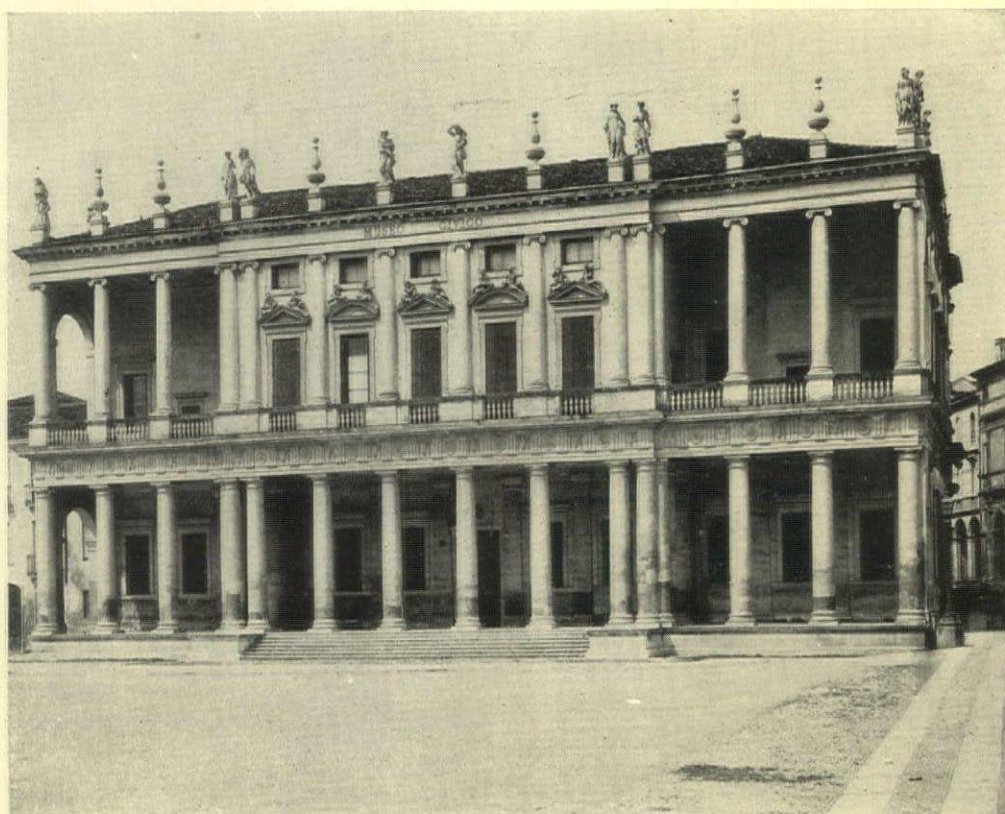


The AMERICAN ARCHITECT



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A GARDEN IN JAPAN

THE AMERICAN ARCHITECT

VOL. CXV

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Architecture and Engineering

By THOMAS CRANE YOUNG

THE preference given by the United States Government to the engineer and contractor over the architect in the conduct of building operations for war was perhaps natural, considering the necessity for haste and the fact that the army officials in charge of the preliminary organization were themselves primarily engineers. It must be admitted that in regard to rapid construction surprising results were obtained, although without the usual necessity for any consideration of cost. Whether architects could have done better or as well must always remain an open question in the absence of a comparative test under like conditions. There is, unfortunately, some ground for the criticism that the architectural profession has not kept pace with modern business developments and has given an unwise prominence to that portion of the business of building which has been designated by the critics as "Art."

The American Institute of Architects remains today practically as organized about fifty years ago, when living conditions and business methods were as different from the present as day and night. It still attempts to govern through an inflexible Code of Ethics based upon archaic practices which are unworkable today, and, consequently, seldom closely followed.

The modern practice of engineering as applied to buildings is largely a development of the last fifteen or twenty years, and its national association is organized on a more liberal basis. Broadly speaking, it is governed from the bottom up and, is, therefore, democratic and more in harmony with the times.

The regulations established by the Institute are largely responsible for any misunderstandings regarding the position of the engineer in relation to building. The Schedule of Charges states that the architect is to be reimbursed for "the costs of the services of heating, ventilating, mechanical and electrical engineers. Although this wording is a recent modification, the code still implies as general custom permits, the separation of these engineering activities from the services to be performed by the

architect. All, or nearly all, of these specialties are necessary to any building operation of magnitude and their work must be incorporated in the general architectural plans. It is small wonder then that the owner should question the constructive ability of the architect and consider himself subject to imposition through the multiplication of fees. If the owner deals with each specialist separately he is subject to an added inconvenience and the architect loses a part of the control which he should properly exercise himself. The same may be said for continuous superintendence which also is excluded by the code from the service properly performed by the architect. The total expense for professional services often amounts to a considerable sum and forms a part of the cost of the building which must be provided for. It is unbusinesslike to leave the matter in doubt.

To avoid explanation and perhaps a disagreeable argument with an owner, or the alternative of paying for this technical advice from his own pocket, the architect in some cases seeks to cover the matter up by inserting a clause in his specifications requiring the contractor to include in his proposal an amount sufficient for the purpose, but disguised as "payment for shop drawings" or some similar expedient. To say the least, it is an unbusinesslike shifting on to the owner or contractor of responsibility which should properly be assumed by the architect. The disinclination on the part of architects frankly to face the situation has led to still worse abuses. In some cases manufacturers of building material offer to supply engineering service gratis, provided their material is specified or purchased. Of course, the cost is added to the manufacturer's price, but the service so obtained is not likely to be the best. It is, of course, proper that the owner should pay for any necessary technical services, but it certainly would be more dignified and businesslike for it all to be included in the architect's fee, which should be correspondingly increased.

There are always two sides to any controversy, but it is difficult to formulate a defense until a criti-

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cism has been expressed in concrete form. Something of this sort appears in the Journal of the Institute for November, 1918, in an article by V. A. Matteson, of the Construction Division of the Army, a part of which we quote:

"By a sort of process of disintegration, various fields of endeavor have been started in the past half-century which we have been responsible for saying were not architecture but engineering in some form. The result is that the term "engineering" covers a multitude of activities, but the term "architecture," which should be the broader term, has been confined to very narrow limits. It has been decreed by ourselves that, in order to be architecture at all, our work must have some claim to relationship with "art." Science has been used in connection with the work of the Construction Division, but not much, if any, of what is commonly called "Art" (with a capital A). Therefore, by our own definition, by the limitations we have ourselves set, by public opinion which we have molded, and by our own narrow conception of what a "master builder" should be, architects, according to popular definition, have not been of much service to the Construction Division, as compared with those who are commonly called engineers. On the other hand, if we consider that any man who has knowledge of the art and science of building, and puts that knowledge to practical, professional service as a master builder, is an architect, then we may say that the Construction Division is almost entirely composed of the most able architects that the world has produced."

This appears to be a fair indication of the attitude of Government officials and coincides in the main with similar views heard in conversation and expressed in certain writings appearing in engineering publications not now at hand from which to quote.

Aside from the assumption of the rôle of "artist" in place of "master builder" the gist of the accusations against the architect is that he is often visionary, unbusinesslike, and incompetent to design in detail whatever work of engineering is required in his building. These faults are frequent enough, but neither architects nor engineers are always perfect. Our critics lose sight of the fact that in laying out the general plans, the architect provides for and solves the main features of each engineering problem involved in construction, leaving the details of these and many other parts of the construction for subsequent elaboration.

It is his function to incorporate with his own work that of each of the various technical experts so that in the completed building the parts which each provides will fit in and work together as the parts of a single machine. He must do this in such

a manner as to satisfy the financial requirements of the owner, the physical needs of the tenant and the aesthetic sense of the community.

The training of the architect usually includes a study of the fundamental principles of engineering, but it is true that he is not often an expert in the sense applied to the engineer, nor is this necessary. It must be remembered that there are often eight or nine distinct phases of engineering necessary in modern buildings of any magnitude, each of which requires a preparatory period of four years to qualify as an expert, and experts in one branch are seldom similarly qualified in another. It would manifestly be impossible for any one man, either architect or engineer, to qualify as an expert in all branches during the span of a single life. Besides a certain knowledge of engineering an architect must have a working familiarity with a dozen or two of the building and industrial trades, to say nothing of decorative painting and sculpture. If not a universal expert himself, he can co-operate with other specialists, and this co-ordination of effort is absolutely necessary in the conduct of modern building operations, whether under the direction of the engineer or architect. If by the former, he will find it necessary himself to depend in equal degree upon the assistance of experts in other lines of work.

Engineering has a better standing as a profession because it has established a definite standard of education for those who practice it. It is much more difficult to do this for the architect, owing to the great diversity of information he must acquire, but a similar definite standard of education must be required before architecture can be maintained as a profession at all. Facts brought out by the war have, however, caused an almost universal doubt as to the efficacy of present methods of education in many other branches of human endeavor as well, and probably much study and effort will be necessary before our educational institutions can be made properly to fulfill the requirements of modern life.

At the present time the education of the engineer, whether military or civil, includes no study of the aesthetics of construction, and this probably accounts for the extreme ugliness of most structures purely utilitarian in character and especially of most buildings designed by engineers.

It has recently become fashionable to minimize the value of the aesthetic element in a structure and yet at the present time the whole world bewails the destruction of thousands of buildings throughout Europe because of the loss of their acknowledged beauty which has for long been a prolific source of income to the countries possessing them. Beauty

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and ornament are not synonymous terms by any means, though frequently so misused. Nor does the element of beauty in a structure bear any special relation to cost. But when it does exist, it appears as the result of the exercise of some mental quality which, for the want of a better term, may be designated as skill, or may be what is meant by "Art."

At the close of the Civil War, as now, the engineer was in the ascendancy, and for the ten years following, national architecture as to merit was at its lowest stage since the inception of our government. The next twenty-five years, partly due to the workings of the "Tarsney Act," saw an enormous improvement in American architecture until it equalled perhaps the product of any of the modern nations. That this work should be attributed to the engineer rather than to the architect, many of whom

attained world-wide eminence during this period, is a claim which borders somewhat on the ridiculous.

After all it seems rather futile to dispute over the relative importance of architecture and engineering. The functions exercised by each are necessary in any construction and neither can obtain results without the co-operation of the manufacturer, the contractor, and not least, of labor, each contributing to the finished product in his own manner of work and degree of skill.

Co-operation must be the key word for building in the future, and whether this may best be obtained through organization as had in the past, or in modified form, perhaps in larger units combining and exercising under one head all of the functions necessary to building, from finance to labor, is one of the new problems of peace yet to be solved.

Analyzing the Development in American Architecture

By DAVID J. VARON

THE military achievement of our nation in this great war has been far reaching. It has revealed our country to the world at large, and where we were thought of as a conglomeration of materialists, we have suddenly shown that we were as truly idealistic as any older nation. Our devotion to the highest ideals was sealed by the death of thousands of our best men on the Altar of Liberty. When our forces at Chateau-Thierry opposed an iron wall to the foe, it was in a new garb. It was the heroes of the War of Independence who reappeared. This revelation of real humanity in the nation once upon a time known as "the nation of business" is fraught with consequences. We might inquire how should we stand a world investigation about our achievements in fields other than military. I leave it to others to speak for agriculture, industry and commerce, contenting myself with an analysis of American endeavor in the architectural field and from the artistic standpoint. That field is vast and ought to be subdivided into at least three big parts: industrial, commercial, and civil architecture.

About twelve years ago, in a conversation with a friend, I expressed the opinion that one of the great problems we had to solve was the industrial plant, feeling that if the Greek genius were still at work, the goddesses Electricity, Steam, etc., would be glorified in the beautiful and powerful temples of labor. Today this dream is beginning to materialize. If you have never ventured out of your

office for the last decade there are great surprises in store for you. The Larkin plant in Buffalo, the Sears-Roebuck plant in Chicago, and many others of similar type would show you what tremendous strides we have made along this line. Things are looking more human, an air of courtesy is pervading the organizations all through. Architects and owners have vied with each other in the attainment of an ideal and have succeeded. We may be proud of their success, because upon it is based that of the whole nation. Our business men have come to understand that it pays to shed beauty over an industrial structure. In the long run it is repaid by the superior quality of the product and the reduction of labor turnover.

In the labor housing, which is an industrial collateral question, the improvements have also been great, especially since the Government took the matter up. We have understood that a good man needs to be well housed. The foundation of a nation has to be well seated, well cared for, if it has to be relied on for the support of the whole structure. Let us hope that what we have achieved along this line is only a start, a beautiful one, full of hope for the future, to the advantage of the laboring class and to the credit of the Government.

It would require several articles to put in its true light our civic architecture. Suffice it to say that we are in the ascendancy.

Commercially we have had to cope with our typically American problem, and this is the sky-

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scraper. How interesting is the history of the development of this class of building! At the time of its birth the skyscraper was surely not intended for a parading feature along our thoroughfares, but as a necessity dictated by the imperious demands of the rapidly developing business in our congested cities. Room in the business centers was growing scarce and rent ran high. There was only one logical solution at a time when locomotion was not so easy as to-day, and that was the superimposition of a new city over the old. Buildings were doubled and trebled in height. The strides, as far as engineering was concerned, were huge. There was no limit to the possibilities offered by the steel frame. But the men of the architectural profession were taken aback. It was all so sudden that the first solution which offered itself was the actual multiplication of elements: if an office building was to be three or four times higher than usual, then the basements must be accentuated three or four times and three orders would in turn superimpose each other, etc. In other examples, three or four regular six-floor-high buildings climbed upon each other with remarkable nimbleness. They made you think of very skillful acrobats.

Meanwhile cultured people began to take the matter to heart. Our schools of architecture were just beginning to bloom. As classic architecture began with worshipping Vignola, the latter's book was taxed for the solution of this most modern of all problems. One solution—if not the best—was offered, which took hold of all the mechanically inclined minds: the same divisions of the classic order, base, shaft, and entablature, were to find their counterpart in the design of the new type of office building. Soon there were to be seen elaborate bases whose height was determined by the formula; then practically barren shafts, and, at the height prescribed by the teachings of Vignola, came another elaborate part corresponding to the entablature. The easy so-called solution spread like wildfire from coast to coast and from North to South. All these new structures "meant business."

Now, at best, these giants were mere masks. They could not stand the slightest test of rationalism. What relation was there between the appearance and the reality? None. Huge columns and portals adorned the entrance, and you supposed that they ushered you to equally important quarters. Great was to be your disappointment. For the inside had nothing to do with the front. In fact, one man studied the equipment of the building, its plan, etc., and another, possibly ignoring all the requirements of the program, took care of the front, the main part of the study of which was to conform to the formula and yet make it different from that of a neighboring giant building. It was for the solu-

tion of such difficulty that the ingenuity of the designer was to be taxed. But the matter, thank heaven, was comparatively easy, owing to the multiplicity of orders, of borrowed styles, of an infinite variety of materials, etc.

There were some who did not grasp at once the "high" significance of such combinations. Well, a more learned friend explained the matter in a very simple manner. The base, which usually reached the height of the heretofore six-floor building, was kept elaborate because people walking in the street could see the ornaments without difficulty. The shaft was barren, precisely because you could not try to see any detail without getting a sprained neck; as to the gorgeous decorations of the top, they were reserved by the kindly artist for those who looked on the new Babylon from across the river or a few miles off. They were to greet the newcomers to our shores.

But, somehow, this mechanical, camouflaged solution did not and could not take hold of all architects. This sort of dress or veneer applied without any plausible reason on the most interesting achievements of the builder-engineer was something decidedly wrong. As to the theory of its proposed solution, it was altogether false. There was no relation of organ to function in its subdivisions, as in those of the orders. Here the base spreads out in order to carry the upper weight on a wider area, and so forth. The cap spreads also in order to relieve the stress of the architrave as far as possible. Hence there is in the order that peculiar charm which accompanies truth.

Meanwhile the best minds of the country were at work trying to live up to the very definition of art which must be a combination of service, truth and beauty. Observing everything in nature, following in this the very same methods of old, they found there must be on the outside at least a suggestion of the inside. Once more those judicious minds contrived to make architecture abide by the simple definition beautiful construction, whereas it has been heretofore an effort to the contrary, "beauty made constructible." How could they reach a solution? Here is where the survey of our achievements becomes very interesting, the more so that the next proposed solution is very rational and thereby points to a change brought or to be brought into methods of teaching in all our schools.

The successful architect started by analyzing the very skeleton proposed by the engineer, and he saw at once that the one important element in it was the pier, whose office it is to carry down to the rock all the weight with which succeeding floors loaded it. In such a system no wall supports itself, but its weight is shifted on every floor on the pier. Hence the latter element must needs become the dominant

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one. This is what our architects grasped at once and affirmed with the utmost conviction on their work. They had the courage to do away with the obsolete formula teachings and assert their new conception. It proved to be full of life. The metallic pier was accentuated outwardly without any fear and without desire to abide by any so-called symbolic principle that the vertical points to heaven, which is good enough teaching up to a certain age. Verticality emphasizes gravity, and it is therefore a good enough item to be accentuated. It is service and truth combined. No longer the acrobatic climbing up of one building on the top of another, no matter how great the respective merit of each be, but the vertical pier dares to defy the very clouds. This is what gave us buildings of the Woolworth type. That there are some mediaeval details in them is due to the purpose of conciliating to some extent the new creations with the spirit of tradition which for centuries has associated Gothic with any comparatively tall structure. The first step in the right direction, and the most difficult, is made. More power to the daring minds who undertook to open new possibilities!

Our commercial structures begin to be useful and truthful, and to some extent beautiful. The question is to make them altogether so. That is the next step. While comparatively easier, it entails some academic reforms. We may pride ourselves on having the richest and most costly museums in the world. They will help us immensely in our endeavor. But they should serve us only as an inspiration if we wish to create not necessarily an American art but any art at all. Art is not created with models, but with a keen appreciation of life itself, of its poetry, the appreciation of the contemporary events, as well as the aspirations of the nation. Now, if our desire were to revert to the absolute form of polytheism then we should with all freedom let run on our friezes all the themes of Greek and Roman mythology. It would prove our consistency. But as we profess to have altogether a different creed, what can such ornaments as an ox skull beautifully adorned with garlands mean to the man in the street? It is, indeed, "Greek" to him. But as we are anxious to revive the very principle which guided the ancients in their expressions we shall find in our modern life enough material and symbols to give our creations an expressive beauty. The church is right when it commends the praying in the current language, which one understands, no matter how fine a Latin word may sound. To be a living, a lasting, art, ours must appeal to the great number, as did the old. That composition will be classic, whether or not there be any classic details in it, which will

be beautifully representative of the present tendencies of the masses and not only of the few versed in the finenesses of the Iliad and the Odyssey. For the latter our museums will always supply plenty for their want. But the man behind the plough, or even behind the desk, needs an art which breathes in the same atmosphere as he does. As the common people in the Middle Ages found in every pinnacle or gargoyle something reminding them of their folk-lore or an expression of their creeds and legends, so we ought to foster an art which would be comprehensible to the street cleaner as well as to the college graduate.

It requires merely a change in the attitude of our academic heads with regard to the teachings of poetry and life to make these things possible.

Opportunity is now rapping at our door. As a result of our great military victory, which helped make the world safe for democracy, this country is contemplating the erection of hundreds of liberty memorials, Temples of Liberty, as it were. The whole nation is already keenly interested in the proposition. We may expect the co-operation of all the enthusiastic citizens. This is the surest warrant of the coming of a new era in art. The Greeks and the Middle Ages gave us such examples of national enthusiasm, and this is precisely the reason for their being able to hand down to us works of art on which we can see the image of their very lives. If we are to succeed—and we must—it will not be on account of our using this or that style, borrowed from this or that period, but simply because we will have developed more poetry; we will have learned better to appreciate the events of our own time. The symbols we are to use will be representative of our modern aspirations and activities. Humanity of today does not have to blush before its ancestors. The democratizing of the whole planet is as worthy a reality as was poetic or romantic any Herculean deed or myth. The laws of creation are still at work in our midst, but their expression is not quite adequate.

That teaching I deem to be a failure which does not kindle a sacred fire in the bosom of our youth, a desire to feel before Nature and the scenes of the everyday life the same feelings as the poets who put them into verse for them. Art is an expression. One could not expect any expression where there is no impression.

The whole matter of our art lies at the very foundation of society, at school. In the proportion of our making the methods of teaching more imbued with admiration for modern life, and heaving with aspiration toward an ideal, we will have an art worthy of ranking with that of any other period or country in history. And we will have it.

Recent Books

The Formal Garden*

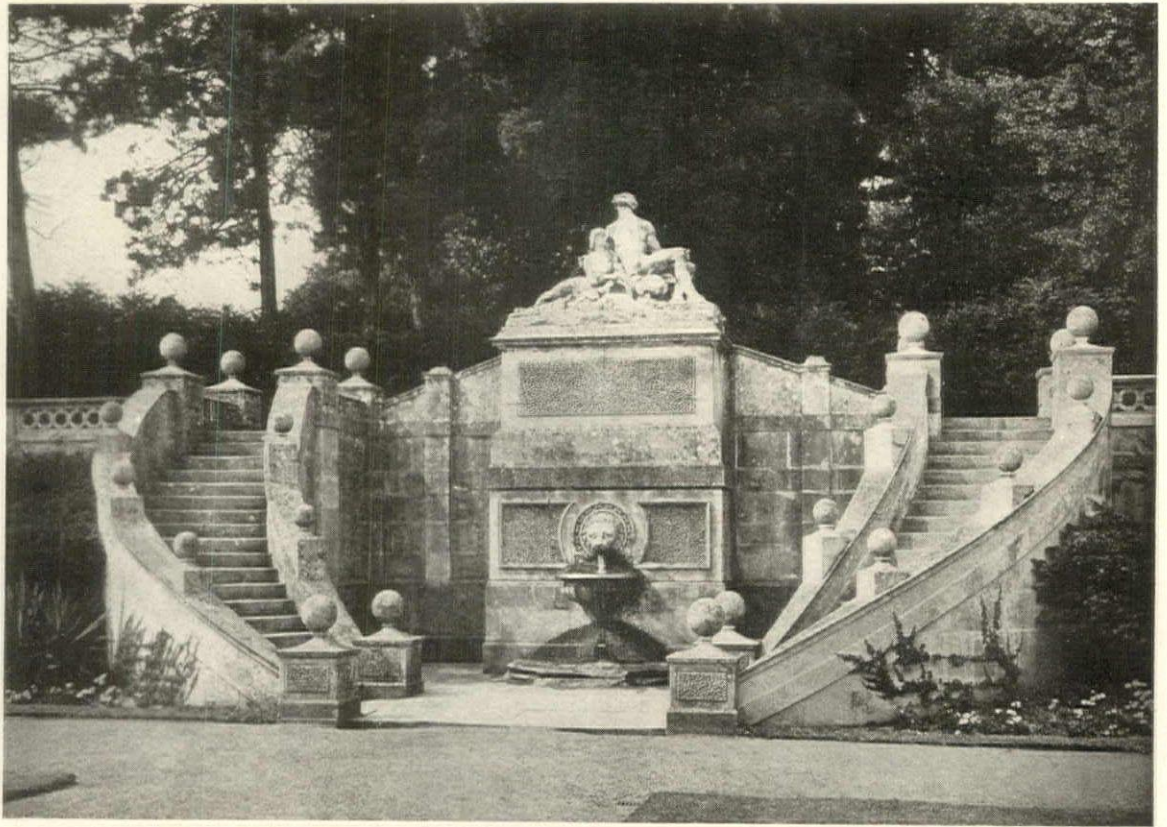
THE formal garden in England, as we know it today, was, up to the beginning of the Tudor period, non-existent. Europe, and particularly England, had been ruled by that good old plan of "he may take who hath the power, and he may keep who can." The English house, as referring to the seat of the lord of the manor, was a feudal edifice, surrounded by moats and defended by strong masonry walls. To venture from even the safe shade of these walls was to risk the marauding bands of some neighboring lord. Even the land that it was necessary to till to afford subsistence was worked under the protection of armed guards whose constant vigilance during the period between seed time and harvest was necessary to insure the garnering of the crops.

By the middle of the sixteenth century, rural England had assumed a more peaceful state, and there existed conditions of personal security which

permitted a freer going about. These peaceful conditions at once affected every phase of the domestic life of a people whose martial equipment had been laid aside and who began freely and safely to practice agriculture. Henry VIII and later Elizabeth used their influence toward the general reorganization on higher planes of the entire scheme of domestic life.

The architecture of the period also began to assume the characteristics with which we are familiar. Whereas in earlier days the windows of these huge castles were small in size, and mostly on the open courts, the new buildings were fenestrated in such a way that the interiors were flooded with light and air and afforded a wide view of the surrounding country. The bowling greens previously confined to the inner courts were now removed to well selected locations. The "dipping wells" that necessity in the past demanded should be easily accessible, were rebuilt outside the walls of the "tower," and the gardens where were raised the vegetables to supply the table were largely expanded and located further afield.

*Garden Ornament, by Gertrude Jekyll, full cloth, 11 x 17 inches, with over six hundred illustrations. Price, \$28.00. New York: Charles Scribner's Sons.



STAIRWAY IN THE GARDEN AT BOXWOOD, WILTSHIRE, ENGLAND

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Among the nobility and gentry there was large riches, and the rivalry to improve the house and its surroundings led to the encouragement freely given to architects, craftsmen and gardeners in Europe to visit England, where their services were always in demand and their opportunities for profitable employment very great.

This influence of the artist and artisan of the Continent is everywhere discernible in Tudor houses, but in no direction more strongly than in the stately English formal garden. From its origin principally

have been developed results the fame of which has traveled to the four quarters of the world.

