in height with gables at either end. These gables were frequently made of wood to save the necessity of cutting and fitting the stonework under the slope of the roof. Nearly all of these early houses were erected by their owners, and the hardware was forged by the local blacksmith. It may be noted here that these conditions were very different from those which existed in the South where the people had greater wealth. Frequently both mechanics and many materials were imported and used in constructing the Southern homes.

The settlers of this old Colonial town clung more tenaciously to the customs and traditions of their mother country than did the Dutch who settled further South, for the type of building used by the settlers in Kingston can be seen today in Holland and Belgium, the gambril roof type of house developed by the Dutch in New Jersey and Long Island being wholly unknown in the vicinity of Kingston.

The old Dutch arrangement of placing the houses close on the street left no room for stoops or porches. In fact, they were not needed, for the doors were recessed in the thick stone walls, being thus protected from the weather. The only addition was a stone block which extended the width of the doorway and served as a step at the entrance. As

ENTRANCE TO FITCH HOUSE
A Fine Example of Its Period

the door of this period was chiefly a means of protection against the Indians, it was very simple, generally being a heavy door with battens on the inside and was held together with hand wrought nails. The frames were hewn and fastened together with wooden pins, while the door itself was made with an upper and lower section in the true Dutch style.



DOORWAY, JEREMIAH PLASS HOUSE
A Simple, Well-proportioned Doorway

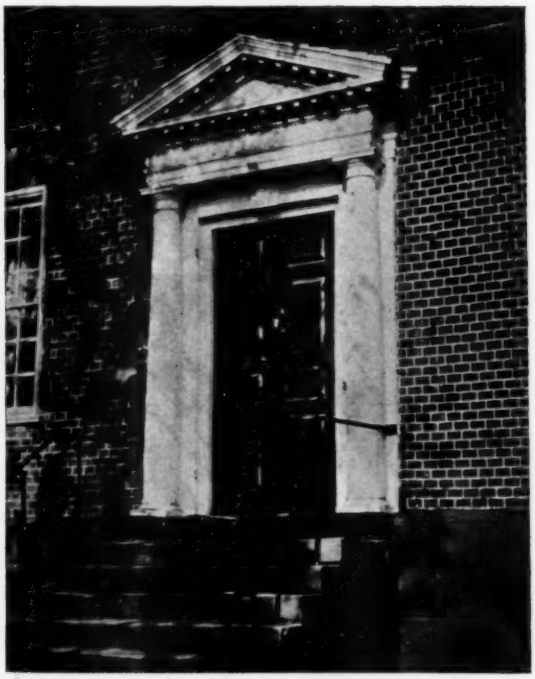
No transoms were used. The "Nash" doorway is a good example of this type.

After the town was burned by the British in 1776 the houses were rebuilt, the owners generally using the old stone walls, which were practically undamaged. As there was no further need of protection against the attacks of the Indians, the doors were made thinner, sometimes in two sections, sometimes in one. Better mechanics came with these times and the doorways of this period, while still very simple, were sometimes more ornate than the preceding ones in that they were paneled and moulded. Transoms were now added to light the halls. The "Elmendorf, Van Steenburgh and Van Buren" doorways are examples of this type.

As time went on the people became more prosperous, skilled mechanics were developed, a better knowledge of architecture was gained from travel

DOORWAY, HOUSE OF GENERAL SHARPE
Built About 1823. Porch of Later Construction and Inferior to Doorway

DOORWAY, VAN ANDEN HOUSE



Above, at Left:

A PHILADELPHIA DOORWAY

▽ ▽

Above, at Right:

DOORWAY AT ANNAPOLIS

▽ ▽

Below, at Left:

DOORWAY AT ANNAPOLIS

and books, saw mills also came into use and it became the fashion to build of brick and wood as well as of stone. All this is reflected in the doorways of Judge Lucas Elmendorf's house, the Suydam-Van Lueven house, the General Sharpe house and the Court House, all of which were built before 1823. In these we find good design, the side lights and transoms of leaded glass and note the careful workmanship, the good taste of the owners, and in fact all of the best developed up to this time.

During the next period we have the doorways of the "Plass, Fitch and Van Anden houses," which were influenced by the wave of Grecian architecture that swept over the country in the early part of the 19th Century. While these doorways are in good taste, it will be noted that some of the mouldings are clumsy and heavy and that they lack the grace and beauty of the preceding period. Although some of this may be attributed to the use of a style that was unfitted in many ways for the conditions where it was used, it was, in fact, but the forerunner of what was to follow.

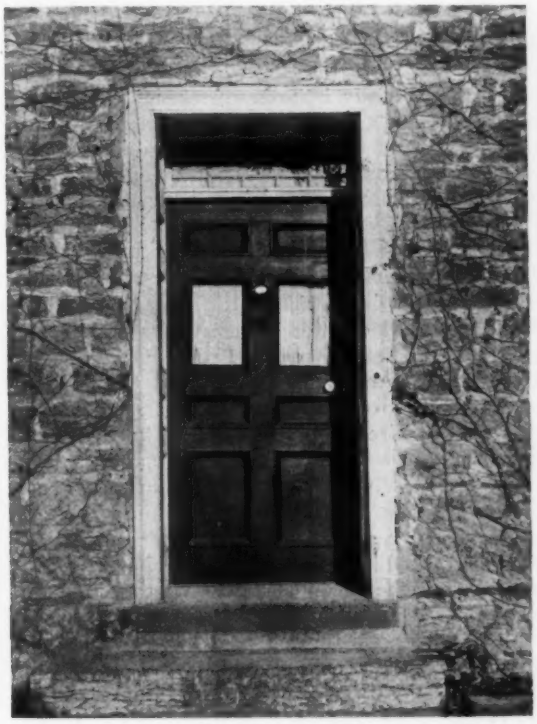
There is no need to go further and describe the periods of utter bad taste that followed, no necessity of going to Kingston to find examples of the so-called Gothic period, the ginger-bread and zig-saw age, for we can find them everywhere.

Strangely enough, the zig-saw monstrosities have their redeeming points. While the carpenters catered to the bad taste of their customers, they did not easily give up the moulding planes with which they worked out the mouldings by hand, and here and there we find good mouldings.

The next were the periods of the so-called Mansard and the Queen Anne down to today, when we have again awakened to the fact that the doorway reflects the taste of the house owner and tells each passerby the sort of man that dwells therein.

ENTRANCE TO SUYDAM-VAN LUEVEN HOUSE

Built About 1790. A Simple Example of the Third Period



DOORWAY, VAN BUREN HOUSE

This Is an Advance Over the Doorway of the Elmendorf House on Page 818. The Glass Panels Are Recent Additions

Developing the Individuality of Oak

By H. R. Churchill

MOST of us remember the horrors of the solid silver, solid oak, Haviland china period, when to have selected oak for one's trim in the new home was to have arrived at the acme of respectability. Oak was the thing regardless of its treatment or suitability, and its treatment was generally shabby from an artistic viewpoint—given a light, yellowish finish, or, later, the abomination of "golden" oak with a high gloss.

Oak is just as good to-day as it ever was, but we are learning to understand and allow for its finishing limitations and to humor its individuality. We've learned that some effects may be obtained with oak and others may not; so we employ oak where it fits into our scheme of things, and where the color is the chief consideration, and if that color may not be had on oak, we select another wood.

Botanically speaking, oaks are of some fifty-seven different varieties—black and white, all of them embracing most of the excellencies of oak and not differing materially in texture, tensile strength or beauty of grain and figure. But commercially, and from the wood finisher's viewpoint, it is sufficient to remember that oaks are red oak and white oak.

This characteristic of color variation has considerable influence on the results obtainable with finishing materials, and for that reason it is well to think out carefully the ultimate results desired before the trim is selected and in place. The specifications should call for either red or white oak, arbitrarily, an entirely practical procedure, since the distinction is commercially recognized.

The physical characteristics of oak are too well known to require lengthy description, but it is well to remember that oak is a porous wood with long pores running longitudinally through the log. These pores form what we call the grain of the wood and are not to be confused with the pattern or figure. The latter has little or no relation to the grain, but comes from the medullary rays which are more spectacularly present in oak than in any other wood. Both the figure and grain are diversified by the manner of sawing, which may be either straight or quartered.

Popular taste demands quarter-sawing, which refines, diversifies, and brings into smaller scale the naturally bold figure of the wood. It is in quarter-sawed oak that we see the small, scattered flakes of hard, non-porous fiber which do not readily absorb stain and appear lighter in the finished wood than the surrounding surface. These flakes, however, are not always present in every piece of quarter-sawed wood; hence they are not to be regarded as an evidence of the wood having been sawed one way or the other. For fine effects there is no doubt but that quarter-sawed oak has the first choice.

Yet straight-sawed oak has a certain beauty of its own—less refined, perhaps, but particularly well suited to some types of interiors and some finishing processes. Straight-sawed oak presents a broad, long-leaf surface, showing none of the small flakes from the medullary rays. The pores are opened in greater length, and these, together with the slight roughness, to be noted at the edges of the leaf, or layers of wood on the surface, provide a foothold for paste fillers which make this sawing especially effective where the color of the paste filler is the governing influence in the finishing effect.

Broadly speaking, there are four standard methods of finishing oak: Fuming; a rubbed varnish finish; a flat varnish finish, and a wax finish. Between the latter two there is but little difference in appearance, with some advantage of durability and "cleanability" on the side of the flat varnish; so that custom seems to sanction the fine rubbed varnish finish and the flat varnish finish. Fumed oak is beautiful, and comes nearest to the ideal of old English, smoke-darkened, worn oak, but to-day the genuine box-fumed oak trim is nearly as scarce and as hard to find as an ichthyosaur. We are building houses every day for to-morrow's occupancy, and cannot await the natural darkening of oak from use and time; nor will the modern speed mania brook the cost and time expended in the somewhat complicated process of box-fuming; so it devolves upon us to produce the effect of age and fuming with a short cut, which has been done with a good deal of success.

The rubbed varnish finish on oak presupposes a paste wood filler, oak being an open grained wood. Without this filler the coats of varnish, up to the number of four or five, would sink into the open grooves, and a uniformly rubbed surface would be an impossibility. The usual specification for such a finish consists of:

1 coat of stain (acid or oil stain),
1 coat paste filler,
1 coat white shellac,
2 or more coats of fine rubbing varnish.

The final coat rubbed dull with pumice stone and oil or water, applied with haircloth.

If the desired color is not too strong, and can be obtained with a colored paste filler alone, the stain may be omitted.

For the flat varnish finish, either one of the following specifications will give good results, according to the effect that is desired:

1 coat of stain (acid or oil),
1 coat of shellac,
1 coat of flat varnish (of specified manufacture),

or

1 coat of stain (acid or oil),
1 coat of paste filler,
1 coat shellac,
1 coat of flat varnish.

These are standard and dependable specifications. The one that should be chosen is not so much a matter of taste in finishes, as it is a matter of the fitness for the purpose in mind. The specifications, too, are general, and it is in their amplification and in the exceptions found to set rule that the difference lies between the ordinary and the distinctive in wood finishing, as will be shown later on.

Second in importance only to the outside surface finish is the color medium. Stains are of three general types: spirit, oil and acid stains. Occasionally one hears of using an ammonia stain, but not commonly, as results from ammonia stain are not found to be dependable and uniform. Of the remaining three, spirit stains are pretty well out of the running, too; for, notwithstanding their real beauty and delicate elusiveness, they apply unevenly and dry so quickly in the application that it is next to impossible to equalize them. Acid stains are as beautiful in effect as spirit stains and apply much more easily and evenly. They are also comparatively lasting in color. Transparent, and of infinite variety of color, acid stains are, perhaps, the most satisfactory all-around stains for hard wood. Their only drawback is their tendency to raise the grain of the wood, so that where a fine rubbed finish is desired, a preliminary sponging with cold water is necessary in order to forestall the raising of the grain by the stain, necessitating, of course, additional labor expense.

Oil stains, in their turn, are divided into two classes: Pigment oil stains and aniline oil stains. The latter are beautiful in effect and produce a greater variety of color effects than do pigmented oil stains. In many cases they work out with perfect satisfaction, but there is an element of uncertainty about them which it is well to consider, in that there seems to be a tendency to bleed through the succeeding coats of finishing material. This is probably due to the combination of the penetrating aniline color and the heavy oil. The same colors in spirit stains and others do not show this tendency. Pigmented oil stains are dependable, non-bleeding, and, in their own special bailiwick, have attractions which are not to be denied.

