PENCIL POINTS

JANUARY 1933

AN ILLUSTRATED JOURNAL for the DRAFTING ROOM

35 CENTS A COPY

. . . YET IT COSTS LESS!

REPUBLIC salesmen everyday hear prospective buyers of Toncan Iron Pipe say, "But it costs more." But that's no argument against buying it—at least hundreds of actual users don't think it is, because in the end it actually costs less.

Bare pipe prices are no basis for figuring values. The true yardstick is the cost of the pipe installed divided by the service life. Installation usually costs more than the pipe and fittings, and when failure occurs the entire installation cost is lost forever. Then it costs money to tear out the old, and the original cost must be paid again for the replacement. Figure it this way. One kind of pipe lasts, say 5 years. Another 10 years. Even if the 10 year pipe costs twice as much as the other, it saves money for the user—saves the entire cost of tearing out the old and replacing with the second installation.

Toncan Iron Pipe lasts longer because it is made from an alloy of scientifically refined iron, copper and molybdenum. It costs more to make, yet it costs less to use because its resistance to corrosion among ferrous metals is exceeded only by the stainless irons and steels. Wherever the spectre of rust raises its ugly head, Toncan Iron Pipe will save you money.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

REG. U.S. PAT. OFF.
TONCAN
COPPER
MO-LYB-DEN-UM
IRON PIPE

Pencil Points, published monthly by The Pencil Points Press, Inc., at 258 Atlantic St., Stamford, Conn. Publication office Stamford, Conn. Editorial and Advertising Offices 419 Fourth Avenue, New York, N. Y. Yearly subscription $3.00, single copies 35 cents. Entered as second class matter, March 10, 1930, at the Post Office, Stamford, Conn., under the Act of March 3, 1879. Volume XIV, No. 1. Dated January, 1933

# PENCIL POINTS

Volume XIV January, 1933 Number 1

What Prospects Lie Ahead?

By Thomas F. McSweeney*

Editor's Note:—*This article is not intended and should not be read as a prophecy. The author has simply examined past and present conditions as shown by statistics in an effort to discover any encouraging signs that may lie hidden behind the dark clouds of depression. He finds a latent demand for housing, but it awaits capital to satisfy it.*

In more normal and happier days, architects and builders are much concerned with questions of architectural adornment and of refinements in erection methods. But today, with practically nothing to adorn, or erect, these questions have become of minor importance and the chief problem is the possible revival of building. Specifically, it boils down to the inquiry; what are chances for a building revival in 1933?

This question may best be answered by a study of building history and by a comparison of the conditions now operating with those of the past. The experiences of the last two years have clearly demonstrated the impossibility of accurate business forecasts, and, since construction is the most erratic of all our major industries, any predictions of its course are particularly unreliable. But, since an intelligent understanding of what has happened in earlier and similar periods is by far the best basis for a knowledge of what may be expected in the future, a little historical background is essential. How has construction acted in other depressions?

First of all, what data have we? There are available two types of construction statistics; first, the study of permits granted, and secondly, the compilation of the F. W. Dodge Corporation as to contracts awarded. The permit studies go back to the eighteen-fifties, and furnish the basis for any long time analysis. This material is not particularly accurate, however, and should not be used if better data can be obtained. The Dodge figures on contracts awarded have been compiled for 36 states as far back as 1923, for 27 states to 1919, and have been extended, by estimates, to the years from 1910 to 1919. This series is much more accurate than the permit data. It leaves something to desire, but inferences from it are relatively authoritative.

Several analyses of these time series have been made. The Babson organization has, since its beginning, carried on studies of building permits; the 1919 reports of the Harvard Economic Society gave a thorough analysis of a similar series; and data of the same sort is used as a component part of the general business indices prepared by the American Telephone and Telegraph Company and by the Federal Reserve Banks. All statisticians who have studied the movements of building agree as to their general character. Building drops into depressions long before general business; it also recovers sooner and leads the way to prosperity.

In order to understand this condition more clearly, it will be necessary to examine the curves of building and of business. For the sake of brevity, only the period since 1920 will be considered. That exactly the same sequence held during the pre-war years, is shown in the "Review of Economic Statistics" for 1919, in which the Harvard study is described.

In 1919, construction and general business had not yet steadied down after the terrific dislocation of the war. But, in the early spring of 1920, construction dropped sharply into the greatest depression it had known for a generation, and which has been exceeded, in recent history, only by our present unfortunate condition. The curve of general business (the index of the New York Times Annalist is used for this) did not drop below normal until the late fall of the same year. Construction led general business into the depression by about six months.

The fall in the construction curve was sharp, and reached its bottom in the late autumn of 1921. From there the recovery was steadily upward, and preceded the upturn of general business by more than six months.

Since this 1921 depression, we have undergone two sharp, but short, recessions before the crash of 1929. The business slump of 1924 had been anticipated clearly by building almost a year previously, and the drop in general business in the late fall of 1927 was heralded by a similar recession of building in the early spring of that year. In each of the three cases construction had fallen before general business, and had also very definitely preceded it on its way up again.

The same similarity holds for the entire course of the present depression. Building started its long downward course in the early spring of 1929. All during that summer, builders were complaining that the great concentration of funds in stock market speculation was depriving their industry of the money it needed. But from our vantage point of 1932 we now see that the great falling off of construction was only the herald of the business crash to follow eight months later.

Early in 1931, business improved markedly and the

Lecturer on Construction Economics, M.I.T.

forecasters predicted better things. But, unfortunately, construction, which had gone up five months previously, had already turned down again. True to all precedents, general conditions followed into low levels.

So much for indices. No data of this sort can be credited with much weight unless it has an understandable cause. Construction payments, in normal times, put into circulation at least one-eighth of all the nation's income, and it must be obvious that this tremendously important source of employment and of wages can not be dried up without affecting the entire structure of the country's economic life. Business necessarily gets bad when building stops, because so many of the nation's best wage earners are curtailed in their purchasing ability. Conversely, if building revives, and the great amounts of money usually involved again begin to circulate, other things improve.

It is possible to carry this analysis a step further, and subdivide the ups and downs of building. This was done at the Fifth Annual Meeting of the Harvard Economic Society, held on November 11 and 12, 1932. The Dodge Company figures for total construction value were offered, together with a comparison curve of residential construction. One of the graphs is reproduced in Figure 1, together with the Annalist Index of General Business. The amplitude of fluctuation for building is, of course, much greater than that of the general index, and the lag of business behind total construction is plainly apparent. The interesting point of this chart is the much more rapid recovery of residential construction than of total building. It is generally accepted that in 1921 residential construction dragged business out of its slump.

The reason for this is not difficult to discover. In 1920 there existed a very great housing shortage in the United States, due to the practical stopping, since 1917, of all construction not absolutely essential for war purposes. The shortage was not apparent, for

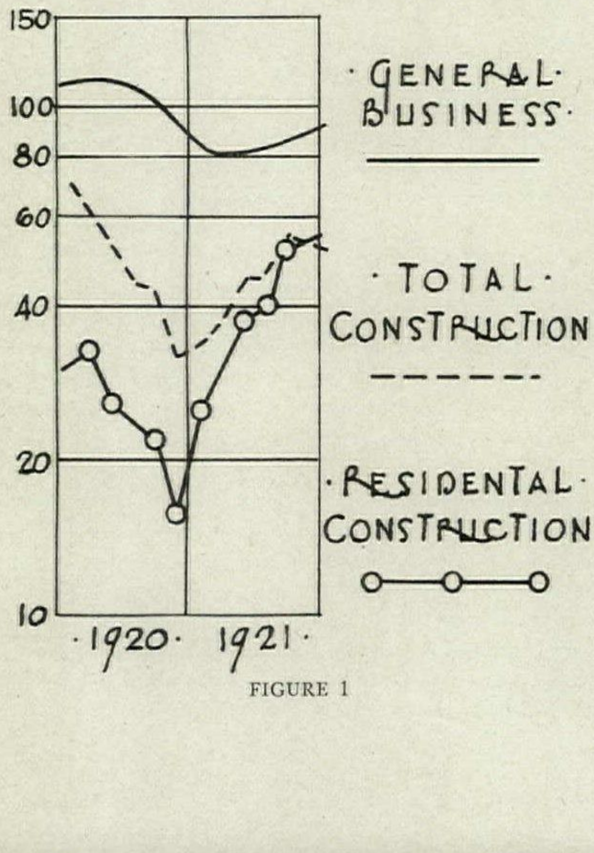


FIGURE 1

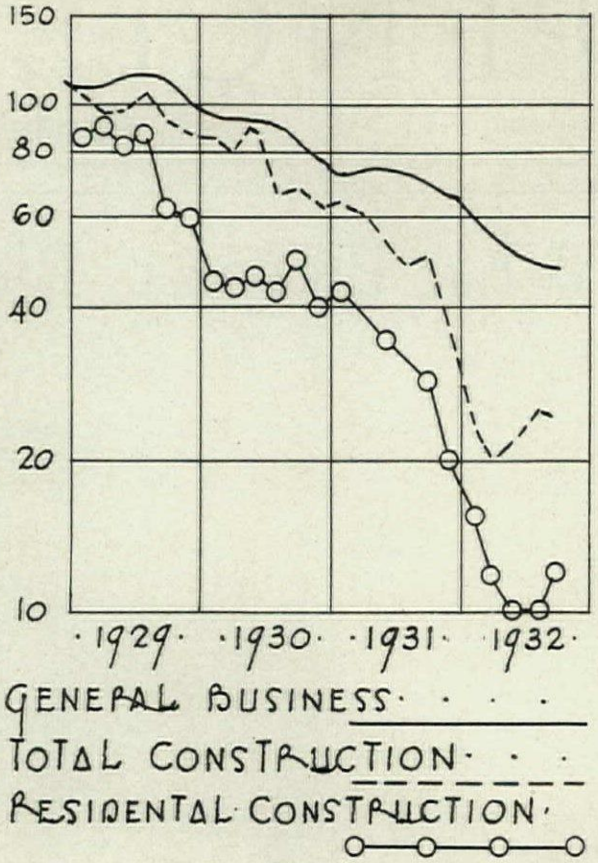


FIGURE 2

then, as in all hard times, there seemed to be plenty of vacant houses and apartments everywhere—but it nevertheless existed. In the winter of 1920-1921 this shortage was realized; houses began to be built, and recovery in all fields began.

How far does the history of this last major depression apply today? So far, the present depression has exhibited chiefly the downward trend, and there can be no doubt that total building has gone down sooner and faster than general business, and residential construction sooner and faster than total building. This sad story is graphically shown in Figure 2 for the present depression period. On both Figures the vertical ordinates are logarithmic, so that equal percentage changes are shown by equal vertical displacements. The Annalist curve is shown as still headed down, but at a slower rate (data issued since this chart was drawn give the curve a very encouraging upswing), while residential construction, after reaching an all-time low, is exhibiting the greatest percentage recovery it has shown since the late lamented days of 1928. If there is any justification for comparing the present depression with that of 1921 and if the same saving housing shortage exists now as then, this improvement may mean something, and may be a most hopeful sign.

It remains, then, to examine the present situation in housing. Fortunately, ample data are available. In the past few years a great many Real Estate Exchanges have made surveys of the number of vacant houses and apartments. Even more helpful, the Post Office authorities have had similar studies made by the mail carriers who report as to conditions on their routes.

In some cases, in addition to listing vacancies, data has been assembled to show the number of families who have been forced to double up, so that two or more live in a house or an apartment meant for a single family. This doubling up has always taken place in past depressions, and the extra family is usually the first customer for housing as soon as its members see any possibility of carrying an extra rent burden.

Figures could be quoted for dozens of cities, but for the sake of brevity only two are listed below. In considering this data, it is to be remembered that the normal vacancy percentage for single-family houses should be around 4% to 5%, while apartment vacancies run from 7% to 9%.

The first survey was made by the Boston Real Estate Board in 1930. The summary is as follows:

Type of House	*Total Included in Survey*	*% Vacancy*
One-family	17,156	3.7
Two-family	8,449	4.9
Three-family	4,476	5.4
Apartments	22,355	10.1

TABLE 1—VACANCY SURVEY FOR BOSTON, 1930

This survey did not cover the entire city, but was thorough for the representative districts examined. In 1930, therefore, there was no extra surplus of housing in Boston. Since then, residential construction has been at a virtual standstill. At the same time, a great many dwellings have been demolished to make way for such things as the East Boston Tunnel, the Southern and Northern Arteries, and for the greatly accelerated construction of traffic circles, new arterial highways, and the rest of Boston's very extensive public works program. Mr. James D. Henderson, a well known tax authority and real estate appraiser, says that the destruction of dwellings has been greater than the new construction, and that there actually exists, in Boston, a shortage of houses equal to four years' normal development. If Boston builders were to begin now to build at double the normal rate, it would take four years to satisfy potential demands.

The story in St. Louis is very similar. Their study was made by the St. Louis Post Office, under the direction of Delbert S. Wenzlick of the St. Louis Real Estate Exchange, and is dated "Spring, 1931." In addition to the usual data as to vacancies, the number of "extra families" is also listed. Refer to Table 2.

In those other cities where the Post Office has listed vacancies and extra families, the result is about the same. St. Louis' 8.5% vacancies was not excessive, and when it is realized that 5.2% of these would be filled if the doubled up extra families were enabled to set up homes of their own, the surplus drops below normal, and an actual shortage is indicated as of the spring of 1931. In St. Louis, as everywhere else, there has been very little construction of homes since that time. It would seem that the estimate that St. Louis actually has three years' residential shortage is justified.

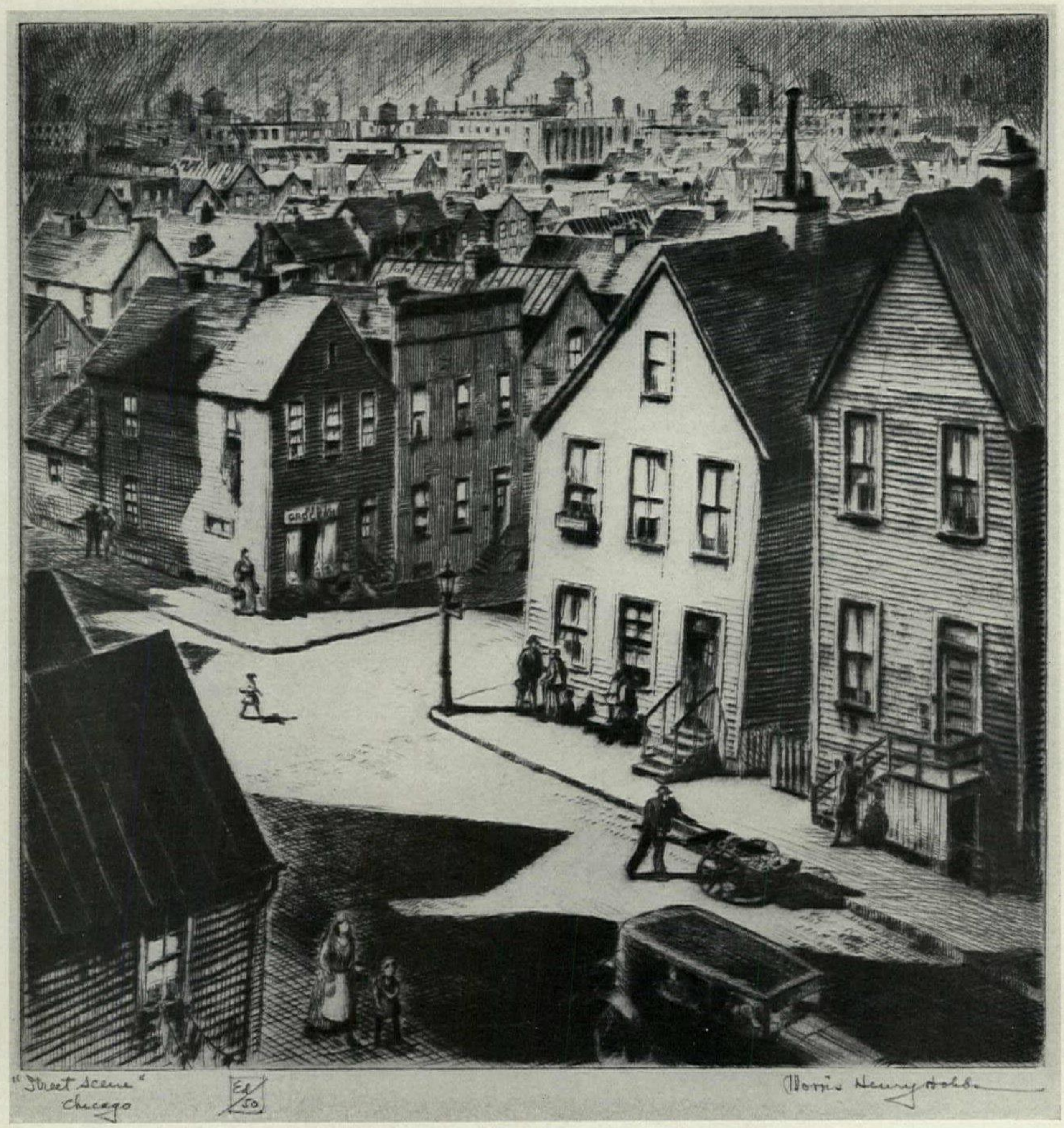
An instructive confirmation of these estimates is found in the survey made recently by the Graybar Company. The result of their study led them to estimate that a potential demand for new residential construction exists which amounts to about two years' normal building for the United States. As the city figures would naturally exceed those for country districts, this estimate is as close a check on the Boston and St. Louis approximations as is to be expected, admitting the lack of precision in any such estimate.

There is another factor which does not appear in any survey, but which may prove to be a great element toward building revival. There are, in all our cities, a growing number of tenement units which are becoming increasingly dilapidated. There can be no doubt that as soon as better times dawn the families now forced to live in them will seek more attractive homes. There is no way of telling quantitatively how large a group these families form. Mr. John Ihlder, Executive Secretary for the Boston Housing Association, in an address recently delivered before the Faculty Club at M.I.T., said that the researches of his organization showed that the number of these substandard tenements far exceeds the number of vacancies.

It has seemed advisable to go into this matter at fairly great length because the seeming similarities of the conditions existing today and those of 1920 and 1921 are so great that they are probably of extreme significance. It is true that, although today's shortage has existed to a lesser extent for three years, it has not yet begun to operate as a savior of the present situation. There are, as yet, really tremendous handicaps to a revival of residential construction. To examine merely the favorable aspects and neglect the only too obvious bars to progress would be the most unintelligent sort of groundless optimism. But it can not be denied that the same fundamental causes for revival that operated in 1920 and 1921 are now present in at least as great force as then, and that the graphs of Figures 1 and 2 may very well indicate that the recovery is already under way. If the upswing of residential construction turns out to be anything but temporary and accidental the extremely hopeful behavior of the curve since August may prove to be the forerunner of far better times to come.