What has been accomplished in England and Italy in the development of the formal garden has been a source of the most beautiful inspiration to men in this country whose clients of large wealth have made it possible to set about a series of important undertakings in garden making. While these are today, in most instances, but the crude skeleton of a real garden, the developing and artistic hand of time will eventually transform them into the same effec-



FLATFORD BRIDGE, ENGLAND. AN EXCELLENT TYPE OF SIMPLE WOODEN BRIDGE

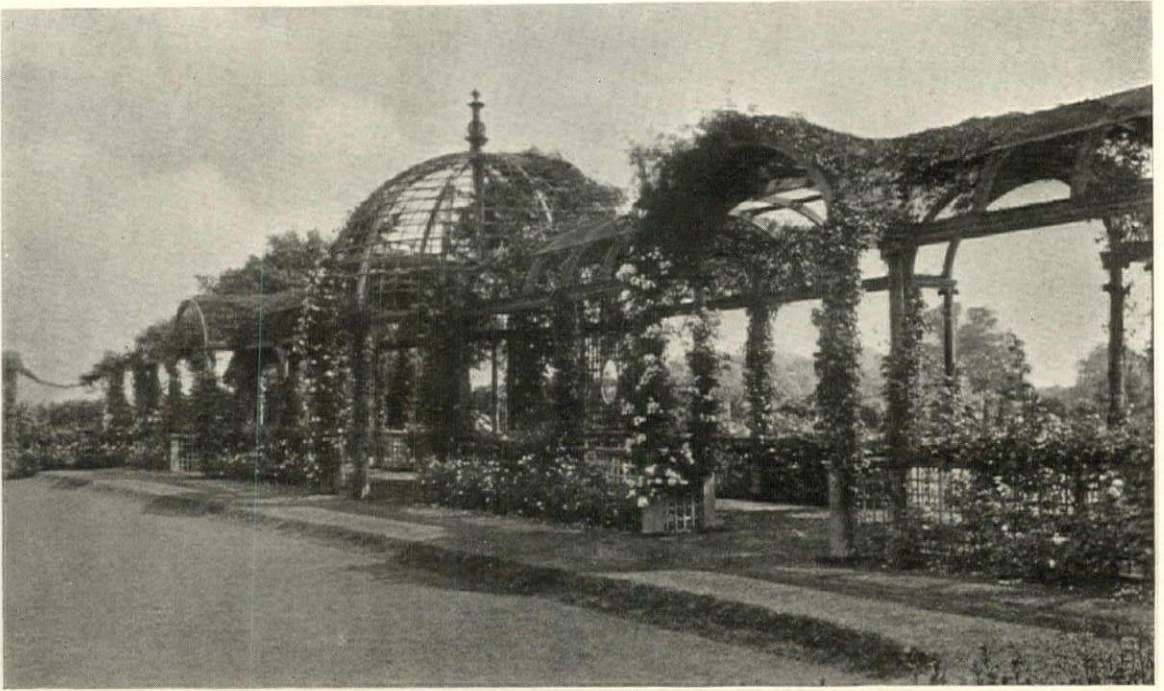
as a utilitarian location where might be raised the necessary vegetables to supply the table, and those essential medicinal herbs that formed the pharmacopia of the time, there developed, under the influence of Italian and French men, the highly decorative and supremely beautiful English formal garden. And to this development there was given the skill of the architect, the sculptor, the craftsman, and what we now designate as the landscape gardener.

Successive generations of reverential hands have builded and led the original schemes until after, in some cases almost four centuries of growth, there

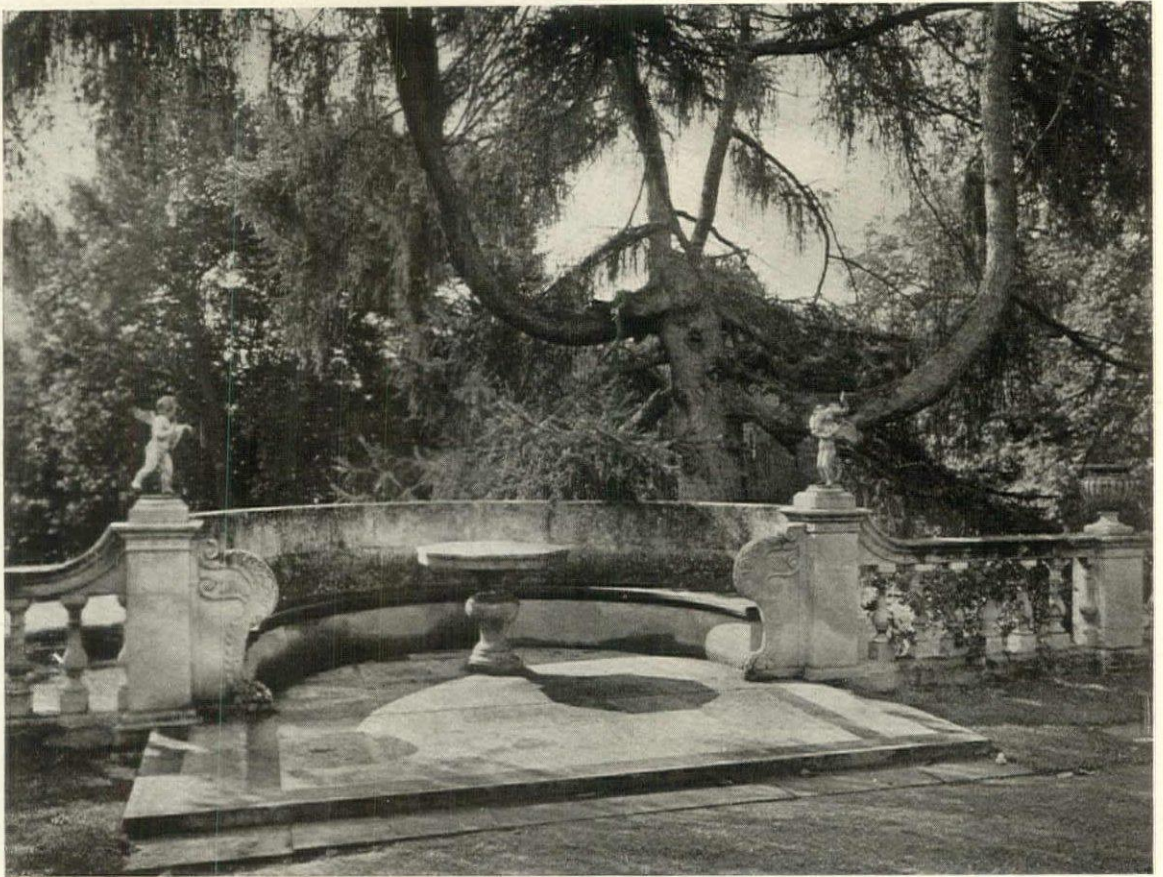
tive results that are to be found abroad. These results will only be attained in this country by the application of the artistic knowledge of successive generations of rich owners and skilled landscape gardeners, but it is quite certain that we shall at some future time have in the United States equally excellent results, as their building will in its inception and development have been controlled by the examples of centuries of growth of the foreign garden.

Many books have been written as to the formal gardens of Europe, each profusely illustrated. These have served to make us familiar as far as

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ARCHED TRELLIS, WITH DOMED CENTER, AT EATON LODGE, ESSEX, ENGLAND



A GARDEN SEAT AT HINTON ADMIRAL, HAMPSHIRE, ENGLAND

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pictures ever will, with the general effect of gardens that have become famous in song and history. It has remained, however, for Charles Scribners' Sons to produce jointly with George Newnes of London a work on gardens that is so markedly in advance of anything attempted along this line in the past, that any reference to the bibliography of the European gardens omitting this important work would be incomplete.

While the title of this large volume (it measures eleven by seventeen inches) is *Garden Ornament*, it would more clearly indicate the character of its

classification of the illustrations. These are divided into seventeen sections. They include gateways, steps, balustrades, paved courts, loggias and orangeries, garden houses, pergolas and bridges. Other classifications of accessories present sundials, fountains and garden ornaments.

The volume is a sumptuous one, and without it the architect's library will, as far as garden making is concerned, be incomplete.

We are indebted to Messrs. Charles Scribners' Sons for permission to reproduce from *Garden Ornament* illustrations accompanying this article.



IN A JAPANESE GARDEN

contents had it been called *Garden Detail*. There is a wealth of six hundred illustrations, carefully made from unusually well taken photographs. Each plate is a storehouse of good suggestion, and many of them possess an artistic quality that is not always present in framed pictures.

As a guide and inspiration to garden planning and designing, this book has the utmost value. The text is brief and only sufficient to introduce the large number of illustrations, each clearly telling its own story.

A helpful feature of this book is the well studied

Architecture and Democracy*

JUST to what extent the spirit of democracy has and will make itself felt in architecture—a subject which, on account of the war, has had such an extraordinary intensification of interest that no one in the habit of observing the shifting currents of art can have failed to perceive it—is most interestingly traced in Mr. Bragdon's latest work. The book will be found to be well-reasoned

**Architecture and Democracy*, by Claude Bragdon, F. H. I. A., 213 pages, price \$2.00. New York: Alfred A. Knopf, Inc.

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GARDEN TEMPLE, VILLA BORGHESE, ROME

and convincing, with a logical and forceful plea to the architect not to revert to the old feudalism from which the war has set him free, but to seek for the self-expression that will create the new, the true democracy in art.

Written, of course, before the ending of hostilities, it does not for that reason lose either its cogency or timeliness. The fact that our participation in the war has resulted so splendidly for the progress and furthering of the democratic spirit through beauty, is taken due note of by the author. He calls particular attention to one conspicuous example—the Red Cross Community Club House at Camp Sherman, Ohio—which stands as a symbol of the architecture of Need, in contradistinction to the architecture of Greed, and is an oasis in the “Euclidian nightmare of bare board and black roofs of the cantonment.”

Mr. Bragdon logically and forcefully presents his views, which in reality hit at the architect who must have a precedent for all his work. No sympathy is spared on the man who in designing a city bank goes back into history's pages and picks out a

yellow-stoned arsenal of old Spain and uses that for the shell of his new structure. There is none of the spirit of democracy in that, according to Mr. Bragdon, who holds that democracy can not be interpreted in terms of existing idioms, be they classic or romantic, but must come from the heart of the architect, where they will create new forms through him.

The architect who is at a loss to know where to go and what to do in order to be played upon by these emotions is referred to the army and navy camps, where the spirit of democracy is incarnate. There, men stripped of all but the elemental necessities of life, have dreamed the dreams and seen the visions that form the new democracy. The Red Cross building just referred to, which attained its final synthesis through the collaboration of a Cleveland architect and a National Army captain of engineers, is given as an example of the ideal relation between architect and engineer—that of a happily wedded pair—strength and beauty. There was no deliberation as to the relative merits of Gothic and Classic, but the appearance and atmosphere of the

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structure are inspiring, in symbolic relation to the times. To Mr. Bragdon it represents what may be called the architecture of Service, "a temple of the new democracy, dedicated to the uses of simple, rational social life."

Speaking of the classification of the expression of the building impulse from what may perhaps be called the psychological point of view, Mr. Bragdon says:

Broadly speaking, there are not five orders of architecture—nor fifty—but only two: *Arranged* and *Organic*. These correspond to the two terms of that "inevitable duality" which bisects life. Talent and genius, reason and intuition, bromide and sulphite are some of the names we know them by. Arranged architecture in its finest manifestation is the product of pride, a knowledge, a competence—a competence staggering to behold. It seems to say of the works of Nature, "I'll show you a trick worth two of that." It is created but not creative; it is imagined but not imaginative. Organic architecture is both creative and imaginative.

To make the whole thing clearer it may be said that arranged and organic architecture bear much the same relation to one another that a piano bears to a violin. A piano is an instrument which does not give forth discords if one follows the rules. A violin requires absolutely an ear—an inner rectitude. It has a way of betraying the man of talent and glorifying the genius, becoming one with his body and soul.

Mr. Bragdon deplors the fact that the architects of today, especially those of the East, are so imbued with the classic which they have had drummed into

them in their early training that it has cast a spell over their imagination, and their efforts can never become truly creative. They have merely become reconstructive archæologists, he asserts. His plea is that they deal more simply and directly with the immediate problem to emancipate them from absurd and impossible convention. In the problem of the office building, democracy, he points out, has been afflicted with the attempt to inflict upon the living present a moribund and alien order.

It is the author's belief that in whatever way the war may complicate the architect's personal problem, it should simplify and clarify his attitude toward art and destroy the evil spell of materialism, which is the very negation of democracy. One step toward the solution of the problem has come, through the war, in the attitude of the profession toward the general housing problem.

Besides Mr. Bragdon's interesting treatment of the advent of the new democratic spirit in architecture, his book contains several of his essays heretofore published in various architectural publications, including one on Ornament through Mathematics, Color and Ceramics, and Symbols and Sacraments. Altogether it is a very readable book that Mr. Bragdon has given us, full of interest to those educated in all architectural schools. The book is copiously illustrated with excellent photographs.

The Post-War Committee

Every architect should support the work of this committee. It is not one of the Institute alone, but representative of the entire profession in this country.

Send your suggestions promptly to the Committee at the Octagon, Washington, D. C.

Recent Legal Decisions

EFFECT OF OWNER'S PROMISE TO SEE SUBCONTRACTOR PAID

A lumberman sued an owner for the price of materials and to impress a lien on the property on the theory that the owner, to induce him to furnish the lumber to the contractor promised to see that he was paid for it. Evidence that the value of the house would have been greatly in excess of the contract price was held competent to show the promise, and that the owner practically assumed control of the work. The personal benefit to the owner by reason of the fact that the contract with the builder was very advantageous—was sufficient to remove the promise from the statute of frauds. The lumberman had a lien, under the New Hampshire statute, notwithstanding he gave no notice in writing of his intention to claim a lien. The provisions of the statute requiring a subcontractor to give notice to the owner of such intention are solely for the benefit of the owner, and the notice may be waived by him.—*Janvrin v. Powers* (N. H.) 104 Atl. 252.

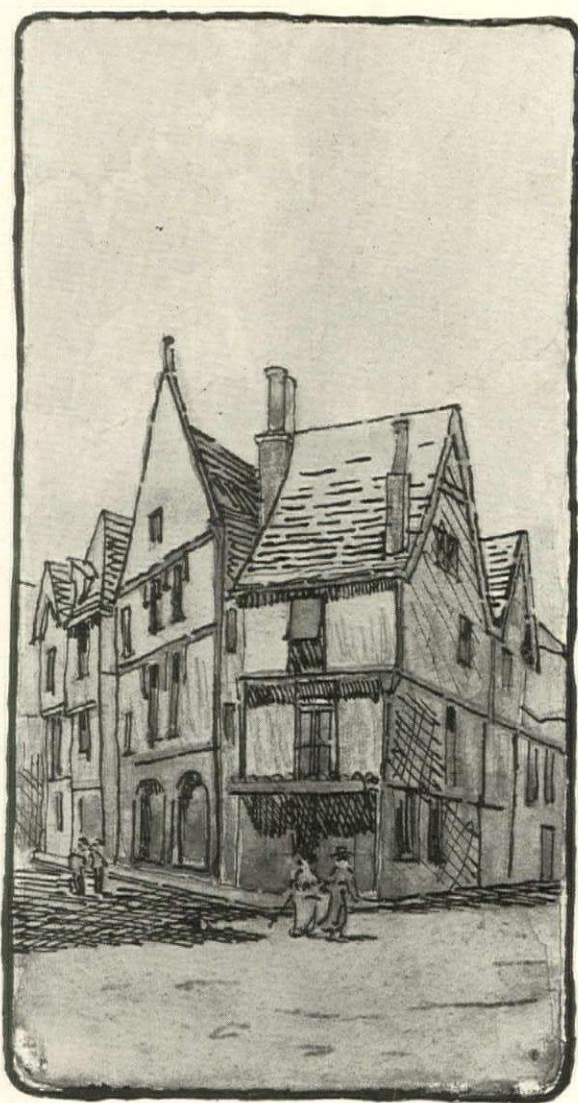
ATTEMPT TO DEFEAT MECHANIC'S LIEN

In an action to foreclose a mechanic's lien for lumber and materials to erect a building, against a husband and wife, the wife's sister claimed the land as hers. It appeared that just before the building of the house, the wife deeded the land to her sister for an express consideration. In the contract for the material it was agreed by the husband and wife that a mechanic's lien should be filed as security for the price thereof, and they gave a note therefor. It was held that the deed to the sister was a manifest sham and that judgment for the plaintiff was clearly right.—*McCaull-Webster Elevator Co. v. Stiles*, North Dakota Supreme Court, 169 N. W. 577.

FOLLOWING PLANS AND SPECIFICATIONS

The New Jersey Court of Errors and Appeals has approved of the following charge: "If the sagging of the walls and the falling of the plaster were due to insufficient support through joists or timbers, even though the defendant (contractor) put them in, but if the specifications called for them, this defendant cannot be held responsible in this case. In other words, if the defendant simply complied with the terms of the specifications, and the architect, through a mistake, provided for timbers in the specifications which were insufficient to properly carry the weight of this building where it was necessary

to have such support, and as a result, the natural and proximate cause of those insufficient timbers, the cracks occurred and the plaster fell, then this defendant is not responsible." In short, the plaintiff owner was entitled to the house he bargained for, and not a better one. If the contract and specifications are not to be the builder's guide, he has none, and the owner may contract for a \$1,000 house and demand a \$10,000 house. A good workmanlike job is a job properly executed; whether the result is what it should be depends on the plans and specifications.—*Drummond v. Hughes* (N. J.) 104 Atl. 137.



OLD BUILDINGS IN BOURGES

From the original sketch by Captain Harry Lane, 519th Engineers, A. E. F.

THE AMERICAN ARCHITECT

THE AMERICAN ARCHITECT

Founded 1876

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Co-operating With the Post-War Committee Architectural Education

THE Post-War Committee on Architectural Practice, in its admirably conceived program, does not stress with the accent that conditions warrant, the subject of architectural education. It refers to this important matter to the extent of a dozen or more lines, declares that our architectural schools "have apparently neglected to train the students in practical business," and reaches the conclusion that "many young men gain their experience at the expense of their first clients."

These conditions would seem sufficient to indicate that there is something radically wrong with our architectural educational methods. In fact, a large majority of the thoughtful men in the profession believe that much of our trouble in the past has been due to the accent that our architectural schools have given to the less essential features of the student's training and to similar faulty practices.

To go even further into this matter, it may be said that almost all of the queries set down in the program of the Post-War Committee, or the state-

ments made as to present conditions of practice, have their origin in the subject of architectural education. The present relationship of the architect to the public results from a system of education that has tended to give the young architect the idea that his position demands aloofness and that he should acquire the highest development of an ultra-professional attitude and at all costs maintain his dignity as an artist. This point of view has dulled his proper appreciation of his responsibilities as a citizen, and has caused him to ignore those particular functions of the Government in the co-operation with which he could be of great value. It has served to give him an exaggerated idea of his own importance, and caused him to avoid the giving of personal service in the progress of his buildings.

These things are all set down in the Post-War Committee's program and the profession at large is invited to discuss them with the committee. It is urged that every architect accept this invitation, and it is also recommended that in stating reasons for past errors and in suggesting methods for their correction, the matter of architectural educational methods as affecting professional practice, past and future, be carefully considered.

ANY future regulation of architectural education should be the work of the practical men of the profession. Any revision should be based on the experience of actual practice. It should be in the hands of men so sure of themselves, so certain of their knowledge of all the relations of the profession, to one another individually, to their clients, to other professions and to the general public, as to cast fearlessly aside all useless impedimenta to correct practice, and adopt measures that to many, wedded to old and obsolete methods, may seem revolutionary.

C. H. Blackall has stated in his admirable article on Architectural Education, printed in these pages, that necessary changes will not come from the free initiative of the schools, but that they must be evolved in the profession itself. That architects have a manifest duty in this respect is certain. This duty has now been squarely put up to the profession by the Post-War Committee.

Further, Mr. Blackall asserts: "There has been altogether too much separation between the profession and the school; too much treating the profession of architecture as if it were an end in itself rather than the preparation of a life work, and as if the academic successes were tangible achievements rather than mere groundings."

The suggestion of Frederic W. Garber, contained in a communication to THE AMERICAN ARCHITECT, offers a solution for the conditions described by Mr. Blackall. Mr. Garber states: "If architectural

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education could be divided into two large groups, first, building, and second, architecture, the two factions could be united."

IT is not the purpose to set down here any suggestions as to just how or how not to revise our educational methods. What is desired is to accent the influence on practice in the past, of certain methods of education now not generally believed up to the times. Further, it is desired to direct attention to the seemingly ill effect of these methods on practice, and to urge upon those who should with a proper regard to their professional responsibilities uphold the work of the Post-War Committee, carefully to consider whether the matter of architectural education is not after all the one big thing which needs to undergo improvement.

Illegitimate Publicity Methods

THE American Institute of Architects at the last convention held in Philadelphia, so amended the code of practice as to permit members of the profession to advertise, but it was tacitly understood that any advertising by the profession should be ruled by that unwritten code of ethics which would govern any legitimate business enterprise.

Many firms have since been reorganized on the basis of a closer co-operation with the engineering profession, and a number of these have through technical and other publications set forth by dignified advertisement the completeness of their organizations and their ability to handle every phase of a building operation from the early one dealing with the problem of financing through all details to the completely furnished structure. All of which is quite right and proper and shows a most commendable business spirit on the part of men who

at one time, and not so long ago, were accused of lack of business ability.

It is unfortunate, however, that this removal of the ban on advertising in connection with architectural practice should have given impetus to a certain class of advertising agents, and it is much more to be deplored that there should be found in the profession individuals and firms who have allowed themselves to be cajoled into certain undertakings. It now appears that many firms of architects have been approached by advertising solicitors who offer to get up, free of all expense, a certain limited edition of the architect's work in book form, provided that they may be permitted to solicit and print in each volume such advertising as they may be able to secure. Were it not that facts have been learned as to the success of these schemes and definite knowledge that certain important firms have lent acquiescence to them, the idea would seem incredible. Naturally an advertising solicitor engaged in such work will not be slow to assure those upon whom he calls for advertising that the architect whose work will be illustrated in the volume would be disposed to look with especial favor upon the goods of those who contribute to the success of his published work.

A more reprehensible proceeding it would be difficult to imagine. A method that would tend more to lessen the dignity of architects could not be devised. If these schemes are carried forward, the harm is serious. It would seem as if here was a matter that the Post-War Committee might with propriety early consider, and that the Institute at its convention in April could investigate with a view to such action as would make clear its attitude toward a practice that if persisted in not only discredits its authors, but casts a cloud on the good name of the profession as a body.

The Post-War Committee

This Committee asks advice and co-operation not only from every architect, but also from those men engaged in occupations allied to architecture and building.

Write your views to the Committee
at the Octagon, Washington, D. C.