The general rule is to apply acid stains to hard woods, both open and close grain, and oil stains to soft, close grain wood. But, here again, it is folly to be too exact in the following of rule, when you have a clever finisher to rely upon.

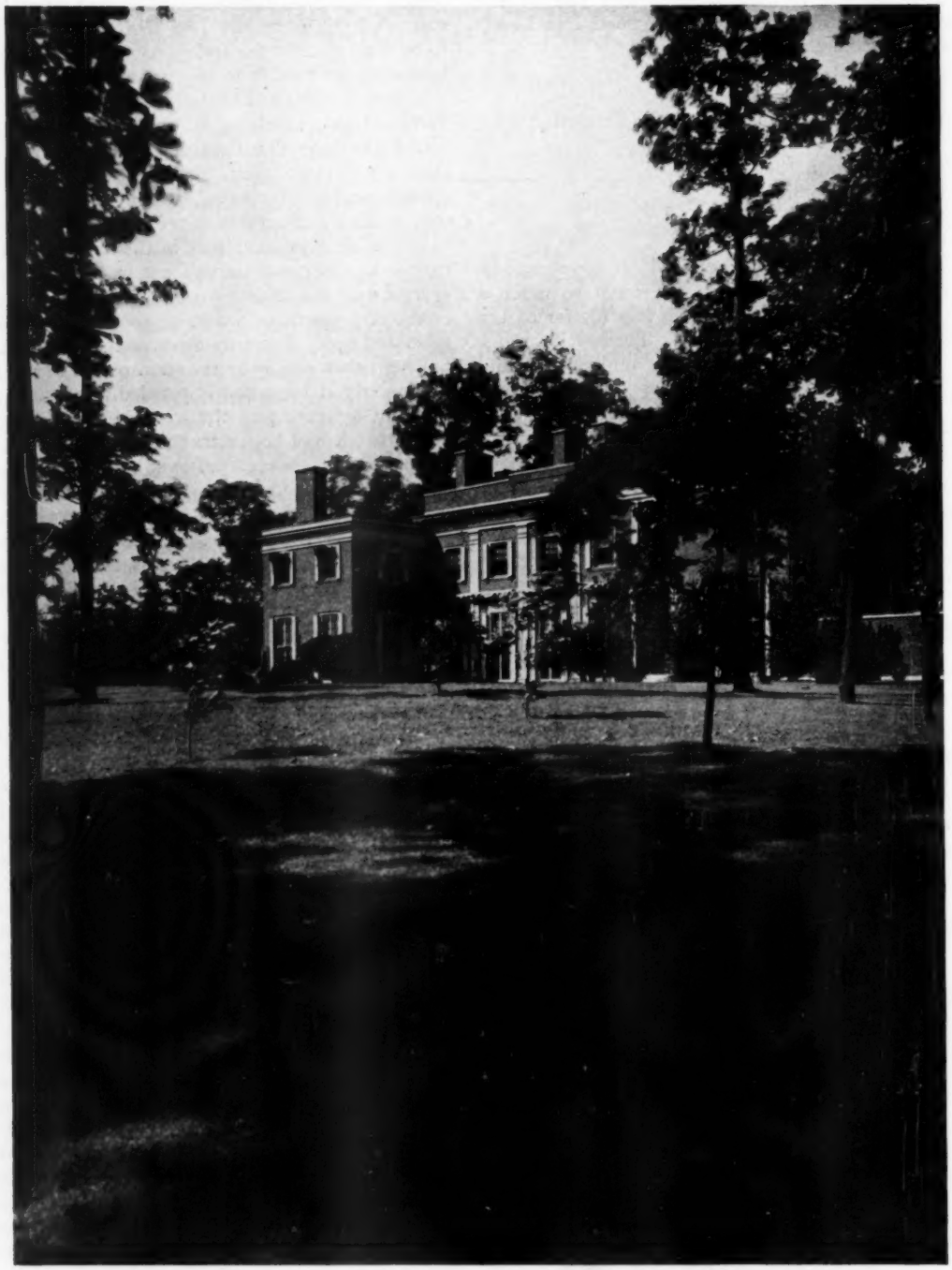
Where it is desired to simulate the worn and age-darkened oak moulding of other days, it will be found that the flat varnish and the pigment oil stain are in their special element. Pigment lends a certain degree of opacity, which produces in the oak, under a flat varnish, a pretty close resemblance to the smoked wood, which, in the nature of things, cannot be clear and transparent in effect. Taking specification No. 2 as a working basis, use a weathered-oak pigment oil stain, or some other pleasing tone, and apply it evenly all over the surface to be finished; then rub away the stain on the high lights, particularly if the work is paneled, thus giving the effect of a wearing of the wood by use during the years that it had been darkening. Over this apply a thin coat of shellac, and over that a thin coat of flat varnish. With the pigmented oil stain there may be omitted the coat of shellac in extreme cases of artistic yearning for the unfinished, and there would actually be attained such an effect of unfinished wood—all with a reasonable degree of durability.

In period effects, where the cruder results are desired, it is advantageous to omit the paste filler and use the specification as outlined above, yet certain results that are well worth while may be had by unauthorized uses of filler. For example, if there is used a weathered oak oil stain, reduced with turpentine to one of the lighter tones of antique oak, and over this a white or light gray paste filler is liberally applied, do not rub away the paste filler as strenuously as where an acid stain is employed. If this filler is rubbed away too thoroughly it will carry with it most of the oil stain and thus defeat the end in view. But if a bit of the paste filler is left on the surface and then shellac and flat varnish applied there will result a good reproduction of the "mouldy" effect of old wood that has been "dug up," or, in other words, a relic.

Another means of attaining this end is to use a material in the nature of thin oil paint of light color, gray, buff, or other neutral tone, brushing it over the outside surface of wood that has been finished after specification No. 2. This is done after the final coat of flat varnish has thoroughly hardened, and the glazing coat, as it might be called, of paint-like material should be rubbed away cleanly with cloth or waste, until it shows only in the depressions of the surface of the wood.

Both of these suggestions are a bit out of the regular line of wood finishing, and should be handled with care. Considerable supervision of the

(*Continued on page* 829.)



LAWN FRONT OF MANOR HOUSE

ESTATE OF MRS. ARTHUR SCOTT BURDEN, JERICHO, L. I., N. Y.

JOHN RUSSELL POPE, *ARCHITECT*

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VOL. CXIII JUNE 19, 1918 NO. 2217

Our Sound Financial Position

IF we contrast our financial policy and the conditions which existed during the Civil War with those of to-day, the soundness and strength of our present position are strikingly demonstrated. During the Civil War, it will be remembered, there was no provision for adequate taxation and there were no channels for the organized distribution of Government bonds, which had to be purchased by the banks and paid for in specie. To-day we have a taxation program which is expected to yield about half of the cost of the first year of our participation in the war, and, as our expenditures increase, we are planning to double our taxation.

In Civil War times our gold reserves were scattered among many independent State banks. Our present gold reserve, which consists of more than one-third of the world's total amount of gold coin and bullion, is concentrated in the Federal Reserve System, which is generally recognized as one of the best and strongest bank systems in the world.

Depleted reserves and large payments in specie by the banks during the Civil War led to a general suspension of specie payments, which resulted in currency inflation to a large and dangerous degree. A repetition of such a condition now is practically impossible, and we need fear no serious inflation of our credit structure or unsafe inflation of currency.

And finally, through expenditures for capital purposes, we are investing in sources of future revenue and reinforcing our existing sound economic foundation.

The Ubiquitous Billboard

NOW that summer is here and we seek the rest and recreation we have earned by long and arduous winter months of labor, each one sets out to find in the great out-of-doors the relaxation so necessary to one's welfare. But, unfortunately, the man of artistic perception who plans a trip when he may enjoy the beauties of nature finds the edge taken from the zest it should bring him by the often-recurring, blatant billboards hedging in the landscape and marring the beauty of the face of nature.

We Americans are a tolerant people, and, while we loudly object to this sort of thing, we nevertheless submit to it meekly. While we are firmly impressed with the idea that we would hail with joy the suppression of these nuisances, while we would even be content with their proper control as to location and artistic presentation, we sit by idly during the rapidly spreading growth of this vulgarity, and if we raise a protest it is so feeble as to avail nothing.

Is not the news in our daily paper sufficiently nerve-racking to entitle us to seek peace and rest in some rural location where we may utterly forget those things that bred monotony in our daily lives? May we do so? No; the images of the very things we daily eat, the things we drink and wear are constantly hurled at us, shutting off from our vision at the most interesting vista the beauties of the landscape.

Why not take up and carry to a successful issue the matter of thinning out the worst of these transgressions and properly controlling those permitted to remain? It can be done if set about in the right way. We have, or did have at one time, a Society for the Preservation of National Scenery. What has become of it? Do not these insulting billboards come within the scope of such an organization?

The New York *Evening Mail* has begun a campaign against the spread of this form of advertising, and its efforts will, let us hope, be crowned with success. In a recent issue it quotes a series of interviews with prominent artists, and these clearly set forth the just indignation of people of refinement against what must be construed as a flagrant violation of the public right.

James Montgomery Flagg expresses, it is believed, the point of view of most people when he speaks of the prejudice that these signboards create in him against the articles proclaimed. He states:

"They are not only artistic crimes, but an unpatriotic waste of wood that could be used to make ships of, and paint that could be turned into camouflage!

"Advertisers believe in the stimulating effect of repetition. They are right in a way. But any right thing can turn into a wrong thing when pushed too far. If you keep on pounding an idea into a person, he turns from it in disgust.

"Personally, you couldn't make me buy talcum powder that had been dinned into me from every roadside. I'd be too mad at it. I'd sooner go unpowdered. As for a motor oil—how many times have I gone out of my way to read a supposed direction sign tacked on a tree, only to find on close inspection, 'Use Creamoline, the Perfect Lubricant!' From that moment on, if I've ever used Creamoline, I stop. Nor has a wooden cow eighty times the normal size of cows the power to induce me to drink malted milk. I'd drink lemonade sooner, because I never saw lemonade advertised in a bit of landscape I loved."

Edward Howland Blashfield, well known to every architect as one of our greatest mural painters, is equally indignant over the unrestricted growth of billboard advertising. He sees in this country a steady and consistent uplift in our artistic ideals, and for this reason he believes and all will agree that there is no reason why if we must tolerate this nuisance it may not be mitigated by the introduction of more artistic methods.

"No country in the world that I have ever seen," says Mr. Blashfield, "carries advertising to such vandalistic extremes as ours. The artist gnashes his teeth as he sees it from the train window or from his motor car. I have written bitterly of it in one of my books on mural painting. I have protested against it all my life.

"And in justice to public opinion which has brought about certain legislation protecting the Palisades and a few other beauty spots from the blight of the signboard. I must say American advertising has improved in quality.

"Art comes only to mature nations. We are outgrowing the picture book stage of art. We are wanting better things—better posters, better billboards, as well as better illustrations for our books, better interiors for our homes. And in time, public protest against pickle signs and foot powders, safety razors and motor oils will tend to thin them out of the lovely places we should take pride in as Europeans do.

"I remember the legend of a Swiss manufacturer who painted an ad on a rocky inlet in a lake.

"People were so incensed that they threatened to chain him to the rock and make him live with that sign for the rest of his life unless he removed every trace of the advertisement at once!"

In many instances cities have sought to curb the activities of those billboards, and in some cases have by moral suasion more than by restrictive laws been able to achieve some measure of repression.

The real cause of complaint is in the crowding on the railway right-of-way and along the main motoring highways a constantly increasing lot of poorly designed and atrociously executed signs. Not alone do they mar the beauty of nature, but to nervous people they serve as a very serious irritant. Perhaps the people responsible for these conditions will claim that for these reasons they serve the best advertising purposes. Perhaps this is true, but also perhaps it is true that many people are affected as Mr. Flagg declares he is, and will studiously avoid patronizing a thing made or sold by people so selfishly neglectful of the rights of others.

The fact remains that something should be done in this matter. Public opinion loudly expressed will effect better results than can be secured in any other way. Let each one who can influence others, and he who believes the time has come for some drastic action lend the weight of his efforts in this direction.