Type of Building	*Number of Units*	*Vacancies* *Number*	*Vacancies* *%*	*Extra Families* *Number*	*Extra Families* *%*
Single-family	60,766	1,797	2.9	4,592	7.5
Two-family flats	68,118	5,181	7.5	2,063	3.2
Other flats	76,808	9,479	12.4	2,260	2.9
Apartments—Mail delivered to boxes	19,700	2,749	13.9	2,682	13.6
Total	225,392	19,206	8.5	11,597	5.2

TABLE 2—VACANCY SURVEY FOR ST. LOUIS, SPRING OF 1931



STREET SCENE, CHICAGO

FROM A DRYPOINT BY MORRIS HENRY HOBBS

Reproduced at size of original

Functionalism and Architecture, 2

By C. Howard Walker, F. A. I. A.

Editor's Note:—*This is the eleventh of a series of articles in which leading architects are discussing the philosophy of design, considered in the light of present-day practice. Preceding articles in the series have been by William Adams Delano, George Howe, Albert Kahn, Alfred Fellheimer, Irving K. Pond, William F. Lamb, Dwight James Baum, Louis La Beaume, and Ralph Adams Cram. The first part of Mr. Walker's article appeared last month.*

Carefully and thoroughly studied utilitarian and structural considerations have inherently a trend towards satisfactory and often beautiful appearance. This is evidenced in mechanics, in catenary curves, in bending to stress, etc., and it is especially evidenced in the effect of intelligent building laws, all of which have beneficial utility as the object of their existence. But any opportunist, with makeshift or casual solution of good intention but lazy performance produces conspicuous examples of undeveloped shapes, failures from lack of study or from incompetency.

Probably no causes have more created beauty in Paris than its building laws begun by Louis XIV, nor in New York than its zoning laws, both dealing with heterogeneous and chaotic conditions, and forcing them to an intelligent basic order. It is an enlightening example of the fundamental allegiance of architectural design to basic utility, and basic functionalism, but it creates its own enormities if it stops short of idealism or fails to avail itself of harmonic proportions. What are the characteristics of the individual and grouped proportions of geometric solids? It is obvious that the simpler forms are the more readily comprehensible, and that they are accepted without cavil by men at large, men who make no claim to artistic training or predilections. For instance, excepting for its relative scale to its environment no offense is given by any single regular polygon or part of a sphere. It is not censored, but if it is an irregular polygon it is less liked. Simplicity is therefore a desirable quality. A pyramid, a cube or elongated cube, that ubiquitous thing the parallelopipedon has no foes, nor does the cone or the dome. Size alone seems to be the measure by which the average man exalts them. With grouping, however, enters design—and the architectural major domo is design.

It is here that the meticulous man of exact science trips, and fails to realize the forest because of the trees. There are three abiding factors in the architectural organism—because it is an organism—and the best organisms have, by surviving as the fittest, proved themselves the least complex. The whole desire is to obtain the *Multum in parvo*.

Factors of Design

First, there is the Unit unchallenged. Second, Group Units with Unanimity. Third, Unity. Unanimity and its consequent Monotony or Harmony (and it has been said that the legitimate outcome of Harmony is Monotony) is the major operation to obtain dignity, serenity. It is the regular repetition of identical factors at identical intervals. It is the marching repeat of the colonnade, the arcade, and their ilk. It made the temples of Greece, the streets of Palmyra, the soaring bays of the Cathedrals. As far as controlling order is concerned it cannot go wrong but it is often condemned by the functionalist because it is not demanded by the material conditions. Therefore away with it. However, "Man cannot live on bread alone."

The result of Unanimity, which so often shrinks into the elemental, undeveloped interchangeable unit cell, has justified itself nobly when used with respect. It is universal, especially in Architecture and the minor Arts. Call it, if you will, mass production; it is merely that unless it is enthroned by Art.

It is utility in the aqueducts of Rome marching across the Campagna. It is ennobled in the Pont du Gard, and in many bridges, in theatres and in the Colosseum. It creates the Temples of Egypt, Greece. It is mere utility in industrial buildings, but is made of interest in civic and palace façades. It is bound by definite regular repeat and is contented with so simple an orderly method. With it simplicity is its great virtue and is enough. It permeates all the minor arts in repeating patterns. Already it has testified complexity of statement is an error, and expresses secondary titillating emotions, intriguing details of which the purpose is to embroider, but it should not violate elemental order.

The introduction of these details creates the demand for Unity of all the factors, elementary and accessory. In a greater or less degree come combinations of various solids and voids, and their developments, various materials and methods of structure, various expression of purpose. If these are uncontrolled, they become a fantasy, if overdone are erratic, and correspond in language to stuttering without a coherent theme. Controlled by structural expression, they produce Amiens, uncontrolled they produce incompetent English Victorian Gothic. They begin to vitiate so-called High Renaissance early in the 16th century, they complete their confusions in the Baroque.

Antonio da San Gallo was little affected by them, nor was Sansovino—but Palladio at times played wantonly in grouping pilasters and columns, even the classical Vignola erred, and Serlio led to Maderna's confused façade of St. Peter's, and to Carlo Borromini's Piazza Navona. Naturally with license used in the design of the groupings of large factors, smaller factors became lawless.

The principle of Unity was crippled by the number of the component factors. This has occurred since the

15th century and the revolt against styles is fostered by two classes of critics. One group finds formality dry, another finds it smothering their would-be inspirations, both uniting in a desire for change, upheaval, and revolution—and expecting to create an art which has in it none of the factors of the mosaic of the past.

The element of actual or apparent stability is of the utmost importance in architecture and demands subservience of mere literal utility to it, i.e., it requires arrangements of factors which, while not violating utility, control its expression. This occasions intelligent adjustment in which design is expressed. Without these adjustments, there is no architecture. They are incident to size and position of masses and voids; and detail accents their character.

Gravitation causes heavier masses to settle at the bottom, and as larger areas give the impression of greater mass than small ones, larger shapes are basic, and smaller ones superposed progressively over them. The reverse is the usual case with voids. There is no more potent method of indicating stability than that of placing solids over solids and voids over voids, which system has become axiomatic.

The character of the materials influences their position also, the stronger material and the sturdier and rougher surfaces, indicating strength, naturally sustain the weaker or the finer and more delicate features of the design. For the same reason, the strengthening of corners, which are liable to injury, has caused pavilion treatment in façades, and pilasters, quoins, etc. Transparent materials, however, have no apparent stability or strength, but count as voids. Glass, therefore, requires subdivisions of solid materials or merely counts as a hole or void, hence the necessity for mullions, transoms, grilles, etc. Glass in itself gives neither dignity nor nobility to architecture, and its use is often excessive from the exploitation of scientific theories without the application of common sense—orientation and latitude from the equator being frequently ignored. Opaque glass without polish overcomes to an extent the appearance of instability.

Architecture is articulated, built up of pieces, and the joints of its structure indicate the limitations of man's power to erect pieces that he cannot readily handle. These joints, therefore, give a scale relative to man. Very large mass always makes an appeal as superhuman, almost supernatural—the appeal of the huge, the colossal—but it is unique, not desirable for environment. Man is most at home midst objects that relate to his own stature. Hence scale, an intangible, evasive quality associated with every object related to man, and in no way more definitely indicated than by the pieces of which he constructs his creations, which intuitively he relates to his ability.

Mathematical Systems

Before abandoning the statements in regard to the proportions of geometric solids and designs in two dimensions, a word can be said in relation to various theories of proportions. These have been all developed with admirable intentions and all have their individual values, inasmuch as they recognize and inculcate order of some kind—and as the universe has order and we are the Scions of it, any order is better than no order.

Certain fundamental facts which indicate stability are obvious, strata and verticals especially. The simplest geometric forms do not depart from these or from the results of gravitation causing crystallization. Geometry teaches this—whether plane or solid, in two dimensions or in three—but beyond this are the possibilities of higher mathematics, conic section, roots, etc., and their manipulations and equations. These are abstrusely fascinating in their inception but less so in their objective definition in forms.

Each method of dealing with proportions produces an obsession for more and more subtlety which loses variety as it increases combinations. This would appear to be excessive at the moment it approaches the occult. The Divine proportions of Pythagoras are still disputed, the dynamic systems are complicated. Plane geometry is easily understood if expressed in rectangular figures, regular triangles, and resultant octagons and hexagons. It has gained little by a consideration of the Pythagorean pentagon and five-pointed star, and beyond these is actually a metaphysical attitude in relation to proportions.

Also, it is very easy to create *post facto* systems from existing examples, especially as it is a well known fact that Egypt, Assyria, and Greece all had skilled mathematicians, whose knowledge was simply used and regulated their action. But it is also to be remembered that all early expression of registration of fact or intention of utility was devoid of mathematics and was empirically made. It is not necessary to impute more than the simplest plane, and later solid, geometry to a very large proportion of admirable works of art in all ages and by mankind generally. When involved theories occur, they are necessarily *post facto*, made from erudite assumption, and fail to justify so complex a reaction.

Various webs of network can be deployed over delineated forms, at the will of the experimenter, and their foci will hit some salient features in the chosen background. This however has little, if anything, to do with the functional character of design, but merely drives it into a pattern, creating order from ignorant disorder and thereby benefiting the result. No pattern of proportions can be absolute, but should exist relatively to the appearance of the object. It is therefore mutable, free within simple bonds, and not autocratic. Sincere intention to state simply and to the point, unenamoured of intricacies, is the *sine qua non* of design.

Stability is manifestly desirable. The effect of it is obtained simply in three ways. By horizontal zones, vertical stripes, and by voids over voids and solids over solids. Horizontal zones appear very early. Verticals in early form became pier and post and column. Voids over voids were adopted when buildings became over one story in height.

Patterns

The patterns of architectural designs have been defined by line drawing and by shadows caused by a light from above; i.e., the sun. This is an established practice. Line drawings show two dimensions only, unless isometrics or perspectives, but in "*rendus*" there has been established the system of shadows which can be measured for the third dimension.

Models

As a matter of fact, architecture, like sculpture, is best studied by models, which give all the information provided by plans and elevations directly and not by conventions. All mouldings and detail have owed their effect to their shadows. The horizontal lines of cornices, eaves, belts, etc., create the horizontal portions of architectural design and indicate structural change of material, and often subdivision of purpose, to a greater degree than the vertical of pier, column, buttress, pilaster, etc. They are not necessarily functional, but, in common with all architectural factors, are of value to accent structure and purpose and should not be ignored in engineering.

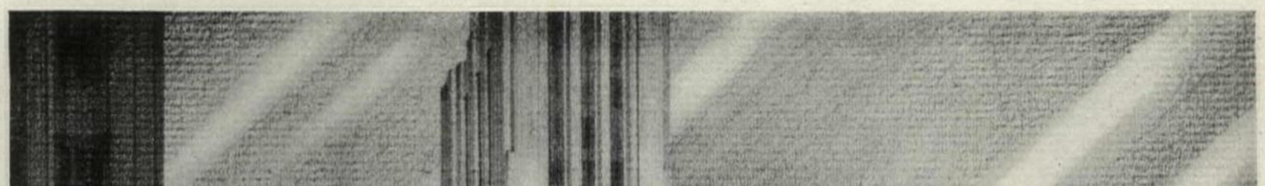
A new condition has arisen with the use of chromium rustless steel, which offers the opportunity for silver lines of detail at the tops of factors instead of shadows at the bottom, accenting by high lights. Even mediocre architecture never appears so well as after a light snowfall lies on the tops of projection and, by white, establishes lines of stability. Chromium steel produces this effect. It has been used on the Empire State Building.

Stratification

Stratification isolates or segregates areas. In erections in stone, it has been common sense to use the larger and heaviest factors below as basic, and smaller and lighter factors above. This has produced, by the joints, texture surfaces which have received much consideration and which accent stability.

In architectural design, three elemental states exist, as before stated, which can be expressed by the Unit, Unanimity, and Unity. The Unit is a simple entity, complete in itself, without necessary association with other factors. Such are the simple geometric solids, the sphere, the cube and its extensions, the pyramid, and regular polygons, the obelisk, etc. They are universally uncensored in themselves, and accepted as of intrinsic value. When grouped they invite criticism of their mutual relations. If elaborated, they dominate all accessories or cease to have integrity. They are frequently the crustacean shells of purpose, and to that extent functional.

Unanimity of expression by factors has produced the largest proportion of the world's greatest monuments. In its simplest form it is repetition of identical factors or voids. It is the marching orderly repeat of the colonnade, the arcade, the fenestration of walls, buttressing, etc. It is used in serried ranks and indicates identical purpose of its factors, with identical structure.



FROM A PENCIL RENDERING BY ARTHUR J. FRAPPIER

Suggested design for a new public library to form part of the Civic Center for Paterson, New Jersey, as proposed by the Regional Plan Association, New York.

PENCIL RENDERING BY SCHELL LEWIS

UNITED STATES POST OFFICE AND COURT HOUSE, BINGHAMTON, NEW YORK

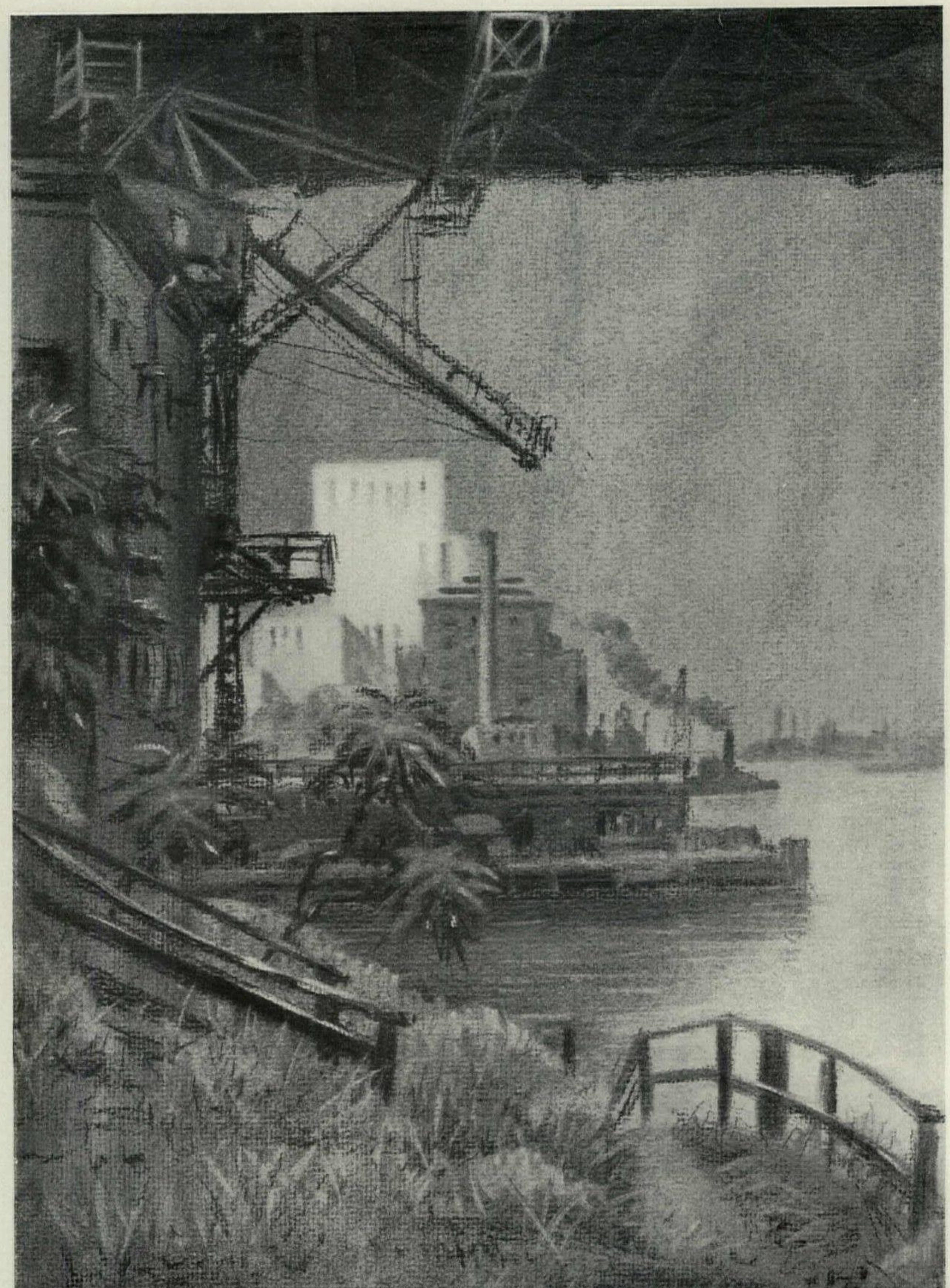
Conrad and Cummings, Associated Architects—Lorimer Rich, Consulting Architect

A GRAY DAY ON THE WATERFRONT

A Group of Charcoal Sketches of Contemporary New York

By Edward P. Chrystie

In which the Artist, an Architectural Draftsman and Designer, Demonstrates that the Medium So Effectively Used by the Late F. Hopkinson Smith is Still Worth the Attention of the Sketcher.