PLATE 87

CHURCH OF THE HOLY ROSARY, DAYTON, OHIO

W. L. JAEKLE, ARCHITECT

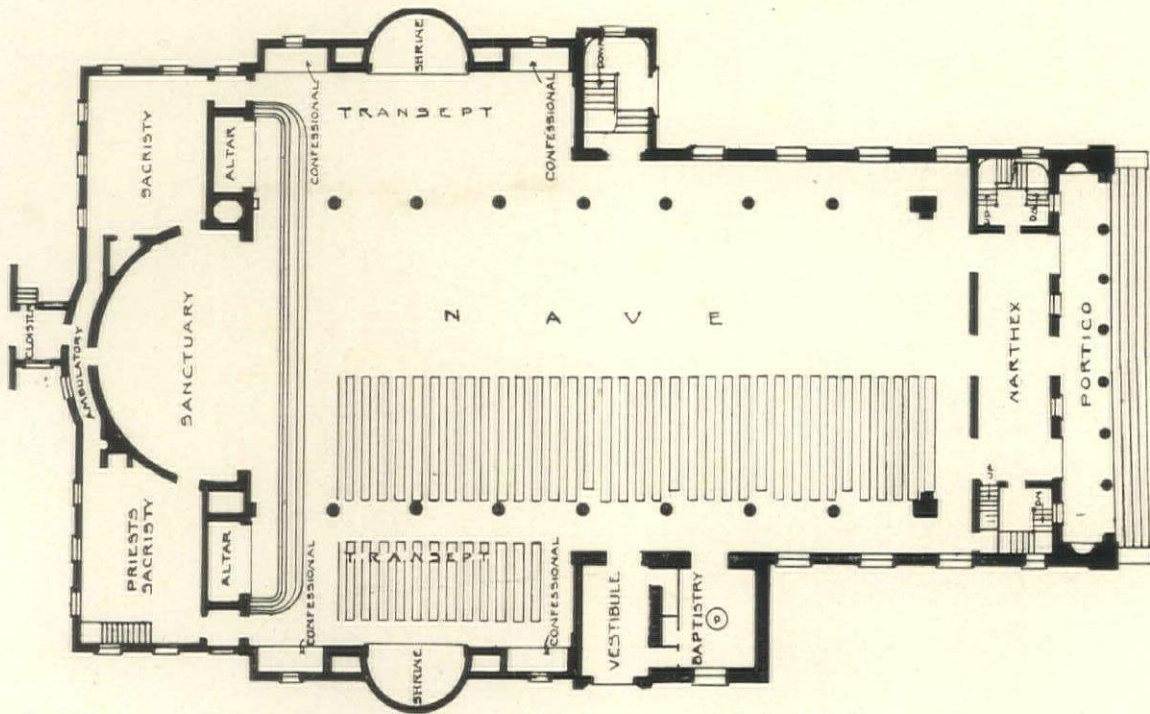


PLATE 88

CHURCH OF THE HOLY ROSARY, DAYTON, OHIO

W. L. JAEKLE, ARCHITECT

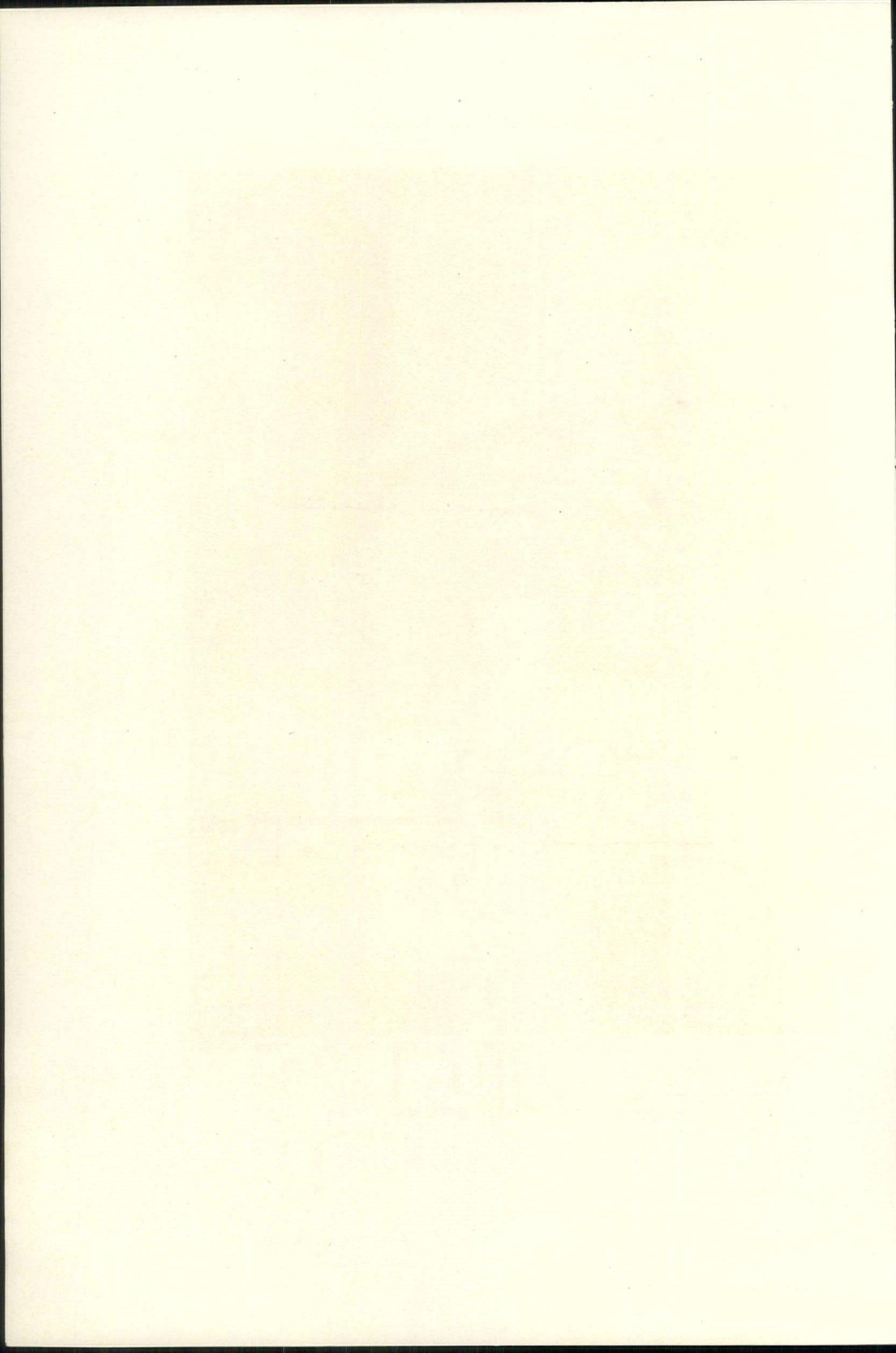




PLATE 89

INTERIOR LOOKING TOWARD GALLERY

CHURCH OF THE HOLY ROSARY, DAYTON, OHIO

W. L. JAEKLE, ARCHITECT



DETAILS OF TRANSEPT

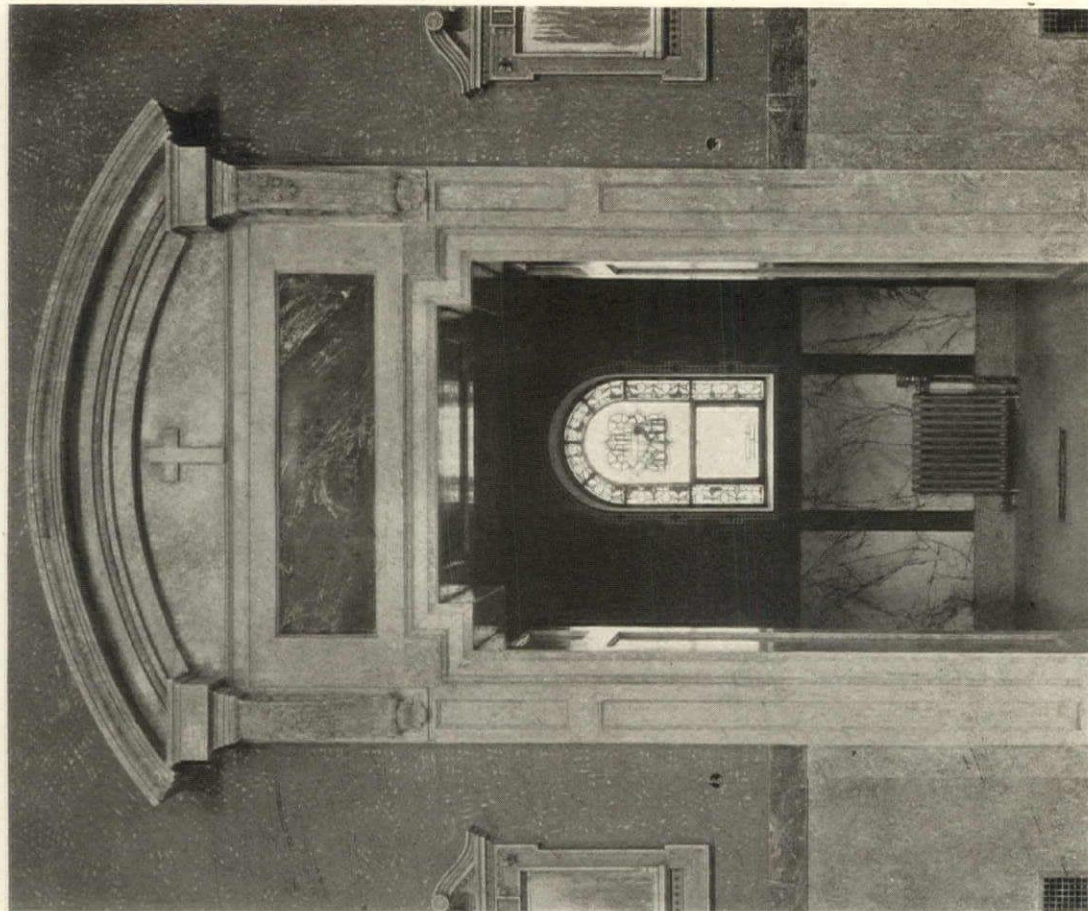


PLATE 90

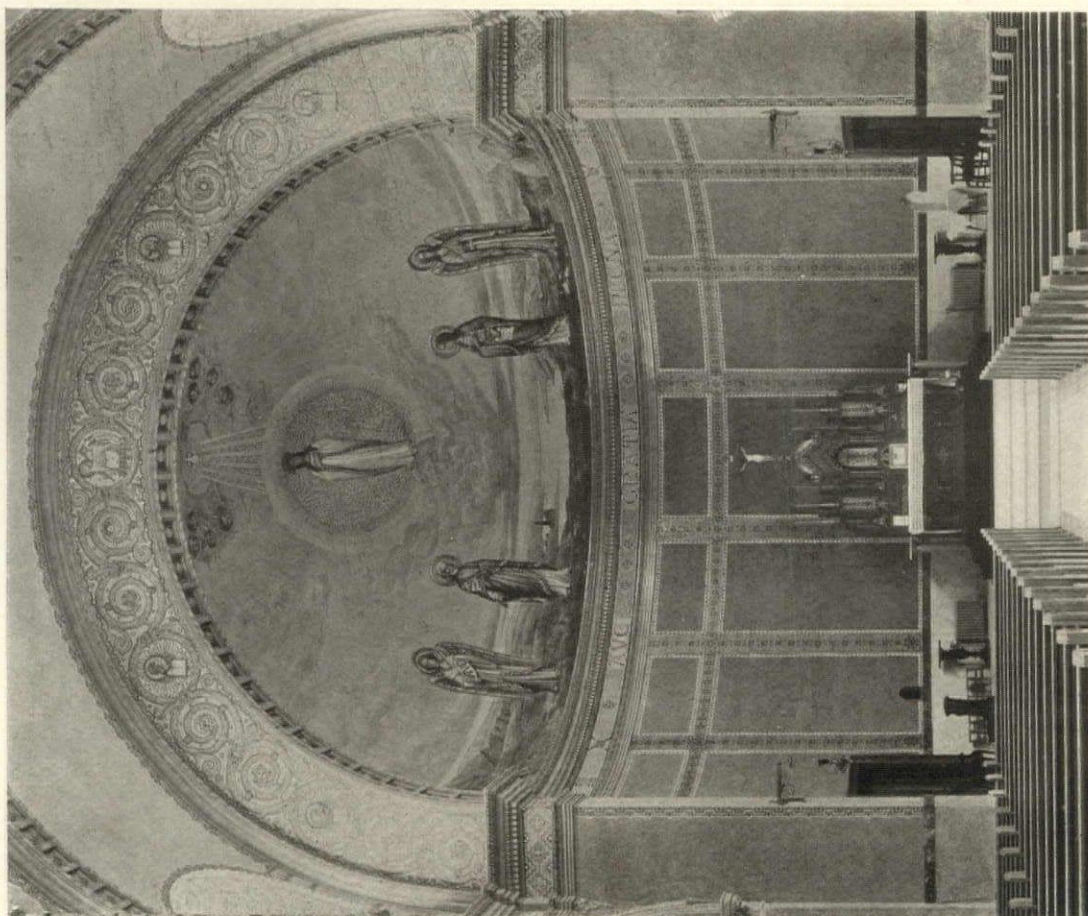
CLERESTORY DECORATION

CHURCH OF THE HOLY ROSARY, DAYTON, OHIO

W. L. JAEKLE, ARCHITECT



BAPTISTRY DOORWAY



DETAIL OF SANCTUARY

CHURCH OF THE HOLY ROSARY, DAYTON, OHIO

W. L. JAEKLE, ARCHITECT



PLATE 92

ALLIES' SHOP, ST. LOUIS, MO., MAINTAINED FOR BENEFIT OF
THE AMERICAN FUND FOR FRENCH WOUNDED

GUY STUDY, ARCHITECT

ON entering this café, one finds himself transplanted into a different world. Here is the picturesque quaintness of a village street "somewhere in France": in the center are spreading trees, real trees; at one side, a lovely little 17th century house painted saffron red, is built up against the ruin of a 13th century church, of which only the doorways and the shrine remain; across the way is the village inn, with thatched roof, green shutters, and laurel trees before the door; at one end of the street is a high wall topped with broken bottles, beyond which a scene in the Vosges mountains has been painted, giving the effect of great distance and reality.

No papier-mâché nor imitated construction has been used. All of the houses are built of permanent materials. The architect, Mr. Guy Study, has given care and thought to every detail, such as hand-forged hardware, frames of heavy solid timbers mortised and tenoned and tied with oak pins, and hand-split shingles laid irregularly.

The artists working with Mr. Study, Mr. Frederick Carpenter and Mr. Joseph Adamak, have reproduced the gray, mauve, and those tints of plaster mellowed by time; these soft tones harmonize exquisitely with the apple-green of chairs and tables spread fête-like into the street. Quaint lanterns made of wrought iron enhance the twilight feeling of late afternoon. The very necessary touch of life is supplied by young girls, who serve as waitresses, dressed in peasant costumes of blue with flaring headdresses of white organdie.



PLATE 93

ALLIES' SHOP, ST. LOUIS, MO., MAINTAINED FOR BENEFIT OF
THE AMERICAN FUND FOR FRENCH WOUNDED

GUY STUDY, ARCHITECT

Financial and Commercial Digest

As Affecting the Practice of Architecture

False Economy to Await Lower Prices

That the manufacturer, jobber, retailer and consumer will have to realize and convince each other that they cannot stop buying if business is to keep its nose above water during the reconstruction period, is the opinion of T. E. O'Brien, president of the Leader Iron Works, Decatur, Ill. "All of these factors," he states, "are so closely linked together that one must depend upon the other. If the man who contemplated building a \$40,000 home delays operation because of high cost of material, then he must expect his employee who intended building a \$3,000 home to do likewise.

"If the farmer waits for lower prices he must expect the city folks who consume his product to cut down their purchases. In fact, if the implement or pump factory employee is out of work, his purchases from all classes of merchants are of necessity cut down to the lowest point which will allow himself and family to exist.

"So isn't it a fact that we are playing a game of false economy when we wait for lower prices? Won't we suffer more in the long run because of this hesitancy than if we would take the other view and not only encourage our customers to buy, but practice what we preach by buying the things we need ourselves?

"Where do people get the idea that prices to be normal must be pre-war prices? There is no logical reason to believe that prices will reach that level for a long time. Taxes will be extremely high for years to come and 'labor' has no intention of living under the same wage and conditions as existed before the war, 'so whither are we drifting'?

"If prices were to start a sudden decline now, by the time a pre-war basis prevailed business would have reached the worst stage of stagnation this country ever saw and every shred of confidence would be destroyed, and confidence is the one and only thing that will restore the proper balance to business.

"The man with money to do things and who hangs back now is the slacker. This is the time for the manufacturer, jobber and dealer to utilize personal salesmanship and advertising space in a big way just as the Government did to mobilize our resources to win the war. Of what good will his money be if this country is thrown into chaos, due

to millions of men being out of work? Idleness causes unrest and often leads to riots and destruction of property which will mean losses a hundred-fold greater than the difference between prices now and lower ones later. Wouldn't it be much better to try and strike a happy medium and adopt a live-and-let-live program?"

Sees Loan Market Improving

Lewis H. Losee, vice-president of the Lawyers' Title and Trust Company of Brooklyn, believes that the situation in the building loan market created by the high cost of material and the cost of labor may be remedied in the near future. "There is a big improvement," he said, "but it has not taken as yet the shape of a boom. There is an encouraging sign in the transactions during the past few months and an indication of the revival of confidence in building. The demand for apartment buildings is to be expected at this time when the adjustment of living conditions is in progress following the disturbance of the war."

Report on Jobs for Unemployed

Within the last two months the United States Employment Service in New York state has placed 50 per cent of the male civilians who have applied for employment and 38 per cent of the soldier and sailor applicants. The report of activities of the service has been made public by Director Dr. George W. Kirchwey.

Speaking of the discrepancy between the percentage of civilians placed and soldiers and sailors sent to positions Dr. Kirchwey said it was due to the fact that men discharged from the service are particular about the job in which they settle after their experiences abroad, a condition which, he thought, natural. To many the opportunity is now presented to look about for better work than that in which they were employed before the war. They now seek opportunity for advancement in various lines of endeavor.

"Another thing," continued Dr. Kirchwey, "which is making the placement of soldiers difficult is their tendency to overestimate their own abilities. We have had men apply to our offices and rate them-

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selves as expert machinists, on the ground that they had become highly skilled in one of the technical units of the army. After referring them to a machine shop we have found that they were unacquainted with even the simplest types of machinery. I have in mind one man who wanted a job as instructor of French in a school or college, whose only knowledge of the language was gained from six months' contact with the inhabitants of the villages where he was quartered.

"To overcome this tendency we are working out a system of simple questions which will enable our examiners to determine whether an applicant is really qualified for the position which he desires."

January Exports Set Record

January exports exceeded in value the total for any previous month in the history of American commerce, according to a statement issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

The export figure announced for January is \$623,000,000 as against a total of \$566,000,000 for December, and \$505,000,000 for January of last year. Only twice before have exports reached the \$600,000,000 mark. During the seven months of the fiscal year ended with January the exports totaled \$3,798,000,000, as compared with \$3,450,000,000 for the corresponding period of the previous year.

The value of imports in January was \$213,000,000, as compared with \$211,000,000 in December and \$234,000,000 in January, 1918. For the seven

months ended with January imports totaled \$1,698,000,000, which is a slight gain over the \$1,634,000,000 for the similar period of the previous year.

The excess of exports over imports in January was \$410,000,000, an impressive total when it is remembered that the excess of exports for the entire fiscal year 1914, the last normal year, was only \$470,000,000.

Testing Structural Materials

In commenting upon the needs for an appropriation of \$175,000 by Congress to be used by the Bureau of Standards in its work of investigating stone, clay, cement and other structural materials, Director Stratton states that building needs throughout the country are based upon the most unreliable data. He says there is great need for floor and partition tests, and that the increase of \$50,000 over last year's appropriation is asked for that purpose. An appropriation of \$60,000 is also asked for the investigation of fire-resisting properties of building materials. The sum of \$15,000 has been asked for an investigation of the effect of sea water on concrete.

The director states that there has been an entire change in the floor industry in recent years and it has been necessary to develop new refractories. He referred to the linings of the furnaces on battleships, which are now made of a light brick of very high heat-resisting power.

With the present appropriation the bureau has been conducting some column tests, with some good results from brick, cement and steel protected columns under temperate conditions.

Current News

New Jersey Architects Organize Memorial Committee

With the view of co-operating with the various communities of the State, the advisory committee on war memorials of the New Jersey Society of Architects organized last week, with James O. Betelle as chairman, Captain Shiras of Elizabeth as vice-chairman, and Hugh Roberts of Jersey City as secretary. The other members of the committee appointed by President Gilbert C. Higby are John F. Capon and Henry Baechlin of Newark, Stockton B. Colt of Elizabeth, C. W. Fairweather of Grantwood, Fred W. Wentworth and Harry T. Stephens

of Paterson, Arnold H. Moses of Merchantville, and William W. Slack of Trenton.

It is the plan of the committee to prepare a communication for submission to all of the municipalities of the State, offering its services in an advisory capacity. Feeling that the question of memorials should be approached with the fullest consideration, the hope was expressed by the members at the organization meeting that the municipalities would feel free to call upon the committee for advice. The belief prevailed that time should be taken to obtain the ideas of citizens and representative bodies, as well as to ascertain the views of the returning soldiers.

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It was reported to the committee that Governor Edge had been apprised of its formation and had given his hearty sanction, saying that he would be glad to take official cognizance of the organization.

Consideration was also given by the committee to the subject of expediting construction work, and the opinion prevailed that a concerted effort on the part of all interested bodies should be made to induce the Federal Government, the State and the various municipalities to start necessary operations under their respective jurisdictions as soon as possible. It was felt that the increase in costs would be counteracted by the general satisfaction resulting from employment.

League Dines French Commissioner

The Architectural League of New York gave a dinner Thursday evening, March 13, in the Fine Arts Building, West Fifty-seventh Street, New York, to Lieut. Seymour de Ricci of the French High Mission, now in the United States.

The subject for discussion was "Art in French Homes in the 18th Century." Lantern slides were shown illustrating the history of the home-furnishing crafts in the days of Louis XV and Louis XVI, including the most characteristic examples of French craftsmanship as applied to the making of furniture, textiles, porcelain and metal work. These landmarks in the history of the eighteenth century were selected from some of the most artistic homes in Europe.

Lieut. de Ricci is a student of industrial arts in France and has an intimate knowledge of the history of Gallic home making.

Building Industry Asks Lower Freight Rates

Agitation for an immediate lifting of restrictive freight rates on building materials has been most determined. Representatives of the sand, gravel, stone and slag industries, and the cement manufacturers, have appealed to the Division of Public Works and Construction Development of the Department of Labor for assistance in the presentation of their case before the railroad administration.

Many of the contractors and builders reporting to the Department of Labor insist that freight rates, more than any other factor, are holding back the more extensive building projects, especially in the Central West. They submit that if there is to be

an early resumption of general building and construction work, freight rates on sand, gravel, stone, slag and cement must be reduced, and such shipping restrictions as were inaugurated to prevent the diversions from war uses of building materials, must be withdrawn.

Building Zones Planned for Ohio

Senator William Agnew has introduced a bill in the Ohio Senate to authorize adoption of building-zone plans for a half dozen cities having City Planning Commissions. The bill authorizes the Council of any city having such a commission to enact an ordinance regulating the height and bulk of buildings, the area and dimensions of yards, courts, and other open spaces in connection with buildings and the location of trades, of industries and other uses of property. Councils, however, shall not adopt a building-zone plan until a general plan shall have been prepared by the City Planning Commission and submitted to Council.

Fight Unemployment by Constructing Homes

Indiana is preparing to fight both unemployment and radicalism through a campaign of home building and home owning. In his address before the annual convention of the Indiana League of Savings and Loan Association in Indianapolis, President W. B. Reed insisted that the cure for both these menaces was homes and more homes. Mr. Reed's appeal for a state-wide campaign for home building met with an enthusiastic response and out of it is expected to come a drive that has the encouragement and backing of state and municipal officials. The effect of such a campaign is bound to be beneficial for the home owning man if every community takes the responsibilities of citizenship seriously and is not prone quickly to take up untried social and political theories and experiments.

While the figures are by no means complete, data obtained by the division of public works and construction development clearly indicate a revival of home building in Illinois, Indiana, Iowa and Ohio. Activities in this field are not yet normal but from week to week an increase is shown indicating a growing confidence on the part of the private building interests. All authorities in the building industries agree there is a pressing demand for residential buildings.

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Canada Pushes Housing Bill

The Government housing bill will have the right of way over the legislative track. Ontario's premier, Sir William Hearst, in introducing the measure, said he wished it to go through the various stages quickly and get royal assent without delay. The bill offers loans to cities.

A loan of \$2,000,000 was offered at 5 per cent by the province to municipalities provided the latter put up 25 per cent of the amount loaned to builders. Subsequently the Dominion government set aside \$25,000,000 for the purpose and of this sum about \$8,500,000 was available for Ontario. Should a larger amount be required, it likely would be forthcoming. It was estimated, Sir William said, that a \$3,000 home would cost the purchaser \$20 a month if payment were spread over a period of 20 years.

Sudbury was the first place to pass the necessary by-law to comply with the act. Windsor and Sandwich since had taken similar action. About 20 municipalities had intimated their intention of coming under the act, and about 20 more were considering the matter.

It was expected that 60 municipalities would this year avail themselves of the machinery provided under the act.

Our Immediate Responsibility

"We must not overlook the fact," states Mayor Jewett of Indianapolis, in an interview published by the Department of Labor, "that our immediate responsibility is to discharge the cost of peace." Continuing, he says:

"There is hesitation on the part of some in extending business enterprises on account of the prevailing high prices of labor and material. This is evidenced in the building industry. This line of business activity has been at a standstill for two years. A revival of building enterprises will reach into the industrial field a very great distance. It involves setting into motion the wheels of industry which manufacture and produce steel, lumber, brick, cement and all other building material and building equipment which goes into the construction of such work. This means opening up employment for thousands of men in these various manufacturing plants.

"The cost of labor and material is higher than before the war, but there is no reason to believe that these costs will be subject to a perpendicular reduction. It is more reasonable to believe that any decline in these costs will be gradual and not abrupt. The war raised greatly the plane of costs. Wages

are higher, materials are higher and living necessities are correspondingly higher. These increased costs are all relative. Therefore, a gradual reduction of the entire cost plane is to be expected rather than an abrupt decline in any line of costs. This being true, the chance of investors and builders suffering financial loss because of building at prevailing prices, is remote.

"A stimulation in the building industry and in public improvements will be of immeasurable benefit to every city. It will absorb the unemployed and keep the community in an active, healthy state. In the war business concerns felt a responsibility to the nation and the city to hold their business organizations together, even at a sacrifice. This was a part of the cost of war. Now that we have peace the same policy can be applied with the same excellent results and may well be considered as a part of the cost of peace. If we hold back and wait for low prices before we again become active, we shall defeat the very object we seek to attain. We shall lose the money we sought to save."

Says Unemployment is Exaggerated

Judge Elbert H. Gary, chairman of the Board of the United States Steel Corporation, has declared as "exaggerated" the reports of unemployment in the steel industry. Speaking at a meeting of the Directors of the American Iron and Steel Institute he said that the industry is in better condition than it has been reported to be. "So far as our information goes," he said, "there is less unemployment than we would have been led to believe through some publications."

The meeting was called to consider general conditions in the steel industry, and to consider the so-called Redfield plan for the lowering of prices by an agreement among the interests in the different industries. Asked as to prices, Judge Gary said that as far as he knew they were being well maintained.

Memorial to Dead U. S. Fliers

The Aero Club of America has announced plans for the erection of a monument to commemorate the American airmen who made the supreme sacrifice in the war. It is planned to place the memorial in the famous cemetery at Toul, France, where are buried Major Raoul Lufberry, Lieut. Hober Baker, Blair Thaw, and other American aces, the plan to mark the memory of the nation's dead pilots having been suggested by Captain Eddie Rickenbacker at the Aero Club's recent annual dinner.

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Building Lime in 1918

War restrictions on the building trades greatly reduced the demand for building lime, the production of which in 1917 amounted to one-third of the total lime output, according to the United States Geological Survey. Manufacturers of building lime, except those who supplied Government contractors, reported decreases in demand ranging from 5 to 90 per cent in 1918, and some plants that supply only building lime were closed throughout the year.

A number of Government building projects, most of them in the East, had called for, or were likely to call for, lime during the last two months of the year, but some of these projects may have been abandoned after the armistice was signed on November 11. All restrictions placed by the War Industries Board on the production and transportation of lime were removed on November 12, too late to have any appreciable effect on the recovery of the industry before the end of the year. In view of these conditions it will not be surprising if building lime sold in 1918 has fallen to about 900,000 short tons, and that building lime has for the first time lost to chemical lime its lead among the lime products.