The School of Experience

THOUGHTFUL observers will have been impressed with the great possibilities affecting the future of architectural practice in this country to be developed when the large number of architects now engaged in war service abroad return and take up once more the work they laid aside in response to the Nation's call.

Men who through years of academic training have studied the development of building, have always been engaged in the creative aspect of their work. What they have achieved in design and construction has largely been governed by the directness of line and the rectilinearity of form controlled by the T-square and rule.

Architects serving abroad have acquired, through a most unusual experience, valuable ideas as to certain phases of architecture and construction and the methods employed to create them. Buildings erected as early as the Middle Ages have been reduced to heaps of ruins, and all the many and valuable secrets of their construction fully exposed. Other buildings that have escaped are mostly of a period when builders made few drawings and ran their lines by an eye trained to accurate measurement, combined with close power of observation.

At times our men abroad will, perhaps, have had opportunity for careful observation of all these things; at others there will have been time for only a passing glimpse. All these things, but transitory impressions at the moment, will later become coordinated and result in the acquirement of a mass of knowledge of greater practical value than an equal period spent in the class room or even in professional practice.

These men are coming back to us trained in the discipline of the soldier, hardened by military life, mostly in the open; in short, both physically and mentally equipped for the work that will await them. Their wide experience will insure their becoming very vital factors in influencing the things in architecture that the future shall produce. In place of a certain ultra-artistic and often artificial aspect of the functions of architects, they will undoubtedly inspire, by their example, all those manly characteristics that are so much to be cultivated.

We owe these men abroad a very large debt. What they will teach us when they return will undoubtedly increase it.