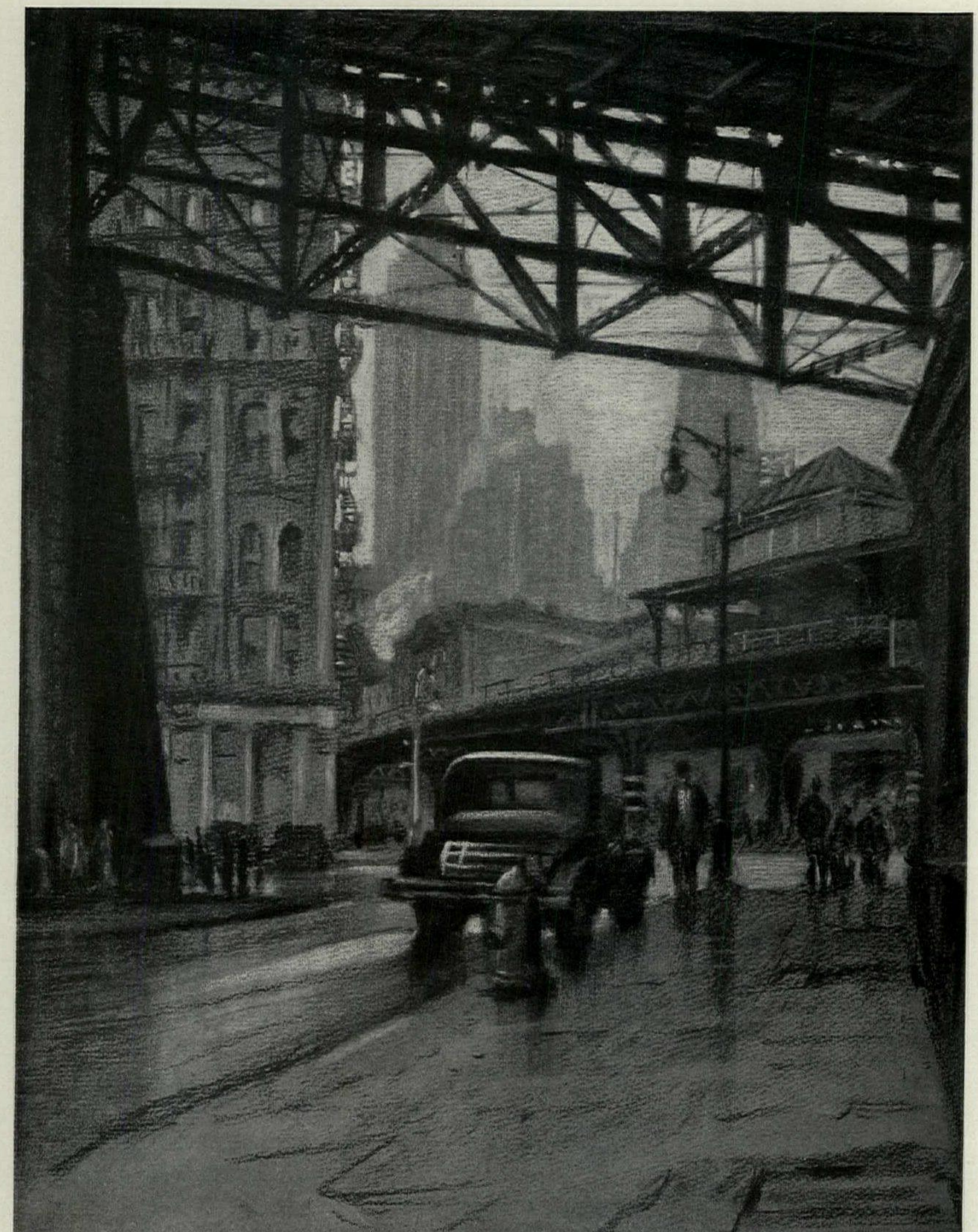


UNDER THE QUEENSBOROUGH BRIDGE, NEW YORK

CHARCOAL DRAWING BY E. P. CHRYSTIE

MUNICIPAL BUILDING, NEW YORK

CHARCOAL DRAWING BY E. P. CHRYSTIE



CHERRY STREET AT FRANKLIN SQUARE, NEW YORK

CHARCOAL DRAWING BY E. P. CHRYSTIE

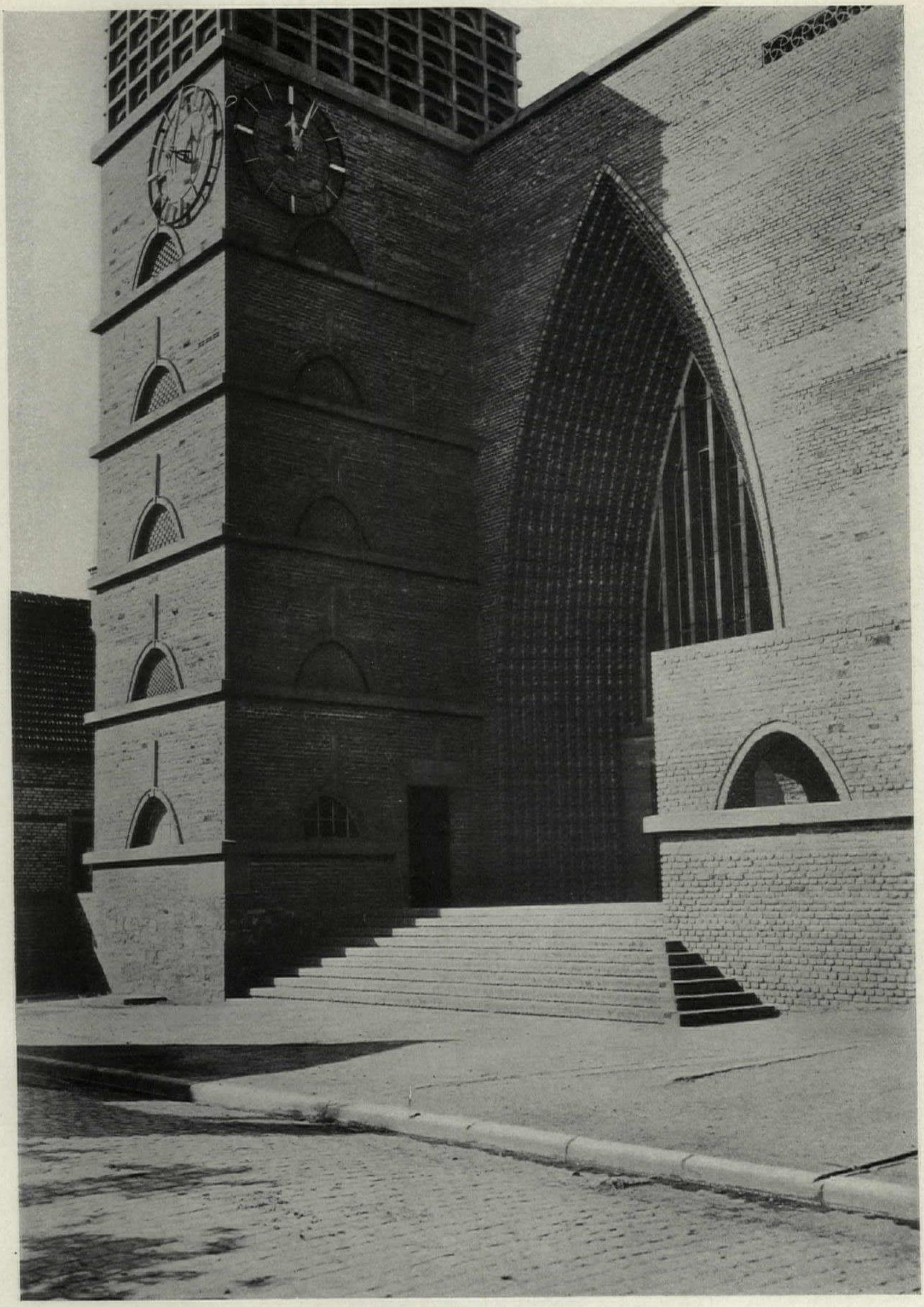
ST. BONIFATIUS CHURCH, FRANKFURT AM MAIN, GERMANY
MARTIN WEBER, ARCHITECT

A Group of Modern German Churches

As Photographed by B. Kenneth Johnson Showing a Variety of Treatments of the Clock Tower Which May be of Interest to the Designer.

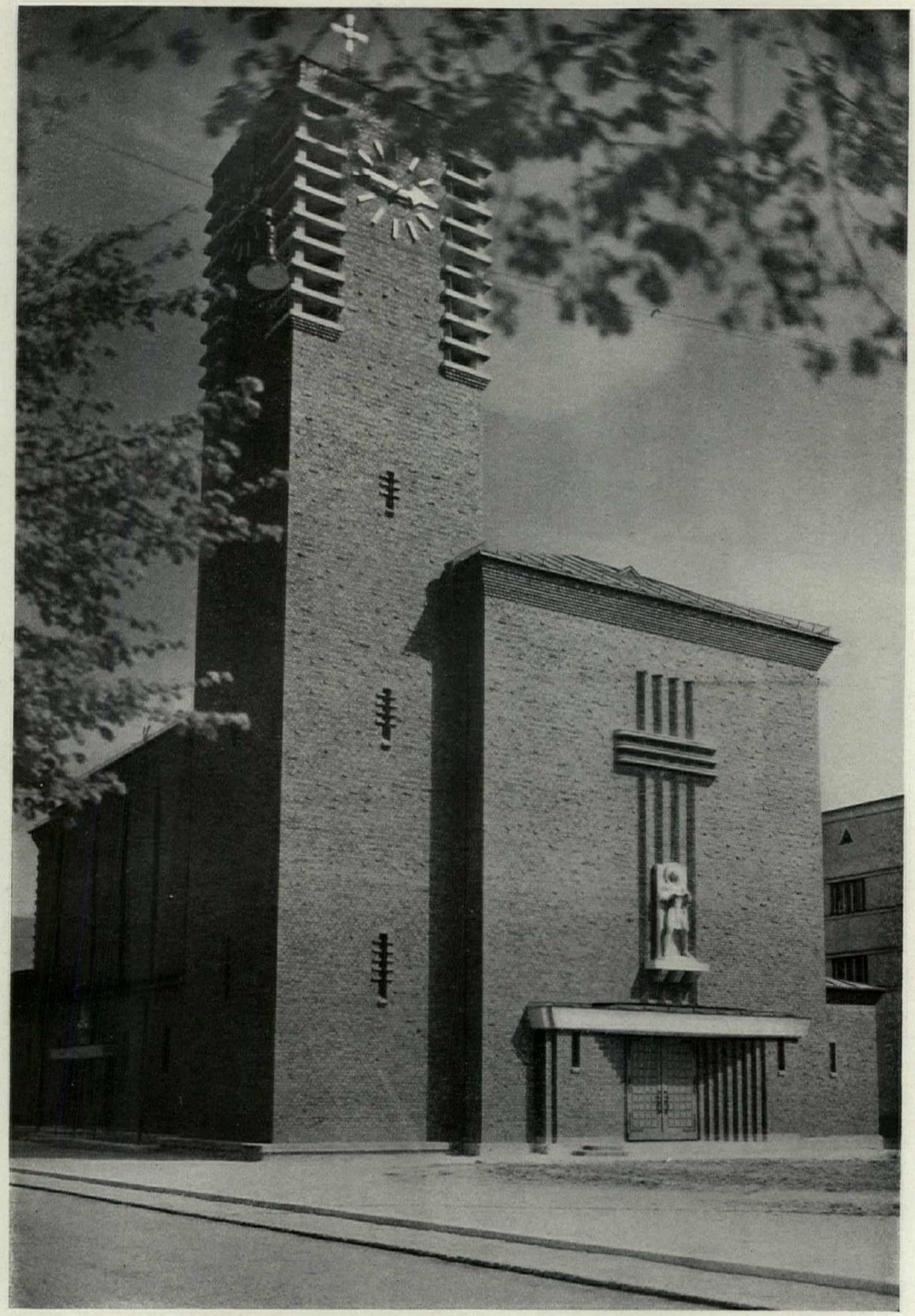
EVANGELICAL TEMPELHOF CHURCH, BERLIN, GERMANY

BY CITY ARCHITECT BRÄUNING—PHOTOGRAPH BY B. KENNETH JOHNSON



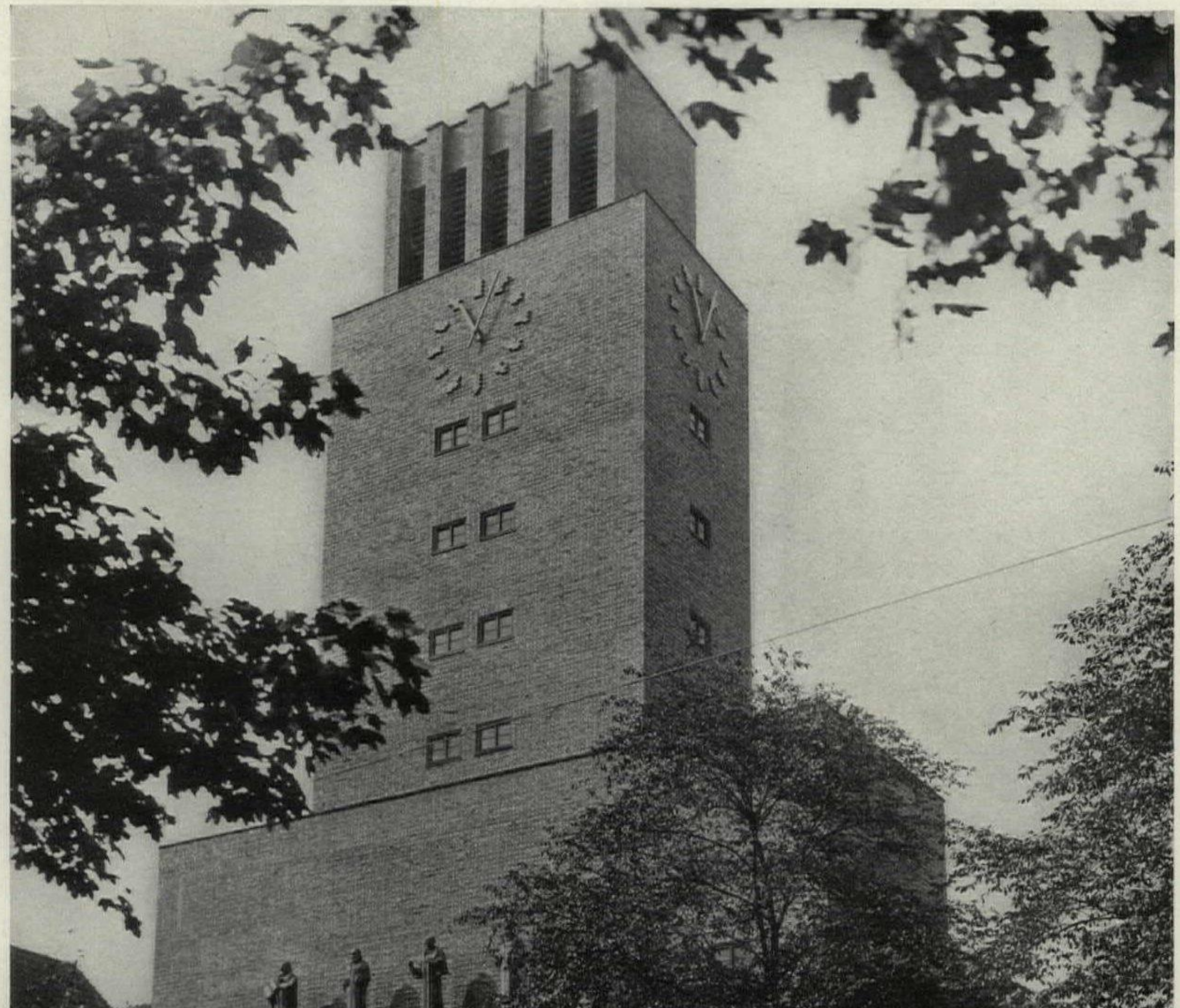
CATHOLIC CHURCH, MAINZ-BISCHOFSHEIM, GERMANY