The general curtailment of building operations since the spring of 1917, however, implies that greatly increased activity is necessary to restore the country to normal conditions in this respect, and the Federal Government is already taking steps to stimulate building. Doubtless many prospective builders are inclined to wait for a decrease in costs, but although the cost of some necessary commodities and of labor may decrease slightly, the great demand for buildings will probably maintain the prices of building materials in general at a high level.

Inscription for Lafayette's Statue

The text of the French inscription for the equestrian statue of Lafayette, to be erected in Mount Vernon Square, Baltimore, Md., has been received by Mayor Preston of that city. It was written by President Poincare at the request of the mayor, who asked that it be in French. A translation follows:

"In 1777 Lafayette, crossing the seas with French volunteers, came to bring brotherly help to the American people who were fighting for their national liberty.

"In 1917 France was fighting, in her turn, to defend her life and the liberty of the world. America, who had never forgotten Lafayette, crossed the seas to help France; and the world was saved."

Helping France in Reforestation

An offer to help France in its work of reforestation in the devastated regions has been made by the American Forestry Association, whose representative, Percival S. Ridsdale, is now in Paris. During his stay he will confer with the French Government foresters, and will submit his plan to aid in furnishing the seed necessary for replanting the trees in the territory where they have been destroyed by the ravages of war or cut for war purposes.

To carry out planting experiments, Mr. Ridsdale took to France with him a quantity of Douglas pine seed, all that he has been able to procure at present. French foresters have expressed a desire to obtain the seed of this variety of pine, as they believe it will be successful in certain parts of the country.

In case the offer of the American Forestry Association is accepted, a systematic effort will be made to gather all the seed needed for reforestation in France. After a meeting in Paris, Mr. Ridsdale will make a trip through the wooded regions of France, Belgium and Italy to investigate the damage in the theaters of war, as well as the quantity of wood cut in the forests behind the lines for the needs of the Allies.

North Dakota Legalizes Home Building Plan

North Dakota has entered upon a program of state activity in industry unparalleled in its own history or in the history of any other state in the Union, by the signing by Governor Frazier of several bills which had their foundation in the Farmers' Non-Partisan League. By these bills the state will now establish and operate the North Dakota Home Builders' Association for the purpose of enabling inhabitants of the state to build and operate their own homes, to build and operate terminal grain elevators and flour mills, and to set up an industrial commission to manage these and other industries that the state may decide to embark upon under the unlimited power granted by new amendments to the state constitution.

Co-operate With Building Campaign

Ten thousand members of the National Association of Real Estate Boards are pledged to co-operate with the own-your-own-home branch of the building campaign now being carried on by the U. S. Department of Labor. Assurance of this aid has been given by Tom S. Ingersoll, secretary

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of the association, which has lent Paul C. Murphy, the chairman of its own-your-own-home committee, to the department's information and education service for work with the public works and construction development division.

Since the first of the year the Department of Labor has been making a survey of building conditions, and the most conservative estimates place the shortage of homes in the United States as not less than half a million. In order to stimulate building construction as a means of employing returning soldiers and encouraging general business activity, the department has enlisted the aid of the banks in every state in solving one of the principal after-the-war industrial problems.

Bronze Button for Discharged Soldiers

The "honorable discharge" emblem to be issued by the War Department will be a bronze lapel button somewhat similar to the G. A. R. button of like significance. It is the intention of the Government to distribute the button free of charge to all entitled to it.

Of appropriate and artistic design, the button is the result of a competition among American artists and sculptors, conducted by the Commission of Fine Arts, of which Charles Moore is chairman, and the following are members: Herbert Adams, sculptor; J. Alden Weir, painter; Charles A. Platt, William Mitchell Kendall, John Russell Pope and James L. Greenleaf, architects; and Col. C. S. Ridley, secretary. Fifteen designs were submitted by the commission for final selection by the Chief of Staff.

The buttons will be manufactured only by concerns chosen by the Government, which will furnish the dies for their manufacture and purchase the buttons, thus obviating any possible variance from the approved pattern in design, color or material.

Urge Comprehensive Highway Building

In addressing a recent convention of the American Road Builders' Association, General T. Coleman du Pont spoke of the need of a comprehensive national highway system. As chairman of the Board of National Councilors of the National Highways Association, General du Pont said he had noted that the people of the United States are just waking up to the importance of good roads as the basis of national highways.

"The efficiency of the political units now in general charge of the work," said General du Pont, "as the states, towns and counties, can only be synchronized through an organization that is national, and such a Federal organization should have the power to correlate the work of political divisions to the end that hereafter we may have a system of national highways intelligently laid out and maintained in the most economical manner. If Federal aid is given to road building, regardless of whether such roads are a part of the national system of highways, it is not good political economy.

"The most essential item of road engineering is location. It is the only thing about a road that can be absolutely permanent. All Americans who got to France and beyond a port of embarkation will, I am sure, be the strongest advocates of good roads when they get home."

A resolution was presented at the meeting by E. J. Mehren suggesting the appointment of a committee from the association to lay before the Secretary of War the urgency of returning to this country at an early date a large proportion of the highway engineers now with the army in France. This resolution, as well as another one toward fixing uniform regulations for truck weights and sizes on the highways, was referred to the resolution committee for action.

Placing Disabled Soldiers

Figures indicating progress in re-educating and placing disabled soldiers, sailors and marines show that the work is going forward at a satisfying pace. It has been stated that the total number of cases with which the Federal Board for vocational education was in contact was 22,851. Of these 6552 were reported from the war risk insurance bureau; 9020 from hospitals; 4494 from the Red Cross; 73 from the United States Department of Labor; 1652 from the men direct, and from other sources 1060.

Not every wounded man is entitled to retraining. First, under the law, he must have been awarded compensation by the war risk insurance bureau, and thus far 3655 have been awarded compensation, 79 having been denied it, and 19,117 are cases in process of determination.

It is necessary to have the war risk insurance bureau pass upon a case as the essential preliminary, and the agents of the Federal Board assist all disabled men to make their applications to the war risk insurance bureau. In the last thirty days 2855 men have been assisted in filing their applications. Nine thousand four hundred and twenty-five men have been interviewed by the various agents of the Federal Board and 9162 were awaiting interview.

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There were 6286 prospectives for retraining. During the last month 490 cases have been awarded training and entered upon the various lines of study fitting them for useful work in the skilled trades, occupations, professions and other callings, the total available to be selected from being about 500.

Naturalization for 151,449 Granted in Year

Approximately 9 per cent of the applications for naturalization made during the fiscal year of 1918 were rejected, according to the report of the Commissioner of Naturalization to the Secretary of Labor. There were 151,449 petitions granted and 12,182 denied.

Of the petitions denied, 486 were rejected on account of bad character, 1234 for ignorance of American institutions, and the largest number for any cause, 3800, for want of prosecution. The number rejected because of invalid declarations was 2303, as against 766 the year before, the large increase explained by a Supreme Court decision during the year, which makes declarations invalid after a lapse of seven years.

The number of petitions continued was 46,519, as against 31,210 in the preceding year, an increase of 50 per cent. This indicates an attitude on the part of the judges strongly supporting the aim of the bureau, acting with the public schools, to have every citizen fully equipped for citizenship duties.

Hines to Address Lumber Congress

Walker D. Hines, director general of railroads, will address the American Lumber Congress to be held in Chicago April 14-15-16. It is expected that the congress will result in the formation of a national policy for the lumber industry.

Eliminating Fire Hazards

The Board of Fire Examiners of the city of Ottawa, Ill., has taken its duties seriously and is doing much to eliminate fire hazard in that section. The board has secured the co-operation of school children who are reporting all dangerous conditions in their homes. Blanks for the purpose are distributed with the result that many conditions that might have escaped unchallenged are brought to light. The firemen then check up reports of hazards and the knowledge they gain of buildings as they do this is likely to be of value to them in case fire breaks out in any of them. The board is not content to have merely one report, but carries

on a follow-up system, reminding the children that new hazards may have developed since the last report and getting them to disclose new conditions that may require attention.

To Hasten Canal Terminals

Construction of \$400,000 worth of terminals in New York City for canal purposes will be completed as early as possible, according to Lewis Nixon, State Superintendent of Public Works. Contracts are to be signed early in the Spring.

Asks Data for Compiling War History

The Secretary of War has directed that a bulletin be published to the army to provide that officers and other persons who have been in or with the army during the war, and who are in possession of historical information of value for use in connection with the history of the war, are authorized and invited to communicate such information direct to the Chief of the Historical Branch, Army War College, Washington, D. C.

Obituary

William R. Williams

William R. Williams, architect, and one of the oldest residents of Oneida, N. Y., died at his home in that city last week. He was ninety years of age. At one time he was associated in business with the late W. I. Tillotson. He retired from active business twenty years ago, but kept up an interest in the welfare and advancement of Oneida until his death. Mr. Williams designed many prominent buildings in that section of the State.

John W. Proctor

John W. Proctor, a widely known architect in the San Francisco bay cities, died last week in New Monterey, Cal. Mr. Proctor designed many buildings at Point Richmond and did all the Y. W. C. A. buildings at Asilomar, the association camp on the ocean side of Monterey peninsular, and a number of the finer homes at Pebble Beach. He was born in Nova Scotia, March 11, 1857. His widow survives him, and there are two brothers, one in Boston and one in Indiana. A sister lives in Belmont, Mass.

City War Plans Memorial

A monument in the form of a club house is being planned in honor of the men in the service from Philadelphia's Twenty-fourth Ward. It will be fully equipped and will cost \$75,000. The proposed club house will contain a swimming pool, gymnasium, reading rooms and an auditorium, and will be used as a neighborhood civic as well as a recreation center. A prominent place will be given a tablet containing the names of the soldiers and sailors who died in the war.

A Housing Exposition

A somewhat unusual exposition of housing will be held in Oak Park, Illinois, March 22 to 29, both inclusive.

It is planned to select a set of plans and specifications of a model house as the basis for the exposition. All material and equipment necessary to build and furnish this house adequately will be displayed in the forty booths of the exposition, arranged in sequence according to the order in which the building processes usually occur in actual building operations.

Undoubtedly an exposition of modern housing, arranged in this manner, will afford an unusual educational opportunity to the prospective home builder. Fuller particulars may be obtained by addressing Charles E. White, Jr., Director, Oak Park, Ill.

Personals

F. J. McCabe has moved his architectural office from 303 Fifth Avenue, New York, to the City Savings Bank Building, Bridgeport, Conn.

Lauritz Lauritzen has joined William H. Gambert in the practice of architecture in New York City, the firm to be known as Gambert & Lauritzen.

Lewis Nixon of Staten Island, New York, has been named for the office of State Superintendent of Public Works by Governor Alfred E. Smith.

The removal of the architectural offices of D. C. Bennett from 1303 West Lake Street, Minneapolis, Minn., to 631-633 McKnight Building, is announced.

An architectural office has been opened by Charles S. Evans and C. C. Kirkland in the Unity Building, Tulsa, Okla. They request that manufacturers' samples and catalogs be sent them.

Henry K. Holsman, architect, has transferred his drafting room and library to 1544 East 57th Street, Chicago, but will retain his business conference office at 175 West Jackson Boulevard, Chicago.

William Pitkin, Jr., landscape architect, and Seward Hamilton Mott, associate, announce the removal of their offices from Rochester, N. Y. to the Guardian Building, Cleveland, Ohio.

The firm of Fahnestock and Raidebaugh, architects and engineers, Harrisburg, Pa., has been dissolved by mutual consent, and Mr. Fahnestock will shortly open a new office in that city to practice architecture.

Thomas Gannett Holyoke and Holyoke Davis have formed a partnership for the practice of architecture under the firm name of Holyoke & Davis, with offices at 649 Endicott Building, Saint Paul, Minn.

J. Howard Hess has opened an office for the practice of architecture in the Moorhead National Bank Building at Moorhead, N. D. For the past five years Mr. Hess has been associated in architectural and engineering work for Cass County and the State of North Dakota.

Robert C. Berlin, F. A. I. A., 19 S. La Salle Street, Chicago, has entered into a partnership with Messrs. Swern and Randall, under the firm name of Berlin, Swern & Randall, architects and engineers. Mr. Berlin has been practicing architecture in Chicago for the past thirty-five years. Perry W. Swern, formerly with Graham Burnham & Co., has been associated with Mr. Berlin for the past four years. Frank A. Randall, M. Am. Soc. C. E., has been practicing structural engineering in Chicago and New York for the past fifteen years.

The Post-War Committee

This Committee asks advice and co-operation not only from every architect, but also from those men engaged in occupations allied to architecture and building.

Write your views to the Committee at the Octagon, Washington, D. C.

Late News from Architectural Fields

Special Correspondence to THE AMERICAN ARCHITECT

Construction Problems Discussed at Conference

Washington, D. C., March 15.—The conference of governors and mayors resulted in a clear exposition of the present industrial situation throughout the country. Although the aim of this meeting was merely to exchange views with the members of the cabinet, it doubtless had a far-reaching effect in bringing about crystallization of mere ideas and stimulating federal, state and municipal administrators to activity.

Problems of road construction, public and private building, freight revisions, unemployment, the soldier-and-the-land movement occupied the attention of the delegates to the conference. Their words did not fall upon barren soil, for the various members of the cabinet, and other federal officials sat in on the discussions and took note of protests and suggestions made by the representatives of the municipalities and states. A summary of the opinions expressed and agreed to by a majority of the delegates was embodied in resolutions adopted.

Portions of the resolutions, as adopted, follow: "There is a general feeling that freight rates on all road materials should be radically reduced. In fact, we are willing to express it as our judgment that it should be a sound public policy to make a further cut in freight rates on all building materials. Assuming that this contributes to a temporary deficit with the railroads, it would be more than offset by the compensating result of a re-established general prosperity.

"We are firmly of the belief that the National Government should create some organization to serve as a guide not only in its purchases but to those made by private enterprises, as well. Prices must change. There may be economic justification for some schedules, but not many; and if the Government, through the operation of a committee or commission, will invite industry to go forward in the work before us, revealing facts and figures upon which honest calculation can be made, it can then in any given line announce to the public what prices it finds fair and equitable.

"There seems to be a unanimity of sentiment with reference to making any readjustment in wage scales. If that is to come at all, it should be in consequence of a reduced cost of living.

"The bringing to an end of governmental contracts with private industry entailed tremendous labor, and while we are reassured by the able and illuminating statement of the Secretary of War, Mr. Baker, made to this conference, we urge the highest speed possible in formalizing these readjustments, in making prompt payment of every indebtedness certified to and in thus releasing capital for other uses. The lifting of governmental restrictions at the earliest possible moment in the conduct of these plants will be a further helpful contribution.

"It is the sense of this meeting that the Government take steps to announce its policy as soon as possible as to the disposal of the raw materials of industry now in its hands or under its control, so that the manufacturers may determine their policy under stable conditions.

"It is further suggested that communities be enabled to profit from Federal experience in the matter of working out the housing question, because as bases of industrial activities are changed in this transitional period, situations, quite as acute as they were during the war, are highly probable in the future.

"We regard with especial favor the practice which has been adopted in many parts of the country in establishing

living and suitable memorials to the heroic deeds of war. The modern conception of working out the composite result of perpetuity of sentiment and improved community utilities, educational and otherwise, has made such a strong appeal to the Conference that we recommend it as a helpful public policy."

Reduce Freight Rates on Building Materials

Washington, D. C., March 17.—As a step toward increasing building activity throughout the country, the United States railroad administration will shortly cut down the freight rates on building materials of all descriptions from the present high level to the pre-war standards. The cut will apply not only to materials for general construction of buildings, but materials for roads as well, in the hope that private interests will seize the opportunity with the opening of spring to let contracts generally.

Such a cut would reduce the freight rates on lumber, bricks, cement and structural steel, and would consequently have a tendency to reduce the prices of these commodities, and would be an invitation to those who are contemplating building to go ahead with the work. It would also be a source of employment to a very large number of skilled mechanics.

Walter D. Hines, director general of railroads, in commenting on this situation before the conference of governors and mayors in Washington, declared: "The advances that were made in the rates effective last June to meet the conditions of increased cost growing out of the war, had borne too heavily on road building materials, and in order to encourage the program of resumption of building, there ought to be a substantial reduction in these rates. The matter is having the most careful and expeditious consideration of the Railroad Administration, and I hope very shortly—perhaps in the next week or ten days—to get final report on that matter upon the basis of which I can take definite action."

Washington Memorial Topic of Discussion

Washington, D. C., March 15.—The type of a memorial to be erected to the soldiers and sailors of the recent war is the subject of much discussion, with Col. Robert N. Harper defending his plan of an arch of triumph, and Mrs. Henry F. Dimock favoring a George Washington memorial, to be dedicated to the men of '76 and '17.

Mrs. Dimock advocated the plan of making a building serve the purpose of both a memorial and an educational institution. In addition to a great auditorium, seating 7,000 persons, the plan of the building she advocates would include a museum, a large library and appropriate tablets and pictures of the war.

Preliminary work on the George Washington memorial has already begun, and about \$400,000 have been subscribed toward its erection, and the people of the country would gladly contribute enough to erect a \$2,500,000 structure, argued Mrs. Dimock. It is the plan to have the building a memorial to George Washington, and the two buttresses of the building dedicated to the men of '76 and '17.

Resuming Building Activity

Washington, D. C., March 15.—Contracts awarded for building and engineering operations during the month of February amounted to approximately \$121,000,000, in the section of the country east of the Missouri and north of the Ohio rivers, as compared with \$50,731,000 in the same territory during January.

The bulk of this work was done by private individuals and corporations, a fact which the division of public works and construction development of the Department of Labor accepts as indicating that private interests rapidly are resuming building activities. During the war period a large percentage of work was carried on by the Federal government. At present, the amount of contracts awarded by the Government is negligible, and that done by states and municipalities not an unusual proportion.

By districts, the comparison of January and February contracts let is as follows:

District	Jan. 1919	Feb. 1919
New England	\$ 4,648,000	\$ 2,921,000
New York and North New Jersey	8,152,000	12,918,000
Philadelphia, Baltimore, Wash- ington and vicinity.....	15,805,000	8,923,500
Western Penn., W. Va. and Ohio..	7,916,000	10,893,355
Ill., Iowa, Ind., Wis., Mich., por- tions of Missouri and Kansas....	13,710,000	83,848,931
Minn., North and South Dakota...	1,330,000	500,000

Prepare Building Stabilization Report

Newark, N. J., March 15.—A report on the stabilization of building is expected to be issued shortly by the New Jersey Society of Architects. The various elements of federal, state, and municipal control are being analyzed with the view of devising some plan to stimulate lagging construction.

"In theory this proposition is all right," said Secretary Hugh Roberts of the society, "but it is difficult to put such a plan in practice. While most people competent to judge believe that the cost of construction work will not vary much from present prices in the next three or four years, there is still a feeling on the part of the public that prices will be lower in the near future, and, therefore, there is a general tendency to delay building and other construction enterprises for the purpose of seeing how things will turn out. Some way undoubtedly will be devised to stabilize the prices of labor and material so that the public may be satisfied that their investments will be secured, and so that loaning institutions will be assured that the value of buildings erected at this time will not decrease in the near future."

The New Jersey Society was represented at the hearing in Trenton last week on the bill providing for the licensing of master builders, carpenters and masons. He added that architects were generally favorable toward the meas-

ure in the belief that it will protect the public and property owners against incompetent and dishonest construction work.

Announcement was made that the following sculptors, painters and landscape architects had been added to the society's advisory committee on war memorials: Mahonri Young of Leonia, F. G. R. Roth of Englewood, A. E. Foringer of Grantwood, William L. Mackay of Fort Lee, James L. Greenleaf and John R. Brinley of Morristown.

New 3-Family Bill to Become Law

With every indication that the Burlingame Bill for the transformation of old-fashioned, three-story and basement dwellings into three-family houses will be passed in New York State within a short time, encouragement is held out to the many persons who have been unable to secure apartments in Brooklyn. The legislation will also be of great benefit to owners of these large residences.

Because of the present requirements of the Tenement House law, few of the hundreds of such dwellings in this borough have been altered since the passage of the Lawson bill in 1917, because of the great expense involved in meeting the requirements of the law.

Under the Burlingame amended bill, many concessions have been made by an agreement between the committee of the Brooklyn Board of Real Estate Brokers and the Tenement House Committee of the Brooklyn Board of Charities working in harmony in an effort to help the property owners and to protect the best interests of the tenants. The various defects in the earlier measure have been adjusted and all opposition being removed, the bill promises to become effective in time to relieve a situation in the real estate market which has become very serious in view of the scarcity of new apartments.

The amendments to the old bill make it possible to remodel the old residences at a cost which will permit a return on the investment.

New York's Construction Program

Albany, N. Y., March 17.—Approximately \$20,000,000 of the \$90,000,000 it will cost New York State to administer its affairs during the next fiscal year—the largest amount in the history of the Commonwealth—will be for construction work to help take care of the unemployed.

A statement by the finance chairmen says that there will be other "large items which are more or less conjectural, but which will be appropriated this year," as follows: Hudson vehicular tunnel, \$1,000,000; necessary appropriation for difference in cost in completing abandoned highway contracts, \$2,500,000; additional amount necessary to finish canal terminals, \$900,000; allowance for other special appropriation bills, \$1,000,000. This brings the grand total to \$89,619,000, compared with a total appropriation last year of \$81,525,271.

Department of Architectural Engineering

Planning Sunlight Cities¹

By HERBERT S. SWAN AND GEORGE W. TUTTLE, *New York*

SUNLIGHT cities must be planned from the start. The width and arrangement of streets, the length and breadth of the lot, the type, height and use of building, the least dimension and orientation of courts and yards, the latitude and the topography of the site—all of these have to be considered in laying out a sunlight town. If each of these factors is given its proper weight when the town is first planned, a maximum of sunlight will be assured every home and work-place in the community; ignored, then no amount of replanning can ever completely rectify the mistake.²

Two things are essential to a sunlight plan—a street plan and a building plan. Each of these has to be conceived and perfected in harmony with the other as one unit. They are reciprocal parts of the sunlight plan, and they therefore stand or fall together. It is impossible to give proper consideration to one without at the same time considering the demands of the other. Any other method of treatment is disastrous to the sunlight plan.

SHADOWS CAST BY SKYSCRAPERS

The street plan and the building plan have been so poorly co-ordinated in the Borough of Manhattan, New York City, for instance, that it is safe to say that a preponderating majority of the rooms in the existing shops, factories, offices and apartments of the borough receive no direct sunshine on the shortest day in the year.

This is no less true of the residential sections than of the business sections. But the situation in the downtown financial district illustrates this condition most dramatically. There the shadows of different skyscrapers, at noon on Dec. 21, envelop large areas. The Adams Express Building, which is 424 ft. high, casts a shadow 875 ft. in length; the

Equitable Building, which is 493 ft. high, one 1018 ft. in length; the Singer Tower, which is 546 ft. high, one 1127 ft. in length, and the Woolworth Tower, which is 791 ft. high, one 1635 ft. in length.

The co-ordinates in Table I enable one to compute the ground area shaded by buildings of any height at different latitudes and times.

The effect of skyscrapers casting shadows from a sixth to a third of a mile in length on surrounding property is well illustrated in the case of the Equitable Building. The shadow, which at noon on the shortest day in the year is about one-fifth of a mile in length, completely envelops an area of 7.59 acres. The ground area of the Equitable Building is only 1.14 acres.

The shadow cuts off all sunshine from the Broadway façade of the United States Realty Building, which is twenty-one stories high. The New York Title & Mortgage Company Building, fourteen stories high, and the Washington Life Insurance Building, nineteen stories high, are both completely shaded. The south side of the Singer Tower is shaded to a height of twenty-seven stories. The nearest part of the City Investing Building, 400 ft. away, is in shadow for twenty-four of its twenty-six stories. Even part of the New York Telephone Building, north of Cortlandt Street, is shaded by the Equitable Building. For almost a fifth of a mile this giant skyscraper casts its shadow.

Cedar Street, the street immediately north of the Equitable Building, has an average width of 34 ft. between Broadway and Nassau Street. The height of the Equitable Building is $14\frac{1}{2}$ times the width of this street. On a north-and-south street of this width in New York, uniformly improved on both sides with buildings having a height equal to that of the Equitable Building, and walls 14 in. thick, only 9.31 per cent of the windows would receive any direct sunshine on the shortest day in the year. On such streets only the windows nearest the top for a distance equal to 1.35 times the width

¹Copyright, 1917 and 1919, by Herbert S. Swan. All rights reserved. This article was originally published in *The American City* in 1917. Since its first publication the article has been materially revised.

²See articles by Herbert S. Swan and George W. Tuttle on *Sunlight Engineering in City Planning and Housing*, *The Architectural Forum*, June, 1918; *Planning Buildings for Daylight*, *The Architectural Forum*, November, 1918; and *Report, Commission on Building Districts and Restrictions*, New York, 1916, pp. 176-188.

of the street would admit direct sunshine on Dec. 21 at New York (taking 40° north as the latitude), assuming the windows to be set in walls 14 in. thick. The windows in the thirty-four stories nearest the ground would admit absolutely no direct sunlight. Direct sunshine would only enter those windows in the four stories nearest the top. Not a single window within 447 ft. of the street level would receive a ray of direct sunshine!

High buildings should be erected on wide streets

to impose any restrictions upon its use—there is enough for all. But in contrast with these there are other places, and these places contain the great bulk of the urban population throughout the world, which possess such a fluctuating supply of sunshine that its use must be subjected to the strictest safeguards or the supply will be squandered to no purpose.