PLATE 215

I. N. VAN NUYS BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM

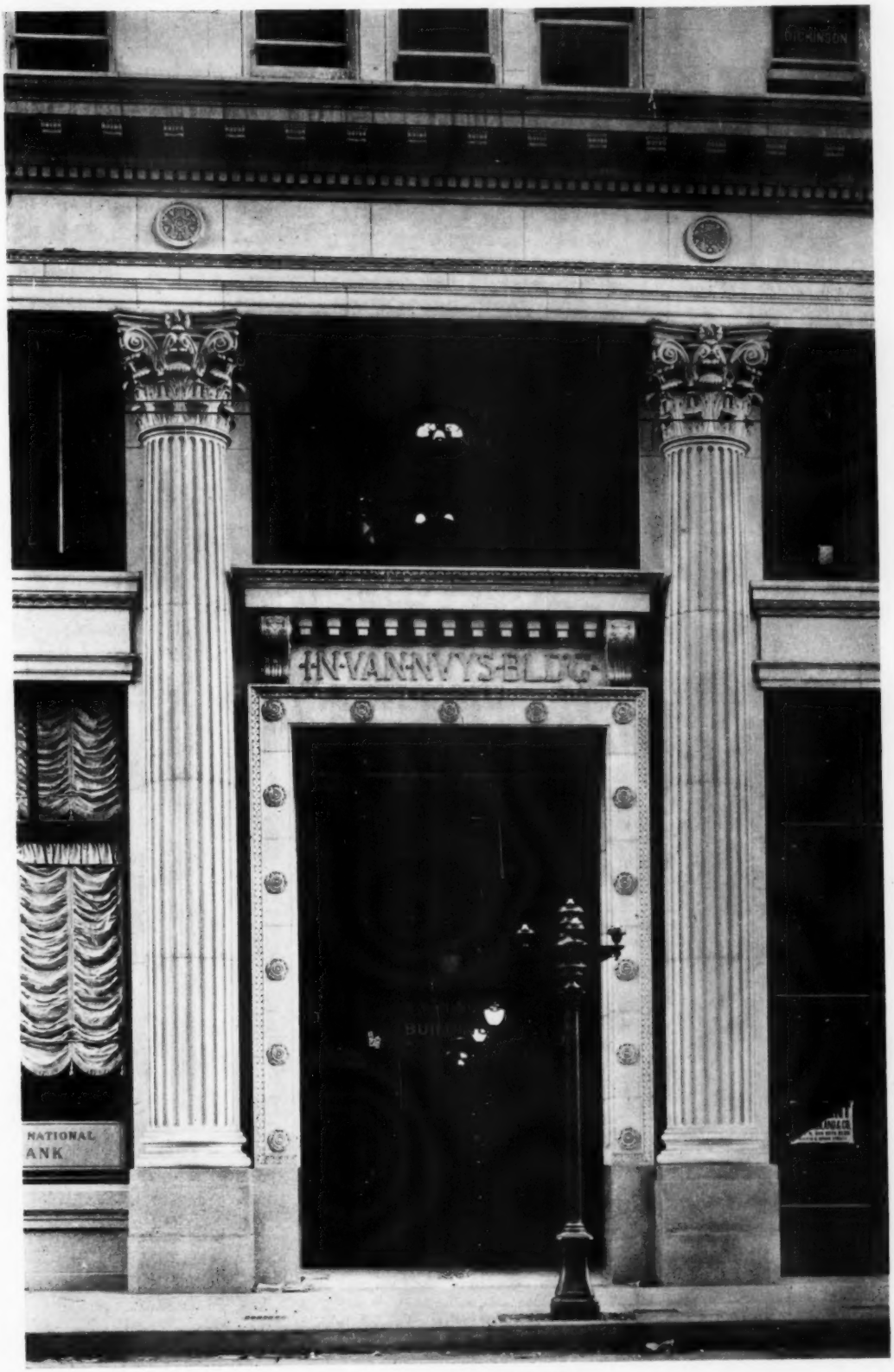


PLATE 216 DETAIL, PRINCIPAL ENTRANCE

I. N. VAN NUYS BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM

PLATE 217

BANKING ROOM—FIRST NATIONAL BANK

I. N. VAN NUYS BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM

PLATE 218 MAIN STAIRWAY

MAIN CORRIDOR

I. N. VAN NUYS BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

TYPICAL CORRIDOR, UPPER FLOORS

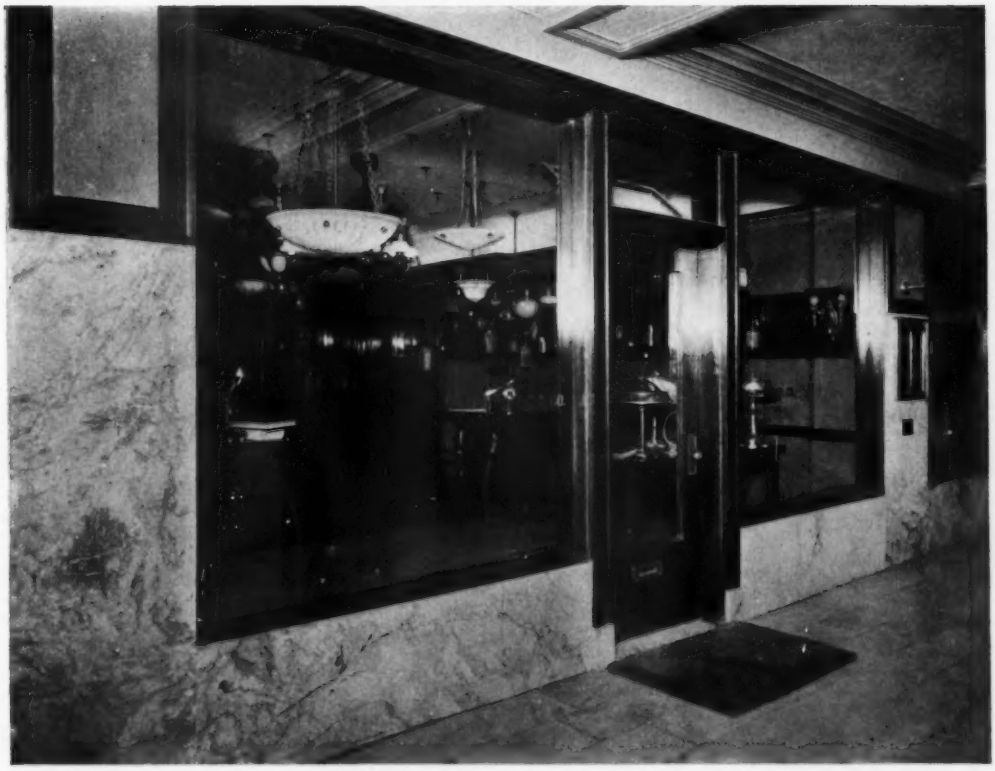


PLATE 219 TYPICAL STORE FRONT, SECOND STORY

I. N. VAN NUYS BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

PLATE 220

W. P. STORY BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM

PLATE 221 DETAIL, PRINCIPAL ENTRANCE

W. P. STORY BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM

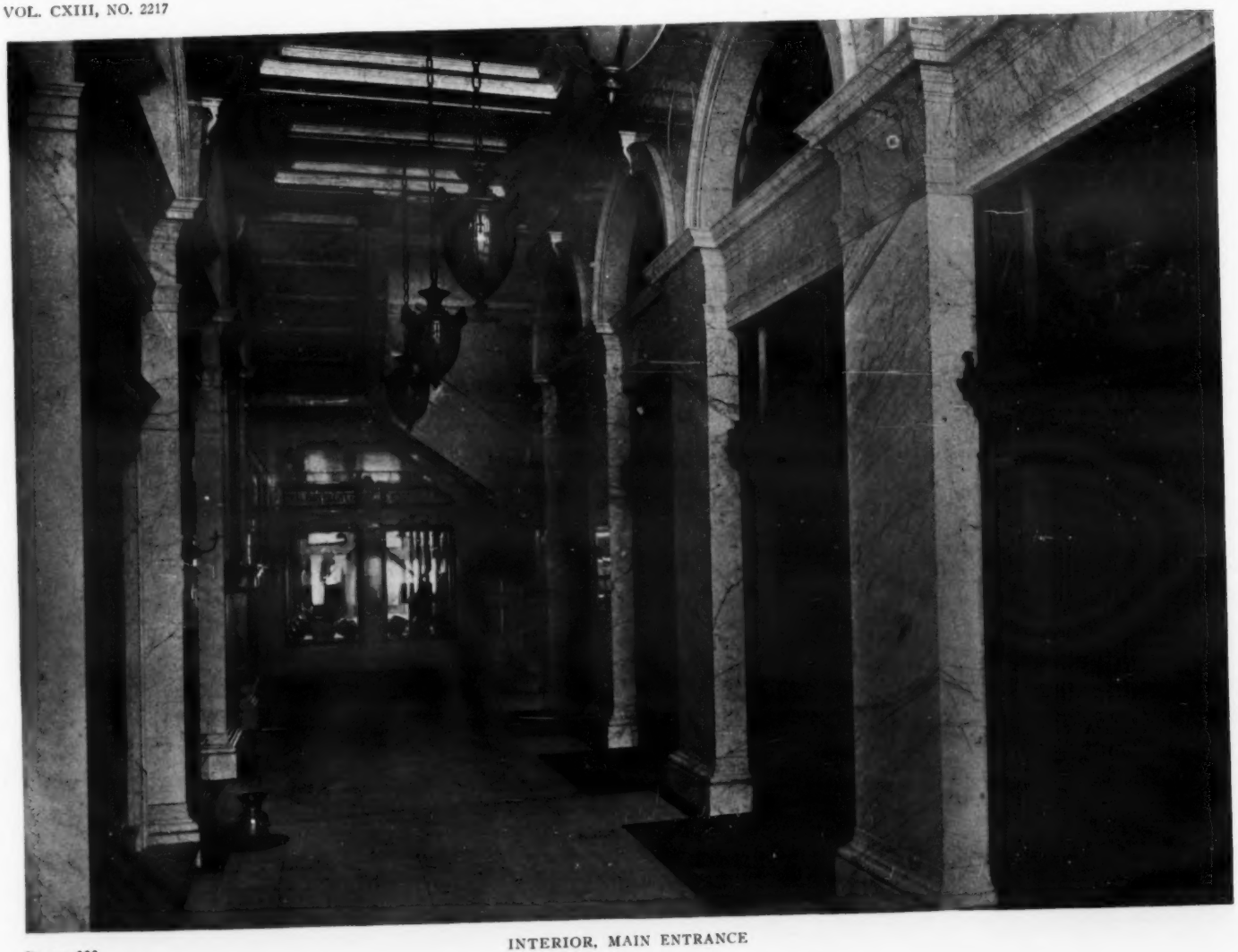


PLATE 222

INTERIOR, MAIN ENTRANCE

W. P. STORY BUILDING, LOS ANGELES, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM

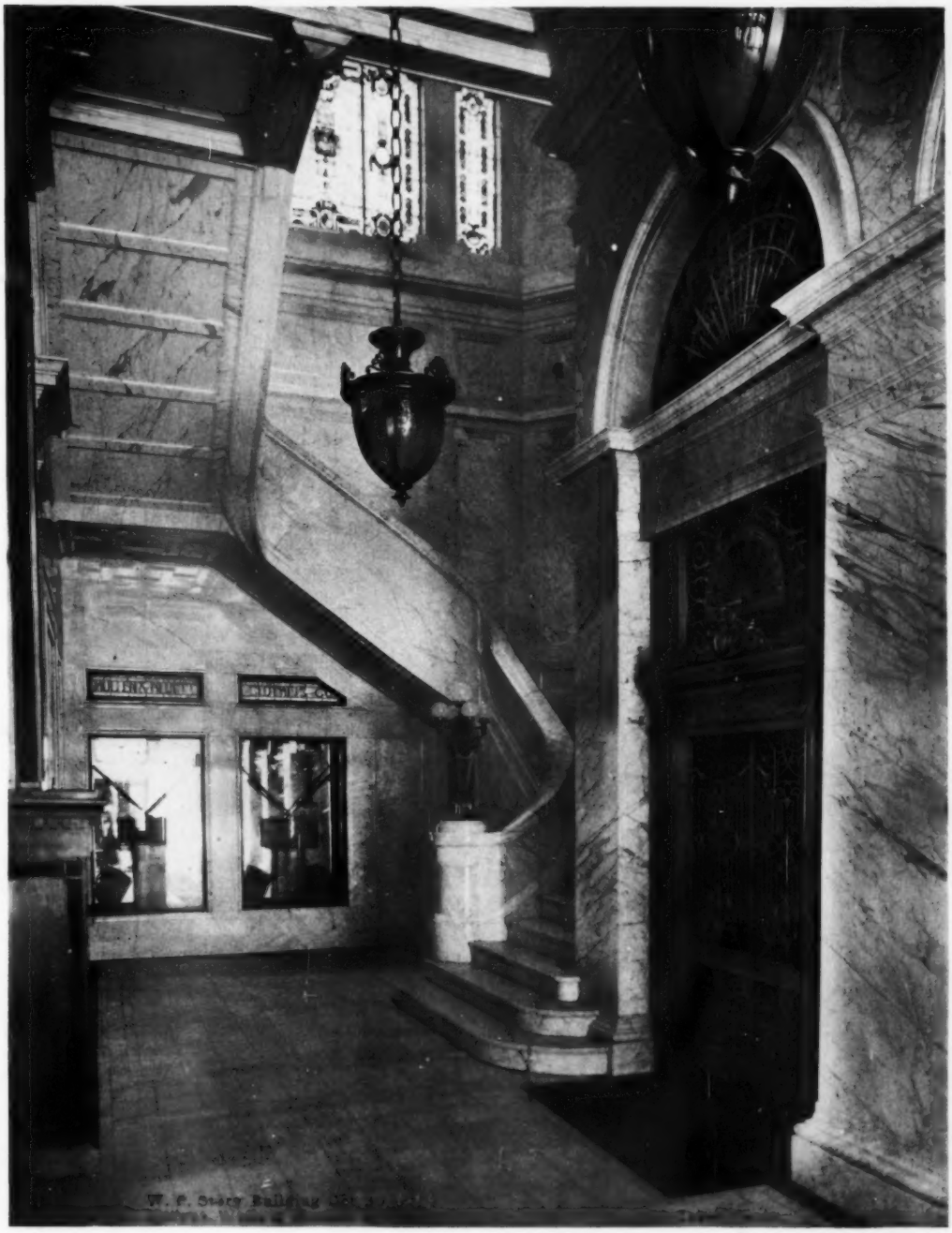


PLATE 223 MAIN STAIRWAY

W. P. STORY BUILDING, LOS ANGELES, CAL.

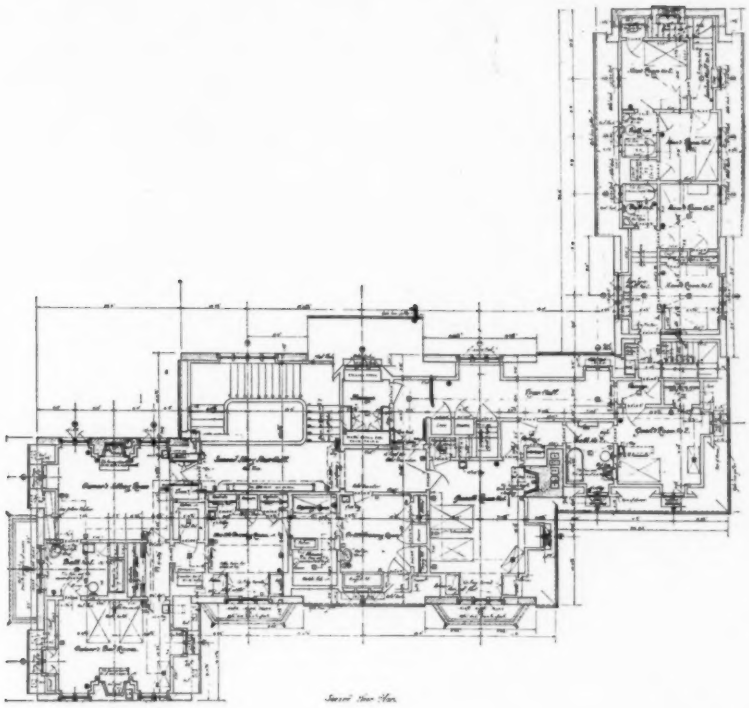
MORGAN, WALLS & MORGAN, *ARCHITECTS*

PLATE 224

HOUSE OF DR. L. W. MANSUR, SHERMAN, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

XUM



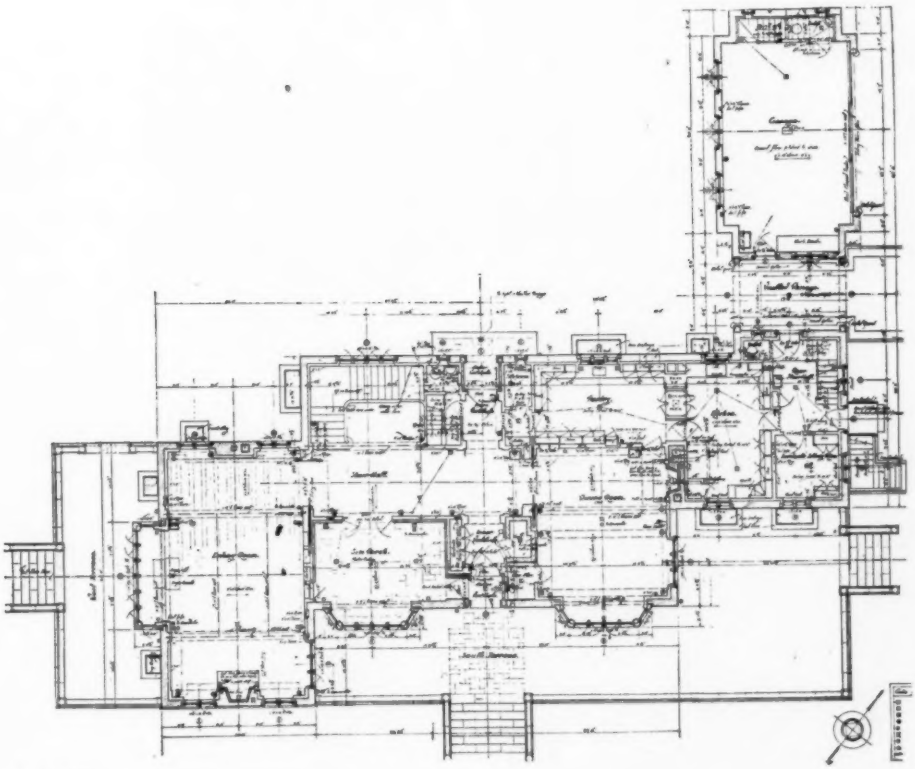


PLATE 225

HOUSE OF DR. L. W. MANSUR, SHERMAN, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

MAIN HALL

PLATE 226

HOUSE OF DR. L. W. MANSUR, SHERMAN, CAL.

MORGAN, WALLS & MORGAN, *ARCHITECTS*

Developing the Individuality of Oak

(*Continued from page* 825.)

decorator would probably be necessary until you were quite sure he had caught your idea exactly. Nor would it be wise to recommend such effects indiscriminately for all oak paneling or for all types of wood trim. However, this is a thing that would suggest itself.

The darker, heavier stains are usually employed for period effects, and these work equally well on white or red oak, though a slight difference in shade will appear. For these, too, the manner of sawing of the oak is a matter of individual preference.

Specification No. 3 is also crude and craft-like in appearance. There is no particular advantage in using the paste filler for a finish of this character, except where the desired color effect cannot be obtained with the stain alone. Many two-toned effects are attractively developed in this way. Two-toned effects may sound a bit startling for wood finishing, but they need not be. Silver gray is in reality a two-toned effect, although it is not obviously so. Silver gray is produced with a gray acid stain and white paste filler, and the best results are to be had with specification No. 3.

There is, by the way, no such thing as a perfect silver gray on oak, for oak—even white oak—has a strong color of its own, and silver gray acid stain, in the nature of things, cannot be a strong color, so that on oak this color is quite dark in tone, and is an impossibility with any other varnish finish than the flat varnish. Rubbing varnish gives a greenish cast to the effect. To a certain extent the effect of the oak color may be offset by leaving the paste filler more liberally on the surface of the wood than good finishing standards sanction.

For a room that is not to be furnished in keeping with the crude and truly antique idea, it would seem unsuitable to finish the trim after specifications No. 2 and 3, for the successful interior is the consistent and logical one, in which the wood trim, its finishing and its lines are in harmony with the furnishings. If the furniture is given a fine finish and is built on slender lines, the trim, be it paneled or of the simplest lines, should be finished in harmony, even though the preference may be for the finish which simulates "no finish."

The chief objection to a varnish finish has arisen from visions of the old "piano polish" idea, where you could look down into the finish and see depths of glare and gloss that shrieked of cheapness and pretension. The modern rubbed varnish finish, fine of texture, rubbed to the last word of dullness with pumice stone and water, and given a bit of extra dullness by applying the rub with haircloth instead of the usual felt pad, is finer in its satin-like surface than anything wax could produce. It's all in the care that is expended upon the process of finishing, and in the excellence and suitability of the material used.

Among the more or less standard paste filler effects on oak—that is, those effects which depend upon paste filler for their color and do not require a stain—are the estimable and commonplace golden oak; gray antique, which is produced with a black paste filler; so-called antique, a semi-light, yellowish effect, in which dark brown paste filler is used. The latter is the effect generally employed on modern oak office furniture of the better class. Of these the most interesting is gray antique. There are, of course, many novel paste filler effects produced with the more unusual fillers, such as Chinese red, blue, green, etc., but these are effects which it takes some courage to advocate. All of the paste filler effects are standard in the following specification:

Past filler, of desired color;

White shellac (pure grain alcohol);

Two or three coats of finest rubbing varnish, rubbed to a dull finish or left in the natural gloss.

They may, however, be used as crude, flat finishes by omitting the coats of rubbing varnish and substituting one coat of flat varnish over the shellac.

Fumed effects obtained with stain are produced by acid stains, as are all of the transparent brown effects in the richer shades, such as English oak, etc. Usually it is desirable to employ the acid stain on oak for any rubbed effect, as the rubbed varnish finish seems to call especially for the transparent acid stain colors.

For the flat varnish effects the pigment oil stains are especially suitable, without the paste filler, though many beautiful effects in this style of finish are obtainable with acid stain in the brown tones. The novel colors in acid stains do not appear to as good advantage under the flat varnish finish as under a rubbed finish.

Where an acid stain is employed, in any effect, or on any wood whatsoever, a following coat of pure grain alcohol shellac is absolutely essential as a binder for the stain, while a high grade shellac substitute may safely be used over pigment oil stain.