DOMINIKUS BÖHM, ARCHITECT—PHOTOGRAPH BY B. KENNETH JOHNSON



ST. SEBASTIAN CHURCH, MUNICH, GERMANY

O. O. KURZ, ARCHITECT—PHOTOGRAPH BY B. KENNETH JOHNSON

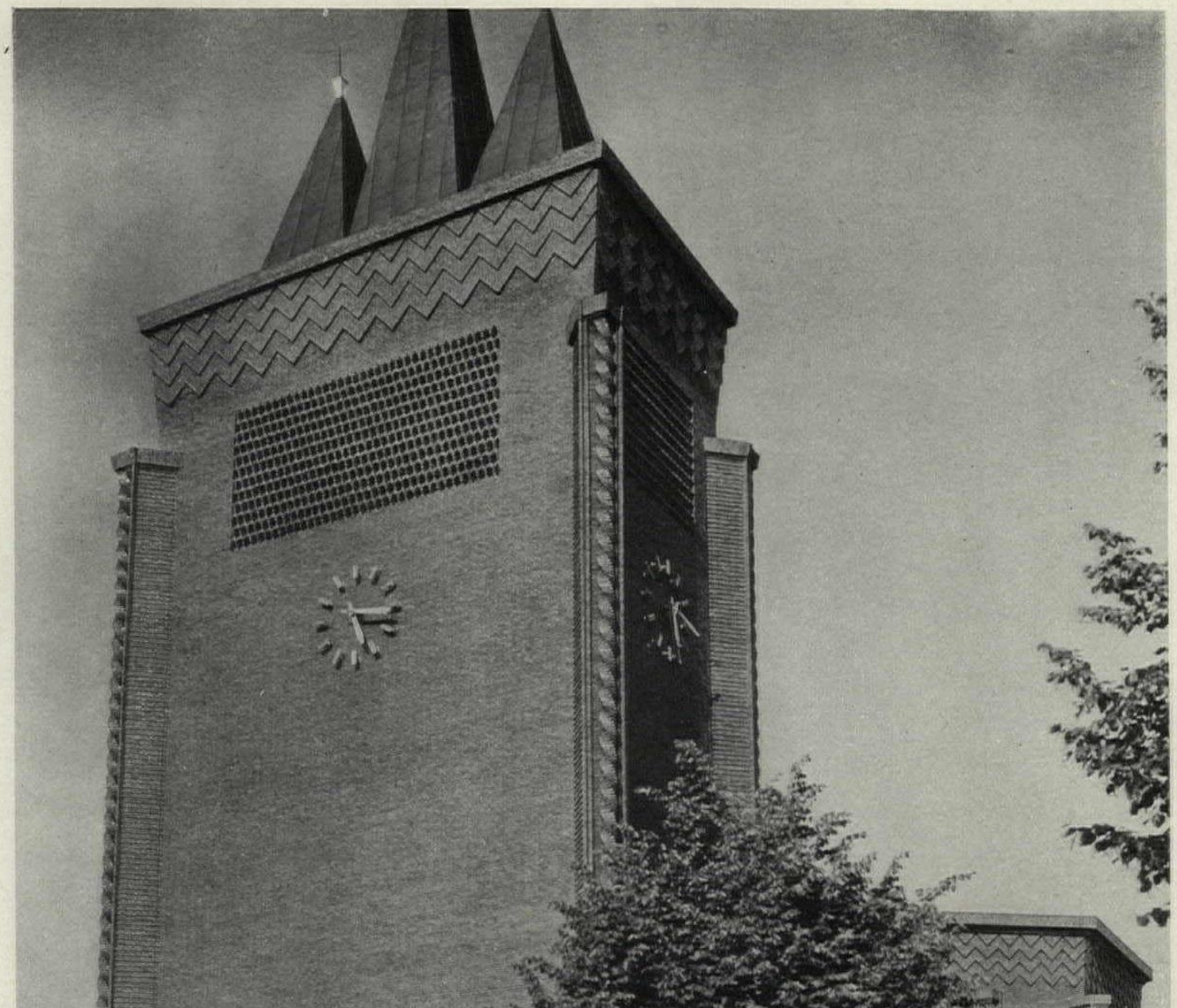


BUGENHAGEN CHURCH, HAMBURG, GERMANY

EMIL HEYNEN, ARCHITECT—PHOTOGRAPH BY B. KENNETH JOHNSON

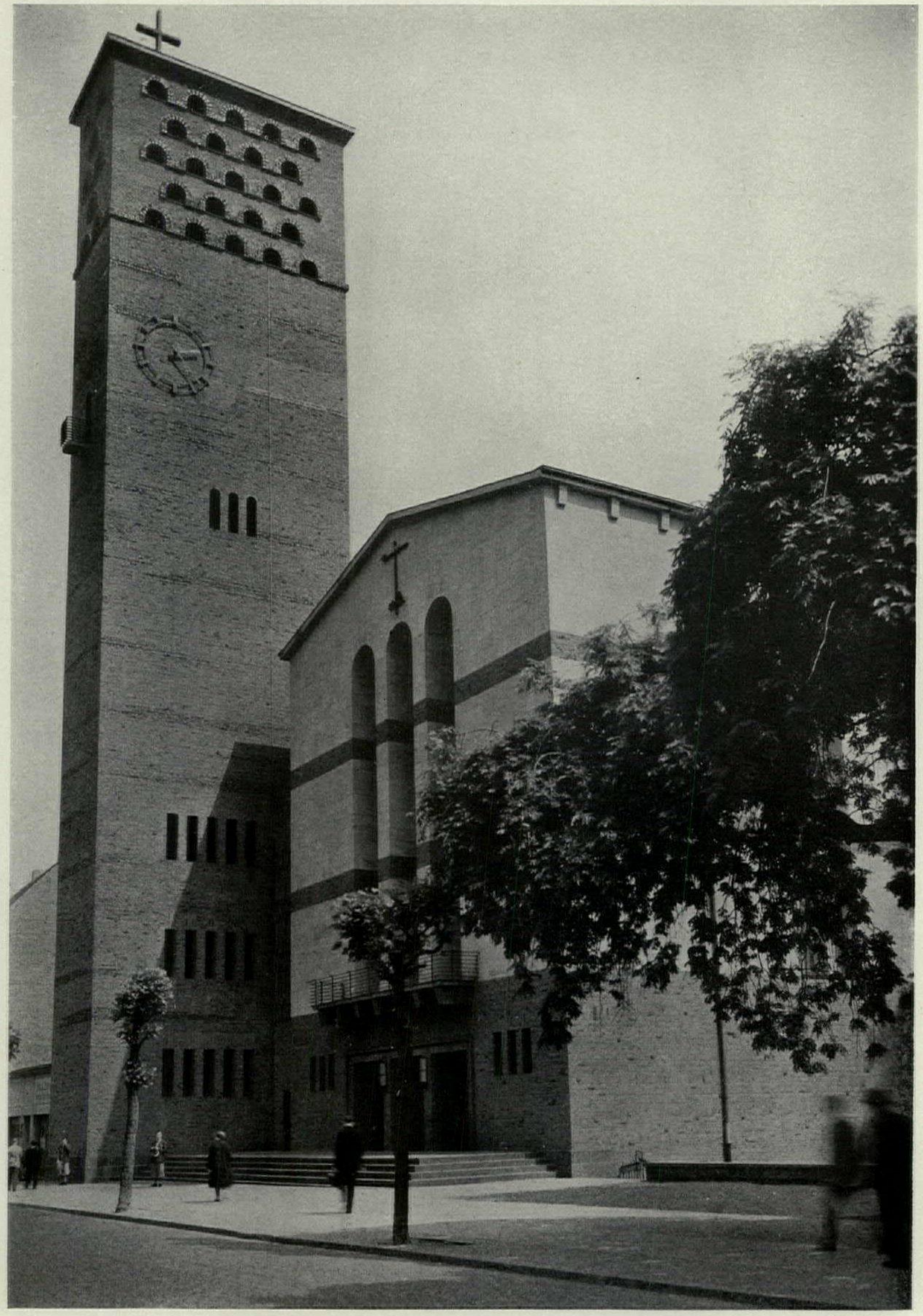
ST. ANTHONY CHURCH, AUGSBURG, GERMANY

MICHAEL KURZ, ARCHITECT—PHOTOGRAPH BY B. KENNETH JOHNSON



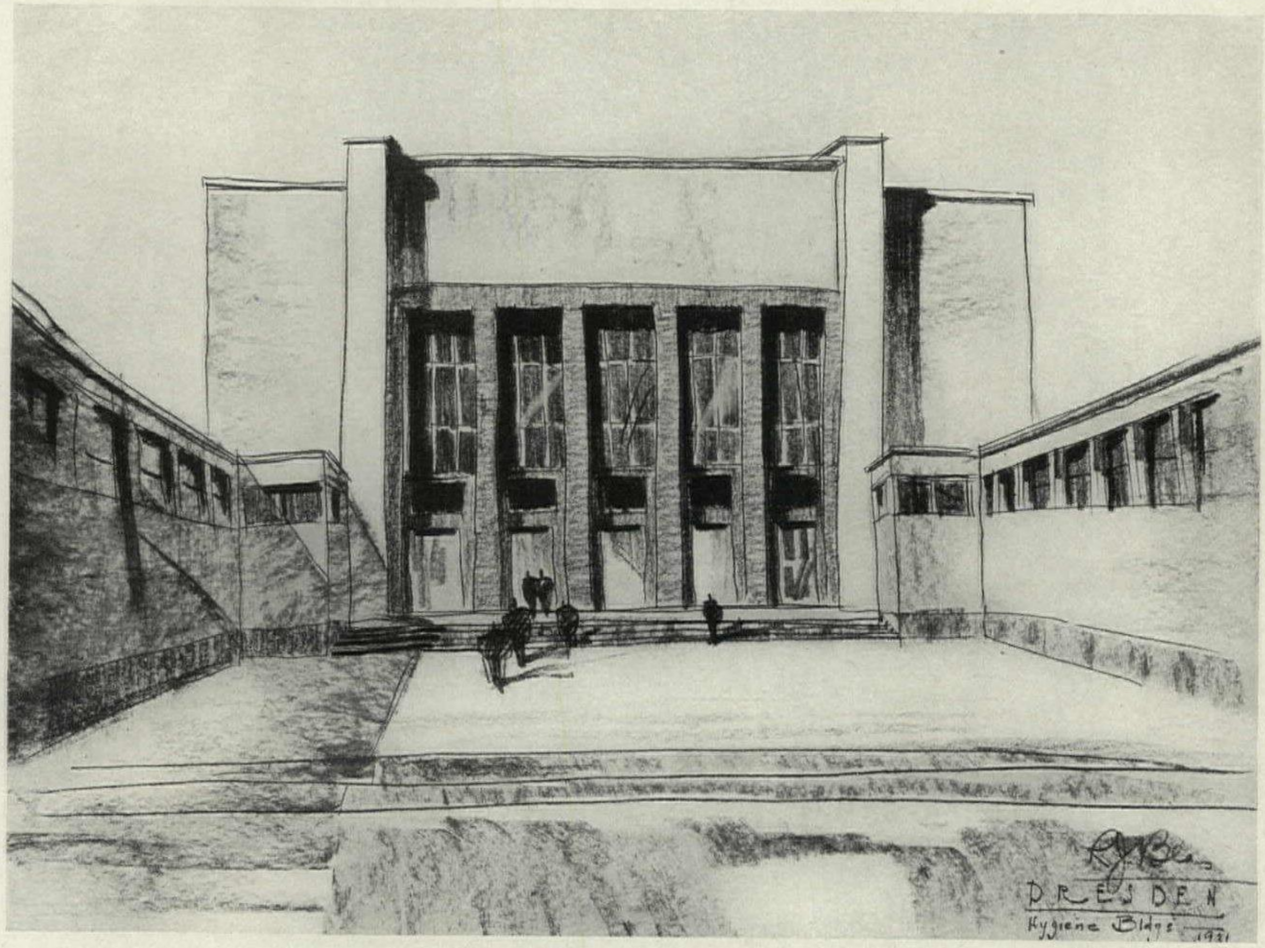
EVANGELICAL CHURCH, BERLIN, GERMANY

E. U. G. PAULUS, ARCHITECT—PHOTOGRAPH BY B. KENNETH JOHNSON



HERZ JESU CHURCH, WEISDORF-LEVERKUSEN, GERMANY

B. ROTTERDAM, ARCHITECT—PHOTOGRAPH BY B. KENNETH JOHNSON

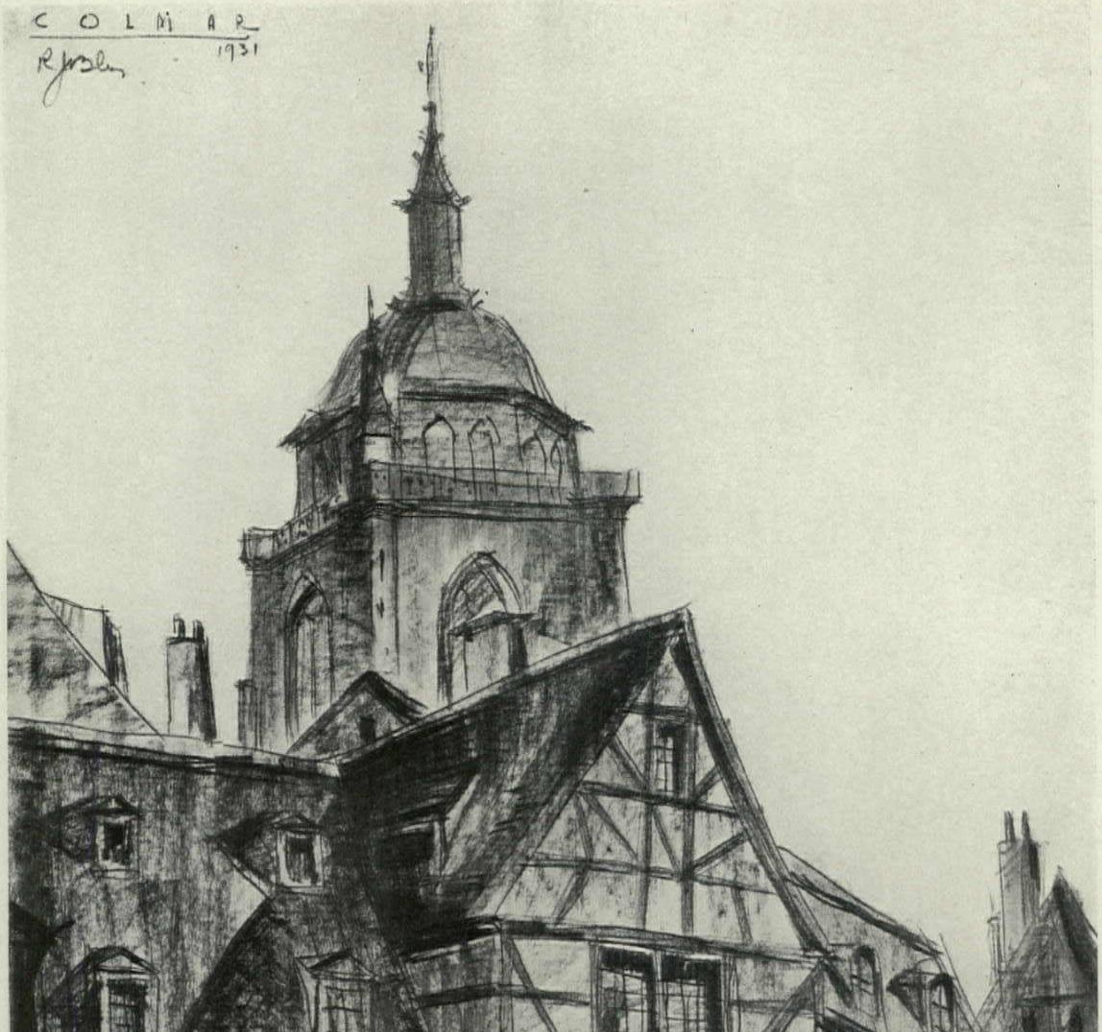


HYGIENE BUILDINGS, DRESDEN, GERMANY

European Views, Old and New

By Romualdo José Blas

As Recorded in Crayon Sketches
in the Popular Technique of the Day
Made Rapidly to Preserve the Student's
Observations of Architecture for Later Reference.

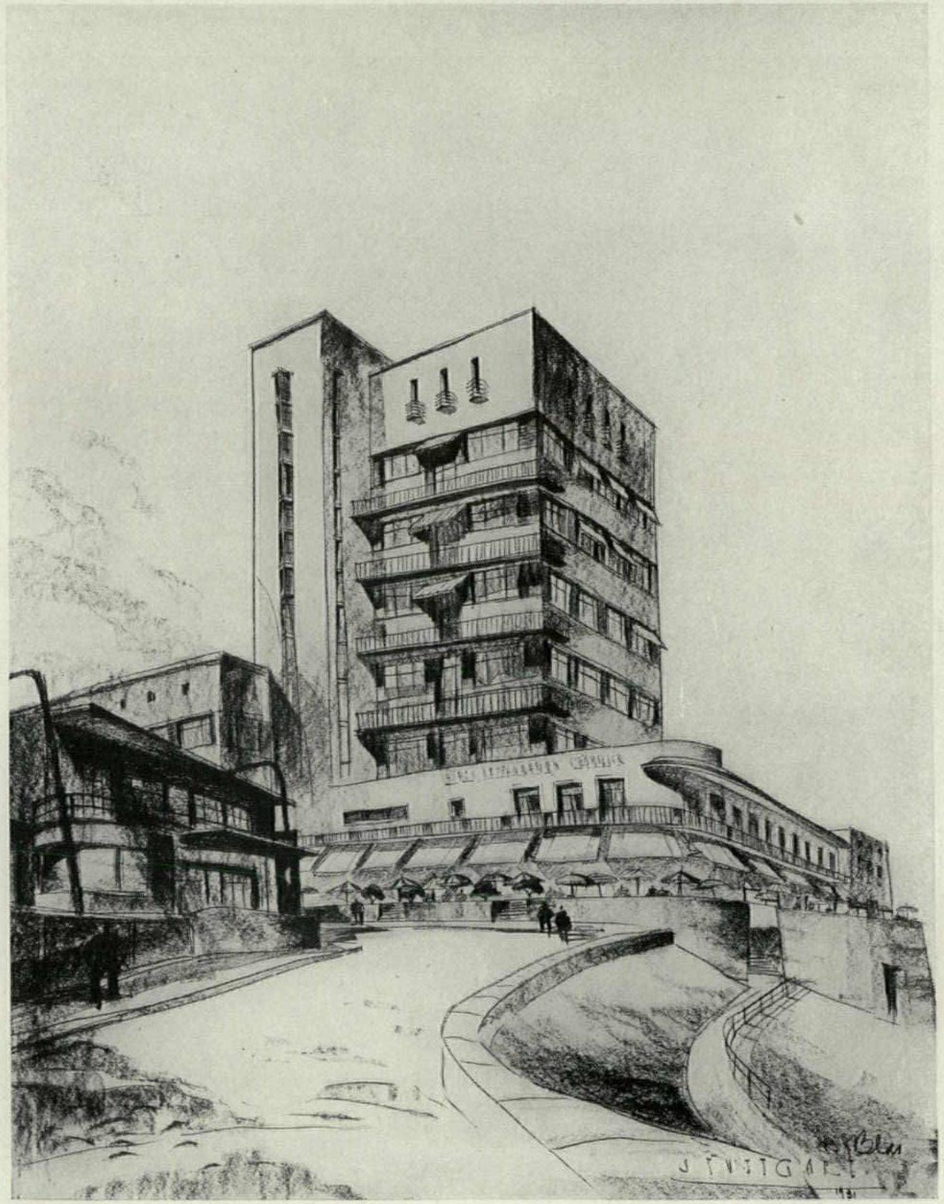


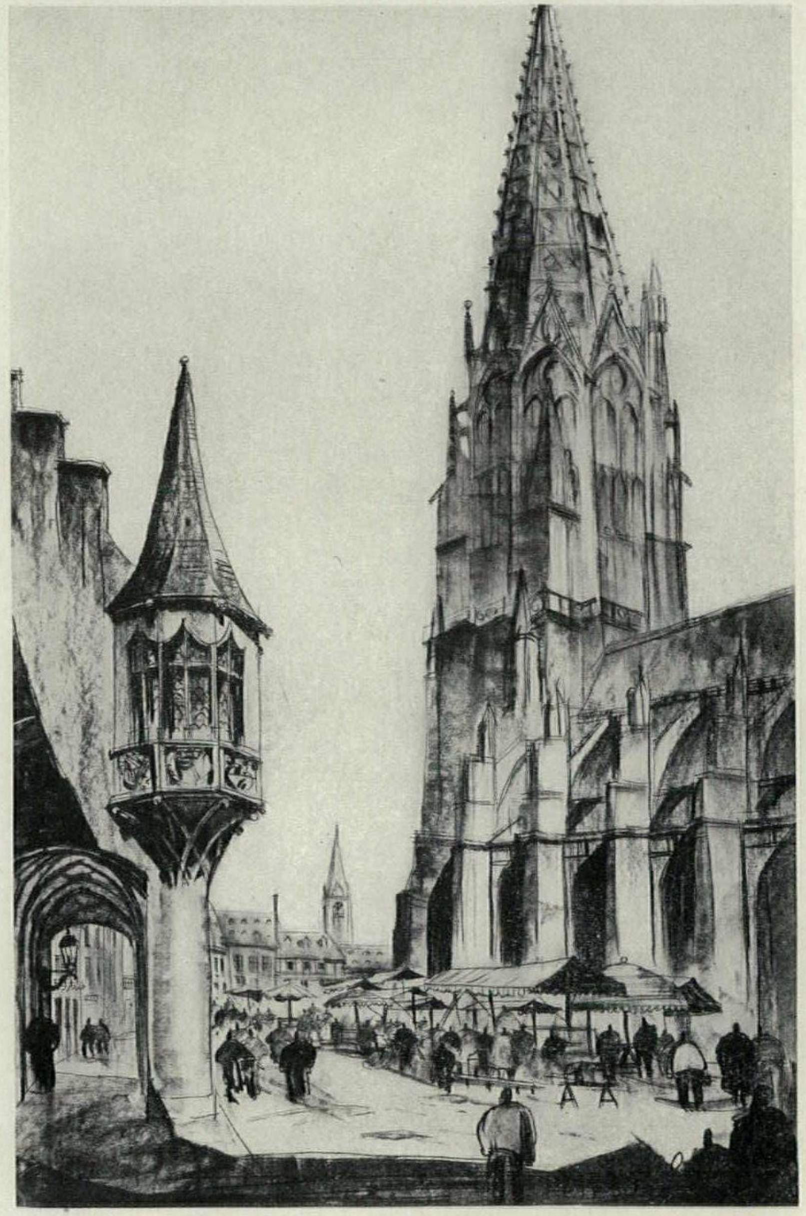
OLD COLMAR

SANGUINE DRAWING BY ROMUALDO JOSE BLAS

MODERN STUTTGART

CRAYON DRAWING BY ROMUALDO JOSE BLAS





THE PICTURESQUE IN MODERN STUTTGART AND OLD FREIBURG AS SET DOWN WITH CRAYON BY ROMUALDO JOSE BLAS

THE ARTIST IS AN ARCHITECTURAL STUDENT OF SPANISH BIRTH WHO HAS SPENT MOST OF HIS LIFE UP TO TWO YEARS AGO IN THIS COUNTRY

New Aspects of the Distribution Problem*

By David Cushman Coyle

Editor's Note:—*The author of this article is a consulting engineer in New York. As an associate of Gunvald Aus of New York, he designed the foundations and steelwork of the Washington State Capitol, the New York Life Building, and so on. He is a student of the theory of wind bracing, has made extensive measurements of the wind sway of New York towers, and has published numerous articles on this subject, as well as books on such diverse topics as "The Analytical Solution of Masonry Domes" (1925) and "The Irrepressible Conflict, Business vs. Finance" (1931).*

Essentially, the reason the United States ran into the ditch was that the road along which we had been driving for three hundred years took a sharp turn, and we failed to notice it in time. It is beginning to be apparent to an increasing number of people that new things are happening and that the old methods no longer work.

Within the last twenty years several new things have happened. We have become a creditor nation on a grand scale, and we can therefore no longer go on with a so-called favorable balance of trade. Moreover, the increase of our population has definitely begun to flatten off; and we can therefore no longer hope for a rapid growth of the home market unless the standard of living rises rapidly. Then, on top of these changes, the new developments of technology appear as the portent of another industrial revolution like the one which followed the invention of the steam engine.