The distance from the equator is of paramount importance in planning a sunlight city. In the first

TABLE I.—CO-ORDINATES OF POINTS DEFINING SUNSHINE AND SHADOW ON THE GROUND LEVEL AT THE WINTER SOLSTICE

The co-ordinates in Table I define the ground area in shadow from obstructions at each hour and half hour throughout the day. The co-ordinates A are measured on the meridian running north and south through the obstructing point; the co-ordinates B at right angles to this meridian. Both co-ordinates are expressed in terms of the obstructing height. Before noon the co-ordinates B are laid out west of the meridian; after noon east of the meridian. The co-ordinates A as measured on the meridian are laid out north of the obstructing point.

NORTH LATITUDE													
Time	25°		30°		35°		40°		45°		50°		Time
	Co-ORDINATES												
	A	B	A	B	A	B	A	B	A	B	A	B	
7:00A.M.	9.80	18.81	66.32	126.91	...	...	...	...	...	...	...	...	5:00P.M.
7:30	3.41	5.67	4.97	8.12	8.89	14.29	37.96	60.73	...	...	...	...	4:30
8:00	2.24	3.22	2.91	4.02	3.99	5.37	6.26	8.29	13.88	18.21	...	...	4:00
8:30	1.76	2.15	2.20	2.54	2.83	3.19	3.86	4.23	5.82	6.43	12.65	13.46	3:30
9:00	1.51	1.55	1.84	1.79	2.31	2.15	2.98	2.68	4.18	3.66	6.76	5.81	3:00
9:30	1.36	1.14	1.64	1.29	2.02	1.52	2.56	1.84	3.41	2.39	4.98	3.41	2:30
10:00	1.26	.83	1.52	.94	1.85	1.09	2.31	1.29	3.01	1.63	4.19	2.22	2:00
10:30	1.20	.58	1.44	.66	1.74	.75	2.16	.89	2.78	1.11	3.79	1.46	1:30
11:00	1.16	.37	1.39	.42	1.68	.48	2.07	.56	2.63	.69	3.52	.89	1:00
11:30	1.14	.18	1.36	.20	1.64	.23	2.01	.26	2.56	.33	3.41	.43	12:30
12:00M.	1.13	.00	1.35	.00	1.62	.00	2.00	.00	2.53	.00	3.35	.00	12:00M.

The following formulae were used in computing the co-ordinates:

Let A = co-ordinate of shadow point on a horizontal surface measured directly north from point casting shadow.

Let B = co-ordinate of shadow point on a horizontal surface measured directly east or west (according as the position of the sun is west or east of the meridian) from point casting shadow.

Let h = height of point casting shadow above the given horizontal surface.

Let a = azimuth of sun.

Let b = altitude of sun.

then:

$$A = h \cos a \cot b$$

$$B = h \sin a \cot b$$

The method of applying the co-ordinates in a specific case is illustrated in Diagram 1. The building in the illustration is situated at 40° North Latitude and is 100 feet high. The time for which the shadow is determined is 10 A.M. In the diagram the co-ordinates are measured with reference to the meridian projected through point C. Parallel lines of the same length as CF projected through D and E enable the ground area shaded by the building to be defined.

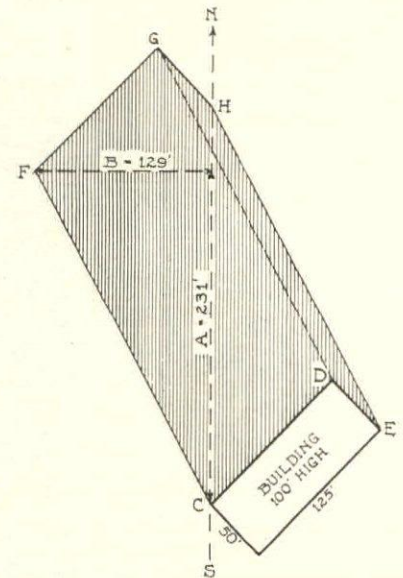


Diagram 1. Method of defining the ground area shaded by a building, 40° north latitude, time 10 a. m., building 100 ft. high.

$$A = 2.31 \times 100 = 231 \text{ ft.}$$

$$B = 1.29 \times 100 = 129 \text{ ft.}$$

$$\text{Area shaded by building} = \text{CFGHEDC.}$$

place, the length of the shortest day diminishes as the latitude increases. The sunlight period at Key West on Dec. 21 is only

and large open spaces; narrow streets and small open spaces should be improved with low buildings. But although the height limit of a building should be proportionate to the width of the open space on each side from which it receives its sunlight, it does not at all follow that this proportion should be the same on all sides of the open space nor at all latitudes.

EFFECT OF LATITUDE

The further north a city is situated the greater is its need for a sunlight plan. Sunlight is a natural resource to be conserved and economized like any other gift of nature. There are places on the earth's surface where the supply of sunshine is so constant that there is probably very little necessity

seven-eighths as long as that at the equator. At Winnipeg it is only two-thirds as long as that at the equator. In the second place, the sun's altitude diminishes with increased distance from the equator. At Winnipeg the altitude of the sun at noon at the winter solstice is only 16.6°. At the equator it is 66.6°.

The effect of this difference in altitude in the sun-lighting of streets and buildings at different latitudes is apparent. With each additional degree of latitude from the equator, to obtain the same amount of sunlight, assuming that it could be obtained, the height of building would have to be decreased or the width of street increased.

To illustrate: Suppose that the height of build-

ings on the south side of east-and-west streets of a given width were limited on the principle that the sun's rays would shine for just one moment at the ground level on the opposite side of the street. On this basis buildings at Winnipeg could only be three-tenths the street width in height, while at the equator they could be 2.31 times the street width in height. In lieu of varying the height of the buildings, the above principle could be observed by varying the street width with the latitude. In that event the width of the street at the equator need be only 0.43 times the height of the building, while at Winnipeg it would have to be 3.33 times the height of the building. The street width required at Winnipeg would be 7.7 times that required at the equator.

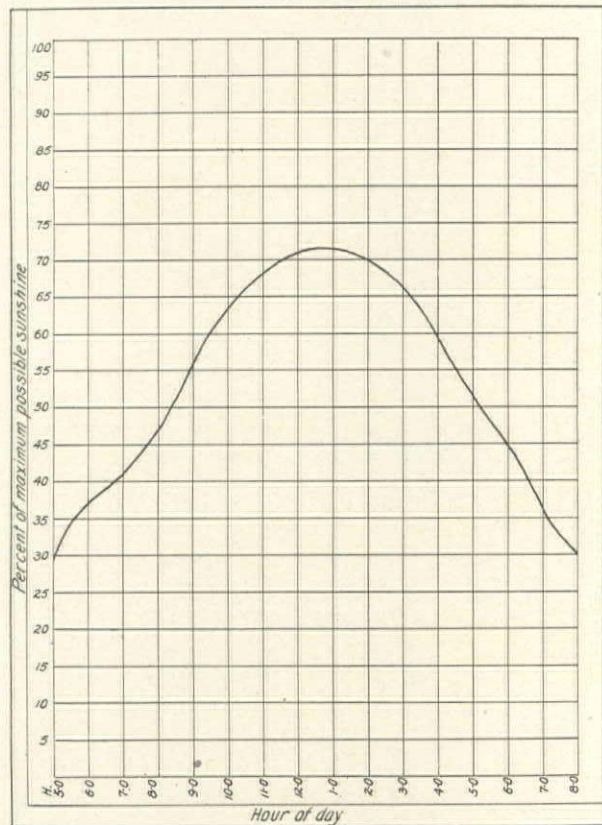


Diagram 2. Hourly percent of maximum possible sunshine in New York, average 1894-1910.

But even this does not tell the whole story. Meteorological observations show that the per cent of the actual to the maximum possible sunshine at any particular place increases generally with the altitude of the sun.¹ This is not only true of different months in the year, but of different hours of

¹The sunshine observations at New York from 1894 to 1910 show that the per cent of actual to possible sunshine for any hour of the day is almost exactly proportional to the sine of the altitude of the sun. The corresponding per cent of actual to possible sunshine lags, however, about 43 minutes after the sun.

the day. Just as the per cent of the actual to the maximum possible sunshine increases after the winter solstice and decreases after the summer solstice, so it increases from sunrise until noon and decreases after noon until sunset (see Diagram 2).

The intensity of sunshine is no less intimately connected with the altitude of the sun than the per cent of sunshine.¹ It, too, varies throughout the

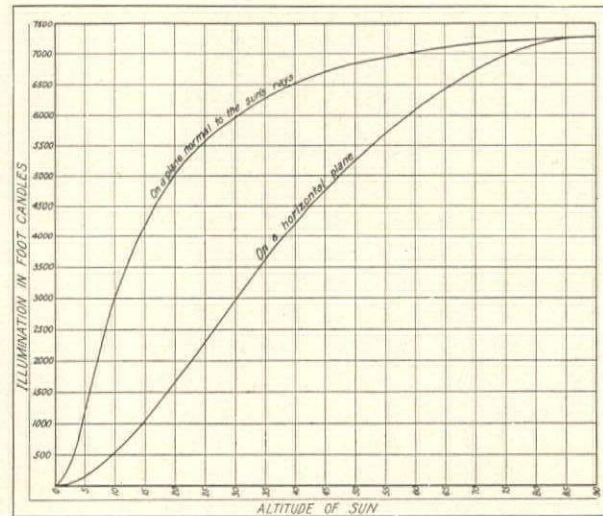


Diagram 3. Solar illumination on a clear day at sea level.

day and the year, increasing with the altitude of the sun and attaining a maximum when the sun is in the zenith (see Diagram 3). The intensity of

¹The curves herewith shown were obtained by plotting observations of illumination of the sun on clear days which were made at Mount Weather, Va., in 1913 and 1914, by Herbert H. Kimball, Professor of Meteorology, U. S. Weather Bureau (Daylight Illumination and the Intensity and Duration of Twilight, Transactions, Illuminating Engineering Society, 1916). The solar rays are absorbed by the earth's atmosphere, and the illumination at any point depends on the mass of the atmosphere through which the rays have traveled. The air mass diminishes, and consequently the solar illumination increases with the height and with the altitude of the sun. The observations followed the theoretical law that the logarithm of the illumination should increase by equal amounts when the air mass through which the sun is seen is reduced by correspondingly equal amounts very closely. The air mass for points at the same height varies inversely as the sine of the altitude of the sun and we find that the following formula fits the observations:

$$\text{Log } I = 3.9478 - \frac{.0863}{\sin h}$$

Where I = the illumination from the sun in foot candles on a plane normal to its rays, and h = the altitude of the sun.

The illumination from the sun in foot candles on a horizontal plane which we will represent by I_h equals the illumination on the normal plane multiplied by the sine of the altitude of the sun, we have therefore

$$\text{Log } I_h = 3.9478 - \frac{.0863}{\sin h} + \log \sin h$$

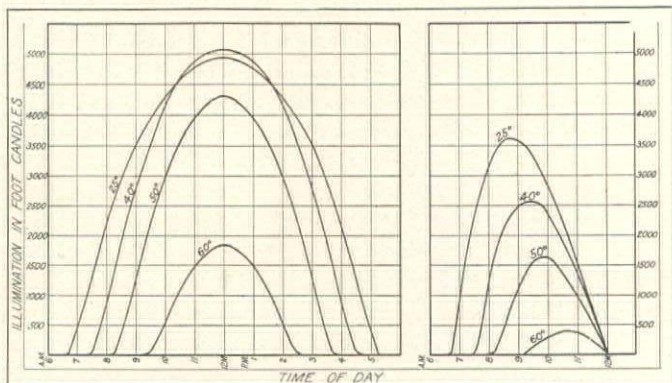
The illumination of the sun in foot candles on a vertical plane at an azimuth of X_0 from the azimuth of the sun which we will represent by I_v is given by the equation

$$\text{Log } I_v = 3.9478 - \frac{.0863}{\sin h} + \log \cos h + \log \sin X_0$$

The curves drawn differ slightly from the formula at very small altitudes as the air mass at the horizon departs from the sine law by a small amount. The intensity of sunlight is not necessarily the same in all parts of the world for the same height and altitude of the sun, since variations in atmospheric conditions may cause considerable variations in intensity of illumination. It is believed, however, that these curves will fairly represent the solar illumination anywhere under normal atmospheric conditions.

the sunshine received on any particular plane, however, depends upon the incidence of the sun's rays (see Diagrams 4 and 5). This occasionally results in surprising paradoxes. At this latitude we are so accustomed to obtaining the strongest illumination

Here, then, is a unique situation where the sunshine is most intense, not on a wall facing south, but on one facing east or west. This condition, however, applies only to the tropics. At all other latitudes the illumination obtained on a south wall is more intense than that received on any other wall.¹



On vertical wall facing south.

On vertical wall facing east.

Diagram 4. Solar illumination at winter solstice for different latitudes and times of day.

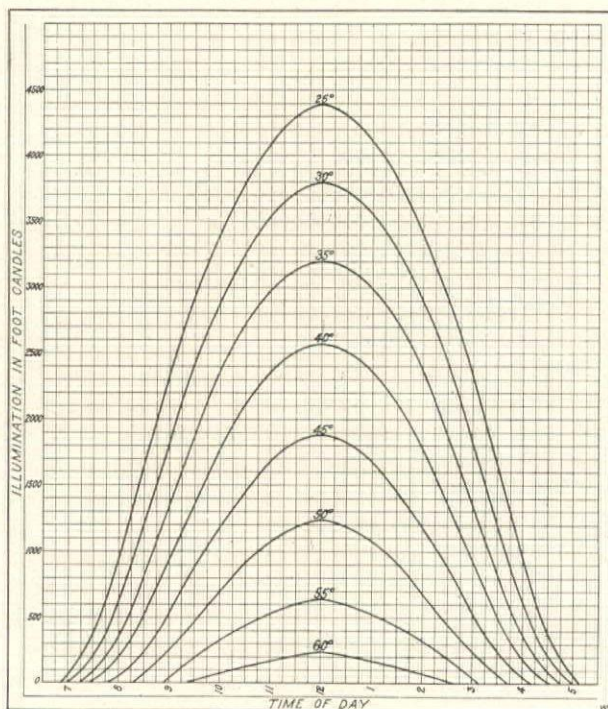


Diagram 5. Solar illumination on a horizontal surface at different latitudes, winter solstice.

on a wall facing south that we are apt to assume this to be universally true. But as we approach the equator the solar illumination received on a south wall diminishes below a certain latitude, due to the sharper angle of the rays, until, at the time of the equinox, it finally touches zero at the equator.

ORIENTATION OF STREETS

The orientation of streets counts for quite as much as the latitude of the locality and the height of buildings in planning a sunlight town. A little sunlight engineering in city planning can to a large extent overcome the two natural disadvantages of a northern latitude in winter—the shortness of the day and the low altitude of the sun. The fact that a sunlight plan can be designed for Winnipeg which will give the front of every house at the ground level more sunshine than a non-sunlight plan will at Key West, demonstrates this conclusively. Indeed, astonishing as it may seem, the very same buildings in solid rows, which, if arranged along the lines of a non-sunlight plan at Key West, would rob the pavement in front of every house of all sunlight, can be arranged at Winnipeg in such a

¹Compare the intensity of sunlight with that of daylight, the former being defined as the illumination received solely from the sun, the latter as the illumination received from the whole visible sphere of the sky exclusive of that obtained directly from the sun (see Diagrams 6 and 7).

The illumination received from the sky is derived from the sun and appears to be due in the main to the reflection and dispersion of sunlight by fine particles in the atmosphere. It varies in intensity with the altitude of the sun. Enormous variations have been frequently noticed within short periods, and it is extremely difficult to obtain concordant results. It is found that in general the sky at various altitudes gives substantially the same illumination as in the zenith, although patches of white clouds may increase the illumination very much in a given spot. A clear blue sky as well as heavy dense clouds show the least, while a sky with white clouds will give the greatest illumination, the light from a white cloud being often many times the light for a similar area of clear sky.

Observations of skylight or daylight on clear days taken at Mount Weather, Va., in 1913 and 1914, by Herbert H. Kimball, Professor of Meteorology, U. S. Weather Bureau (Daylight Illumination and the Intensity and Duration of Twilight, Transactions, Illuminating Engineering Society, 1916), while not so concordant as the solar observations alluded to, are fairly represented by the following formula:

$$S_h = 2058 \sin h + 96$$

where

S_h = daylight illumination from the entire sky on a horizontal surface in foot candles, the illumination on a vertical surface being half this quantity

and h = altitude of the sun.

These observations agreed very well with other observations with which they were compared up to about 35° and were somewhat less at higher altitudes.

It is hoped that future observations will enable much more accurate determination of the skylight illumination for any locality at any time under any specified condition. The daylight illumination has been computed, however, according to the above formula for different latitudes in the belief that it will represent approximately the daylight illumination in those latitudes.

Professor O. H. Basquin (Daylight Illumination, The Illuminating Engineer, N. Y., Vol. 1 and 2, 1906 and 1907) found at Chicago an average sky brightness throughout the year during business hours of 500 candles per unit of area of enclosing sphere of radius unity which give 1571 ft. candles on an unobstructed horizontal plane, and he considered a brightness of 250 candles the proper working quantity under different conditions as follows:

Clear blue	100 per cent
Stormy	66 per cent
More than half blue	133 per cent
More than half cloudy	166 per cent
Overcast	200 per cent

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manner as to give the street in front of every house more than an hour of sunshine. In each case the buildings would be once the width of the street in height, but in the southern city they would all front on east-and-west streets, while in the northern city they would all front on north-and-south streets.

The sunshine period enjoyed by buildings at the ground level of the street façade is shown in such a way in Table II that it may be readily compared for buildings of different heights, streets of different orientations, and places of different latitude as of the winter solstice.¹

The number of days that the north façade of an east-and-west street is shaded at the street level depends upon the latitude and the height of the buildings. Buildings once the street width in height at Key West cut off all sunlight for 61 days in the year; at Winnipeg for 182 days. In very few cities of the United States does the sun penetrate down to the sidewalks on east-and-west streets in the skyscraper district for more than half the year. The alleys and yards back of such buildings are

The number of days in the year that the north façade on east-and-west streets improved with buildings of different heights receives absolutely no sunlight at the ground level is as follows for different latitudes:

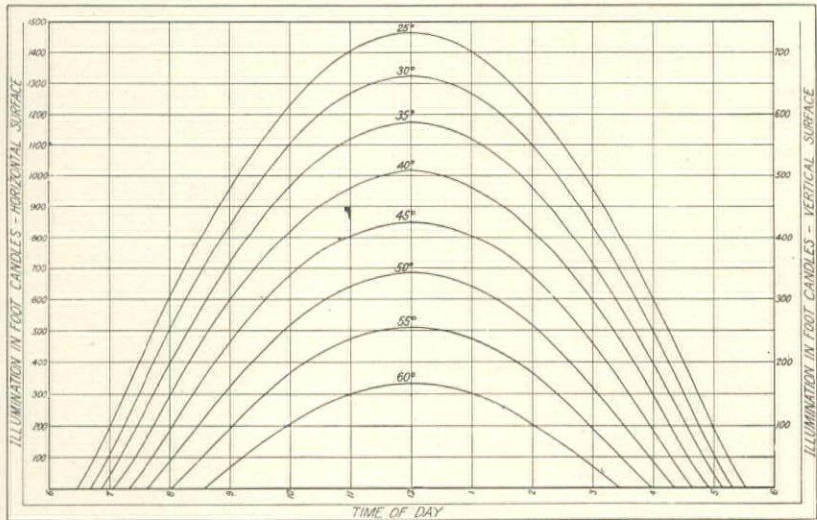


Diagram 7. Daylight illumination received at different latitudes, winter solstice.

Height of building in terms of street width	North Latitude							
	25°	30°	35°	40°	45°	50°	55°	60°
1/2	0	0	0	0	73	108	136	163
1	61	98	127	153	181	182	182	182
1 1/2	135	161	182	182	182	182	182	182
2	172	182	182	182	182	182	182	182
2 1/2 and over	182	182	182	182	182	182	182	182

The street system of Manhattan (40° 45' north latitude) is an excellent illustration of what a sunlight plan should not be. The blocks, in brief, are 200 ft. wide and as much as 920 ft. long, the narrow dimension being oriented 28° 30' west of south and the long dimension 61° 30' east of south. This arrangement is most unsatisfactory. Where a block of the above dimension is uniformly improved with buildings once the street width in height, a height which allows the construction of a six-story tenement house, only the two ends near the avenues receive any sunlight at all at the ground level on the shortest day in the year. In other words, the tenement houses fronting on the streets embracing 82 per cent of the total block frontage receive no sunlight at the ground except near the ends of the block, due to the avenues. If the long side of the blocks paralleled the avenues instead of the streets in Manhattan, the situation would be very much improved. But 18 per cent of the frontage would then be in shadow at the ground level. Sunlight homes and sunlight streets would then be given to an additional 64 per cent of the population. The effect of this increase in sunlight on individual

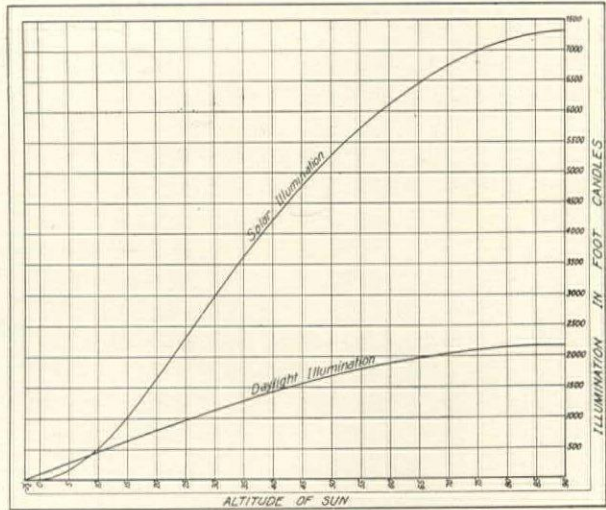


Diagram 6. Solar and daylight illumination for different altitudes of the sun.

often so narrow as to shut out all the noon-day sunlight throughout the year at the ground level.

¹For method used in computing this table see note at end of article.

initiative and vigor, on public health, on sanitation, on the prevention of contagious disease, on snow removal and on traffic conditions can be imagined.

MINIMUM STANDARDS OF SUNLIGHT

In a sunlight plan, minimum standards of sunlight will be established for the interior of rooms and for every street and yard as on the shortest day of the year. This standard of sunlight may be fifteen minutes, a half hour, an hour, or two hours, according to the requirements of the particular locality, but in each case the height of building, whatever it may be, will be regulated with reference to the width of the street and yard space in such a manner as to secure this minimum amount of sunlight.

Either the height of building, or the width of streets and yards, will at any given latitude be made to vary according to orientation in order to meet the requirements of this standard. At Philadelphia, for example, to obtain fifteen minutes of sunlight on either side of a north-and-south street at the ground level, the height of building may be 7.5 times the street width. But to obtain the same amount of sunlight on the north side of an east-and-west street the height of the buildings on the south side may not exceed one-half the street width.

The height to which buildings fronting on streets of different orientation may be erected at different latitudes in order to obtain minimum periods of sunshine at the ground level is indicated in Table III.¹

ARRANGEMENT OF BUILDINGS

In the winter season no sunlight can, of course, be obtained on the south side of an east-and-west street. No adjust-

¹For method used in computing this table see note at end of article.

TABLE II—SUNSHINE PERIOD AT GROUND LEVEL OF STREET FACADE

(For different latitudes and for each side of streets oriented in different directions and improved with buildings of different heights. Winter solstice.)

Table II shows the sunshine period at the ground level of the street facade. It is given for different latitudes and for each side of streets oriented in different directions and improved with buildings of different heights. The figures in the body of the table give the sunshine period in hours and minutes on the side of the street indicated at the top or bottom of the columns as the case may be, and for the orientation there indicated, when the height of buildings on opposite side of street in terms of street width is given at the left. The table also shows the sunlight period at any distance below the top of the building given in the left-hand column. The table has been worked out for every five degrees from 25° north latitude to 60° north latitude, inclusive. These latitudes include all of the United States and Canada. Cities near or at the different latitudes are: 25°, Key West; 30°, New Orleans; 35°, Memphis; 40°, Philadelphia; 45°, Minneapolis; 50°, Winnipeg; 55°, Prince Rupert, British Columbia; and 60°, Mt. Elias, Alaska. The table includes north-and-south streets and those oriented every 15° west and east of south to and including east-and-west streets. The height used is in each instance a multiple of the street width, this multiple varying from one-half times the street width to six times the street width, the higher multiples being worked out primarily for alleys and rear yards. Both streets and alleys are assumed to be open at either end for an indefinite distance.

The sunshine period given in this table is that received by the street facade at a given distance below the top of the buildings on the opposite side of the street. The time that sunshine enters a window at any particular height is, of course, less than the time that it falls on the facade. The number of minutes of sunshine received by the facade cut off from entering a standard window by an 8-inch wall is indicated in the last line of the table for each latitude.* For a wall thicker than 8 inches the amount of sunshine cut off from the window would be greater than that stated in the table.