Outside of the browns and grays on oak, with which we are most familiar, there are many striking novelties which are suitable for the exceptional room—the room which it is desirable to have "different."

Brier-green is an effect with many possibilities for the room which is finished in shallow, flat paneling without ornamentation; where the decorations are autumnal in coloring and the furnishing are to be in keeping. A bit of woodland color-

ing, savoring of the tree bark, brier and moss, the brier green effect, is equally attractive on both red oak and white, though it is well to see it developed on both before specifying, for on the white oak some of the deeper brier tones, bordering on the reds and browns, are less prominent. There is nothing vivid in the tones of brier green—nothing but soft and restful half-tones. The effect is produced with brier green acid stain and light or natural paste filler.

For the very unusual room, which, for lack of the apt word, we call "French," there is verde antique, produced with a true verde acid stain and white paste filler. Clear, vivid, definite in tone, in these days of startling color effects, verde antique has possibilities. It does not appear to advantage on red oak.

For the man's room there are combinations of brier green acid stain and red paste filler, producing a warm, intimate and restful effect; the red showing in deep glowing undertone from the pores of the wood, subdued and softened by the brier-green stain.

These are merely hints of what can be done with combinations; and, in almost every case, the two-toned effects are most attractive under the rubbed varnish finish—always as dull as it is possible to make it. The correct specification for this kind of finish follows:

1 coat of acid stain of desired color;

1 coat pure grain alcohol shellac;

Paste filler of desired color;

Two or three coats of best rubbing varnish, rubbed dull.

Always, where there is contrast between the paste filler and the stain, the shellac should intervene between the filler and stain to prevent a mingling of the two colors. Best results will be had with unusual color effects where the oak trim covers broad surfaces, so that the color on the wood becomes a background rather than a sketchy framework, which has but little bearing on the general color scheme of the interior. In these effects, if anywhere, the straight-sawed oak shows to advantage.

Oak is undoubtedly the first choice for the room in which the effect is to be that of strength. Ornate carvings, heavy stair rails and elaborate panels demand oak, particularly where the type is kept true to period; but in many cases the same idea could be carried out in a lighter, more refined vein with good results in another wood. Birch, gumwood, etc., adapt themselves beautifully to the less virile modifications of the old oak interior.

Among the acceptable substitutes for oak, where it is desired to retain the oak effect, are chestnut and ash. Chestnut is an open-grain wood, similar in appearance to oak when straight-sawed, but is lacking in the flecks of hard fiber noted in the quarter-sawed oak. There is no particular advantage in quarter-sawing chestnut.

Chestnut is not a hard wood, though commercially, and in the finishing room, it is classified as such. Most of the finishing effects that are applied to oak may be used on chestnut with equally good effect and the color varies but slightly. Chestnut, being softer than oak, absorbs the stain more generously and shows a slightly stronger color.

Chestnut is lighter in color than red oak, and possibly a bit lighter than white oak, so that the light effects take successfully.

Ash is a hard, tough, open-grain wood, and is commercially classified as white and black, but the bulk of the ash on the market is very white in color. For this reason the oak effects produce more clearly and lighter in tone on ash than on oak. Ash has an individuality of its own which makes it worthy of a story all by itself from the finisher's viewpoint.

Both chestnut and ash are finished on the same specifications recommended for oak.

The Government's Attitude Toward Building Operations

Special by wire from our Washington correspondent.

REGARDING the Government policy of curtailing building operations, the War Industries Board, the Treasury Department and the Capital Issues Committee are interested in it. The policy may be stated briefly as one of opposition to building during the war unless it is necessary. Each case must be decided on its own merits by the builders and architects. It is stated, homes for workers, especially in war industries, are considered essential, so are factories or additions thereto that are necessary for war production purposes. On the other hand, houses for people who already have other places to live in, establishments devoted to purposes of luxury and the production of non-essentials are not deemed necessary to build at this time.

The Government is discouraging public improvements, municipal building operations, etc., unless necessary. The Treasury Department has shut down on building of unnecessary post offices by the Supervising Architect. However, the Department is recommending to Congress appropriation of some millions to provide Federal buildings or additions thereto in a number of cities.

Secretary of the Treasury McAdoo denies that his Department has advised banks and mortgage companies not to lend money on real estate and building operations, but the Capital Issues Committee exercises important power over the matter of issuance of securities for financing building operations and other enterprises in any amount. The War Finance Corporation, another Government institution, it is understood, will not grant Government financial help to building enterprises unless they are deemed of value in connection with the winning of the war.

Information has reached Senator Calder of New York that it has been decided to disapprove the construction of school houses in that State. It has also been reported to him that the War Industries Board would issue an order prohibiting all building in New York City, but this is denied by Chairman Baruch of the board, although men connected with his office have asserted it to be a fact.

The Government is carrying on extensive building operations under the War and Navy Departments, Shipping Board and other branches, including the Housing Bureau of the Labor Department.

The official view is that money, labor, materials, fuel and transportation utilized in the production of building materials and in carrying on building operations should not be used for unnecessary purposes when the prosecution of the war calls for all the nation's resources.

So far as ascertained there is no law prohibiting any building if one wishes to disregard official advice and if the funds, material, transportation and labor can be obtained, but in seeking to obtain them the builder may run counter to the priority system administered by the Government as outlined, especially as to the first three items named.

The Government people need to be shown the necessity of an operation before they will grant priority. Even the labor supply is being distributed very largely through the Department of Labor, which has organized a number of new agencies to handle problems relative to war labor.

Builders to Help in War

Plans to co-ordinate the building industries of the country on a basis that would place them more easily at the disposal of the Government during the period of the war were discussed by a group of prominent building men at a conference of the building industries at the Engineers' Club June 14.

The keynote of the meeting was that "the industries must be adjusted to the Government, and not the Government to the industries." The sentiment was expressed that in the past the various organizations represented in the building industries had been obliged to act singly in matters affecting their particular interests, and that now the time had arrived when unied effort should be made in order that the best results might be accomplished.

The meeting was opened by H. H. Murdock, chairman of the Building Industries of New York, who then introduced Allen Walker of the Chamber of Commerce of the United States, who acted as chairman. Mr. Walker said the aim of the meeting was to outline a plan of organization which would give fullest representation to all branches of the industry, including the material, engineering, architectural, and contracting branches.

Other speakers were W. B. King of Washington, D. C.; Rudolph P. Miller, C. A. Fullerton, C. J.

Curtin, George S. Bartlett and Franklin T. Miller.

A committee was appointed that is to formulate and complete the plans of organization. The members of the committee are F. H. Chapin of Cleveland, Ohio, vice-president of the Hydraulic Press Brick Company; A. M. Maddock of Trenton, N. J., president of Thomas Maddock's Sons Company; W. D. Baldwin of New York, of the Otis Elevator Company; W. H. Powell of New York, of the Atlantic Terra Cotta Company; George F. Lindsey of Minneapolis; F. T. Miller of the F. W. Dodge Company; B. F. Affleck of Chicago, president of the Portland Cement Association; Colonel J. R. Wiggins of Philadelphia, president of the National Association of Builders' Exchanges, and H. H. Murdock, chairman of the Board of Directors of the Building Industries of New York.

Unsettled Labor Conditions

The Government will probably soon be compelled to take action to prevent the luring of labor engaged on Government work by private corporations who offer the temptation of increased wages. Difficulties have arisen in several localities, and a decided interference with the progress of war preparations has resulted.

Another feature, the nomadic tendency of labor even when there is no advantage of increased pay, has developed. Government officials are now working on plans to prevent men from going from one Government job to another without real cause.

Steel Makers Active in Meeting Government Demands

The companies engaged in the manufacture of steel are adhering strictly to the pledge to give 100 per cent output to the Government, and in most cases there is a strong effort to work mills to 100 per cent of capacity. As the industry stands now the operators are concerned more with the problems of maintaining present operations than with those of incurring them.

The quantity of steel that the ordinary or commercial user—not a maker of Government or war material—is getting, has in many products about reached the vanishing point. Further, it is believed that the Government is about to enter upon various activities involving steel requirements greatly in excess of those already announced. Over and above the program which has been mapped out for enormous tonnages of shell, steel plates, shapes, bars, pipe, rails, etc., for itself and its allies, it is understood that additional and extremely large requirements are to be called for in connection with building and equipping ordnance plants, terminal warehouses, fabricating shops, by-product coke ovens and other undertakings in connection with war work.

Tenth Annual City Planners' Conference

Architects, engineers and landscape gardeners from the United States and Canada attended the tenth annual City Planners' Conference, held at Hotel Statler, St. Louis, May 27-29.

The housing problem was discussed during the three days of the conference, which concluded with an interesting report from Thomas Adams of Ottawa, Canada, concerning city planning activities of the allied countries during the war.

Frederick Law Olmstead of Brookline, Mass., president of the City Planners' National Organization, reviewed the persistent efforts made during the last year by a committee of the organization to have the Government give the necessary attention to the housing phase of war preparations. Mr. Olmstead saw prospects of great improvement in housing for the immense forces of war workers at munitions and other industrial plants.

Lawson Purdy of New York City emphasized the importance of proper housing as a war measure. "To have a good labor supply, we must have a good house supply," he said. "To win the war we must have a good labor supply." Mr. Purdy blamed the migrations of labor upon the poor housing conditions in the average city, and declared that in many industrial plants of the country the labor forces "turn over" 100 per cent per month—that is, such industrial plants are compelled to install entirely new forces of workmen on an average of once a month.

Lawrence Veiller of New York City, secretary of the National Housing Association, declared that "the United States Government has declared itself in unmeasured terms against the tenement as a home for workmen and has outlawed the bunkhouse." Mr. Veiller also addressed a special meeting of the City Club of St. Louis Monday on the subject of "Housing," during the course of which he said: "The average employer two years ago was not interested in housing because, as he said, there was plenty of labor; yet, at a conservative estimate, it costs $50 to replace a man." He cited the records of one big Eastern concern which showed that it employed 13,000 men in one year to maintain a force of 1500, and another which employed 7000 men to get 300 steady workers.

George E. Kessler of St. Louis drew attention to lessons to be drawn by cities from the city planning principles which have been incorporated in the building of war cantonments, and Sydney J. Roy, secretary of the Mississippi Valley Waterways Association, emphasized the necessity for making provision for waterway terminals as a part of city plans in river cities.

Beaux-Arts Institute of Design

The good and far-reaching influence in the field of architectural education exerted by the Beaux-Arts Institute of Design is shown by the lively interest taken in the exhibitions, wherever made, of the series of premiated drawings that form a traveling exhibition of student work.

It is noted that as far away as Seattle, Washington, the showing of these drawings at the University of Washington has been made an important function, and that the local press has given much space in favorable criticism of the work.

In Commemoration of Harvard's Heroic Dead

Since the outbreak of the war in 1914 Harvard University has lost more than seventy of her sons. For this reason the recent Memorial Day services at the University held for those present more than usual significance.

To commemorate fittingly the heroic dead the Harvard Memorial Society presented to the University a panel on which is inscribed the names of the men who have died in the service of this country.

The roll itself consists of a large dark-wood panel with five columns in which to place the names. Above the columns are these lines from Lowell's poem on the death of Robert Gould Shaw:

"But the highest soul burns to light men's feet
Where death for noble ends makes dying sweet."

The panel was designed by Charles A. Coolidge, '81, of Boston. It will be placed in the Widener Library near the entrance of the Farnsworth room, which itself commemorates Henry W. Farnsworth, '12, of Boston, who was killed in action while a member of the Foreign Legion of the French Army.

"After the Battle of the Marne"

Ridgway Knight's painting "After the Battle of the Marne," which in 1915 was the sensation of the Paris Salon, has been purchased by William Nelson Cromwell and donated to the Allies' Blind Relief War Fund for the benefit of blinded soldiers.

This excellent canvas has been on view in the Anderson Galleries in New York, and is soon to be sold at auction.

Its high artistic merit and the very patriotic purpose of its sale will undoubtedly cause it to bring a high price. It is stated that there will probably be developed a friendly but none the less keen rivalry among rich collectors in this country and Europe for the possession of this painting.