The Continuous Process Machine

The continuous process machine, after a dozen years of slow development in a few particular industries, has suddenly burst forth as a fully generalized idea. So long as it was only *an* automatic process in each of a few specialized fields, its effects on the general economic system were small. But now it is *the* automatic process, and its exponents do not hesitate to apply it to anything from rayon fiber to steel houses. There is said to be a machine with which one man makes 40,000 bricks an hour; another machine turns out 2,600 cigarettes a minute. There are plenty of other examples of the continuous process, either in actual operation or now on the boards. In one industry after another, human labor is being almost entirely eliminated as a factor in production. Instead of rows of machine tenders, we have one or two experts watching the gauges of a machine which is a whole factory. We are rapidly approaching a situation where all the available natural resources of this continent can be utilized with the employment of only a very small number of workers.

And yet, unless industry can sell its products to a larger number of people than the number to whom it can furnish employment, business cannot go on. Somehow, the vast majority who cannot be employed in making or distributing goods must be given the means to purchase those goods, or else business is hopelessly paralyzed. This is the new form of the problem of the distribution of income, and in this new form it has become the central toothache of the whole economic body.

In the beginning, this depression was mainly a cyclical depression; but since 1929, many concerns have installed continuous process machines and have made the unemployment of their former laborers not cyclical but permanent. This is in effect a sudden drop in the "trend line," or long-run average market —the line around which the business cycle vibrates. For this reason it may fairly be said that measures to promote cyclical recovery are not enough to meet the situation. The problem of distribution has assumed a position of primary importance, and everything that is proposed to be done needs to be judged by its relation to the distribution of buying power.

Broad Outlines of the Economic System

It is very significant that the widening divergence between a small demand for labor and a large demand for free-spending customers has thrown the common theories of economics permanently out of step with the realities of the economic process. Until very recently buying power was distributed well enough to allow the system to run, by means of various natural adjustments that worked almost automatically. The receipts of industry were in part paid out in wages and in part turned over to capitalists who invested their profits in new extensions of plant. The building and machinery trades were in this way supplied with wages, and made up a considerable part of the market for consumers' goods. This picture of the main outlines of the economic system is the one commonly held by the average business man, and it has been the basis of the policy of the Administration during the last three years.

When the depression came on in 1929, the Administration relied to a large degree on the automatic character of the economic cycle, which had always in the past brought things around in due course to a revival of good times. In order to help matters, the President very sensibly urged the maintenance of wage scales, and many of the large corporations promised to in-

Preprinted from "The Annals" of the American Academy of Political and Social Science, Philadelphia, January, 1933. Publication No. 2547.

crease their expenditures for new construction. These were the recognized standard sources of buying power, and it was natural to expect that if they were stimulated, the market would be improved and the depression brought to a close. In 1932 a second attempt is being made to encourage investment of liquid funds in new machinery and new plant. The reason this program has not been successful in bringing back good times is to be found mainly in this growing discrepancy in numbers between those who must be employed in order to have money to spend for goods, and those who can be employed in making and selling the goods.

There were already serious difficulties in making the system operate by the standard mechanism of distribution. The loss of our position as a debtor nation had dried up our net foreign market, and the loss of our rapid increase of population was beginning to slacken the natural growth of our home market. And then, to make matters impossible, came the continuous process. A million dollars invested in one of these automatic plants can bankrupt twenty million dollars' worth of existing plant; and a few weeks' employment for a hundred men can throw twenty thousand permanently out of their jobs. If everybody who cannot be employed making or selling goods is to be set to building this sort of machinery, the rate at which the new plant will have to go bankrupt is fantastic.

Though investments feel nice in the bank box, they appear in the balance sheet of the corporation as liabilities, and business as a whole can carry only a limited grand total of debt. Investment beyond the debt-carrying capacity of business has always been automatically eliminated by bankruptcy; but this way of disposing of excess savings, by investing them and then losing the investment, is practicable only so long as the total amount of bankruptcy is endurable. People cannot continue investing their savings with enthusiasm if it is necessary that practically all their ventures shall go bankrupt almost immediately. If a revival were now to occur, based on renewed enthusiasm for investment, the spread of automatic machinery would be considerably hastened, and the volume of bankruptcy and unemployment that would appear as soon as the new machines were installed would be very discouraging. The old method of distributing excess capital funds by investment and bankruptcy depended on the drawing of a decent veil between the two. The veil is evidently wearing thin.

Distribution through Services

It has become necessary to recognize that the popular conception of the economic system is incomplete. There are other ways of making buying power, and they now assume major importance since the standard ways have come to be no longer good enough. Large personal incomes are not, in fact, circulated back into the market entirely through the personal consumption of goods and through distribution by means of capital investment. They are in part distributed to consumers through expenditure on personal service, through contributions to cultural and philanthropic services, and through income taxes which are ultimately spent on public services. This type of distribution is a bypass around the strictly mechanical industrial system. Through this bypass, money leaks down from the large incomes to the small without producing any material goods for sale and without imposing any new debts on business.

The distinction between these two categories, goods and services, became of critical importance with the arrival of the continuous process. Goods may be defined, for our purpose, as anything made out of materials or power or both. An automobile and an automobile journey are both goods in this sense. Services may be defined as anything made out of human time and effort, with no significant amount of raw materials and power. A dental treatment and a grand opera are both services in this sense.

We have now reached a point where we can easily utilize all the coal and iron ore and petroleum we dare to expend per year, and all the water and sun power we can lay hands on. In this utilization we can employ only a small part of our population. There are sociological reasons of great weight for not distributing these goods to all as a gratuitous dividend, and no practicable shortening of hours, desirable as that is, can distribute such a small amount of employment over the whole working population. But in the field of services, the possible employment is limited only by human time and energy, which are exactly the things we are trying to employ. It is evident that in the field of services is the answer to the problem of how to distribute buying power without subjecting any one to the disintegrating effects of permanent idleness.

There has been a good deal of argument among the economists about whether or not there is any such thing as technological unemployment. So long as the growth of industry in size was as great as its growth in efficiency, those who were thrown out of work by increases in efficiency might hope to find jobs in new industries. Whether they all did so in the long run might well be a subject of discussion. But when material industry is on the point of running up against the ceiling of our natural resources, beyond which it cannot grow, and at the same time is discharging men at an unprecedented rate, the case becomes very clear. The new industries which are to absorb the surplus labor discharged by manufacture must be industries which make not goods but services. Technological unemployment, from now on, will be measured by the extent to which the market for services is insufficient to balance the industrial system.

Public Projects Necessary

The attempt to bring back prosperity by using the mechanical factors of the industrial system in the old-fashioned way has failed because of new conditions which are too much for these old adjustment devices to handle. Even if some confidence should return and investment should be resumed, the increasing disparity between the stimulating power of investment and the paralyzing power of technological unemployment makes it impossible to hope for any way out in that direction. The solution must lie in a public policy that will encourage or require those who might invest to refrain and to divert a large part of their savings into the market for services.

Obviously, the backbone of such a policy for some years to come must be a large program of public and semipublic projects, supported by income taxes or by large contributions stimulated by the tax laws. Whether these projects are mainly in the service fields such as education or parks, or mainly goods like new public buildings, matters very little at present, since there is plenty of room for expansion in both fields. As business revives and the limits of certain natural resources are approached, the emphasis on services will become important. Artificial encouragement of this form of expenditure will need to be continued until the public has become educated to a sufficient scale of private expenditure to keep the new plenty economy in fairly permanent balance.

It is, of course, impossible to start any such program in the middle. Before there can be any income to spend for new projects, there must be money spent for new projects so as to start prosperity and create the income. The necessary expansion of Federal expenditures will naturally be financed by bonds. Federal bonds have the advantage that they have the power to support Federal Reserve bank notes. There need be no collapse of the bond market under the weight of new issues if the Federal Reserve will buy in the open market on an adequate scale. In effect, the banks can expand credit for the use of the United States Government, with which it can embark on a program of advance.

Large Program Needed

There is nothing very startling in the idea that there will be needed a program of public projects in order to start the wheels of industry turning, nor in the fact that it may be necessary to finance the program by bond issues. The difficulty is most likely to arise when it comes to deciding upon a program large enough to get results. This action is like priming a pump. If it is done on a small scale, it will be like pouring a teaspoonful of water down the pump. The water is lost, and nothing comes back. Small quantities of Federal expenditure, such as those that have been tried so far, serve only to use up Government credit without curing the situation. It is impossible to win a war on a parsimonious basis, and it is equally impossible to win a situation like the present one with a cup of tea and a few biscuits.

In order to make it possible for us to accept an adequate program of advance, it is necessary that we realize the true relation of such a program to the wealth of the Nation. If we see a large increase in the national debt and millions of men working on public and semipublic services, it will be an optical illusion that the Nation is poor because of the debt. Actually we shall be richer, because these and other men, now idle, will be working at building up our national wealth. The bonds will be only a debt between the right-hand and the left-hand pocket. In fact, what will have happened in a case like this is that Federal Reserve bank notes will have been distributed in advance of Federal Government receipts, to those who perform desirable services. This will give them the buying power with which to support American industry and make it prosperous. If after industry becomes prosperous the notes are redeemed by a levy on the higher personal incomes, the circle will have been completed. All that will have happened is that by using credit to overcome the time factor, buying power will have been distributed to consumers, and industry will have been enabled to operate and to produce wealth.

This may sound like shaky practice, but that is only because in the past credit has been expanded to provide unsound investments in unnecessary plant which thereafter went bankrupt. In this case it is merely that we are buying prosperity from the workers by hiring them to perform services and giving them bank notes. If we agree not to tax the workers in order to redeem the bank notes, the workmen can use the notes to buy goods and we will get our prosperity; but if we tax the workers to redeem the notes, they will be no better off than before, and the Nation will be no more prosperous than before.

After the pump has been primed, and the notes redeemed out of the resulting wealth, the prosperity can be continued indefinitely so long as the market for services is kept continuously supplied with money diverted from unnecessary investment in new plant. This is the technique for turning the trend line of the business cycle upward and keeping it at a high level. To a considerable degree, it is also the way to reduce the violence of the cycle itself, because the fluctuations of business are, at least in part, made up of recurrent periods of excessive investment followed by periods of bankruptcy. There will still remain, of course, the many other influences that cause fluctuations in business, especially the uncontrolled expansion and contraction of private bank credit. These further causes of trouble may have to be regulated at some later date, after the emergency has passed.

Capitalist System Upheld

The election has given a clear indication of what is the will of the American people. They do not want to scrap the existing social order at the present time. They are willing to keep the capitalist system if it can be made to come out of its coma and get to work. They believe that something that should have been done must have been omitted, but they are not sure what it is. They have called in a new man and given him a mandate to find out what it was that ought to have been done and do it now. The thing that has been lacking in the policies of the present Administration is the answer to the problem of distribution of buying power; and it is not surprising that the answer has been so slow in developing, because the technological changes that make the question imperative are only just now occurring. The answer lies principally in diverting the larger incomes into the market for services, and the success of the new Government will depend largely on its ability to lead the country to an understanding and acceptance of the necessary operations.

It is a sound instinct that has led the Nation to judge that the present paralysis of the economic system is no proof that it is a hopeless wreck. An automobile that has a little dirt in the carburetor may refuse to go, but it is not a wreck. A capitalist system cannot run on too much capital any more than a gasoline engine can run on too much gasoline. All that made our economic engine stop was that we flooded it with too much gasoline. All it needs now to make it go is that we find means of distributing buying power without loading industry with more capital than it can carry.

Emergency Treatment

This treatment may seem to be too simple for so complex an organism as an economic order. But we must remember that although there are dozens of things the matter with the capitalist system, not all of them were what made it stop running. This is a treatment for a major emergency—not a course in economic hygiene. The new Administration was elected not to act as a scientific economist but to act as a doctor. The difference between a scientist and a doctor is that the scientist's function is to collect all the facts he can lay his hands on; the doctor's first job is to reject all the facts that have nothing to do with the case. When a doctor finds a patient bleeding from an artery and suffering from flat feet, hay fever, and inferiority complex, his first job is to concentrate on tying up the artery. The patient may be a very complicated organism, but a very simple operation is what he needs in a hurry. In the same way, the job of this new Administration is not so much to elaborate a plan for curing all the ills of capitalism, as it is to concentrate on the thing that makes capitalism refuse to run. The temptation to resort to fact-finding as a respectable substitute for action has to be resisted firmly in time of crisis. There are facts enough for action, and the rest can wait until the crisis is over.

There is one thing, however, that a doctor must do before he can tackle even the most pressing emergency. He must get the patient to submit to the operation. Dr. Grenfell tells of a fisherman who died because he believed that God did not approve of lancing an infected hand with a knife. The American people have called in a new doctor, but they are still suffering from what may prove to be a very costly superstition. This superstition is what Virgil Jordon calls the "economy complex"—the widespread demand for indiscriminate retrenchment.

Public Expenditure

It is essential that we learn to discriminate between the kind of retrenchment that helps the situation and the kind that only makes the situation worse. It is evident to anybody that graft and unnecessary duplication of effort do no good to the taxpayers who foot the bill. It is also true, though not so evident, that municipal expenditures, even for relief, do not help to restore prosperity, because municipal taxes, laid mainly on real estate, are passed on in higher rents and prices to the consumer and reduce his buying power. Neither of these forms of public spending helps to distribute buying power to the consumer. Graft tends to collect money from everybody and to concentrate it in a few tin boxes. Municipal spending is a bootstraps proposition; it gives the people buying power with one hand only by taking it away from them with the other. It is for this reason that the large expenses assumed by local units, on the theory of local self-help, have not produced any effect on the depression.

What the public has failed to discern is the fact that the Federal Government, by its spending and fiscal policy, can distribute incomes and cause a large and effective increase in total buying power. However luxurious the services which that kind of spending may provide for the people, it cannot justly be called extravagant. The more of this kind of spending there is, the more market there will be for business, the more men will be actively employed, and the more wealth will be created. The creation of wealth, whether it be shoes or education or just the widespread feeling of economic security, is surely not extravagance. If it is necessary that the Federal Government shall collect billions of dollars every year and spend them on beautifying the country, so that, as a by-product, mechanical industry may be running full time producing material wealth for the whole population to enjoy, then those billions are certainly money well spent.

Here, then, we have the sticking point in the fight for recovery. The new doctor has ahead of him the Herculean task of educating the country to the true difference between the type of spending that makes only debt and poverty, and the type of spending that nourishes business and makes prosperity. If, by virtue of the prestige of a fresh popular mandate and of the tremendous power of leadership inherent in the Presidential office, he can perform that mighty labor, then the necessary operations will be well within the power of a unified government to carry through.

The key to stable prosperity is the continuous distribution of buying power; the key to distribution is the diversion of money from unnecessary capital investment into the market for services; the key to an immediate enlargement of the market for services is the education of public opinion toward an expanded program of public expenditure. The technologists have solved the physical problem of the ages, the problem of production. We have built the house of plenty, and these are the keys to the door.

LIFE STUDY BY FRANK H. SCHWARZ

DRAWN IN BISTRE CRAYON

FROM A PENCIL RENDERING BY SCHELL LEWIS

ESTATE OF MR. AND MRS. CHARLES W. WRIGHT, MILWAUKEE, WISCONSIN—ANNETTE HOYT FLANDERS, LANDSCAPE ARCHITECT

FROM A PENCIL RENDERING BY SCHELL LEWIS

"KULIOUOU," ESTATE OF MR. AND MRS. VERNON TENNEY, HONOLULU, H. I.—ANNETTE HOYT FLANDERS, LANDSCAPE ARCHITECT

Dining Room Architecture

How to Provide Drafting Facilities in a Small Apartment

By Joseph B. Wertz

Has the reader ever had to prove himself a contortionist by trying to extract from the rear of a closet an unwieldy drawing board, in front of which, seemingly, all the paraphernalia in the closet was piled high? Has he broken his back looking under the living room couch for his T-square? Has he tried vainly to remember where his !***÷ (?) triangle was put, and with momentarily mounting ire has he ever finally found that somebody has used up the last trace of his tracing paper? If so, did he ever do what he started out to do? We would like to wager that the sum total of his accomplishments would be a thoroughly upset apartment and a great loss of temper.

The impulse to do something creative with brush or pencil is all too easily distorted and lost. The writer remembers many futile evenings when his originally fresh, eager incentive to do some work at home was so balked by the lack of proper working facilities that his final spark of desire was consumed in wrath and he accomplished nothing.

In common with many other young draftsmen he has spent several years in the usual type of one or two room apartment where the necessary household furniture took up all the available space so that a standing drafting board was out of the question. Occasionally he had to do a little work and used the dining room table but the results were usually as bad as the time he had in producing them.

Then he had an idea! Why not a dining room table which concealed a drafting board? Better still would be to have a table—of such proportions that it might be used as a living room table, a dining room table or a drafting table as the occasion demanded. So a three-in-one table was designed and built, and, since it serves its varied purposes well and has proven a really valuable aid to better work, the formula is herewith presented with illustrations, in the hope that it may be of use to others.

First of all, it was decided that the table must be capable of seating six persons if it were to be used for a dining room table. The minimum top space required for this seemed to be thirty by fifty-three inches with the usual thirty-inch height from the floor. This would allow for a fairly ample drawing board beneath it, but to conceal this board and provide space for instruments, rolls of paper, blue prints, etc., which could be left lying on it while the table was being used in one of its other roles, it became necessary to drop the board and use an apron below the regular table top. This apron was made four and one-quarter inches deep. More depth than this would interfere with the knees of a person seated at the table. To raise the board above the top of the apron for drafting purposes, four levers were devised from eight desk lever catches (these can be obtained at any hardware store) which were bolted in the center (see *A*, Figure 3) and used as a sliding pivot, one end being fastened to the underside of the table top and the other to the underside of each corner of the board. However, the board should be tilted, so blocks were placed under the two upper corners and two of the four levers were fastened to the blocks, thus raising the board at an angle determined by the thickness of the block.

FIGURE 1—THE TABLE CLOSED UP

FIGURE 2—READY FOR WORK

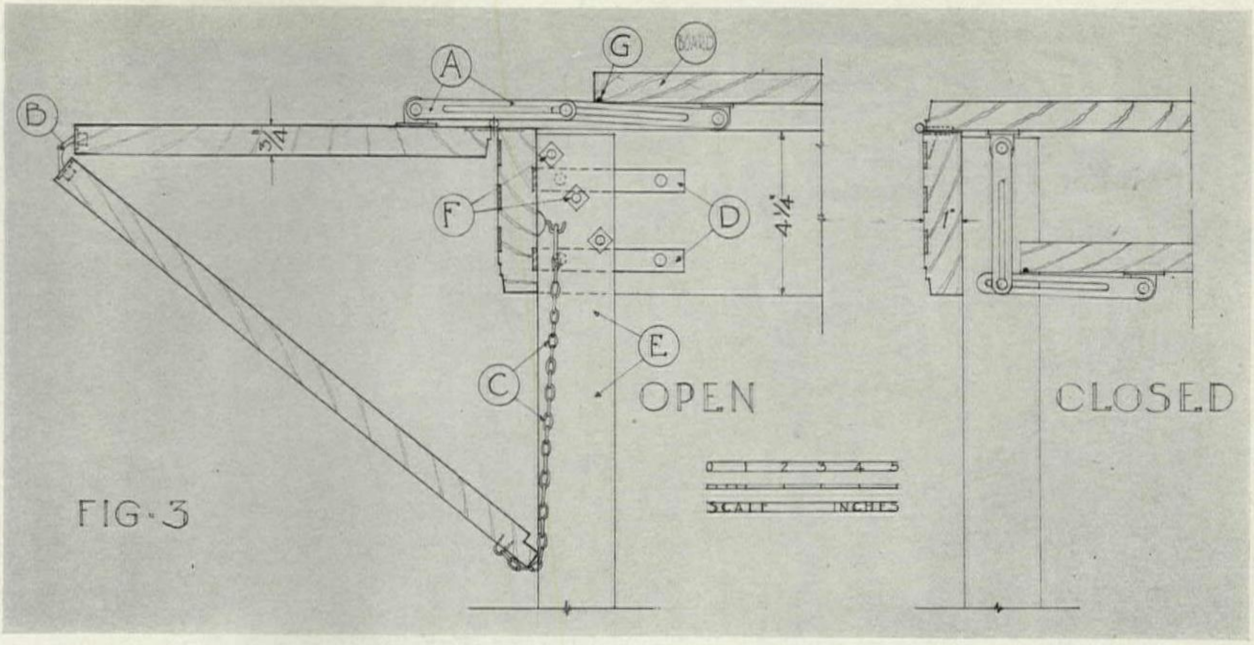


FIGURE 3—CONSTRUCTION DETAILS FOR THE TABLE ILLUSTRATED

The size of the board was determined by the inside dimension of the apron minus one and one-half inches at each end and one-half inch at sides. The space at the ends allows for the play of the levers in raising and lowering the board.