ORIENTATION OF STREET														
Height of Building Times Street Width	SOUTH		15° W.		30° W.		45° W.		60° W.		75° W.		WEST	
	SIDE OF STREET													
	E.	W.	E.	W.	E.	W.	S.	N.	S.	N.	S.	N.	S.	N.
	TIME IN HOURS AND MINUTES													
	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
25° NORTH LATITUDE														
1/2	3 24	3 24	2 58	3 54	2 24	4 38	1 40	5 46	0 30	7 25	...	8 04	...	8 08
1	2 18	2 18	2 06	2 32	1 45	3 00	1 18	3 39	0 21	4 39	...	0 34	...	...
1 1/2	1 42	1 42	1 38	1 43	1 22	2 08	1 03	2 27	0 18	2 38	...	...	...	...
2	1 23	1 23	1 19	1 30	1 06	1 36	0 50	2 00	0 16	1 30	...	...	...	...
2 1/2	1 06	1 06	0 58	1 11	0 53	1 20	0 48	1 23	0 14	1 08	...	...	...	...
3	0 53	0 53	0 53	0 56	0 48	1 03	0 40	1 02	0 13	0 37	...	...	...	...
4	0 44	0 44	0 39	0 42	0 36	0 46	0 32	0 46	0 11	0 21	...	...	...	...
5	0 33	0 33	0 33	0 34	0 29	0 36	0 26	0 34	0 10	0 18	...	...	...	...
6	0 31	0 31	0 28	0 29	0 25	0 30	0 21	0 29	0 09	0 11	...	...	...	...
Deduct for windows	41	41	46	41	56	47	1 22	59	†	1 28	...	...	...	...
30° NORTH LATITUDE														
1/2	3 10	3 10	2 41	3 44	2 07	4 24	1 24	5 31	0 18	7 07	...	6 54	...	6 28
1	2 07	2 07	1 51	2 24	1 28	2 45	1 20	3 16	0 12	3 46	...	...	...	...
1 1/2	1 34	1 34	1 24	1 41	1 10	1 52	0 50	2 05	0 10	1 37	...	...	...	...
2	1 16	1 16	1 06	1 18	0 57	1 26	0 43	1 29	0 08	0 48	...	...	...	...
2 1/2	0 58	0 58	0 55	1 03	0 51	1 07	0 37	1 05	0 06	0 35	...	...	...	...
3	0 44	0 44	0 47	0 49	0 39	0 44	0 33	0 50	0 05	0 15	...	...	...	...
4	0 36	0 36	0 34	0 36	0 33	0 39	0 27	0 36	0 05	0 09	...	...	...	...
5	0 31	0 31	0 29	0 30	0 25	0 32	0 25	0 27	0 05	0 08	...	...	...	...
6	0 25	0 25	0 23	0 26	0 21	0 26	0 19	0 23	0 05	0 06	...	...	...	...
Deduct for windows	43	43	49	43	57	49	1 20	59	†	1 23	...	...	...	...
35° NORTH LATITUDE														
1/2	2 52	2 52	2 25	3 30	1 51	4 07	1 08	5 04	0 06	6 35	...	5 36	...	4 50
1	1 52	1 52	1 38	2 08	1 20	2 28	0 50	2 44	0 05	2 23	...	...	...	...
1 1/2	1 23	1 23	1 11	1 32	1 00	1 40	0 41	1 40	0 04	0 30	...	...	...	...
2	1 10	1 10	0 57	1 10	0 47	1 13	0 35	1 06	0 04	0 10	...	...	...	...
2 1/2	0 53	0 53	0 45	0 55	0 43	0 55	0 30	0 50	0 04	0 07	...	...	...	...
3	0 39	0 39	0 40	0 44	0 36	0 45	0 22	0 39	...	0 03	...	...	...	...
4	0 32	0 32	0 30	0 34	0 28	0 33	0 19	0 28	...	0 02	...	...	...	...
5	0 25	0 25	0 24	0 28	0 22	0 25	0 16	0 21	...	0 02	...	...	...	...
6	0 21	0 21	0 21	0 22	0 19	0 22	0 14	0 18	...	0 01	...	...	...	...
Deduct for windows	45	45	50	46	58	51	†	60	†	1 16	...	...	...	...
40° NORTH LATITUDE														
1/2	2 37	2 37	2 04	3 07	1 33	3 45	0 50	4 32	...	5 10	...	3 06	...	...
1	1 40	1 40	1 25	1 52	1 04	2 04	0 38	2 04	...	...	...	...	...	...
1 1/2	1 10	1 10	1 00	1 20	0 50	1 20	0 28	1 08	...	...	...	...	...	...
2	1 00	1 00	0 50	0 59	0 44	1 00	0 25	0 46	...	...	...	...	...	...
2 1/2	0 44	0 44	0 41	0 48	0 35	0 47	0 23	0 35	...	...	...	...	...	...
3	0 32	0 32	0 35	0 39	0 28	0 34	0 18	0 27	...	...	...	...	...	...
4	0 27	0 27	0 25	0 28	0 22	0 26	0 14	0 18	...	...	...	...	...	...
5	0 21	0 21	0 21	0 24	0 18	0 21	0 12	0 15	...	...	...	...	...	...
6	0 18	0 18	0 18	0 19	0 15	0 17	0 11	0 12	...	...	...	...	...	...
Deduct for windows	48	48	52	48	58	53	†	60	...	59	...	...	...	...

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45° NORTH LATITUDE

1/2	2 18	2 18	1 48	2 44	1 15	3 13	0 35	3 45	...	2 50	...	...	...	...
1	1 24	1 24	1 10	1 34	0 48	1 40	0 24	1 24	...	...	...	...	...	...
1 1/2	0 58	0 58	0 50	1 03	0 38	1 02	0 21	0 48	...	...	...	...	...	...
2	0 49	0 49	0 43	0 48	0 32	0 46	0 16	0 32	...	...	...	...	...	...
2 1/2	0 38	0 38	0 33	0 40	0 25	0 37	0 13	0 24	...	...	...	...	...	...
3	0 30	0 30	0 27	0 31	0 22	0 27	0 11	0 17	...	...	...	...	...	...
4	0 24	0 24	0 19	0 22	0 17	0 20	0 09	0 12	...	...	...	...	...	...
5	0 18	0 18	0 16	0 19	0 13	0 17	0 08	0 09	...	...	...	...	...	...
6	0 16	0 16	0 14	0 16	0 12	0 14	0 07	0 08	...	...	...	...	...	...
Deduct for windows	50	50	54	50	59	54	†	1 01	...	...	...	...	...	...

50° NORTH LATITUDE

1/2	1 52	1 52	1 27	2 14	0 55	2 36	0 22	2 39	...	...	...	...	...	...
1	1 06	1 06	0 52	1 13	0 36	1 10	0 15	0 36	...	...	...	...	...	...
1 1/2	0 47	0 47	0 38	0 47	0 28	0 50	0 10	0 21	...	...	...	...	...	...
2	0 41	0 41	0 30	0 38	0 23	0 40	0 08	0 15	...	...	...	...	...	...
2 1/2	0 30	0 30	0 24	0 26	0 20	0 30	0 07	0 13	...	...	...	...	...	...
3	0 23	0 23	0 21	0 23	0 15	0 19	0 06	0 08	...	...	...	...	...	...
4	0 19	0 19	0 15	0 16	0 12	0 14	0 05	0 06	...	...	...	...	...	...
5	0 15	0 15	0 13	0 14	0 10	0 12	0 04	0 05	...	...	...	...	...	...
6	0 13	0 13	0 11	0 12	0 08	0 09	0 03	0 04	...	...	...	...	...	...
Deduct for windows	51	51	55	53	†	55	†	1 01	...	...	...	...	...	...

55° NORTH LATITUDE

1/2	1 25	1 25	1 04	1 40	0 36	1 45	0 05	0 54	...	...	...	...	...	...
1	0 48	0 48	0 38	0 51	0 23	0 44	0 03	0 09	...	...	...	...	...	...
1 1/2	0 32	0 32	0 27	0 34	0 17	0 27	0 02	0 05	...	...	...	...	...	...
2	0 25	0 25	0 21	0 25	0 14	0 20	0 02	0 04	...	...	...	...	...	...
2 1/2	0 20	0 20	0 17	0 19	0 11	0 15	0 02	0 03	...	...	...	...	...	...
3	0 17	0 17	0 14	0 16	0 09	0 12	0 01	0 02	...	...	...	...	...	...
4	0 14	0 14	0 11	0 12	0 07	0 09	0 01	0 02	...	...	...	...	...	...
5	0 11	0 11	0 09	0 09	0 06	0 07	0 01	0 01	...	...	...	...	...	...
6	0 08	0 08	0 07	0 08	0 05	0 06	0 01	0 01	...	...	...	...	...	...
Deduct for windows	53	53	55	53	†	55	†	†	...	...	...	...	...	...

60° NORTH LATITUDE

1/2	0 53	0 53	0 37	0 59	0 15	0 43	...	...	...	...	...	...	...	...
1	0 28	0 28	0 21	0 28	0 09	0 16	...	...	...	...	...	...	...	...
1 1/2	0 20	0 20	0 15	0 19	0 06	0 10	...	...	...	...	...	...	...	...
2	0 15	0 15	0 11	0 14	0 05	0 07	...	...	...	...	...	...	...	...
2 1/2	0 12	0 12	0 09	0 11	0 04	0 06	...	...	...	...	...	...	...	...
3	0 10	0 10	0 07	0 09	0 03	0 05	...	...	...	...	...	...	...	...
4	0 08	0 08	0 06	0 07	0 02	0 04	...	...	...	...	...	...	...	...
5	0 06	0 06	0 05	0 06	0 02	0 03	...	...	...	...	...	...	...	...
6	0 05	0 05	0 04	0 05	0 01	0 02	...	...	...	...	...	...	...	...
Deduct for windows	†	†	†	54	†	†	...	...	...	...	...	...	...	...
Side of Street	W.	E.	W.	E.	W.	E.	S.	N.	S.	N.	S.	N.	S.	N.
Orientation of Street	SOUTH		15° E.		30° E.		45° E.		60° E.		75° E.		EAST	

*The standard window considered in this paper is one with a glass surface 32 inches wide and 61 1/2 inches high, the opening between the stop beads being 36 by 66 inches.
†Entire time.

ment in the height of buildings or in the street width can sunlight rooms having a northerly exposure. The remedy in such a case would be to require the rooms to have windows exposed toward one of the other three points of the compass. This can readily be done in detached houses, but it is very difficult in attached houses. This condition suggests the advisability of reserving east-and-west streets for detached houses. North-and-south streets, on the other hand, may be developed with either attached or detached houses.

In thickly built communities where it is impossible for all windows to have a southern exposure, buildings should generally be arranged in such a manner that the narrow dimension is oriented east and west and the long dimension north and south,

so that the greater length may receive sunlight on both faces.

Compliance with these principles would favor streets of a north-and-south orientation for attached houses. In the case of detached houses the orientation of the street is not so important, an east-and-west street in some respects being superior to a north-and-south street. For a detached-house district an east-and-west street has this decided advantage—the narrow dimension of the lot may front the street; on a north-and-south street the length of the lot would have to front the street. The requisite sunlight for detached houses of a villa type can, in other words, be purchased more cheaply on an east-and-west street than on a north-and-south street.

The undesirability of fronting attached buildings on east-and-west streets can scarcely be over-emphasized. The south side of such streets receives no sunlight whatever during the winter and very little during the summer. On the north side of the street no sunlight is obtained at the ground level except near the ends of the block, if the elevation of the building on the opposite side of the street exceeds the altitude of the sun at noon at that latitude. In other words, the pavement on the north side of an east-and-west street at the

winter solstice will be in shadow north of the latitudes given for different building heights as follows:

- 1/2 times width of street, latitude 39° 59' north;
- 1 times width of street, latitude 21° 33' north;
- 1 1/2 times width of street, latitude 10° 14' north;
- 2 times width of street, latitude 3° 07' north;
- 2 1/2 times width of street, latitude 1° 39' south;
- 3 times width of street, latitude 5° 00' south;
- 4 times width of street, latitude 9° 21' south;
- 5 times width of street, latitude 12° 09' south;
- 6 times width of street, latitude 13° 59' south.

Attached houses should, as a general rule, front on streets oriented north and south. This arrangement not only provides them with the maximum

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amount of sunlight, but it also secures the most intensive utilization of the land. Such buildings situated on streets oriented at an angle east or west of south, assuming a uniform height limit on both sides of the street, obtain a very uneven amount of sunlight, one side enjoying a superabundance at the expense of the other. No matter what the latitude, the height of building, or the street orientation, one side always receives less sunlight than would be the case on a north-and-south street. With buildings of an excessive height, and particularly at high latitudes, this would not only be true of one side, but of both sides.

To limit the height of buildings differently on the two sides of the street in proportion to the sunlight coefficient of each side would result in entirely different types of development on the two opposite sides of the street. To apply the sunlight coefficient, on the other hand, to the street width so that buildings of the same height could be erected on either side of the street and each side enjoy its minimum standard of sunlight would have the result in many instances of giving the street an absurd width. Either of these expedients is obviously not so satisfactory as a north-and-south orientation of streets with a uniform building height on both sides of the street.

There must be economy in the utilization of land as well as in sunlight. Where there is a conflict between the two there is little doubt as to the side the owner of land ripe for urban development will champion. Fortunately, in this case the interests of the owners harmonize with those of sunlight planning. A north-and-south orientation of streets for this type of building not only results in the fullest utilization of land, but it also secures the best distribution of

TABLE III—MAXIMUM HEIGHT LIMITS FOR DIFFERENT PERIODS OF SUNSHINE

The table shows the uniform height to which buildings fronting on streets of different orientations may be erected at different latitudes in order to obtain given periods of sunlight at the ground level or at the same distance from the top of the building on the opposite side of the street on the shortest day in the year. The figures in the body of the table give the approximate height limit of buildings in terms of the street width on the side of the street indicated at the top or bottom of the column as the case may be and for the orientation there indicated which will permit the period of sunshine given at the left, on the opposite side of the street. This height limit has been calculated by fifteen-minute periods from a quarter of an hour to two hours of sunlight. The maximum height to which buildings may be erected so as to allow a given minimum period of sunlight at the ground on the opposite side of the street is represented as a coefficient or multiple of the street width. To ascertain the height limit permitting the desired amount of sunlight, it is, therefore, only necessary to multiply the street width by the coefficient for the given condition in Table III. To ascertain the street width required to furnish a building of a given height a certain period of sunlight at the ground level, it is only necessary to divide the height of the building by the appropriate coefficient for the period of sunlight required, as given in Table III. The quotient will be the allowable width of street. The height of building in this table is in each case given only to the nearest tenth of the street width. This fact explains apparent discrepancies between Table II and Table III.

ORIENTATION OF STREET														
Minutes of Sunshine	SOUTH		15° W.		30° W.		45° W.		60° W.		75° W.		WEST	
	SIDE OF STREET													
	W.	E.	W.	E.	W.	E.	N.	S.	N.	S.	N.	S.	N.	S.
Height of Building in Terms of Street Width														
25° NORTH LATITUDE														
15	11.1	11.1	10.1	11.8	9.8	12.5	9.3	10.3	4.3	8.4	...	1.0	...	.9
30	5.5	5.5	5.3	5.6	5.0	5.9	4.2	5.6	0.3	3.5	...	1.0	...	.9
45	3.6	3.6	3.4	3.8	3.0	4.4	2.5	3.9	...	2.8	...	1.0	...	.9
60	2.7	2.7	2.6	2.8	2.1	3.1	1.6	3.1	...	2.4	...	1.0	...	.9
75	2.1	2.1	1.9	2.3	1.6	2.5	1.1	2.6	...	2.1	...	1.0	...	.9
90	1.7	1.7	1.5	1.9	1.2	2.1	.7	2.2	...	1.9	...	1.0	...	.9
105	1.4	1.4	1.3	1.6	1.0	1.8	.4	2.0	...	1.8	...	1.0	...	.9
120	1.3	1.3	1.0	1.4	.7	1.6	.2	1.8	...	1.7	...	1.0	...	.9
30° NORTH LATITUDE														
15	9.9	9.9	9.7	10.3	9.1	10.9	7.5	8.6	.4	3.1	...	.8	...	.7
30	5.2	5.2	4.8	5.2	4.2	5.3	3.2	4.5	...	2.2	...	.8	...	.7
45	3.2	3.2	3.1	3.5	2.6	3.6	1.8	3.3	...	1.9	...	.8	...	.7
60	2.4	2.4	2.2	2.6	1.8	2.7	1.1	2.6	...	1.7	...	.8	...	.7
75	1.9	1.9	1.8	2.1	1.4	2.2	.7	2.1	...	1.6	...	.8	...	.7
90	1.5	1.5	1.4	1.7	1.0	1.8	.4	1.9	...	1.5	...	.8	...	.7
105	1.3	1.3	1.1	1.4	.8	1.6	.1	1.6	...	1.4	...	.8	...	.7
120	1.1	1.1	.9	1.2	.6	1.4	...	1.5	...	1.3	...	.8	...	.7
35° NORTH LATITUDE														
15	8.7	8.7	8.2	8.7	7.6	8.4	4.9	6.6	...	1.8	...	.7	...	.6
30	4.3	4.3	4.1	4.4	3.7	3.8	2.0	3.6	...	1.4	...	.7	...	.6
45	2.8	2.8	2.6	3.0	2.2	2.7	1.1	2.6	...	1.3	...	.7	...	.6
60	2.1	2.1	1.9	2.2	1.5	2.2	.6	2.1	...	1.2	...	.7	...	.6
75	1.6	1.6	1.4	1.8	1.1	1.9	.3	1.8	...	1.1	...	.7	...	.6
90	1.3	1.3	1.1	1.5	.8	1.6	.1	1.6	...	1.1	...	.7	...	.6
105	1.1	1.1	.9	1.3	.5	1.4	...	1.4	...	1.1	...	.7	...	.6
120	.9	.9	.7	1.1	.4	1.2	...	1.2	...	1.0	...	.6	...	.6
40° NORTH LATITUDE														
15	7.5	7.5	7.2	7.6	5.7	7.1	3.2	5.0	...	.8	...	.5	...	.5
30	3.7	3.7	3.6	3.7	2.7	3.7	1.3	2.7	...	.8	...	.5	...	.5
45	2.4	2.4	2.3	2.5	1.6	2.5	.6	2.0	...	.8	...	.5	...	.5
60	1.8	1.8	1.8	1.9	1.1	1.9	.3	1.6	...	.8	...	.5	...	.5
75	1.4	1.4	1.2	1.5	.8	1.6	...	1.4	...	.8	...	.5	...	.5
90	1.1	1.1	.9	1.3	.5	1.3	...	1.2	...	.8	...	.5	...	.5
105	.9	.9	.7	1.1	.4	1.2	...	1.1	...	.8	...	.5	...	.5
120	.8	.8	.6	.9	.2	1.0	...	1.0	...	.7	...	.5	...	.5
45° NORTH LATITUDE														
15	6.1	6.1	5.6	6.0	4.4	5.1	2.1	3.2	...	.6	...	.4	...	.4
30	3.0	3.0	2.7	3.1	2.0	2.8	.7	1.6	...	.6	...	.4	...	.4
45	2.0	2.0	1.7	2.1	1.2	2.0	...	1.5	...	.6	...	.4	...	.4
60	1.3	1.3	1.2	1.6	.8	1.5	...	1.2	...	.6	...	.4	...	.4
75	1.1	1.1	.9	1.2	.5	1.3	...	1.0	...	.5	...	.4	...	.4
90	.9	.9	.7	1.0	.3	1.1	...	.9	...	.5	...	.4	...	.4
105	.7	.7	.5	.8	.2	.9	...	.9	...	.5	...	.4	...	.4
120	.6	.6	.4	.7	.1	.8	...	.8	...	.5	...	.4	...	.4

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50° NORTH LATITUDE

15	4.7	4.7	4.0	4.3	4.0	3.9	.8	1.9	...	.4	...	.3	...	.3
30	2.3	2.3	2.0	2.3	1.7	2.0	.1	1.2	...	.4	...	.3	...	.3
45	1.5	1.5	1.3	1.6	.7	1.4	...	1.0	...	.4	...	.3	...	.3
60	1.1	1.1	.9	1.2	.4	1.3	...	.8	...	.4	...	.3	...	.3
75	.9	.9	.6	1.0	.2	1.0	...	.7	...	.4	...	.3	...	.3
90	.7	.7	.4	.8	.1	.8	...	.7	...	.4	...	.3	...	.3
105	.5	.5	.3	.7	...	.7	...	.6	...	.4	...	.3	...	.3
120	.4	.4	.2	.6	...	.6	...	.6	...	.4	...	.3	...	.3

55° NORTH LATITUDE

15	3.4	3.4	2.9	3.2	1.7	2.5	...	.8	...	.3	...	.2	...	.2
30	1.7	1.7	1.3	1.5	.7	1.3	...	.6	...	.3	...	.2	...	.2
45	1.1	1.1	.8	1.1	.3	1.0	...	.5	...	.3	...	.2	...	.2
60	.8	.8	.5	.9	.1	.8	...	.5	...	.3	...	.2	...	.2
75	.6	.6	.4	.7	...	.6	...	.5	...	.3	...	.2	...	.2
90	.5	.5	.3	.6	...	.5	...	.5	...	.3	...	.2	...	.2
105	.4	.4	.2	.5	...	.5	...	.4	...	.3	...	.2	...	.2
120	.3	.3	.1	.4	...	.5	...	.4	...	.2	...	.2	...	.2

60° NORTH LATITUDE

15	2.0	2.0	1.4	1.8	.5	1.1	...	.2	...	.1	...	.1	...	.1
30	1.0	1.0	.7	.9	.1	.6	...	.2	...	.1	...	.1	...	.1
45	.6	.6	.4	.6	...	.4	...	.2	...	.1	...	.1	...	.1
60	.4	.4	.2	.5	...	.3	...	.2	...	.1	...	.1	...	.1
75	.3	.3	.1	.4	...	.2	...	.2	...	.1	...	.1	...	.1
90	.2	.2	.1	.3	...	.2	...	.2	...	.1	...	.1	...	.1
105	.2	.2	...	.3	...	.2	...	.2	...	.1	...	.1	...	.1
120	.1	.1	...	.2	...	.2	...	.2	...	.1	...	.1	...	.1

Side of Street	E.	W.	E.	W.	E.	W.	N.	S.	N.	S.	N.	S.	N.	S.
Orientation of Street	SOUTH		15° E.		30° E.		45° E.		60° E.		75° E.		EAST	

sunlight. Blocks improved with houses in rows or with apartment houses should have their length parallel to north-and-south streets and their breadth parallel to east-and-west streets.

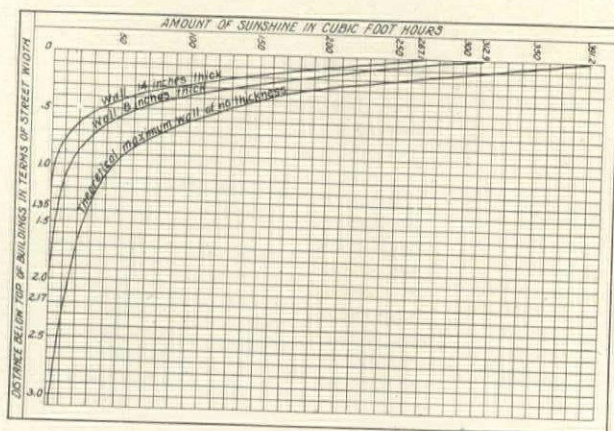


Diagram 8. Total amount of sunshine admitted by window facing east or west, 40° north latitude, winter solstice. Calculated for room 14 ft. square; window pane 32 in. wide and 61½ in. high, the opening between the stop beads being 36x66 in., and the inside dimensions of the masonry 40x70 in. Distance between center of window and south wall of room is 5 ft. and height of window sill above floor 2½ ft.

In such developments the distance separating east-and-west streets is of no particular consequence to the sunlight of apartments. The location of such streets in these sections of the city may therefore be left entirely to considerations affecting the con-

venience of traffic. Blocks the length of which parallels east-and-west streets should be re-subdivided into lots fronting on minor north-and-south streets laid out across the narrow dimension of the block before they are improved with attached houses.

The amount of sunlight obtained on east-and-west streets in detached-house districts may be effectively increased by staggering the buildings in such a manner that no house is directly back of one in front on the same block.

ARRANGEMENT OF WINDOWS

All windows oriented in a certain manner obviously do not receive sunshine for the same time. Even though there be no buildings on the opposite side of the street, a considerable percentage of the sunshine received

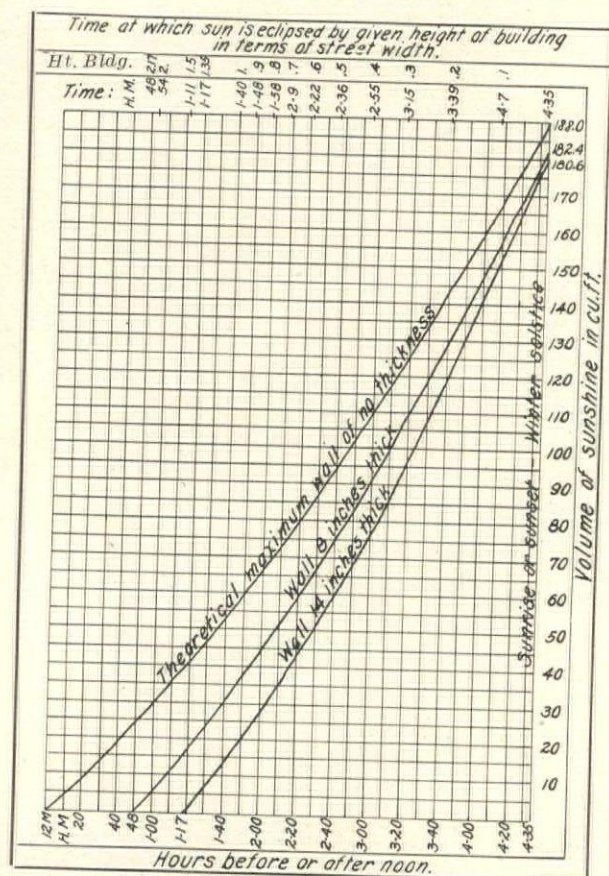


Diagram 9. Volume of sunshine admitted by window facing east or west, 40° north latitude, winter solstice. Calculated for same conditions as in Diagram 8.

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by the facades will usually be cut off from entering buildings by the thickness of the wall in which the windows are set (see Diagram 8).