Shortage of Coal is Threatened Next Winter

In a statement made by the National Coal Association it is prophesied that another coal shortage, more serious than that of last winter, and almost certain interference with the war program, are inevitable throughout the East unless there is a readjustment soon of traffic over Eastern railroads. This is the prevailing opinion of bituminous coal operators in the chief producing sections of the country. The enormous demands of other war industries are crowding coal off the rails, and the resultant continued shortage of cars at the mines has cut production to the danger point.

A Conference on Hospital Problems

A conference, under the auspices of the War Service Committee of the American Hospital Association, on hospital problems resulting from the war, was held at the Academy of Medicine in New York on June 6.

A thorough discussion of the provisions for the care of Government patients was held, and the many problems involved in caring for invalided soldiers and sailors, location and capacity of army and navy hospitals, use of civil hospitals and the best methods of co-operation were considered.

A. H. Albertson Joins Government National Housing Forces

A. H. Albertson, for the past ten years the representative in Seattle, Washington, of Howells & Stokes of New York, has been called to Washington for work under the direction of the Federal Director of Housing.

Mr. Albertson is vice-president of the Washington State Chapter of the Institute, and prominently connected with the work of the Seattle Municipal League and the Associated Charities.

Picric Acid Plant Planned

War Department Awards Contract Involving $8,000,000

A contract has recently been awarded by the War Department for the construction, at Brunswick, Ga., of a plant for the manufacture of picric acid. This chemical is used in the manufacture of high explosives. It is expected that 72,000,000 pounds of the explosive will be manufactured in a year after the completion of the plant, which, it is hoped, will be ready for occupancy by Nov. 1.

Ten to fifteen thousand men will be engaged in the work of construction, and it will require 4000 men to operate the plant. The buildings will cover 1600 acres and cost $8,000,000 to build.

An Advance in Freight Rates

A 20 per cent increase in wages of certain classes of railway employees has been recommended by the Railroad Wage Commission. This increase involves an addition of approximately $260,000,000, which, together with the increased cost of coal and other essential supplies, has served to force the carriers to ask for an increase in freight rates of at least 25 per cent to take care of these increased expenditures. It is very probable that the Government will consent to this advance in rates. Naturally the increased rates will affect the prices of many important building materials.

England to Build Shipyards

Information received in Washington states that England has decided to build 12 new Government-owned shipyards, which will contain in all 100 ways. It is expected that these new yards will add considerably to the merchant marine tonnage of the world. According to the British plans, fabricated vessels of steel only will be built in the new yards. These vessels will all be much larger than the fleet which is now being built in American yards. The specifications call for ships of 12,000 and 15,000 gross tons each.

It was stated that the new yards will be constructed down in Wales, off the beaten path of shipbuilding in England. This has been determined upon so that the present shipbuilding program of England, which is situated chiefly on the River Clyde, will not be interfered with.

The belief is entertained that the new British yards will be devoted to fabricated ship construction. The British originated the fabricated ship idea and they have launched the first fabricated ship. This particular vessel, it was said, has already been put in service, and been to an American port upon one occasion.

Brickmakers to Organize

Leading brick manufacturers from all parts of the country are to gather in Chicago soon to discuss the organization of a national common brick association.

It is proposed through the contemplated organization to place the common brick field on a solid commercial foundation where its entire resources can, if necessary or found desirable, be placed at the disposal of the Government in furthering its war program.

Plans for the new association include the establishment of a secretary's office at Washington, where the interests of the brick manufacturers can be watched closely and the use of brick for war work be extended. Representatives of at least 90 per cent of the brick produced in this country, which in normal times aggregate approximately 7,000,000,000 common brick annually, will be sought by the promoters of the organization. There are about 3500 brick manufacturers in the country.

A Summer Class for Women

In view of the number of young men who are going into military service, the University of Michigan will offer a special course in training and elementary drafting for young women. This course will be given in the approaching Summer Session beginning on July 1st, and will consist of eight weeks' intensive work, covering enough ground to enable young women to adapt themselves, on the one hand to the needs in architects' offices, and on the other in mechanical drafting.

Further information may be had regarding the first from Professor Emil Lorch, College of Architecture; and regarding the second from Professor H. J. Goulding, College of Engineering, University of Michigan, Ann Arbor.

Newport's Costly Landscape Architecture Turned to War Gardens

Many of the heretofore handsomely treated lawns and landscape effects surrounding the larger "cottages" at Newport have been shorn of much of their æsthetic aspect and turned to practical use as war gardens.

Department of Architectural Engineering

Night-Lighting the Factory

In Three Parts—Part I

CERTAIN readjustments are being made in almost every class of manufacturing, the causes of which are varied. Some of them are compulsory through legislation. These compulsory changes originate in industrial boards or commissions to which the states have delegated certain powers. There is no doubt but that every state will eventually have its industrial board, industrial commission or department of labor, among whose functions will be the control of certain physical elements that affect production by human labor. One of the most important elements that influence industrial production is light, both natural and artificial.

Among the resulting effects of adequate lighting, both natural and artificial, on productive processes are the following:

1. Reduction of accidents.
2. Greater accuracy in workmanship.
3. Decreased spoilage of product.
4. Increased production for the same labor cost.
5. Less eye strain.
6. Better working and living conditions.
7. Greater contentment of the workmen.
8. Better order, cleanliness and neatness of the plant.
9. Easier supervision of the men.

A PLANING MILL WITH 250-WATT LAMPS ON A 16-FT. MOUNTING.
Light walls and ceiling aid in the excellent distribution of light and absence of deep shadows.

Of these items the first four affect the profits of the enterprise, the last five the safety of the operatives, and Item 8 also pertains to loss by fire. It is difficult to define the limits of the influence of any item.

New Jersey, Pennsylvania and Wisconsin have

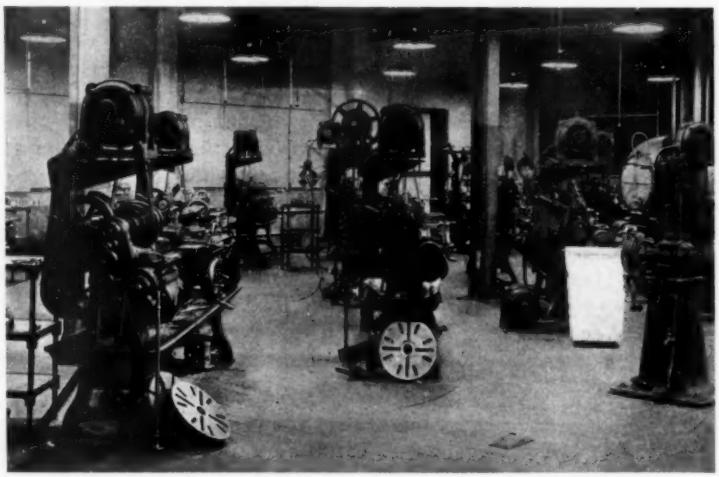
enacted codes which regulate the lighting of work places, and Ohio is now preparing such a code. Like other measures that benefit all those concerned, lighting regulations will become universal only through public demand.

There are other considerations that bear on this matter and exert an influence on manufacturers. These concern the cost of production, and are considered purely from an economic viewpoint. Productive effort has been confined to the daylight hours because of the lack of an adequate means of artificial illumination; for this reason daytime work has become a fixed *habit,* and the idea is prevalent that work under artificial light is necessarily ineffective. But the art of artificial illumination has now progressed to a degree of effectiveness which is equal to natural illumination, and this prejudice against its use is unfounded. The cost of artificial illumination is little in comparison with the cost of labor, and the saving of 30 to 40 seconds in an hour will offset the cost of lighting.

It is stated by Mr. Ward Harrison, Illuminating Engineer, that under present conditions it would require the expenditure of a little more than 1 watt per square foot of floor space to produce an illumination of from 5 to 10 foot-candles, assuming that well-diffused lighting units were used. (*A foot-candle is the measure of light intensity incident at right angles on a plane one foot distant from a light source of one candle-power.*) With current at 2 cents per kw.-hr. the total cost of lighting should not exceed 7.5 cents per square foot per year for a night shift of 2500 hours.

A square foot of floor space, either owned or rented, costs a certain sum per year whether used or not. It is apparent that revenue can be derived only from the *use* of the floor space. It then follows that a manufacturing floor space that is idle for 14 to 16 hours per day is a cost that must be defrayed by the 8 or 10 hours of productive activity. It is also necessary, in many processes of manufacturing, to maintain a certain degree of heat during the heating season for the entire 24 hours of the day. This is then an unproductive cost also. It should be remembered that this applies only to spaces devoted to manufacturing and not to spaces used for warehousing, as this latter usage is productive during the entire time that a maximum storage of goods is maintained.

When a manufacturer is confronted with a demand for his product which exceeds the capacity of his plant, he has recourse to two means of satisfying the demand. One way is to increase the size of his plant, equip it and operate it on a day shift only; the other is to provide adequate artificial light for night shift work. In this case, says Mr. Harrison, he would have to compare the annual cost of lighting the floors at 7.5 cents per square foot (with added heating if any) with the annual rental value of the addition to the plant fully equipped with machinery and ready to operate. It has been found that the cost of interest, depreciation or replacement, and taxes ranges from 30 to 75 cents per square foot per year, depending somewhat on the location and type of building construction, but more largely on the amount of machinery required. Thus the charge for a plant of 100,000 square feet area would fall between $30,000 and $75,000, depending on the industry. The cost of lighting this plant for night shift would not exceed $7500. From the consumers' viewpoint rent now comprises from 15 to 30 per cent. of the increase that accrues to raw material in passing through a manufacturing establishment, and night operation should effect a substantial reduction in the cost of manufactured articles.



A MACHINE SHOP WITH WHITE WALLS AND CEILING.

Lighted with clear 200-watt lamps installed with porcelain-enameled metal-cap diffusing units. The illumination is good, free from annoying glare and sharp shadows, with a light intensity of more than 10 foot-candles.

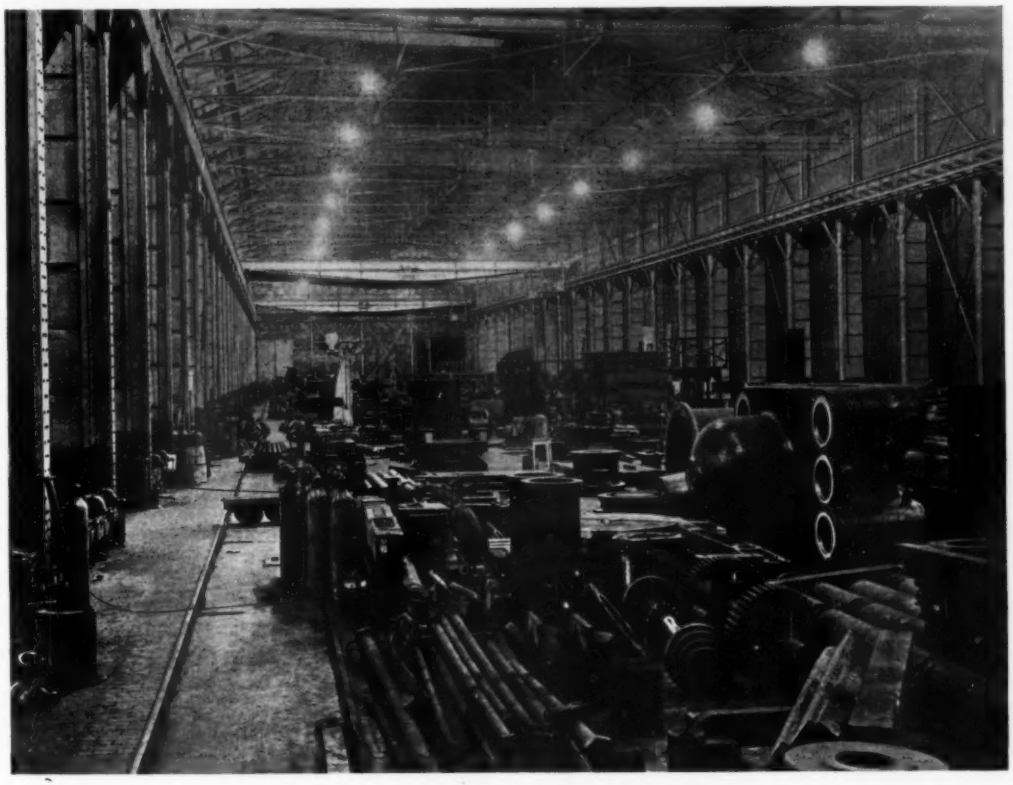
Another element must be considered in connection with this matter, and that is the availability of labor for night shifts. The objections often raised are

that men do not like to work at night, that good men do not have to work at night, that it is impossible to change the established mode of life, and that really restful sleep cannot be secured during the day. The last objection is the most reasonable one, but with better housing conditions which are now recognized as an economic necessity, and with a day consisting of an early morning and a night-shift ending at midnight, the sleeping hours would not be materially disarranged. Good men will work at night under proper conditions and under the extreme pressure of extra production at this time they are becoming accustomed to night work.