The table top was divided into four sections which open from the center. The two inner sections, being larger than the end sections, were made fifteen and one-half inches and eleven inches wide respectively. This ratio may vary according to the position of the table legs and the amount of space desired beyond the ends of the table when in open position. The smaller or end sections of the table top were hinged with butt hinges to top edge of apron and with "Soss" (see *B*) invisible hinges to the neighboring sections.

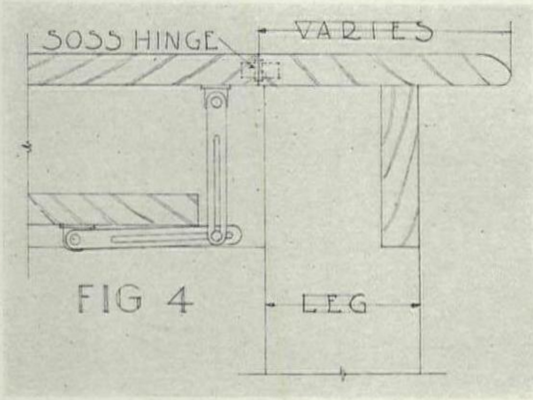


FIGURE 4—A VARIATION

When the top of the completed table is open and folded back to the correct position, it may be secured by the simple means of a sash chain and key ring—the former, attached to the underside of the larger section near the center edge, has a ring at the free end which may be slipped onto a hook on the inner center of the apron (see *C*).

There is not sufficient room within the apron for cross bracing, so the corners of the table have been reinforced by means of two angles (see *D*) one-half inch wide by one-eighth inch thick and with four-inch flanges. These are countersunk and screwed to the apron with flat-headed screws.

It happens that this particular table was designed to go with modern surroundings. It therefore has bent aluminum legs (one-quarter inch by two inches, see *E*) fastened to the apron with countersunk bolts (see *F*) which are covered with twelve-gauge metal strips. This gives a semi-decorative effect to the outer corners of the apron.

Metal legs are not very practical unless extremely thick and well braced at the bend, which makes them much more expensive than wood.

To make the table absolutely steady, the legs, if they are to be of bent metal, should be much heavier than those used here, which would probably bring the cost somewhat above the total of sixteen dollars for the whole table which was expended in this case (not to mention the writer's time).

The same table may be designed in several different styles and materials equally well, but in order to hinge the top properly it should be kept almost flush with the outer edge of the apron, unless a different type of table is desired as suggested in Figure 4. This construction may well eliminate the chain by allowing the leaf to rest on that portion of the top which is stationary, but the table top is thus increased in size unless the drafting board is cut down.

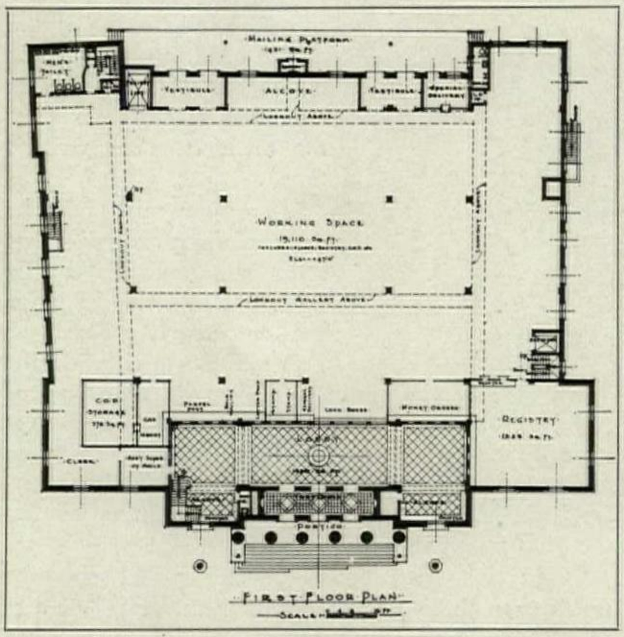
It is well to place the butt hinges so that when the top is open the levers rest upon them instead of digging themselves into the apron. It is also advisable to drive a fourteen-penny finishing nail to the underside of the drawing board at each lever and bend it down so that the lever will strike this nail and be prevented from eating into the soft drawing board (see G).

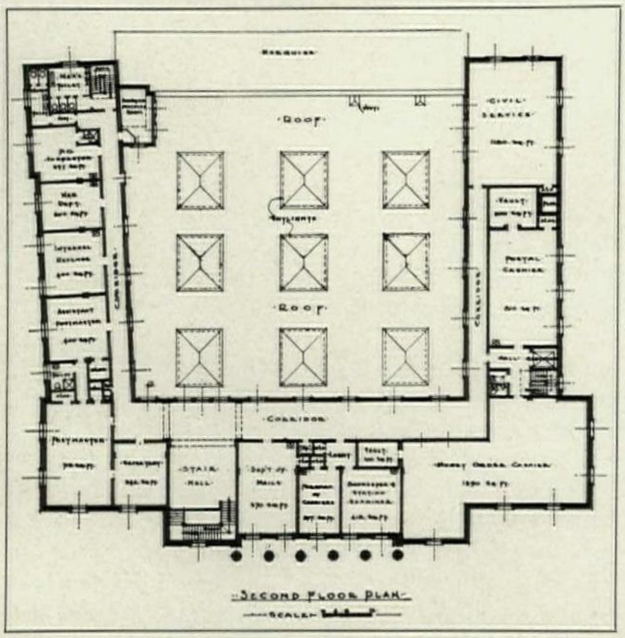
To provide a tray for pencils, thumb-tacks, etc., a few feet of one-quarter by one inch strips may be nailed to the right-hand side of the board, forming partitions of various sizes.

It is wise to cover the drawings with a piece of oilcloth before closing the table over them, if much soup is to be served above.

One must use a chair while working at this table unless the kitchen stool happens to be of the right height, although the writer finds the chair a welcome change after riding a stool at the office all day.

The table has been in use for over a year and has proven a great help. It is so easy, after clearing the dinner dishes off the table (and washing them!) to open up the table and find everything lying ready to begin work on—and then, at the end of the evening, to close the top (a matter of a few seconds), leaving the drawing in place ready for the next evening and the table ready to receive the breakfast things.

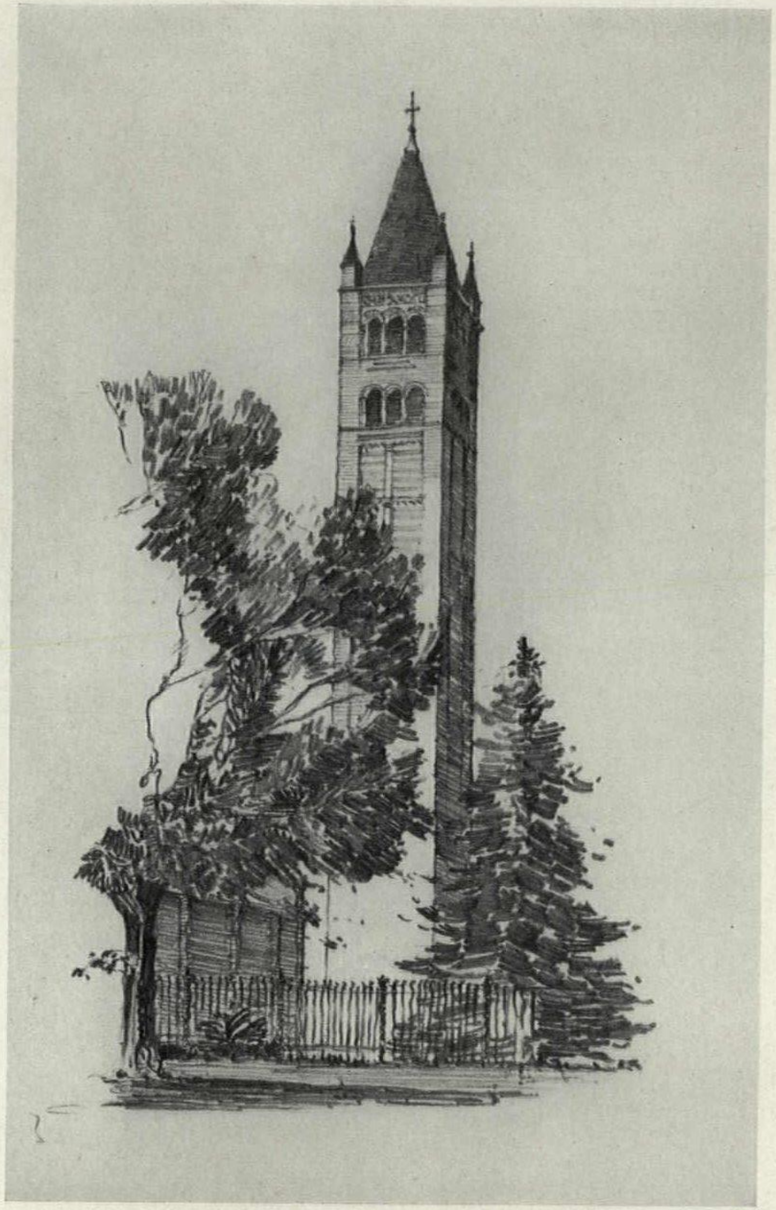




UNITED STATES POST OFFICE, FLUSHING, NEW YORK—PLANS AND PERSPECTIVE

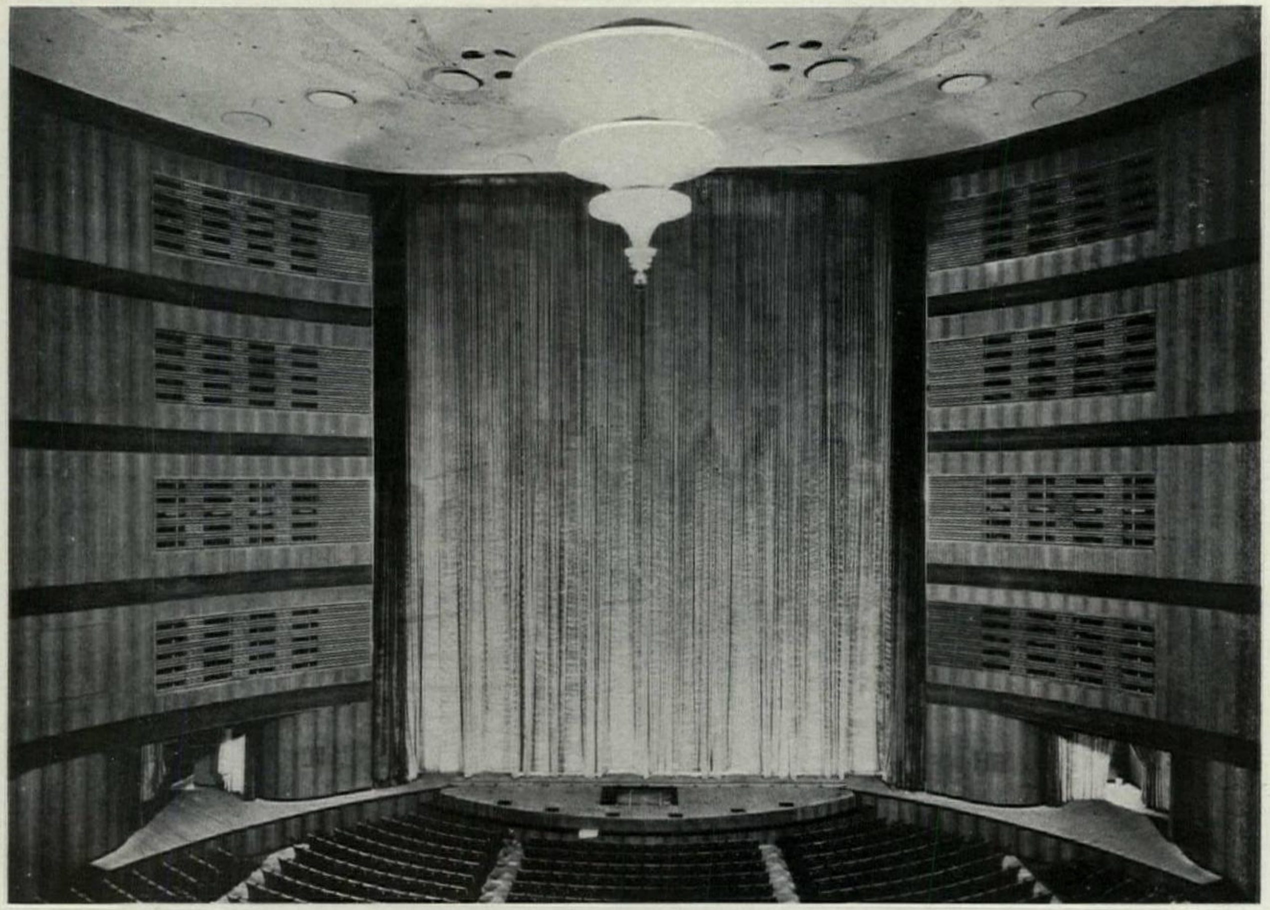
DWIGHT JAMES BAUM AND WILLIAM W. KNOWLES, ASSOCIATED ARCHITECTS

Rendering by Schell Lewis



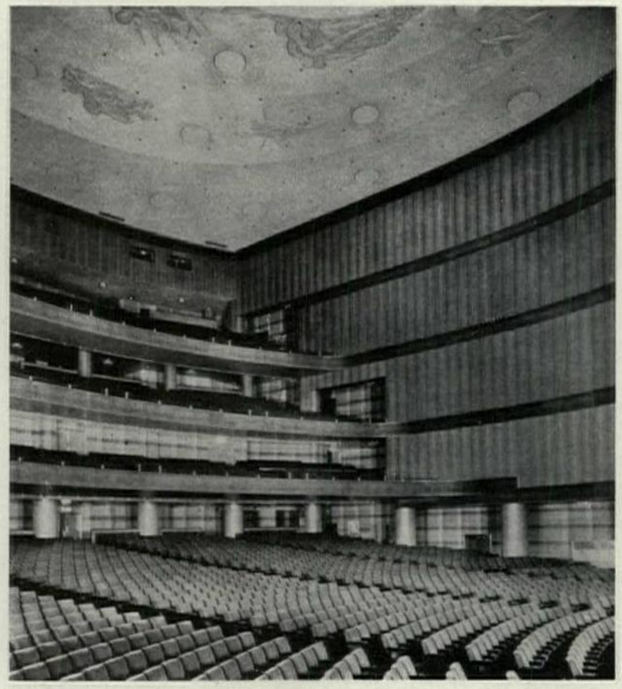
TWO PENCIL SKETCHES BY GEOFFREY NOEL LAWFORD

CAMPANILE OF SAN ZENO AND MARKET PLACE, VERONA, ITALY



THE PROSCENIUM AND AUDITORIUM—EUGENE SCHOEN, DECORATOR

The RKO-Roxy Theatre in New York was opened to the public last month. The auditorium and three mezzanines provide a seating capacity for 3700 people. The wall surfaces are, for the main part, veneered with quarter-sawn mahogany, the vertical grain emphasized by the reversed use of the grain for trim and the horizontal lines of the balcony fronts. Where it was necessary to cover the walls to insure proper acoustics, Mr. Schoen has used a plaid linen crash which he designed in orange, yellow, and brown tones, carrying out the general colors of light and dark terra cotta and dark brown used in the auditorium.

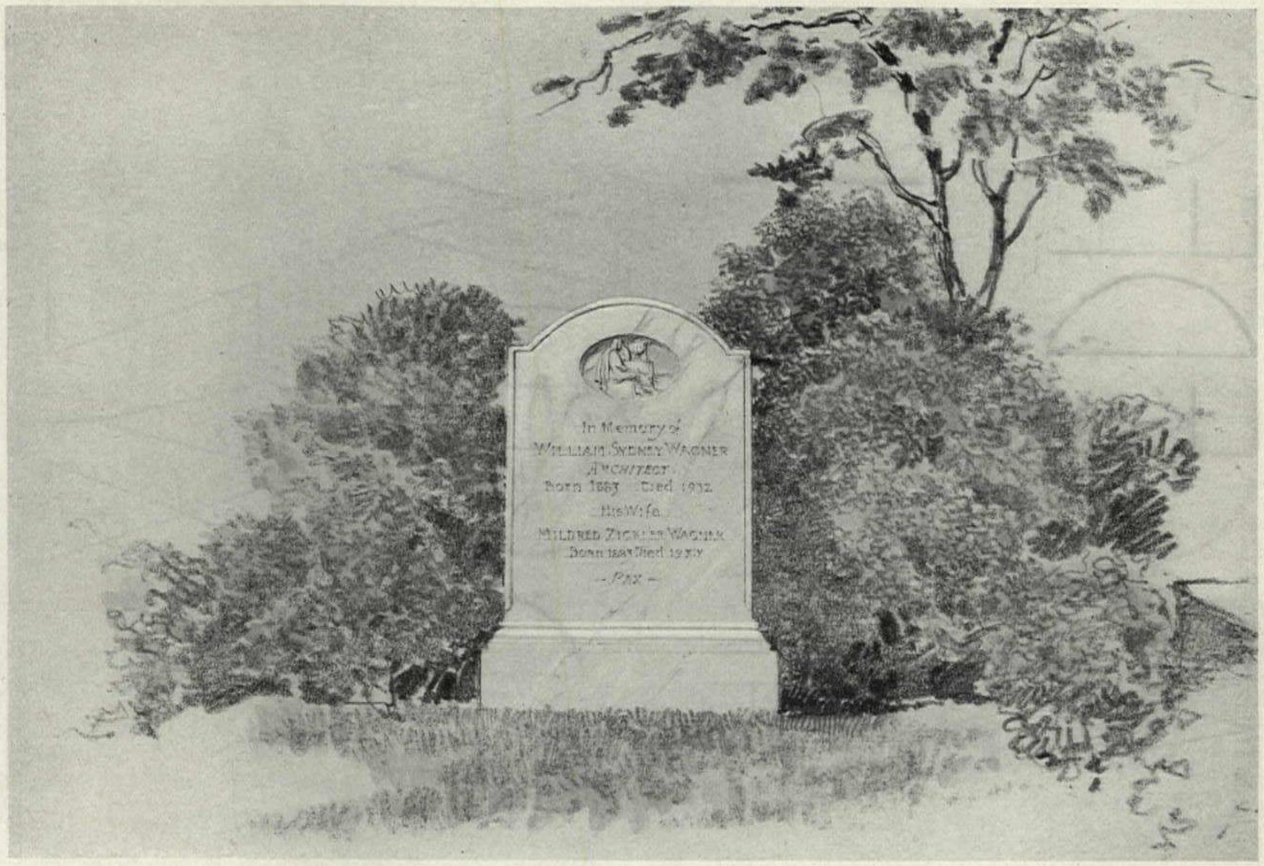


The ceiling is of white plaster, decorated with mythological figures in bas relief by the sculptor, René Chambellan. The auditorium is lighted from the ceiling by numerous small openings, equipped with diffusing lenses, and a large center fixture measuring 18 feet in diameter and 24 feet in depth. This fixture contains the electrical control room and concealed batteries of spotlights.