The walls enclosing a window on account of their thickness diminish the sunshine period in a room as

creases far more rapidly with increased height of buildings than does the sunshine period. Where opposite buildings obstructing the window are low, the ratio of the sunshine volume to the sunshine period is nearly as great for a thick wall as for a

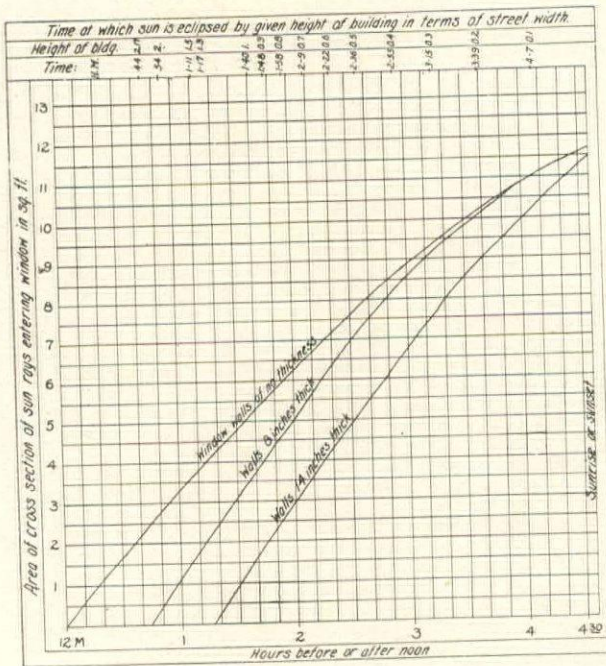


Diagram 10. Cross section of sun's rays entering window facing east or west, 40° north latitude, winter solstice. Calculated for same conditions as in Diagram 8.

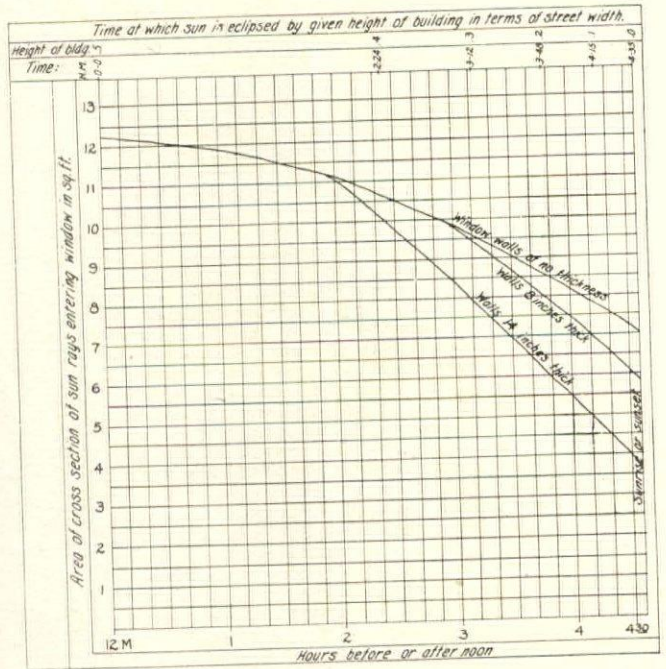


Diagram 11. Cross section of sun's rays entering window facing south, 40° north latitude, winter solstice. Window in center of south wall. Other conditions same as in Diagram 8.

well as the volume of sunlighted air (see Diagram 9). These walls should therefore be made as thin as practicable. The effect of the thickness of the walls in cutting off sunlight diminishes as the size of the window increases. Consequently a single large window set in a wall of given thickness is much more efficient in admitting sunlight than several windows having the same collective area.

The sunshine period cut off by walls of a given thickness at a window opening, as shown by Table II, is very much greater in a northern than in a southern city.

The volume of sunlighted air in rooms is of just as much importance as the sunshine period. A room, for instance, may enjoy direct sunshine for a considerable period and yet have a comparatively small portion of its cubic contents acted upon by direct rays from the sun.

The volume of sunlighted air in a room de-

thin wall. But this ratio is considerably reduced in the case of high opposite buildings.

A window opening to the south obtains in this latitude not only a longer period of sunshine and a greater volume of sunshine, but also sunshine of a greater intensity than does a window facing any other direction (see Diagrams 10 and 11). As this disparity in the sunshine value increases with distance from the equator, it is plain that the farther north one proceeds the more desirable a southern exposure becomes for the windows.

Windows opening to the south admit at some latitudes the entire sunshine period enjoyed by the building facade, provided the walls are not too thick. But this is an exceptional condition. The general

rule is that the walls in which windows are set shut out sunshine for a less time on north-and-south streets than is the case on streets of any other orientation.

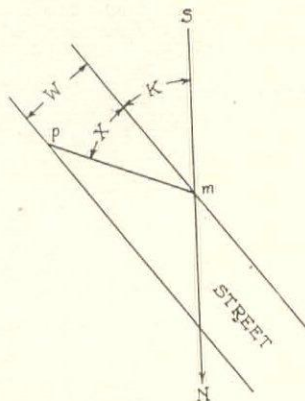


Diagram 12. Method of computing building obstruction.

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Various expedients may be tried to increase the volume of sunlit air in rooms. By a beveling of the window opening, a window set in a thick wall can, within limits, be made to admit as much sunshine as one set in a thinner wall. The position of windows within rooms is also of importance. Thus a window the top of which is situated near the ceiling permits a deeper penetration of the sun rays into a room than one the top of which is placed some distance below the ceiling. The sunshine volume in rooms with windows opening to

the supply of sunlight, but they also economize space. Buildings "pocketed" at either end between deeper buildings receive much less sunlight than those conforming to a common building line, unless they are equipped with a side yard of sufficient width on the south to insure their own sunlight. The provision of such a side yard is usually so expensive that it can be afforded only in private home districts.

INNER AND OUTER COURTS

Deep buildings in solid blocks are quite generally a misfit in a sun-light plan. They necessitate inner and outer courts and open spaces, the economic use of which does not ordinarily conform to the height standards of sunlight. Inner courts should not be used at all; outer courts, except those opening to the south, should be used very sparingly. The justifiable use of outer courts depends almost entirely upon the direction of their open end. Outer courts opening either to the east or to the west are subject to the same criticism as east-and-west streets—one side receives no sunlight at all on the shortest day in the year. Outer courts opening to the north are still worse; unless they are extremely long, only a triangular segment of either side wall near the top of the building receives any sunlight. These objections, however, do not apply to an outer court opening to the south, either side of which possesses the advantages enjoyed by buildings on north-and-south streets, while the end, if the court is not too long, has

many of the advantages of a building on the north side of an east-and-west street. An inner court possesses none of the advantages of an outer court open to the south, while it has all the disadvantages of courts open toward the east, west and north in an exaggerated way. Buildings on the south side of east-and-west streets should have their outer courts opening into the rear yard; those on the north side into the street.¹

The type of building enjoying the maximum possible sunlight, and which most readily avoids the use of courts, is one facing on a north-and-south street not more than two rooms deep measured

¹The writers have worked out two complete sets of tables, one showing the exact period of sunshine and the other the daylight illumination enjoyed by inner and outer courts under different conditions.

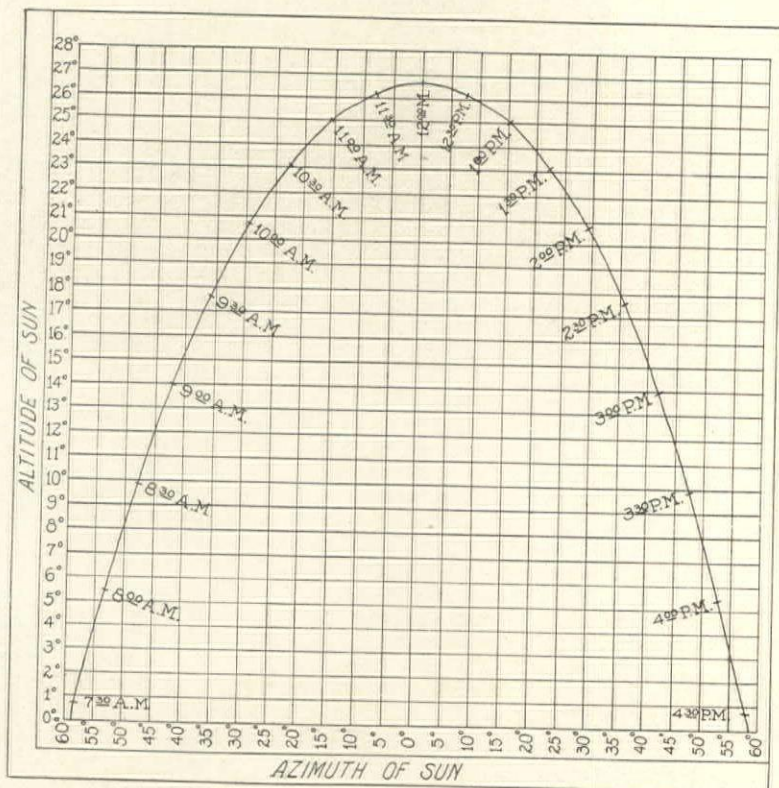


Diagram 13. The altitude and azimuth of the sun, 40° north latitude, winter solstice.

either the east or the west may be considerably increased by having the windows located as near as possible to the south wall of the room. Windows opening to the south should be placed as near the middle of the front wall of the room as practicable.

FRONT AND REAR BUILDING LINES

Every attached house should preferably not only front on a north-and-south street, but should also back on a rear yard running parallel to such a street. This yard should be open at either end so that each building backing on it may derive full benefit of the sunlight purchased by its vacant space. Uniform building lines are highly desirable both in front and in rear. They not only conserve

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from east to west, every room deriving its sunlight directly either from the street or the rear yard in the case of attached houses or from the side yards in addition to the southerly exposure in the case of detached houses.

THE LOT UNIT

The size of the lot unit is, of course, always conditioned by the character of the building and the amount of space demanded for lawns, gardens and accessory buildings. For sunlight purposes it should also be conditioned by its latitude and its orientation. The minimum practicable depth of workmen's dwellings of low cost and built in rows is probably about 25 ft. How deep at different latitudes would the lot unit have to be for such buildings oriented on north-and-south streets with a yard in the rear, to obtain at least two hours' sunlight on either side at the street and yard level, assuming the height to be 25 ft. and ignoring any demand for extra space on account of gardens and accessory buildings?

The width of the yard on each lot provided in the rear of the houses at each of these latitudes respectively would be equal to half the street width in front. Utilizing the sunlight coefficients in Table III, we find the required street width at each latitude to be as follows:

Latitude	Street width	Minimum depth of lot
25°	19.2 ft.	34.6 ft.
30°	23.4 "	36.7 "
35°	27.2 "	38.6 "
40°	32.4 "	41.2 "
45°	41.0 "	45.5 "
50°	64.1 "	57.1 "
55°	83.3 "	66.6 "
60°	250.0 "	150.0 "

The depth of lot and width of streets required for any type of development with a minimum sunlight standard can easily be ascertained by using the proper sunlight coefficient. A sunlight plan does not concern itself with the width of lots except where side yards are utilized to obtain sunlight. The width of such yards and the height of the adjacent buildings must, of course, stand in the same relation as their sunlight coefficients.

SETBACKS AND CORNICES

Setbacks to maintain the minimum standard of sunlight at the ground level must be in the same ratio as their sunlight coefficients. If not, they are to be considered as an increased height of building,

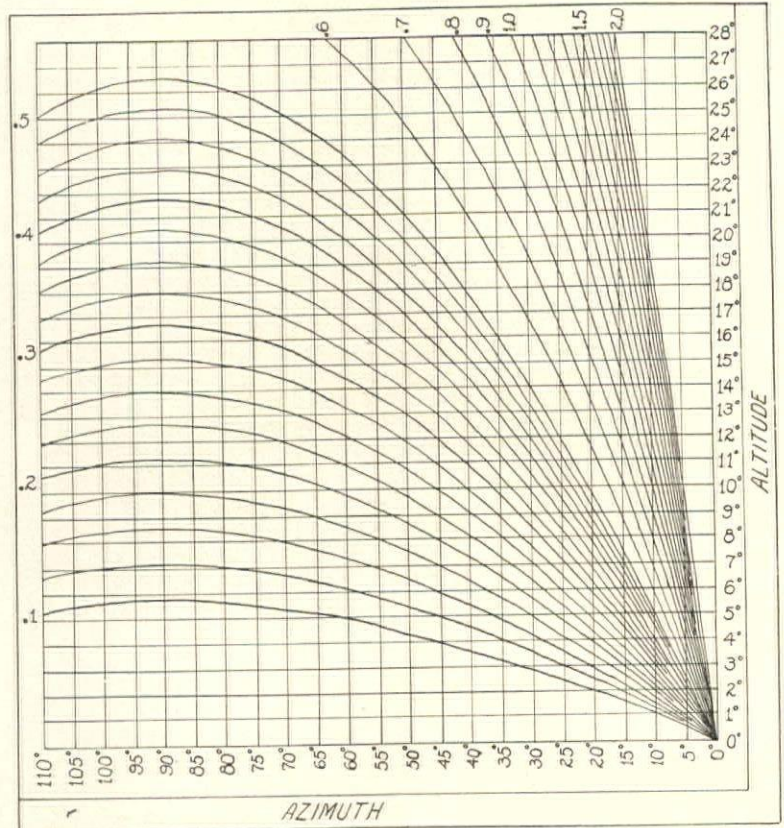


Diagram 14. Building obstruction at different altitudes and azimuths. Curves represent top edge of buildings at different heights in terms of street widths.

the amount of such increase depending upon the setback angle. Cornices usually diminish the effective street width by as much as, and often by considerably more than, the amount of their projection, when the height of building is measured to the cornice.

BUILDING REGULATIONS

Good housing means sunshine, daylight, air, ventilation. These are the avowed objects of all building codes. The height of buildings has been restricted, the percentage of lot that may be covered by buildings limited, and the size of courts and yards rigidly regulated—all with the hope that the aggregate amount of sunshine, daylight, air and ventilation in the community might be increased. This hope has, of course, in a measure been realized, for some control is better than no control, even though that control may be based upon a very imperfect appreciation of the means necessary for the achieve-

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ment of these ends. But what is needed for the promotion of good housing to-day quite as much as restrictive regulations is the definition of scientific standards which will directly relate height and area provisions to the minimum requirements of public health. Without the establishment of such standards we cannot be sure that our building codes encourage the right kind of development.

Note:

METHOD OF CALCULATING THE SUNLIGHT TABLES

The tables have been worked out by graphic methods and in brief they consist in plotting the path of the sun, as seen from a given point, on a suitable projection, noting at the same time on its projected path points at 30-minute periods or oftener from noon (see Diagram 13). In the same manner the edge of the building casting the shadow is plotted as seen from the same point (see Diagram 14). Then it is plain that the arc of the sun's path as projected, which is above the projection of the edge of the building, will be the path of the sun while illuminating the point in question and the time may be determined from the 30-minute intervals noted on its path. This in general is the method and there are many ways by which it can be carried out, by using different planes of projection, different systems of projection, etc.

It is believed that the particular method devised by the authors for computing Tables II and III, which will be briefly described below, is new and has many advantages.

The location of the sun and also the point in cornice line or edge of building casting the shadow is defined by its altitude and azimuth from the point considered, azimuths being measured from the south, + toward east, - toward west.

- Let l = latitude of place
 d = declination of sun, + when N, - when S
 h = altitude of sun
 A = azimuth of sun measured from south, + when east, - when west
 t = hour angle from noon, + in a. m., - in p. m. (1 hour = 15 deg.).
 W = width of street
 H = height of building casting shadow
 K = azimuth of street measured from south, + when east, - when west.

We then have for the azimuth of the sun

$$(1) \tan A = - \frac{\sin t}{\cos l \tan d (1 - \tan l \cos d \cos t)}$$

and for the altitude

$$(2) \sin h = \sin l \sin d + \cos l \cos d \cos t.$$

From these formulæ the altitude and azimuth of the sun may be determined at any time for any locality.

The U. S. Navy has published the azimuths of the sun so that they may be taken directly from tables, leaving only the altitudes to be computed.* These quantities may also be obtained graphically.

The position of the sun is then plotted for every half hour, or preferably oftener, at all hours between sunrise and sunset from the altitudes and azimuths of the sun found as above, after adding the refraction to the altitudes by the use of a table of astronomical refractions. A rectangular projection is used (the plane of projection being vertical and perpendicular to the meridian, south being taken as zero azimuth). Azimuths are plotted as abscissa, altitudes as ordinates (degrees and minutes being laid off in the same manner as if they were linear measurements) and the corresponding times from noon noted on the resulting curve.

*Hydrographic Office United States Navy Publication No. 71. Azimuths of the Sun.

The U. S. Coast and Geodetic Survey kindly furnished tables of altitude and azimuth for the particular latitudes and times used in this work.

We have now to locate the corresponding curve for the edge of the building casting the shadow (Diagram 14). If m , Diagram 12, is the point of observation at the ground level on the side of the street where its shadow is cast and p is a point on the cornice or edge of building casting shadow at height H , while X is the angle which the horizontal projection of pm makes with the side line of the street, assumed as level, and k is the altitude of p as observed at m , we have

$$(3) \tan k = \frac{H}{W} \sin X.$$

Values of k for each ratio of $\frac{H}{W}$ required, as $\frac{1}{2}$, 1, $1\frac{1}{2}$,

2, etc., are now to be found for different values of X , say for every 5 deg., or as may be required to plot a smooth curve. It is only necessary to compute that part of the curve, however, which will intersect the sun curves above described. We then plot these altitudes for different values of X referred to the side of the street on tracing paper in the same way and on the same scale as the altitudes and azimuths of the sun. Then when one of these diagrams is superimposed on the sun diagram with zero X corresponding to zero azimuth of sun, the sun diagram will represent on the projection the position of the sun at any azimuth as seen from the point of observation and the superposed diagram will represent the corresponding position of the skyline or cornice line of the buildings on one side of the street (assuming that they are of uniform height and continue indefinitely without breaks) when the street is in a north and south direction, as seen from the point of observation on the opposite side of the street at ground level.

The angles X and the corresponding altitudes k should be laid off on both sides of $X=0$, the curve being symmetrical about a vertical through that point. The resulting curve to the left of zero will represent the line of obstruction to sunlight (skyline or cornice line of building) due to buildings on the east side of the street, at the point of observation on the opposite side of the street at ground level, and conversely the skyline curve on the right of zero will represent the line of obstruction to sunlight due to buildings on the west side of the street at the point of observation at ground level on the east side of the street.

This combined diagram will show the time when the sun begins to shine on the west face of this north and south street, and when the sun leaves it entirely in shadow, for when the sun is below the skyline its rays are cut off by the buildings from the point of observation, and when the sun is above, that point receives the direct rays of the sun, consequently when the sun's position is at the point of intersection of the two curves the point of observation passes from shadow to sunlight, or conversely. In this particular case of a north and south street the intersection on the left locates the position of the sun when the sunlight first reaches the point of observation on the west side of the street and the altitude and azimuth of the sun, at that instant, as well as the time, is shown on the diagram. The vertical line through azimuth zero will represent the skyline or cornice line of the buildings on the west side of the street as seen from the point of observation on that side, and the intersection of this vertical line with the sun diagram will give the altitude, azimuth and time when the sunshine leaves this west face of the street and shines on the east face. Similarly, this same instant is the time when sunshine first strikes the east face of the buildings on the street, and the altitude, azimuth and time when it leaves this face is given by the point of intersection of the sun curve with the skyline curve to the right of zero azimuth. For any latitude or time of year it is necessary to use the proper sun curve for the given latitude and time.

A street in a north and south direction has thus been considered, but the same diagrams are applicable to a street in any direction. The only change necessary is the shifting along the axis of abscissa of the zero point of the skyline diagram on the sun diagram so that zero X on the skyline diagram shall coincide with the azimuth on the sun diagram which expresses the direction of the street. This lateral

displacement is necessary to make the relative position of the sun and skyline of the street correct for the given direction of street; for example, if we have a street making an angle of 60 deg. west of south, zero X should be placed over 60 deg. west azimuth on the sun diagram, for only then will the azimuth and altitude of the skyline of the given side of the street be correctly represented on the sun diagram. Then $X = 60$ deg. is azimuth 0; $X = 45$ deg. is azimuth — 15 deg.; $X = 30$ deg. is azimuth — 30 deg.; $X = 15$ deg. is azimuth — 45 deg.; and $X = 0$ is azimuth — 60 deg.; and the directions on the skyline diagram are now shown in their true azimuths measured from the south.

We have described the making of a skyline diagram for a level street with uniform building heights, but a diagram may be similarly plotted to determine the sunlight at any given point for any arrangement of obstructing buildings from the altitudes and azimuths at the given point, of points on the edges of obstructing objects casting shadows. Similarly a window diagram may be drawn on a skyline or building diagram which will show when sunlight is admitted by a window of any given dimensions. Only when the path of the sun appears above the skyline curve corresponding to the height of buildings above the window, and within the window diagram, will the sun shine through the window.

For all directions which a street may make it is sufficient to work out the required quantities for the street directions in a quadrant, say from south to west; for from symmetry the quantities found in the s. w. quadrant for a street having a given azimuth west of south, will apply to a street having the same azimuth east of south, counting times before noon in the latter case, in place of times after noon in the former, and vice versa.

The times given are such as a sun dial would give and are not mean local times. The maximum difference is about 15 minutes. Tables are available showing this difference, known as the "equation of time," for any time of the year, also the difference between sun dial time and standard meridian time, but as we are dealing with time differences during a day, the variation is inconsiderable for so short a period, and the reduction is only necessary when we require the clock time.

To get the entire time of sunlight on the face of a building the entire sun curve should be plotted from sunrise to sunset, bearing in mind that the curve is symmetrical about a vertical through azimuth zero; and the skyline should be plotted for the extent of azimuth reached by the sun both east and west (although only its intersections with the sun curve are made use of). Then any period when the sun shines on the side of a street can be readily seen by inspection; otherwise a period of sunshine may be overlooked.

We have projected the sun and the skyline on a vertical plane at right angles to the meridian, as best representing the phenomena; but the same method might be used by projecting both the sun's path and the skyline on a vertical plane parallel to the meridian or one having any given azimuth. Other projections may be and have been employed in solving this problem, as for example the orthographic or stereographic projections. The projection used herein has the advantage that the scale is equal for all altitudes and azimuths, so that one skyline diagram suffices for all street directions. With the other projections, however, owing to differences of scale, separate skyline diagrams are required for each direction of street.

The above diagrams give directly the time during a day that the entire front of a building is in sunshine, when the opposite side of a level street is occupied by a continuous row of buildings of indefinite length and are of any given height; that is, the front at the bottom will receive this amount of sunshine, while points above will receive greater amounts, which may be found by using, instead of $\frac{H}{W}$, $\frac{H_1}{W}$ where H_1 is the distance down from top of opposite building to level of point where period of sunlight is required. In the case of a street having a uniform grade for some length, the skyline diagram for that condition can be easily plotted.

The problem may arise, given the number of hours that sunlight entirely covers one side of a street, to find the limiting height of buildings on the opposite side of the street for a given street width. In this case, plot the sun curve for the latitude and time of year required and superpose thereon the sky curves for the given street direction

as before for several different ratios of $\frac{H}{W}$, noting the corresponding total number of hours that the sun will shine on the given side of such street until one ratio will give a time somewhat greater and another somewhat less than that required; then if these two ratios are taken near enough together so that the sun curve between them is substantially straight in all portions included, we may find the correct ratio for the given time by proportion, when the height of the building follows from the street width. Similarly, the width of street which will permit a given number of hours of sunlight when buildings in continuous rows are at any given height also follows from the $\frac{H}{W}$ determination above.

At a given point on the side of a street the sunlight begins or ends in most cases when the sun comes from back of the face of the building or passes to the back of the building. In other words, the sun, at the instant of beginning or of ending of sunlight at a point on the front of a building, is in its plane. In this usual condition the height of buildings for a given width of street, or widths of street for a given height of buildings, which will permit a given period of sunshine on the opposite side of the street was found in the manner described below.

From the sun diagram for the latitude and time of the year required, find for the azimuth of the street the time on the sun diagram when the sun is in that azimuth, then subtract, if a certain number of hours of sunlight is required on the westerly side of the street, or add if these hours of sunlight are required on the easterly side of the street that number of hours, and we have the time when sunlight or shadow should appear. Take the corresponding altitude and azimuth of the sun at this time from the sun diagram, and this azimuth will be the azimuth of the sun when the edge of its shadow is at the base of the buildings on one side of the street, the given number of hours from the time that the sun is hidden by these buildings. From this azimuth A , and the azimuth of the street K , find the angle X , which the direction of the sun makes with the side of the street. This angle is the difference of these two angles when they are measured both east or both west of the meridian. When, however, one azimuth is measured east and the other west of the meridian, the angle X is the sum of K and A . Then, with angle X , and the width of the street, find the horizontal distance on azimuth A across the street, which is $\frac{W}{\sin X}$. Then this distance, multiplied by the tangent of the corresponding altitude of the sun h , will give the height of building required; or, collecting the expressions we have for height of building,

$$H = \frac{W}{\sin X} \tan h,$$

where $X = A - K$. The corresponding width of street for a given height of building is given by the formula

$$W = H \frac{\sin X}{\tan h}$$

The sun is assumed in the computations to have no appreciable size and the illumination concentrated at its center. The sun is about 32' in diameter and it takes about two minutes when in the equinox to travel across the meridian; sunlight will begin, therefore, a short time before the time found but will not reach its full intensity until after that time. In the same way the intensity will diminish a short time before the time found but will not be completely shut off until after the time given.