These points are presented in order to impress architects and engineers with the importance of light, both natural and artificial, in connection with industrial plants, and also to show the necessity of a complete survey of all of the conditions as a basis for correctly designing an industrial plant.

The requirements for satisfactory artificial illumination have been standardized largely through the efforts of the Illuminating Engineering Society. Their findings and recommendations are in a large measure embodied in the various state codes regulating these matters, and are also the basis of the code of lighting for factories, mills and other work places which is recommended by the Advisory Commission, Council of National Defense, through the Division of Lighting of its Committee on Labor.

Granted that adequate lighting is desirable, the general requirements of such an installation consist of the following:



A HIGH ERECTING ROOM WITH LIGHT WALLS.

Lighting units of 1000-watt lamps with porcelain-enameled dome steel reflectors. Units placed above the traveling cranes and out of the ordinary line of vision obviates glare. Light of good intensity and excellent diffusion.

1. Sufficient illumination should usually be provided for each workman, irrespective of his position on the floor space.

2. The lamps should be installed and selected so as to avoid eye-strain to the workmen.

3. Lamps should be operated from sources of supply which will insure reliable illumination results, particularly on account of the demoralizing effect of intermittent service just when the light may be most needed.

4. Adequate illumination should be provided from overhead lamps, so that sharp shadows may

be prevented as much as possible, and in such measure that individual lamps close to the work may be unnecessary except in special cases.

5. The type and size of lamps should be adapted to the particular ceiling height and the class of work in question.

6. In addition to the illumination provided by overhead lamps, individual lamps should be placed close to the work if they are considered absolutely necessary by a lighting expert, and in such cases the lamps should be provided with suitable opaque reflectors.

Considering Item 1, sufficient illumination has been determined to consist of the following intensities:

	Foot-candles at the Work	
	Ordinary Practice	Minimum
(a) Roadways and yard thoroughfares	0.05— 0.25	0.02
(b) Storage spaces	0.50— 1.00	0.25
(c) Stairways, passageways and aisles	0.75— 2.00	0.25
(d) Rough manufacturing such as machining, rough assembling, rough bench work	2.00— 4.00	1.25
(e) Rough manufacturing involving closer discrimination of detail	3.00— 6.00	2.00
(f) Fine manufacturing such as fine lathe work, pattern and tool making, light colored textiles	4.00— 8.00	3.00
(g) Special cases of fine work such as watchmaking, engraving drafting, dark colored textiles	10.00—15.00	5.00
(h) Office work such as accounting, typewriting, etc.	4.00— 8.00	3.00

NOTE: Measurements of illumination are to be made at the work with a properly standardized portable photometer.

In the proposed Ohio State Code there is a table comprising 245 separate operations apportioned to six general intensity requirements. Individual or special requirements should be determined by trial or based on satisfactory daylight conditions. The intensity of satisfactory artificial illumination, however, is less than that of satisfactory daylight illumination, and is generally from one-third to one-half of the latter. This is because the eye is adjusted during the day to the more intense general illumination that prevails at that time.

STOCK ROOM OF A METAL WORKING PLANT WITH WHITE WALLS.

Lighting units consist of 750-watt lamps, with bowl-shaped porcelain-enameled steel reflectors. Units spaced on 60 ft. centers in two rows, the height of units is 45 ft. above the floor. The white walls aid in securing uniform illumination.

Sufficient illumination requires the entire floor area to be evenly lighted, as the presence of dark spots interferes with the quick, sure-footed and safe movement of workmen. Also, if the work alone is brilliantly lighted and the rest of the room is comparatively dark, the eye is tired by encountering areas of uneven light intensity. A condition of uniformly bright illumination gives a cheerful aspect to the work-place which has a beneficial effect on the operative and increases his production.

The following table of working intensities of daylight illumination is the summary of several hundred readings recently made to determine the intensity of daylight illumination in representative manufacturing plants.*

Each figure given is the mean of a number of observations, and the measurements extended over

*Effective Lighting of Factories as Judged by Daylight Standards, by Ward Harrison. Transactions of the Illuminating Engineering Society. Vol XII, No. 8, 1917.

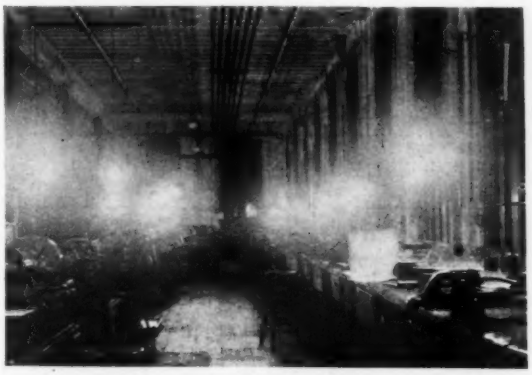
both clear and cloudy days. The aim was to secure data which represented good average working conditions. The test plate of the photometer was placed as close as possible to those parts of the machines at which the operators' attention was ordinarily concentrated. Factory processes were divided roughly into three groups in accordance with the relative necessity for accurate vision; it will be noted that in general the operations requiring closest attention (Grade A) were ordinarily best lighted, for wherever possible such machines were located near the windows. Just below the data on horizontal illumination (on the horizontal plane) there is given in each case the results of readings taken in two vertical planes, toward and away from the windows. It is interesting to note that the horizontal intensity roughly approximates a geometric mean between these values, the effect of the saw-tooth roof construction in equalizing the illumination in all plans is also evident.

WORKING INTENSITIES OF DAYLIGHT ILLUMINATION IN FOOT-CANDLES

Factory Products.	Grade of work A	B	C
Engine lathes .. Horizontal	10	7	3
Vertical, Min.—Max.	6—15	2—15	0.5— 9
Automatic engine lathes	14	12	10
	2—30	2—30	1—15
Machined forgings		6	5
		2—15	1—10
Special machinery	10	7	
	4—20	3—15	
Lamps	10	9	
	5—16	11—15	
Vacuum cleaners	17	11	
	7—25	3—20	
Automobiles	5	5	5
	2—11	2— 8	3—11
Automobiles*	10	3	5
	6—12	1— 3	4— 5
Storage batteries		5	3
		1— 6	0.5— 5
Machine tools and patterns	6	9	
	2—16	3—35	
Sheet iron equipment	10	5	8
	1—20	1—12	2—15
Machine gears	7	8	5
	3—16	5—18	1—15
Hardware	10	10	4
	1—20	1—20	0.5—12
Printing machinery		5	3
		1—15	0.5— 5
Sewing machines		4	2
		1— 8	2— 5
Cloth bags		5	7
		3—10	3—10
Clothing	10	4	
	10—20	7—15	
Furniture	5	5	
	3—20	0.5—12	
Average	10	7	5
	4—18	3—15	1.5—10

*Saw-tooth roof.

The second requirement, the avoidance of eye-strain is of great importance. In this connection it is not eye-strain due to insufficient illumination that is intended, but the strain due to glare. Until recent years the sources of artificial illumination



A MACHINE SHOP WITH BARE LAMPS.
Note glare and poor light intensity at the work, resulting in extremely bad lighting.

were not of sufficient intensity to cause eye-strain from glare. With the development of gas and electric lighting units of brilliant intensity this matter is one of importance. The use of these modern units must be made in connection with reflectors of kinds and shapes that will shield the eye

MACHINE SHOP SHOWN ABOVE EQUIPPED WITH METAL REFLECTORS.
This prevents glare and increasing the intensity of light at the work. The center lamps are mounted near the ceiling for general illumination, with low-down lights at the work for local illumination.

from the discomfort of glare and at the same time increase the percentage of useful light.

No standard definition of glare has yet been established, but it is generally understood to apply to any brightness within the field of vision of such a character as to cause discomfort, annoyance, inter-

ference with vision or eye fatigue. Glare is caused by two things, the brilliant source of the light or by specular reflection, the latter being less important. In either case glare is dependent somewhat on the surroundings. A brilliant light in a room having light-colored walls, ceiling and floor does not produce the same effect on the eye that the same light produces in a room with very dark walls, ceiling and floor. In other words, the background has an important influence. The effect of the contrast of a light source with the background is well illustrated by the scarcely noticeable effect of an arc light in bright sunlight and its blinding effect in the night-

A MACHINE SHOP FOR FINISHING LARGE PARTS.

Lighted with 200-watt clear lamps in porcelain-enameled steel-dome reflectors placed above the traveling crane.

time. Therefore the brightness of a light source can be greater when the general illumination is of a high intensity than when it is of a low intensity. The permissible ratio then between the brightness of the light source and the background must be smaller at high values of intensity than at low ones. To overcome glare caused by the light source, the lamps should be at least 25 to 30 degrees above the ordinary line of vision or used in connection with some type of reflector or enclosing device that serves the purpose. It has been determined that it is the total *quantity* of light that the eye receives direct from the source that impairs the vision rather than its initial brightness. Therefore, the distance between the eye and the light source measures the quantity of the light received by the eye. This distance is a factor of great importance.

The form of glare due to specular reflection is caused by a comparatively small area reflecting light of considerable brilliancy. It finds its base on glossy papers, polished metal or other shiny surfaces. The intensity of this form of glare depends upon the brightness of the light source and the reflecting medium. It can sometimes be overcome by changing the location of the light source, the position of the workmen or by properly diffusing the light so that the possible reflection is of very low intensity.

A WOOD WORKING PLANT WITH WHITE WALLS AND CEILINGS.

75-watt lamps with porcelain-enameled steel-dome reflectors. Bowl-frosted lamps used to minimize the glare. Lamps over benches 10 ft. apart and 3½ ft. from the walls.

An arc or bare lamp filament which causes discomfort at once should not be used within the field of vision. Those light sources that give rise to fatigue after some period of time are permissible where the light source is not within the range of vision for long periods, in such places as passageways, storerooms and places where workmen are not employed in fixed positions, but move about so that the light source is not continuously within their field of vision. In locations where the field of view remains fixed over a considerable period of time, as in many manufacturing plants, offices and au-

ditoriums, a light source that remains within the field of vision continuously without producing any sensation of glare must be used.

The requirements of a lighting system unobjectionable from the standpoint of glare have been enumerated as follows:

CENTER VIEW OF WOODWORKING PLANT.
Lamps spaced 10 ft. apart in both directions in center of shop. The wood material worked on has a good reflection factor and aids in diffusing the light.

a. No source of light at high intrinsic brilliancy should be so located that it can be seen readily except at a considerable distance. In cases where it is impossible to screen the source entirely, the presence of a brightly lighted background, such as the surface of a reflector, will considerably diminish the harmful effect.

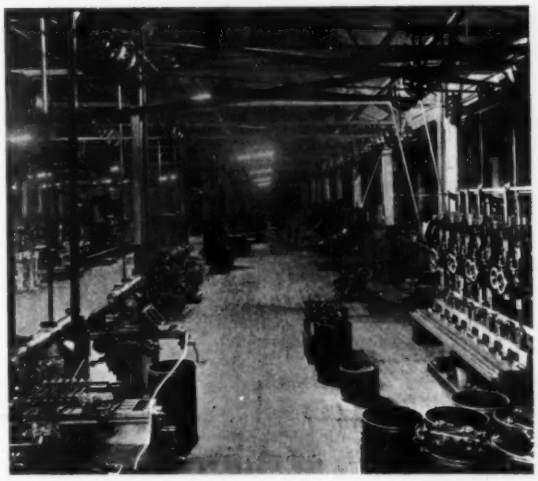
b. No considerable amount of light, even from a well diffused source, should be allowed to enter the pupil of the eye directly when it is focused on the work; this usually requires that no light source, unless remote, be visible when the head is inclined toward the working surface.

c. It is desirable that the area within the field of vision be uniformly illuminated; at least, the brightness of any portion of this area should not be materially greater than that of the object under observation.

d. Specular reflection should be guarded against so far as possible. Where the position of objects worked upon is fixed and the greater portion of the work is in one plane, lamps can be so placed as to avoid specular reflection in the direction of the eye. In the majority of operations in industrial plants, however, such conditions do not exist, and efforts should be directed toward producing conditions which will allow the operator readily to shift his position in such a manner that direct reflection cannot reach the eye.