The stage opening occupies practically the entire end wall; the drop curtain is of champagne - colored chenille.

RKO-Roxy Theatre in Radio City, Rockefeller Center

Reinhard and Hofmeister, Corbett, Harrison and MacMurray, Hood and Fouilhoux, Architects



PRELIMINARY STUDY BY OTTO R. EGGERS OF MONUMENT TO WILLIAM SYDNEY WAGNER

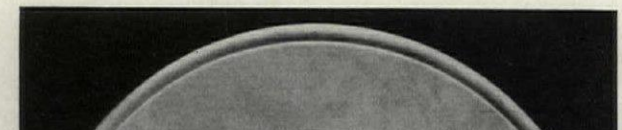
A Monument to William Sydney Wagner, Architect

Designed by Otto R. Eggers, Architect, and Edward Field Sanford, Sculptor

William Sydney Wagner, an architect of great prominence and winner of the Paris Prize, died at his summer residence at Northport, Long Island, on May 26, 1932.

As a member of George B. Post & Sons and afterward under the firm name of Bottomley, Wagner & White, he was responsible for much of the better work in New York and other cities.

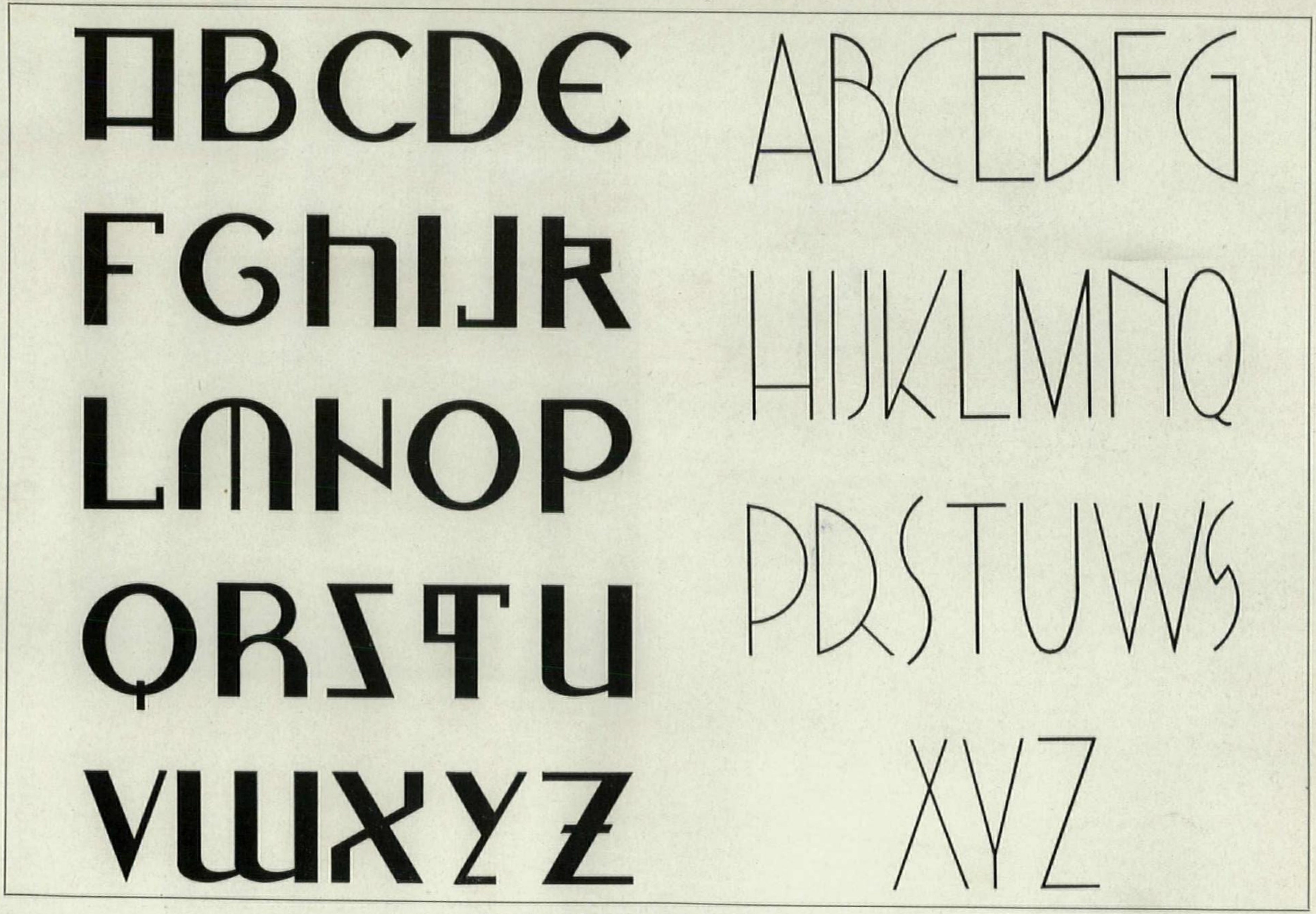
As a token of the esteem in which his memory is held by his many friends a monument has been erected in Northport Rural Cemetery on a hill overlooking Long Island Sound.



This memorial is the result of the combined efforts of several of his friends. It was designed in collaboration by Otto R. Eggers, Architect, and Edward Field Sanford, Sculptor.

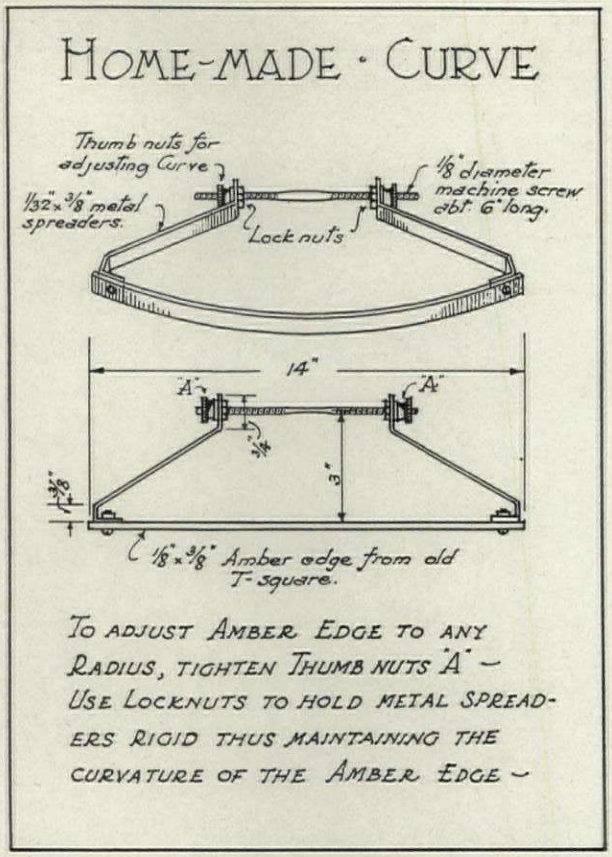
The slab of Vermont marble was obtained through the kind efforts of Mr. Lou Crandall of the George A. Fuller Company; the beautifully sculptured mourning figure is by Mr. Sanford; and the memorial inscription was carved by Mr. John Donnelly.

The foundations and the labor necessary to the setting of the stone were contributed by Mr. Clair Wills, of C. T. Wills, Inc.



TWO ALPHABETS DESIGNED BY IRENE K. AMES

Miss Ames has prepared a number of modern alphabets similar to those illustrated. If sufficient interest is shown by our readers it is possible that they may be published as a low-priced portfolio of large plates, double the size of those reproduced.



PEN-AND-INK DRAWING BY WILLIAM R. NEVINGER
(PRIZE—*Class One—December Competition*)

WILLIAM H. ECHELMEYER of Aldan, Pennsylvania, wins the award for a Good Wrinkle this month with his idea for a Home-made Curve, constructed as shown in the drawing above. Here are the directions:

"This simple 'apparatus' was of unquestionable advantage in laying out large curves such as railroad tracks, property lines, etc. It stands to reason that the average architect's office does not have an elaborate and expensive set of railroad curves giving various radii at 1/16" or ⅛" scale, nor could the average office be expected to hand out for use these expensive spring arrangements which have advantages. 'Nickels' count these days, so:—

"A piece of amber edging from an old discarded T-square, a few pieces of ⅜" x 1/32" metal strip (a few pieces of an old 'Mechanic's Toy' happened to be used for this purpose), a few small machine screws and nuts, and a 4" machine screw, and a little patience and the curve is the best ever.

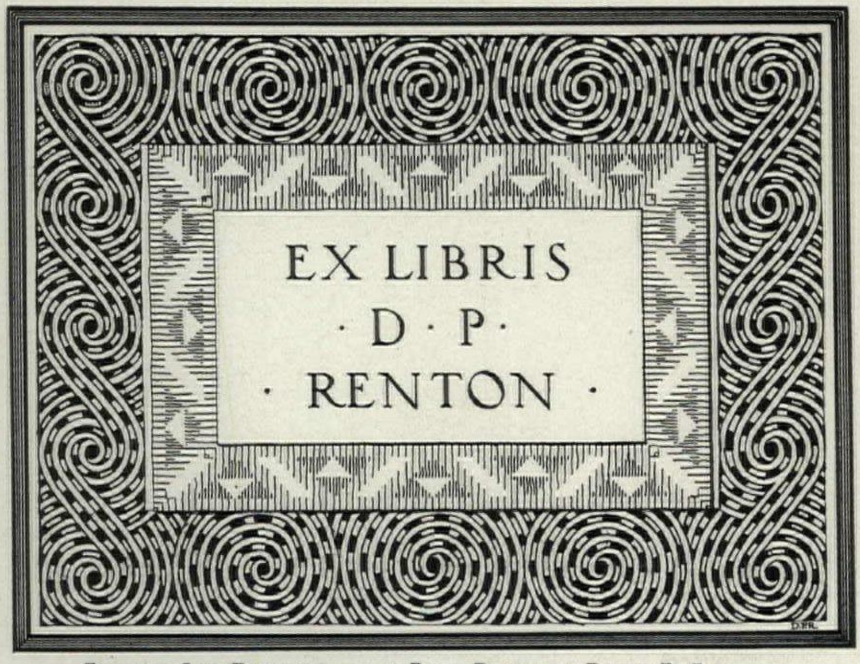
"Lay out required curve on full size board, with the help of a beam compass. Lighten up on the two nuts to bend amber edge to this radius, use lock nuts to prevent the distance between these tightening nuts from changing and you can use this fixed curve without worrying if someone will move your board or their board. It's valuable, accurate, and costs only a little time to make."

JOSEPH B. WERTZ also has a new wrinkle which he calls "The Soda Pad."

"In practically every architect's office a solution of soda and water comes in handy for making changes on blueprints since it is a bleach for the blueprint emulsion and brings out the natural white of the paper wherever it is applied. It is used chiefly in pen or ruling pen but here is another method which will relieve eye strain.

"The usual rubber stamps *OFFICE COPY*, etc., are printed in a dark ink which is difficult to read on a blueprint—so make a fifty per cent solution of soda and water, pour this onto a new clean ink pad, then sprinkle some dry soda on the pad and work this in well with the fingers, repeat this sprinkling and rubbing in process several times and then allow excess moisture to evaporate. Press a clean rubber stamp against the pad—stamp the blueprint—and clear white lettering will appear. Any type of rubber stamp may be used providing the lettering is not too small.

"After using, close the pad to prevent further evaporation, more water may be added as it becomes necessary to keep the pad properly saturated."



PEN-AND-INK DRAWING FOR A BOOK PLATE BY DAVID P. RENTON
(PRIZE—*Class Four—December Competition*)

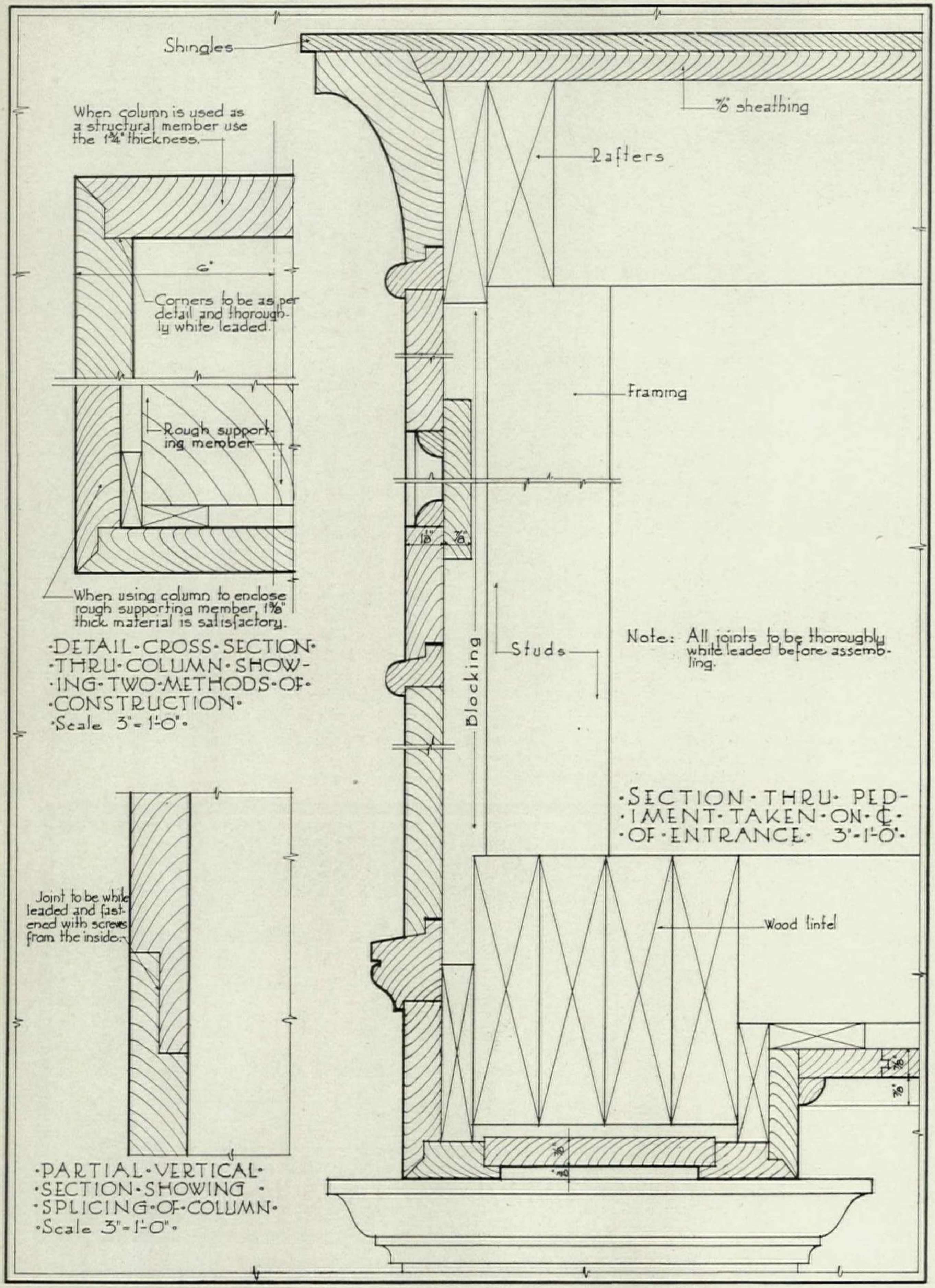


PLATE III—PEDIMENT AND PIER DETAILS OF OUTSIDE VESTIBULE AND PORTICO—DRAWN BY PHILIP G. KNOBLOCH

(The elevation and outside details were published in the two preceding issues.)

THE SPECIFICATION DESK

Floors and Flooring Materials—1

By David B. Emerson

There is nothing in the construction of a building which gets more hard usage than the finished floors. Unfortunately many of us pay too little attention to the selection of the proper material for the service required; needless to say a material which may be excellent for one type of building is practically worthless for another type.

Wood Floors

Of all flooring materials, wood is the most universally used. This is due largely to ease in handling, relatively low cost, both for the installation and upkeep, its low heat transmission and its high sound absorption, and for its resilience as a walking surface, to say nothing of its beauty from a decorative point of view.

Just when and where wood was first used for flooring is practically impossible to say, but it is fairly safe to assume that it was in use as early as the building of the first timbered structures in England and on the Continent. With the commencement of the building of homes rather than fortresses, the use of wood flooring became more general, and by the middle of the sixteenth century it had even found its way into the palaces of kings.

At various times in this country, practically all woods, both hard and soft, have been used for flooring. In New England in the Colonial days, white pine was used almost exclusively for floors, even in the finest houses, and despite the softness of the wood it seems to have worn very well. At that time floors were laid in random widths, using boards which were sometimes as wide as twelve inches. This was also true in England at the same time, as the floor boards in that portion of Wilton House which was built by Inigo Jones are of oak and average about six inches wide; in some of the buildings which were built during that period they are even wider.

At the present time in this country the principal native woods which are used for flooring are long leaf yellow pine, North Carolina pine, Arkansas soft pine, Douglas fir, Sitka spruce, larch, red and white oak, walnut, maple, birch, beech, and tupelo. In using long leaf yellow pine, North Carolina pine or Douglas fir flooring, it is much better to use vertical grain or "edge grain," as it is sometimes called, rather than flat grain, due to its superior wearing qualities and greater freedom from splintering.

As practically everyone who will read this article is probably thoroughly acquainted with the regular strip flooring in the various woods, I will not tire the reader with any description of the materials or of the method of laying them; they are altogether too well known.

Parquetry flooring, or parquet flooring as it is also called, is of probable French origin and was used as early as the seventeenth century, if not earlier. The most common type of parquetry flooring was, and still is, the "herring-bone" pattern. In the early work there were too distinct types used: the early French or Italian, laid with sixty-degree mitred joints, and the later French of the period of the "Louis" with forty-five-degree butt joints. With the building of the greater palaces in France, it was only natural that the beauty of their floors would be given proper consideration, and as a result we have the wonderful basket weave floors at Versailles, the Trianon, and Fontainebleau. Despite the relative nearness of the two countries, the visits of English architects to France, and the fact that Daniel Marot, one of the able French architects of the seventeenth century, worked on the interiors at Hampton Court, parquetry flooring was used very little in England during the seventeenth and eighteenth centuries. The English architects seemed to prefer the straight plank floor, wherever wood floors were used, except in very rare instances such as Melbury House in Dorsetshire and Castle Howard in Yorkshire, where a few of the rooms have parquetry floors.