Unvarying service, as noted in the third requirement, obviates loss of time due to a complete stoppage of the light. The cost of the interruption is not confined to the actual duration of a dark period, but also for a time thereafter during the process of the eye readjusting itself to the regular working conditions. There is another unmeasured loss that is always associated with an unexpected interruption of a production routine. A light of constantly changing intensity, or one that flickers, necessitates a constant and rapid readjustment of the iris of the eye. This causes the muscles which control the eye to become unduly fatigued, induces a nervous strain followed by undue discomfort and pain.

The prevention of dark, sharp shadows, as the fourth requirement, is important. Unless the object has only one surface, the presence of soft shadows is desirable to aid the workman in distinguishing the different planes of the object and detecting irregularities in the finished surfaces. The degree of the shadow is dependent on the type of the lighting unit and its location. The maximum degree of shadow results from the direct light of a bare lamp in an open reflector of small area and a minimum shadow from an indirect lighting unit.

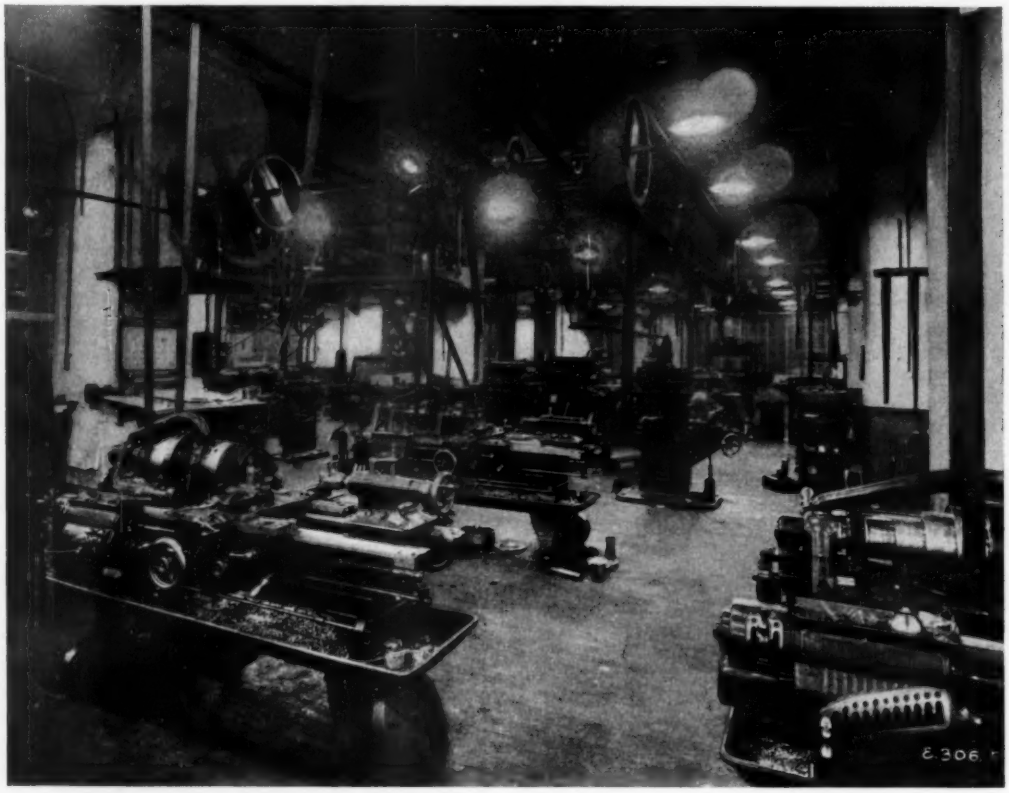


INSTALLATION OF MERCURY-VAPOR LIGHTING UNITS.
Mounted about 12 ft. above the work. Good distribution of light and comparative freedom from shadows.

Between the two any degree of shadow depth can be secured.

The illumination of the horizontal plane is the usual basis of requirement and calculation, and in many processes this is sufficient, but in others inadequate. Many products require work on their vertical faces, and in this event illumination of the vertical surfaces must be provided. This is accomplished by using lighting units which have sufficient intensity in the 50-70 degree zone as well as below these angles. In other words, vertically directed light is incapable of lighting vertical planes. In some situations the illumination of vertical planes is materially aided by the reflection from light-colored walls, benches or adjacent material.

In discussing the basis of design in a subsequent article the fulfillment of requirements 5 and 6 will be explained.



A MACHINE SHOP OF FLAT-SLAB REINFORCED CONCRETE CONSTRUCTION.

With bays 20 x 20 ft. in size and with four 100-watt lamps located symmetrically in each bay on 10 ft. centers. The average light intensity is 5.58 foot-candles. There is an average of four machines to each bay with an operator to each machine. Drop lights are required only in exceptional cases. The lamps are 9½ ft. above the plane of illumination with a ratio of spacing to mounting height of 1.1. The purpose of placing the units at this height was to reduce glare as much as possible and to insure that each point in the room receives almost the same volume of light from at least four lamps, in order that shadows may not become troublesome even though the light from the nearest unit is intercepted.

Industrial Information

Healthful Heating

"Healthful Heat," of the sort that makes your house a home, is advertised by the Sill Stove Works, Rochester, N. Y., as being incorporated in their Homestead furnaces. This heating system is a form of warm air heating, developed from the designs of 1,000 heating experts, whose opinions were sought, tabulated, and majority opinions followed. This company claims for its product unusual economy of operation, stating that, "the Homestead furnace burns more air, and therefore burns less fuel." The ash pit is deep and large; holds the waste of the fire and still leaves space below the grates for a free circulation of air—this is also said to save the grates from danger of warping due to excessive heat. The grate bars themselves are said to have an unusually large percentage of air ways, permitting the air to pass into the coals, to mix with the gases in the combustion chamber and make possible their consumption. Another fuel saving feature of the Homestead furnace is its triple heat retainer casing, which is composed of two insulating air spaces which intercept the heat which ordinarily would pass into the air of the furnace room.

The Modern Monitor

Old-time monitors afforded but a small measure of light and ventilation, and their development into a maximum effectiveness is due largely to the remarkable progress made in the construction of solid steel sash. Section Two of the Fenestra Line, a booklet just issued by the Detroit Steel Products Company, Detroit, Michigan, is devoted to monitor sash and operators. The principles of ventilating foundries, assembling shops and like places are first explained, and the adaptability of the horizontally and continuous center pivoted sash for perfect ventilating service is clearly demonstrated. In addition to the two kinds of sash just mentioned, the top hung and horizontally rolling types of sash are described, detailed and their useful application indicated. The Fenestra erection service is described. The Fenestra mechanical operating devices are fully described and detailed and the particular uses of each type explained. These devices are both hand and electrically operated.

The booklet is profusely illustrated with detail drawings, sectional drawings of typical building constructions of all kinds that use monitors and photographic reproductions of notable installations, —in fact, it is an extremely usable treatise on the monitor and its varied forms of construction. Attention is called to other publications of this company which describe the use of side-wall sash, underwriters' sash, vertically sliding counterbalanced sash, power house sash, institutional sash for asylums, jails, etc., also partitions and sliding, hinged, accordion and fire-escape doors.

Pyrobar Gypsum Roof Tile

The United States Gypsum Company, 205 West Monroe Street, Chicago, Illinois, in its periodical literature on Pyrobar Gypsum roof tile, presents some interesting facts as to just what the use of gypsum in building construction means. The low conductivity of this material is emphasized, together with the fact that it is fire and gas resistive, non-condensing, heat saving, a light weight roof deck, and thoroughly economical and easy to obtain. With reference to the insulating qualities of gypsum, the following statement made by this company is of interest:

"The prime object of 'fireproofing' structural steel is not so much to prevent the destruction of the steel by fire as to prevent its loss of strength when subjected to high temperatures. Obviously even though material practically invulnerable to fire is used as the fireproofing material, it does not follow that any protection is given to the steel unless that material also *insulates the metal* and prevents the heat of the fire from reaching it and raising its temperature above 500 degrees Fahr.

"It is one of the characteristics of Gypsum Tile that its temperature cannot be raised above 212 degrees Fahr.

"Gypsum ($CaSO_4+2\,H_2O$) is mined as a natural rock—a crystalline combination of 79 per cent calcium sulphate and 21 per cent water. In the process

of manufacture the rock is finely ground and heated until the water of crystallization is driven off. The product is then known as *Calcined Gypsum.*

"When Calcined gypsum is mixed with water, it recrystallizes (sets) and a material chemically and physically corresponding to the original rock form is the result. Very briefly, this is the way Pyrobar Gypsum Tile are made.

"Gypsum Tile is the only material that has ever successfully passed the Underwriters' Laboratories' fire and water test for fireproof partitions."

Quality Pipe

The factors which go to make the pipe of the Youngstown Sheet & Tube Company, Youngstown, Ohio, "quality pipe" are fully and attractively described in a booklet entitled "Quality Pipe" which is published by that company. The processes, from the mining of the ore to the shipping of the finished product, are graphically portrayed, there being photographs of every phase of manufacture of this product. There is ample description, too, of the methods pursued, together with interesting information relevant to the product. It is stated that, in addition to the ordinary departments of manufacture, this company maintains extensive chemical and metallurgical laboratories for analyzing and checking all raw materials. A most rigid inspection is also made of all finished products. That this company believes in the influence which the environment of the worker has upon the product of the company is evidenced by the following statement, which appears at the end of the booklet:

"In our plant is a well-organized Safety and Welfare Department. We have endeavored not only to make working conditions as safe as possible, but it has also been our desire to make them pleasant as well. Throughout our works are found fresh drinking water, ventilating and safety devices, locker rooms and, where space permits, flower gardens.

"Without doubt, comfortable and safe work conditions go to make for quality products."

Employee-Satisfaction

Drinking water fountains as a force in reducing excessive labor turnover are discussed in a folder published by the Armstrong Cork & Insulating Company, Pittsburgh, Pa. This little sheet is merely the announcer of a large book, "Drinking Water Systems," which supplies a large amount of valuable data on this subject, which has been investigated as a serious problem through several years of constant study. As a result, the findings of this company represent conclusive information, practical and theoretical, looked at from every angle of this important issue. Insulating methods, with particular reference to those manufactured by this company, are also discussed in this book.

All-Metal Sanitary Equipment

Sanitary washbowls, drinking fountains and metal lockers are advertised in the pamphlets of the Manufacturing Equipment and Engineering Company, Boston, Mass. This all-metal, sanitary and fireproof equipment is particularly desirable for use in factories, gymnasiums, public buildings, department stores and the like, and presents certain undeniable advantages in that these products are obtainable in a wide variety of types, are low in cost, economical in space and simple in construction and operation. Complete catalog of all the products manufactured by this company, as well as the booklets under discussion, may be obtained upon request to the manufacturers.

Bankers' Number of Grinnell Automatic Sprinkler Bulletin

A recent issue of the *Grinnell Automatic Sprinkler Bulletin,* published by the General Fire Extinguisher Co., Providence, R. I., is called the Bankers' Number, and is given over to fire prevention, having particular interest for them. The effect of the war in cutting down insurance indemnities is the subject of one interesting article, which is accompanied by valuable tables and charts. The second half of the *Bulletin* is given over to fire-prevention matters. This publication should prove valuable propaganda in the campaign for fire prevention, if given wide circulation.

Artificial Lighting for Industrial Purposes

The Holophane Glass Company, 340 Madison Avenue, New York City, has recently published a booklet entitled "Scientific Industrial Illumination." In this discussion, which is amply illustrated, the need and the economic advantages of scientific illumination are first taken up. The fundamental principles of good industrial lighting follow, together with information regarding the products developed by the Holophane Company to meet industrial housing needs. The last section in the book contains a fund of general engineering data which should make the book of value as a reference.

XUM

PALAZZO DORIA, GENOA, ITALY