The first parquetry floor laid in the United States, so far as I have any information, was at Monticello, under the direction of Thomas Jefferson. This was probably about the only floor of its kind in the country, as the architecture of that period was very naturally strongly English in its character. Mr. Jefferson undoubtedly conceived the idea of using parquetry flooring in his home during his residence in France from 1784 to 1789. French parquetry flooring was almost invariably of oak, whereas, in our parquetry a great number of hardwoods, both domestic and imported, are used. The native hard woods most commonly used are white oak, walnut, maple, and birch; among the imported hardwoods, English Oak, Circassian Walnut, Teak, Koko Wood, Mahogany, Tiger Wood, Sapelli, Vermilion Wood, Rosewood, Satinwood, Ebony, Sabicu, Amaranth, and Tulip Wood have all been quite extensively used.

The usual sizes of wood strips for herring-bone parquetry are 2 inches by 12 inches, 2 inches by 16 inches, 2¼ inches by 11¼ inches, 2¼ inches by 13½ inches, and 2¼ inches by 18 inches, 13/16 inch thick, tongued and grooved for blind nailing. Solid pieces are used except with some of the rarer hardwoods when a three-ply laminated construction is used, with ¼-inch face and back veneers. In addition to the herring-bone, and the different types of historical basket weaves, the modern parquetry makers have numerous new patterns which are very well suited to the modernistic architectural surroundings.

A special form of parquetry is quite frequently used in fireproof buildings. This form of parquetry, which so far as I have any knowledge, is always laid in herring-bone pattern and is bedded in hot asphaltic mastic. The pieces are specially milled with flat backs and with special grooves on the lower edges and ends, so that the mastic will gather and not be forced up into the joint when the pieces are brought together. Asphalt emulsions and asphalts cut back with solvents are also used for this purpose, and have a distinct advantage in that they do not have to be heated. This type of floor gives a very resilient walking surface. It has been used in a number of the galleries of the Metropolitan Museum of Art, and after numerous visits I have found them to be most comfortable floors to walk and to stand on.

Before laying this type of flooring the concrete floor slab should be given a levelling coat of cement mortar, trowelled to a smooth, even surface. This cement finish should be given a good coat of bituminous paint, either hot or cold, to seal the pores thoroughly. Each individual piece should be laid separately, and be dipped carefully in the hot mastic before it is set in place.

Another type of wood flooring which is very popular, especially for Tudor or Jacobean rooms, is the hardwood decking or plank floors. This flooring usually comes in random widths from four inches to eleven inches wide, and in random lengths. The clear decking or plank is usually of a three-ply laminated construction. The cross core stock is 7/16 inch thick, and the face and back veneers are 1/4 inch thick, surfaced to 3/16 inch thickness, giving a total thickness of 13/16 of an inch. The boards are grooved on both edges and both ends, and are provided with slip tongues, through which they are blind-nailed to the sub-flooring. Rough cast decking or plank is similar to clear decking, except that it is very frequently solid stock 13/16 of an inch thick. This type of flooring contains sound knots, swirls, streaks and worm holes. The edges and butts of all boards in rough cast decking should be finished either with a slight V-joint, or with an irregularly rounded edge to give the effect of the cracks in an old-time floor. In some cases where a decidedly antique effect is desired inlaid patches are set in the decking to imitate the repairs which have been made during centuries of use. The laying of decking is done by blind-nailing each board and screwing the butt of each board, using two flathead screws for all boards up to ten inches in width and three for boards eleven inches in width. The screws are countersunk and plugs or discs are glued into the holes, simulating the wooden-pegged floors of the early days, or the plugging over the spikes which was used in the old ships' decks. Dovetail keys are frequently used on the edges of the boards to prevent spreading or pulling apart. In some cases where it is desired to give a closer resemblance to a ship's deck narrow strips of ebony or stained white holly are set between the boards at edges and butts to simulate the pitch used in caulking. Decking is usually of oak or walnut, but a number of the other hardwoods have been used at different times.

A comparatively new type of flooring which can be used very successfully over cement floors is the "unit wood block," which is fabricated of several pieces of ordinary strip oak flooring into a square or rectangular unit. The blocks are laid in asphalt mastic.

A most interesting type of flooring has been used in Belgium which has never so far as I have any knowledge been used in this country. This flooring is made up of strips six inches wide by thirty inches long, with cross strips one and a half inches wide between the strips, the joints being broken in the center of the strips. This type of flooring was used in the Hôtel de Ville at Brussels; it is probably modern as much rebuilding and redecorating was done in the interior of this building during the later years of the nineteenth century.

Before laying parquetry flooring or decking the back of the flooring should always be given a heavy brush coat of asphalt damp-resisting paint. This is particularly necessary where the floors are laid over cinder fill.

For heavy duty floors in manufacturing plants, warehouses and buildings of a similar character, also for gymnasiums, schools, and shops, a special type of flooring has been used very successfully. This type of flooring is a strip end grain block flooring made in built up lengths approximately seven and one half feet long. The purpose of this construction is to secure the end grain durability combined with the dressed and matched floor smoothness. There are several different types on the market from which the architect may take his choice. Each type has its distinctive features; one type is built up into strips by dovetailing to horizontal baseboards; another by stringing on wood dowels and another by the use of wire trusses. With the first type, heavy wood splines are used to join the built sections and the strips are nailed laterally to each other. This type of flooring should be laid in asphalt mastic. The blocks which are used in the different types range from two to four inches deep, according to the service they are to have. Several different kinds of wood are used by the various manufacturers of block flooring, among which are oak, yellow pine, Douglas fir, Port Orford cedar, and red wood.

As a general rule the blocks used for this type of flooring are treated with creosote or some other forms of wood preservatives.

To get the most successful results in the use of wood flooring there is no one item any more important than that of finishing. It can be truthfully said that a poor floor can be made to look very well if properly finished, whereas a very good floor may be made to look very badly by poor finishing. With those conditions to consider, it certainly behooves the specification writer to be very careful in specifying the finishing of the floors, and it also behooves the superintendent to see that the specifications are properly carried out. The first precaution to insure satisfactory results with the finishing of the floors is not to allow the finished floors to be laid until the building has thoroughly dried out and all standing trim has been set; and what is better, not until the painting or finishing of all woodwork has been done. This method of procedure naturally minimizes the liability of damaging or staining the floors after laying. Before finishing, the floors should be either scraped and sanded, or sanded without scraping. Some of the leading floor layers surface their floors entirely by sanding, using a coarse sandpaper until all irregularities are removed and finally finishing with very fine sandpaper. All sanding of floors is done by electrically driven machines, except in spaces which are so small that the machine can not be operated. If scraping is done it should always be done in the direction of the grain of the wood. This rule also applies to sanding, except in the case of the intricate basket weaves, where it is almost, if not quite impossible to manoeuvre the machine so as to accomplish that result.

The simplest form of finishing for wood floors is oiling which is a very good treatment for schools, and buildings of a similar character where the service is fairly heavy and the cost of upkeep must be kept as low as possible. Boiled linseed oil was formerly used for this purpose, but of late years special floor oils have been put on the market and some patent penetrating preparations which are made up of wood gums and specially selected vegetable oils are also used. These preparations penetrate the wood deeply and restore certain elements which are lost in the kiln drying; these various oil treatments keep the dust from rising and also preserve the floor.

For the general run of hardwood floors in residences the simplest finish is probably a varnish finish, which has the advantage of not being slippery. The method of application is quite simple. With all open grain woods, fill with a paste filler of the desired color. Filler should be thinned with either turpentine, benzine, wood alcohol or gasoline to obtain the proper consistency. Never, under any circumstances, use a liquid filler. When the gloss has left the filler, rub off the surplus filler with burlap or excelsior, rubbing across the grain of the wood. Allow at least twelve hours for the filler to set or dry. With close grain woods the filler should be omitted and the floor given a coat of acid stain of the desired color. After filling the floor should be given two or three coats of floor varnish. Varnish may be either "gloss" or "dull" according to the results desired. Gloss varnishes are harder, tougher and more elastic than dull varnishes and should always be used for the undercoats. Where an acid stain has been used the floor should be given a wash coat of shellac and two or three coats of floor varnish. A natural effect on close grained woods may be obtained by the omission of stain, and in open grained woods it may be obtained by the use of a natural paste filler the color of wood.

Brushing lacquers are being quite extensively used in floor finishing at the present time. Lacquers which were discussed at some length in my article in PENCIL POINTS, September, 1930, are harder and tougher than varnishes and will naturally wear considerably longer. They are applied either the same as varnish on filled surfaces, over stain on unfilled surfaces with a coat of varnish for a final finish, or as an undercoater for wax finish in either one or two coats. Where it is allowed by the labor unions, or where no unions exist, lacquer may be applied with a spray gun, which is much less expensive than brushing it on.

The finish which is recommended by most of the leading flooring manufacturers and specified by many of the leading architects is the wax finish, which has been used for many years in Europe and is used quite extensively in this country. Before waxing all open grained woods should, under ordinary circumstances, be filled as described for varnished floors, then given two coats of white shellac. Floor varnish is sometimes used as an undercoater for wax; also lacquer is used as noted before. The best way to apply wax is to double a piece of cheesecloth to obtain extra thickness and then fold into a sort of a bag. Put a handful of wax inside and go over the surface of the floor thoroughly. The wax will work through the meshes of the cheesecloth and give an even coating over the floor. This method prevents waste, and an excessive amount of wax in spots. After the floor has been gone over with the wax and allowed to dry about twenty minutes it will be ready for polishing. Rub to a polish with a weighted floor brush, first rubbing across the grain and then with it (a clean soft cloth may be used in place of the brush if desired). After polishing with the brush a piece of woolen felt or carpet should be placed under the brush to give the finishing gloss. Allow the first coat to dry for an hour before applying a second coat of wax in the same way and rubbed to a polish. Electric floor polishers are now being used quite extensively for this work.

Some of the leading floor layers and interior decorators are now advocating the omission of the coat of shellac on all floors that are to be waxed and giving them three coats of wax instead of two. This produces a duller gloss and not such a high polish, and it is also claimed that the floors which are treated in this way are not as slippery as those which have been given the coat of shellac and two coats of wax, which is something to be considered.

Another method which is used in the finishing of open grain woods and is becoming quite popular is to omit the filler and to give the floor two coats of lacquer before waxing. This produces a very pleasing finish. In addition to the regular prepared floor waxes of which there are quite a number on the market, there are some special preparations which are made with a base of carnauba wax (the product of a palm tree which grows in Brazil) which give a very good durable finish to wood floors.

CORK TILE FLOORS

Although they are quite a recent development (not over forty years, at the most) cork tiles have taken quite an important place among the various flooring materials. They are manufactured from pure, cleaned and screened cork shavings, compressed under enormous pressure to the required density in iron moulds of the proper depth to produce tiles of the desired thickness. The moulds are then placed in ovens, where they are baked for a number of hours under a carefully gauged uniform heat. By this process the sap contained in the cork is exuded, and forms an insoluble binder for the entire mass, firmly sealing it together, making a solid, yet resilient board, which requires no other kind of glue or cement. The resultant boards are then cut, trimmed and polished to the desired sizes and thicknesses. Cork tiles are made in 5/16-inch and ½-inch thicknesses, and can be cut into any size divisible into 12 inches x 16 inches, but the most economical sizes and those which adapt themselves best for various-sized rooms are 6 inches x 6 inches and 12 inches x 12 inches for square patterns, and 3 inches x 9 inches and 6 inches x 18 inches for oblong or herring-bone designs. The color of cork tiles is the natural brown of the cork, and they are manufactured in three shades, light, medium, and dark. These shades are obtained by governing the period of baking and not by the use of coloring matter; as a result the colors never change or fade.

Various designs in diagonal squares, checkerboard and herring-bone patterns, solid fields with borders, and other patterns are produced by the use of tiles in two or three different shades.

Cork tile floors are very durable and withstand shocks without breaking, will not crack, splinter nor warp, and are capable of bearing heavy loads without crumbling. They are very resilient, easy to walk on, comfortable to stand on, and are practically noiseless.

Cork tile floors can be used almost anywhere that a resilient, noiseless floor is desired. They have been used very successfully in the working quarters in banks, in libraries, art galleries, churches and similar places.

What is probably the largest installation of cork tile in the United States is in the thirty-story Graybar Building in New York City, where all the corridor floors, except in front of the elevators, are laid with cork tile.

The most recent use of cork tile which has come to my notice was the floor in a large gymnasium. This floor was laid in a medium shade of tile, with the various markings for basket ball, indoor baseball, and other games inlaid in a dark shade of tile. I can very easily imagine that this floor, on account of its non-slipping quality, elasticity, and warmth, would be very acceptable for this purpose. I remember very well in my own gym days lying on a cold hardwood floor during the calisthenic drill.

Cork tiles can be laid either on a wood base or a cement base, but in either case, some care must be exercised in laying the base as it must be firm, level, and smooth if the best results are desired.

If a wood base is used it should be 13/16 inch x 3¼ inches face, tongued and grooved flooring; "C" flat grain yellow pine will do very well for that purpose. It should be well laid, driven up tight and blind nailed to every bearing. A double floor is much more desirable than a single one. If a cement base is used it should be laid either directly on the concrete floor slab, or on cinder concrete fill, depending on the floor levels which are required. It should be well trowelled to a smooth, hard surface to receive the tiles.

The tiles should be laid in a high grade, non-alcoholic, waterproof and alkaliproof elastic cement, and all joints should be thoroughly cemented, water tight.

The finishing of the surface of cork tile after laying is a very important item and should be given quite a little thought on the part of the specification writer. Cork tile can be finished in practically all the various methods which are used for wood flooring, but some of the finishes are not recommended.

Among the finishes which are preferred and which give very good results are one or two coats of lacquer and two coats of floor wax, or a special finish is recommended by some of the manufacturers which consists of a first coat of special paste filler, a second coat of bright finish, composed of China wood oil, Kauri gum, turpentine, and volatile thinner, specially made for finishing cork floors, and a third coat of matt finish composed only of gums, volatile and nonvolatile oils.

Rubber Tile Floors

Rubber tile is one of the oldest of the noiseless, resilient floorings, having been put on the market nearly forty years ago. The first tiles to be used were of the interlocking type, which are still made and used although not as extensively as in the past.

Rubber tiles or rubber flooring, as most manufacturers now call it, are made in various ways by different manufacturers, probably no two using exactly the same ingredients, nor exactly the same methods. In general the component parts are finely ground inert mineral fillers, pure nonfading mineral pigments, accelerators which are certain agents to produce vulcanization, a small quantity of wax which increases and maintains the finished polish and is also a natural preserver of rubber, and a certain amount of pure plantation rubber, generally about twenty-five per cent by volume. This mixture is vulcanized in steel moulds under extremely high pressure (from 1600 to 2200 pounds per square inch). All tiles are cut on special precision machines to accurate size, with square, clean cut edges.

The standard sizes for square tiles are, 3 inches x 3 inches, 6 inches x 6 inches, 8 inches x 8 inches, 9 inches x 9 inches, 12 inches x 12 inches, 18 inches x 18 inches; and for rectangular tiles 3 inches x 6 inches, 6 inches x 12 inches, 9 inches x 12 inches, 9 inches x 18 inches and 12 inches x 18 inches. Tiles are made in three standard thicknesses, 3/16 inch, ¼ inch, and ⅜ inch, and the gauge of material to be installed is determined by the type and volume of traffic which it will be required to carry.

The variety of colors available is quite large, there being at least fourteen plain colors, and as many as thirty-six mottled color combinations giving excellent imitations of the leading domestic and imported marbles.

Rubber tile can be laid on either a wood base or a cement base, and the same conditions which are required for a base for cork tile apply to rubber tile. Particular care should be taken to make sure that the cement floors should be absolutely dry before laying rubber tile, as moisture destroys the bond of the cement which is used for setting the tile.

Rubber tile can be used in almost any place where a noiseless, resilient floor is desired. The most prominent installation of rubber tile of which I have any knowledge is in the main corridor of the Empire Building on the corner of Broadway and Rector Street, New York City. This corridor forms the main route to the Sixth Avenue and Ninth Avenue elevated railroad stations, and not less than two hundred thousand persons pass through it each working day. Two of the leading installations of rubber flooring which have been made recently are the floors in the Edison Building, Los Angeles, California, and the very decorative floors in the main lobby of the Waldorf-Astoria Hotel, New York City. In the Edison Building over 200,000 square feet of flooring were used.

There are some places, though, where rubber tile should never be used, notably, where the floor slab rests directly on the ground, whether above or below grade, even when the floor slab is waterproofed; on wooden floors laid on wood sleepers set in cinder concrete fill; in hotel or restaurant kitchens near cooking or dishwashing apparatus, where deposits of heavy grease are liable to occur or in spaces subject to moisture or in contact with strong acids, alkalis, or rubber solvents.

Rubber tile should always be set in the best quality waterproof cement. Each tile should be set separately in a full bed of cement, with joints flushed full by sliding the tile into position. Some manufacturers of rubber tile recommend that where tiles are laid on a wood sub-floor the floor be covered with a thirty-pound saturated building felt, cemented to the wood floor with a full bed of linoleum paste. Felt should be laid with all edges carefully butted. In some cases an unsaturated felt, tacked to the floor in combination with cotton sheeting, is used.

Rubber tile can be finished practically the same as cork tile, except that finishes containing rubber solvents should be very carefully avoided; ordinary floor waxes should never be used as they usually contain turpentine or other rubber solvents. If a wax-like finish is desired use a water emulsified wax, called "rubber floor polisher" by the Rubber Manufacturers' Association, of which at least a half dozen are on the market at the present time.

Mastic Floors

Mastic floors are composed of mineral rubber or asphalts mixed with mineral pigments and fillers. Mineral rubber, quite extensively used for this purpose, is a hydro-carbon, defined by some authorities as a natural bitumen. It is extremely elastic, has very high adhesive qualities, is insoluble in acids, alkalis, or any of the usual solvents.

The mastic is applied to the cement base cold, in plastic form, and is laid with a trowel in thicknesses of ⅛ inch, 3/16 inch and ¼ inch, according to the service required. The floors are laid without seams or joints.

Mastic floors are warm, quiet, and resilient. On account of the ductility of the material they are not liable to crack and due to its insolubility they can be safely laid in basements and other damp spaces without fear of deterioration. Personally I have found mastic floors very satisfactory in hospital work. They can be had in about eight plain colors at the present time.

Mastic floors can be finished with a coat of lacquer and a coat of floor wax, but a special lacquer which does not have any deleterious effect on the asphaltum base in the mastic should always be used.

Editor's Note:—*In the second part of this article the author discusses Asphalt Tile, Linoleum, Burnt Clay Tile, Terrazzo, Mosaic, Marble, Soapstone, Slate, Flagstone, and Magnesite floors.*