Sunrise and sunset are usually given for the time when the upper limb of the sun appears to be in the horizon. These times may be found by using the value — 0° 56'

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for h in the altitude formula previously given (2). At zero altitude the center of the sun would be in the horizon were it not for refraction, which makes it appear higher by about 36', so that the sun has to be 36' lower before its center appears to be in the horizon. Adding the semi-diameter of the sun, 16', and a small correction for dip due to the height of the observer, we obtain $-0^{\circ} 56'$ as above for the true altitude of the sun at sunrise or sunset.

Mathematical formulæ can be used to compute the quantities directly in all cases in which the period of sunlight is required as well as in all cases in which the sun crosses the plane of the face of the buildings on the street, and in other cases by trial and error. The process is tedious and complicated, however, but can be availed of whenever precise results are desired.

The formulæ are as follows:

We have in (3)

$$\frac{H}{W} = \frac{\tan k}{\sin X}$$

which serves to determine the altitude and azimuth of points on the edge of building. When, however, the sun casts a shadow from a point on the edge of the building to that of observation, k becomes h for that point and X becomes $A - K$; substituting these values we have

$$(4) \quad \frac{H}{W} = \frac{\tan h}{\sin (A - K)}$$

Substituting for A its value in terms of l , h and d , according to trigonometrical formulæ, we have

$$(5) \quad \frac{W}{H} = \frac{\sin K \sin d}{\sin h \cos l} - \frac{\sin K \sin l}{\cos l} + \frac{\cos K \sqrt{\cos^2 l - \sin^2 d - \sin^2 h + 2 \sin d \sin h \sin l}}{\cos l \sin h}$$

which expresses the relation between $\frac{W}{H}$ and the altitude of the sun h , when the shadow of the sun from obstructing buildings falls at the ground level of the opposite face of the street.

This formula, with (1) and (2) previously given, will enable the desired computations to be made, to find the

times of sunshine with a given value of $\frac{W}{H}$ we solve (5)

for h , and using the value of h so obtained we solve (2) for t . If the sun crosses the face of the street, we find the time of such crossing from (1) and the difference between this and that derived from (2) will give the time of sunshine desired. No correction has been made for refraction, however, but this may be taken into consideration as follows: In (4), knowing h , we can readily find $\sin (A - K)$, then adding the refraction to h , we have h_1 , and

$$\frac{H_1}{W_1} = \frac{\tan h_1}{\sin (A - K)}$$

is the true ratio of height to width of street for which the interval of sunshine found as above applies.

When it is desired to find the ratio $\frac{H}{W}$ which will permit a given period of sunshine on the street, we first find t from (1), after substituting for A the azimuth of the street. This gives the time when the sun passes the face of the building; adding the interval desired we have t_1 the time when the sunlight should begin or end, with the required $\frac{H}{L}$. With t_1 find the corresponding azimuth of the

sun A_1 from (1), and from (2) with this time t_1 find the corresponding altitude of the sun h , then by adding the refraction to h we obtain the apparent altitude h_1 . Formula

(4) then gives $\frac{H_1}{W_1}$ after substituting therein h_1 , A_1 and K .

The total time of sunshine at a point, that is, the time from the first appearance of the sun at the point until it is entirely eclipsed, and the corresponding values of $\frac{H}{W}$ may

be determined similarly by adding the value of the semi-diameter of the sun, about 16', to the altitude of the sun corrected for refraction, and using this new altitude in the equations in the same manner as the altitude corrected for refraction was used above. When the sunshine is cut off by the face of buildings, however, the time that the semi-diameter of the sun takes in passing the face of building must be added to the period found above.

Industrial Information

In this Department there is published each week information as to the development of materials and methods derived from reliable sources.

A Contractor's Service

Among the valuable suggestions contained in the program of the Post-War Committee, considerable emphasis is given to the inter-relationship of the architect and the contractor.

As typical of the co-operation which contractors are prepared to offer, particularly with reference to industrial and commercial structures, the record of the Gaylord W. Feaga Co., Cleveland, is of interest. This is described in a booklet called "Buildings." Herein is discussed the importance of intensive effort on industrial construction work. In the production of industrial buildings, it is stated, the demand of the day is for a readiness to begin at

once the necessary operations, for accuracy and thoroughness of workmanship throughout the undertaking, and for the maximum dispatch consistent with efficiency.

Having analyzed the matter this far, they proceed to give evidence of how their facilities approach the ideals they have set down.

Space is given in this booklet to a discussion of the intelligent application of standardization. A feature is the graphic presentation of the extent to which this is limited by the special aspects of the needs of a particular manufacturer. So long as his needs remain wholly general, unmarked by any individuality, the advantage of standardization is highest. But when his needs are distinguished by

any specific departure from the needs of other owners, the disadvantage sets in, and from that point the graphic curve steadily falls.

This book closes with a comprehensive tabulation of the scope of service offered by the Feaga Company, which should tempt each firm of architects to formulate for itself a summary of its special facilities for carrying work forward in the most nearly ideal way.

Wiring Chart for Country Home Lighting

A wiring chart for determining the proper wire size for use on circuits of 110-125 volt country home lighting systems has just been prepared by the Engineering Department, National Lamp Works of General Electric Company. The steady demand for the low voltage (28-32 volts) wiring chart for country homes, distributed in July of last year, shows that the information contained thereon is valuable and conveniently arranged. For this reason, the chart on 110-125 volt systems is designed along the same lines. To aid in distinguishing the two charts, the new one is salmon-colored and is contained in an envelope on which the printing is done in dark red.

In connection with the high and low voltage systems, it should be noted that there is a fundamental difference between the two designations, 28-32 volt lamps and 110-125 volt lamps. In the first instance, a single class of lamps, any one of which is designed to operate on any voltage within the range indicated, is referred to; but, in the latter case, there is a different lamp for each individual voltage between 110 and 125 volts. While the characteristics of all the lamps in this range are such as to allow of their being grouped together for many purposes, as in the wiring chart just prepared, it should be remembered that a 110-volt lamp is to be burned only on a 110-volt circuit; a 115-volt lamp on a 115-volt circuit, or, in general, each lamp only on a circuit of the voltage for which that lamp was designed.

As indicated above, the information on the chart for 110-125 volt systems may be used for all voltages within the range. Either chart may be obtained on request from the Engineering Department, National Lamp Works of General Electric Company, Nela Park, Cleveland, Ohio.

Garden Ornaments

Considerable is the extent to which a formal garden depends for its success upon the careful selection and placing of garden ornaments.

A wide variety of garden ornaments has been designed by the Galloway Terra Cotta Co., established in 1810 and now located at Walnut and Thirty-second streets, Philadelphia. Terra cotta, or burnt clay, has the quality of long durability. Its use in art goes back through centuries, and much that we know of ancient peoples has come to us through pottery worked by them. The artistic possibilities of this medium are also recognized, for the unburnt plastic clay permits of unlimited artistic expression in the handling of detail.

Galloway pottery, having this unusual durability, coupled with the artistic possibilities of terra cotta, is particularly fitted, it would seem, for garden and decorative use. The simple lines of a sun dial or font stand out in striking contrast against a background of foliage or flowers, and in winter form a pleasing spot of interest. By the careful placing of jars, flower boxes and other decorative pieces a scheme of considerable beauty may be obtained that will be effective in all seasons. A garden pleasingly arranged can be made a delightful retreat for the best part of the year, and that feature should not be underestimated. If environment does all that is claimed for it, surely a garden may perform a distinct and important function by creating surroundings of refinement.

The Galloway Company has received important awards for its work in these fields, and a full guarantee accompanies each order. Its catalog is extensively illustrated and represents a wide range of well executed designs.

Improved Cupboard Latch

The Moss-Ochs Company, 9801 Manor Avenue, Cleveland, manufacturers of machinists' tools, are preparing to place on the market a new form of cupboard latch. The feature of this latch is the plunger, which, instead of being rectangular in shape, is made with steps. The object of this is to enable the door to catch at all times, no matter how badly it may be warped. As most doors have warping propensities, this latch should be of value.



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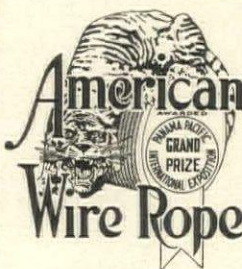
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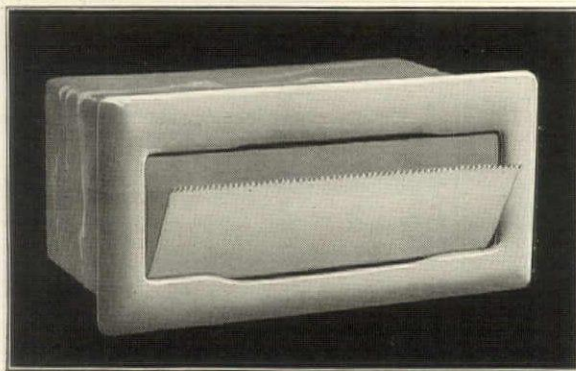
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BUILDING NEWS

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Persons in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

ALABAMA

BIRMINGHAM, ALA.—Board of Education had preliminary plans prepared by D. O. Whilldin, Architect, Title Guarantee Building, for one and two-story school on Montevallo Road and Montgomery Highway. \$500,000.

BIRMINGHAM, ALA.—St. James Methodist Church, Rev. I. T. Walker, pastor, has plans by W. A. Rayfield & Co., Birmingham, for 60 x 100 ft. building at Forty-first Street and Third Avenue, North. \$10,000.

FLORENCE, ALA.—City retained Evans & Brown, engineers, P. O. Box 94, to prepare plans for electric light plant.

TUSKEGEE, ALA.—Tuskegee Institute, R. R. Taylor, director of mechanical industries, is having plans prepared by W. A. Rayfield & Co., Birmingham, for Slater-Armstrong-Trader buildings, one main building and five units, fire proof. \$200,000.

CALIFORNIA

CUTLER, CAL.—National Bank of Cutler let contract to build brick and concrete bank and store building to R. Pedersen & Co., Fresno. \$150,000.

HANFORD, CAL.—California Packing Corp., 101 California Street, San Francisco, plans to build one-story, 110 x 250 ft., brick and frame factory and power house, also number of cottages here. P. Bush, 101 California Street, San Francisco, Architect.

LOS ANGELES, CAL.—A. Pantages, Pantages Building, will build eight-story, 150 x 150 ft., reinforced concrete, steel and brick theater, office and store, Seventh and Hill Streets. \$600,000.

SACRAMENTO, CAL.—Weinstock, Lubin & Co., Balboa Building, San Francisco, plans to build eight-story, 160 x 120 ft., department store on L Street here. S. W. McKim, president. \$1,000,000.

TULARE, CAL.—City Trustees and School Directors plan election to vote on \$90,000 bonds for two brick schools and \$60,000 bonds for auditorium.

WINEVILLE, CAL.—C. Stern & Sons, Van Nuys Building, Los Angeles, are having plans prepared by Krempel & Erkes, Architects, 415 Henne Building, Los Angeles, for remodeling winery buildings into fruit and vegetable cannery. Present buildings are one story, reinforced concrete and brick, cement flooring. \$100,000.

COLORADO

ALAMOSA, COL.—Odd Fellows plans to build home. W. E. Simmons, chairman. \$65,000.

CENTER, COL.—Board of Education will build two-story, 60 x 275 ft., brick and concrete school. Montjoy, French & Frewen, Chamber of Commerce Building, Denver, Architects. \$80,000.

LAS ANIMAS, COL.—Thomas Mercantile Co. plans to build 50 x 150 ft. store on Carson and Powers Streets.

LONGMONT, COL.—City will vote on \$55,000 bond issue to build City Hall.

CONNECTICUT

ANSONIA, CONN.—Appropriation Committee, Capitol, Hartford, petitioned to appropriate \$100,000 to build State armory here.

ANSONIA, CONN.—S. Yudkin, 403 Main Street, is having plans prepared by O. Frantzke, Architect, care of owner, to build one-story, 200 x 202 ft., concrete garage on Central Street. \$50,000.

BRIDGEPORT, CONN.—Zimmer Bros., 179 Golden Hill Street, plans to build four-story store and office on Main Street. \$50,000.

BRIDGEPORT, CONN.—Progressive Building Co., 1215 Main Street, will build four-story, 72 x 125 ft., brick and concrete apartment hotel on Lafayette and Liberty Streets. \$150,000.

CHESHIRE, CONN.—State Legislature, Hartford, appropriated \$80,000 to build factory at Cheshire Reformatory for Boys.

DERBY, CONN.—General Ordnance Co., Housatonic Avenue, let contract for building one-story, 30 x 250 ft., steel machine shop to Truss-Conn Steel Co., 207 Orange Street, New Haven. \$25,000.

HARTFORD, CONN.—Berenson & Moses, Architects, 26 State Street, proposes building three-story brick apartment hotel, concrete foundation, on Buckingham Street, for D. Kaplan. \$60,000.

MERIDEN, CONN.—E. Derektor, 39 Crown Street, had plans prepared by W. A. Donovan, Architect, 3 Colony Street, for three-story, 40 x 75 ft., brick and timber store on West Main Street. \$50,000.

NEW HAVEN, CONN.—Beecher & Bennett, Inc., 280 Elm Street, are having plans prepared by C. S. Palmer, Architect, 191 Church Street, for two-story, 70 x 100 ft., brick store on Broadway and Howe Street. \$60,000.

NEW HAVEN, CONN.—C. W. Ratner, 1476 Chapel Street, will build four-story, 90 x 101 ft., brick, reinforced concrete and steel apartment hotel on Chapel Street and Winthrop Avenue. \$90,000.

NEW HAVEN, CONN.—J. P. Kaufman, 42 Church Street, will build five-story hotel, 84 x 114 ft., brick, steel and concrete, corner Orange and Bishop Streets. \$200,000.

NEW HAVEN, CONN.—Puglisti & Milici, 20 Wight Street, will build four-story hotel, 100 x 101 ft., brick, concrete and steel, Boulevard and Chapel Street. \$165,000.

NEW LONDON, CONN.—Federal Street Methodist Episcopal congregation plans to build brick and steel church on Broad Street. M. R. Geuter, 193 Hempstead Street, pastor. \$100,000.

NORWALK, CONN.—Commissioners of Fairfield County (Bridgeport) are having plans prepared by Davis & Dane, Architects, 1024 Main Street, Bridgeport, for two-story brick addition to home on Westport Avenue here. \$50,000.

STAMFORD, CONN.—S. Weiss and A. Geronimo purchased site on Park Place and plan to build theater. \$100,000.

STAMFORD, CONN.—H. and H. Foundry Co., 770 Pacific Street, proposes building one-story, 60 x 200 ft., brick foundry on Pacific Street. N. E. Emmons, Washington Building, Architect. \$30,000.

WATERBURY, CONN.—Scovill Mfg. Co., 99 Mill Street, will build one-story, 124 x 197 ft., brick addition to factory on Hamilton Avenue. \$50,000.

WATERBURY, CONN.—Immaculate Conception congregation, 97 East Main Street, is having plans prepared by J. A. Jackson, Architect, 1133 Broadway, New York City, for rebuilding church on East Main Street. L. Fitzsimmons, pastor. \$100,000.

WATERBURY, CONN.—M. G. Witort, 789 Bank Street, let contract for building one and two-story brick theater on Washington Avenue to M. P. Laukaitis, 25 Congress Street. \$50,000.

FLORIDA

GAINESVILLE, FLA.—Board of Education, Alachua County, plans to build one three-story high school and one two-story industrial school, brick or tile. Edwards, Sayward & Leither, Chamber of Commerce Building, Atlanta, Ga., Architects. \$150,000.

PENSACOLA, FLA.—Texas Oil Co., Chipley Street, plans to establish fuel oil station. \$1,000,000.

GEORGIA

ATLANTA, GA.—City votes on \$1,000,000 bonds, including \$100,000 for erection of cyclorama and museum in Grant Park. Address the Mayor.

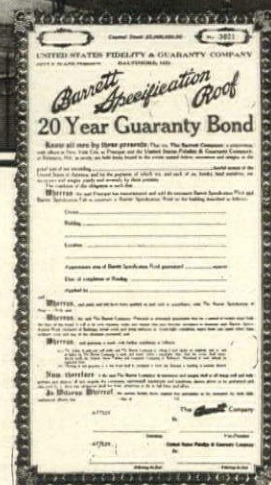
CONYERS, GA.—First National Bank, E. P. McDaniel, chairman of Building Committee, has plans by A. Ten Eyck Brown, Forsyth Building, Atlanta, for bank building, 30 x 72 ft., two stories, brick and terra cotta. \$25,000.

MACON, GA.—Bibb County votes on \$1,500,000 bonds, to include \$40,000 for courthouse, \$400,000 for schools and \$700,000 for paved roads and bridges. J. H. Heard, chairman County Commissioners.

ILLINOIS

CHICAGO, ILL.—Chicago Public Library will build branch library on Crawford Avenue and West Monroe Street. H. G. Wilson, secretary.

Barrett Specification Roofs



More than Half a Million square feet of Barrett Specification Roofs Protect the great Remington Arms Plant

THE type of roof to be used on a huge job like this cannot be decided on the basis of individual preference. Nor can experimenting be tolerated. For the investment is too large and the consequences of a mistake are too serious. When architects and engineers face a roofing job like this they have to get right down to *proved facts and figures*. They have to be absolutely *sure* on four points.

First. That from start to finish they will get just the kind of a roof they specify, with no chance for "skimping" or substituting inferior materials.

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Third. That the roof will positively be trouble-proof and free from maintenance expense for a long period of years.

Fourth. That it shall be the most economical roof possible to obtain, not as to first cost, but, what is of greater importance, as to *cost per year of service*.

Because Barrett Specification Roofs meet *all* of these requirements better than any other type of roof, they were selected to cover these great buildings.

Today the *standard* covering for permanent buildings is a Barrett Specification Roof. It takes the base rate of insurance. It costs less per year of service than any other type of permanent roof. It is guaranteed for 20 years.

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A 20-YEAR Surety Bond is now offered on all Barrett Specification Roofs of fifty squares and over in all cities of 25,000 population and more, and in smaller places where our Inspection Service is available.

This Surety Bond exempts the owner from all expense for repairs or up-keep on his roof for 20 years. It is issued by the U. S. Fidelity and Guaranty Co. of Baltimore, one of the largest Surety Companies in America. Our only requirements are that The Barrett Specification dated May 1, 1916, shall be strictly followed and that the roofing contractor shall be approved by us and his work subject to our inspection.

Thus, in spite of the fact that we do not build roofs ourselves, we are put in a position where we can actually *guarantee* the delivery of the long years of service which Barrett roofs are capable of giving.

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Barrett materials were used not only on the roofs of the buildings of this great plant, but also to water-proof the floors and foundations. 264,600 square feet of Tar-Rock Flooring; 966,000 square feet of two-ply floor-water-proofing; 126,800 square feet of foundation-water-proofing.

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Youngstown Toledo Columbus Latrobe Bethlehem Elizabeth Washington Johnstown Lebanon
THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

CHICAGO, ILL.—Board of Education, 7 South Dearborn Street, plans to build administration building in downtown district. \$250,000.

EAST ST. LOUIS, ILL.—Obeur Nestor Glass Co., Broadway and Terminal R. R., let contract for building two-story, 82 x 190 ft., brick, steel and concrete addition to plant to F. Ganschinietz, 501 North Eighteenth Street. \$65,000.

GOOD HOPE, ILL.—City voted \$60,000 bonds to purchase site and build high school.

GRIGGSVILLE, ILL.—Board of Education plans to rebuild high school recently destroyed by fire. \$75,000.

QUINCY, ILL.—Board of Education plans to build new Irving School. \$115,000.

TROY, ILL.—Troy Grain Co. plans to build concrete grain elevator between here and Edwardsville Township. \$25,000.

VILLA GROVE, ILL.—Village voted \$75,000 bonds to build high school.

INDIANA

CARTHAGE, IND.—Carthage Box & Paper Co. plans to build one-story, 100 x 265 ft., reinforced concrete factory. \$50,000.

IOWA

CHEROKEE, IOWA.—Sache-Bunn Co., 322 Third Street, Sioux City, let contract for building reinforced concrete and brick implement building to Brown Bros., Hospers. \$28,300.

DES MOINES, IOWA.—Blackhawk Tire & Rubber Co. proposes building factory. Sawyer & Watrous, 401 Hippee Building, Architects. \$250,000.

FORT DODGE, IOWA.—City voted \$650,000 bonds to build high school. C. H. Reynolds, City Engineer.

FORT DODGE, IOWA.—Hawkeye Fair and Exposition, Inc., plans to build 72 x 150 ft. administration and woman's building, 72 x 150 exposition building, automobile show building, sales show pavilion and grandstand. E. C. Cameron, Alta, president. \$75,000.

IOWA CITY, IOWA.—State petitioned to appropriate \$150,000 for girls' dormitory, \$225,000 for botany and geology building, \$70,000 for laboratory and \$150,000 on nurses' building.

SHENANDOAH, IOWA.—K. of C. Home Association, care of C. R. Jarvis, secretary, plans to build club here. \$50,000.

WASHINGTON, IOWA.—United Presbyterian congregation let contract for two-story brick church to Shrader, Worlary & McKeane, Washington. \$50,000.

KANSAS

WICHITA, KAN.—Campbell Baking Co., 601-3 North Emporia Street, let contract to build two-story, 60 x 140 ft., brick and reinforced concrete addition to bakery to N. T. Vorse, 911 S. and L. Building, Des Moines, Iowa. \$100,000.

KENTUCKY

LONDON, KY.—Bennett Memorial School will erect high school and auditorium building. \$50,000.

LOUISIANA

BATON ROUGE, LA.—Young Men's Christian Association will erect Y. M. C. A. building, two stories, brick. Cost, \$75,000. Shattuck & Hussey, Architects, 19 S. La Salle Street, Chicago.

SHREVEPORT, LA.—Highland Avenue Baptist Church, Rev. C. P. Roney, pastor, 1333 Jennings Avenue, will erect building at Olive and Stevens Streets, steel and reinforced concrete construction, brick facing. Cost, \$75,000 to \$100,000. Architect not selected.

THIBODAUX, LA.—St. Joseph's congregation plans to rebuild church. \$125,000.

MARYLAND

BALTIMORE, MD.—Crown Cork & Seal Co., 1511 Guilford Avenue, let contract for two one-story, 75 x 240 ft., concrete and steel warehouses on Eastern Avenue to West Construction Co., 907 American Building. \$60,000.

BALTIMORE, MD.—Canton Air Brake Co., 563 Calvert Building, is having plans prepared for one-story steel and concrete plant. First unit to cost \$180,000; ultimate cost, \$1,000,000. R. Schoenwetter and C. A. Zarobsky, 563 Calvert Building, engineers.

BALTIMORE, MD.—Seaboard Bank is having plans prepared by Robert L. Harris, 1131-33 Calvert Building, Baltimore, for alterations to building at Park Avenue and Fayette Street. Cost, about \$50,000.

CUMBERLAND, MD.—Berwin-White Coal Mining Co., Windber, near here, plans to build power plant. \$800,000.

CURTIS BAY (BALTIMORE P. O.), MD.—Mexican Petroleum Co., 120 Broadway, New York City, plans to build large refinery here. Plans include building bulkhead and filling in on 70-acre site. Total cost, \$1,000,000.

TOWSON, MD.—St. Vincent's Male Orphan Asylum, York Road, near here, plans to rebuild building recently destroyed by fire. Loss about \$75,000. A. Deupert, 815 North Arlington Avenue, Baltimore, president Board of Managers.

MASSACHUSETTS

BOSTON, MASS.—G. J. Wilson let contract for building one-story, 80 x 110 ft., reinforced concrete and steel factory and sales building on Brookline Avenue to E. S. Butterfield Co., 88 Broad Street. \$75,000.

BROCKTON, MASS.—Unity congregation, care of C. C. King, 106 Main Street, plans to build brick church and parish on Warren Avenue.

LYNN, MASS.—D. Grossman, Roxbury, contemplates building seven-story brick and concrete hotel on Lynn Shore Drive here. D. Sanborn, Lynn, Architect. \$250,000.

MALDEN, MASS.—Boston Dye House, Malden, had plans prepared by A. Golden, engineer, care of company, for two-story, 80 x 100 ft., brick and concrete addition to factory on Main and Eastern Streets. \$50,000.

WORCESTER, MASS.—Simplex Player Co., Boylston Street, Boston, let contract to build four-story, 50 x 55 ft. and 35 x 115 ft., brick and reinforced concrete factory and storehouse on Blackstone Street here to E. D. Ward Co., 82 Foster Park. \$80,000.

MICHIGAN

CALUMET, MICH.—Calumet Hospital Board plans to build two-story brick hospital. M. S. Carlton, chairman. \$50,000.

DETROIT, MICH.—Detroit Edison Co., David Whitney Building, let contract for building 70 x 110 ft. brick and steel addition to central heating plant to A. A. Albrecht & Co., 1130 Penobscot Building.

DETROIT, MICH.—C. R. Wilson Body Co., Clay Avenue, plans to rebuild plant recently destroyed by fire. Loss between \$300,000 and \$400,000.

DETROIT, MICH.—Newcomb-Endicott Co., 190-200 Woodward Avenue, let contract for twelve-story, 60 x 110 ft., steel building on Woodward and Grand River Avenues to Batchelder-Wasmund Co., Jefferson Avenue, W.

GRAND RAPIDS, MICH.—Board of Education soon receives bids for two three-story, 67 x 167 ft., brick, concrete and steel schools on Congress and Henry Avenues. \$150,000 each. H. Turner, care Board of Education, Architect.

LANSING, MICH.—Board of State Auditors will build six-story brick and reinforced concrete library and office. E. A. Bowd, 129 West Allegan Street, Architect.

MINNESOTA

ROUND LAKE, MINN.—Board of Education is having plans prepared by G. Pass & Son, Architects, Mankato, for consolidated school. B. C. Denkman, clerk. \$50,000.

MISSOURI

BOONVILLE, MO.—Hamilton-Brown Shoe Co., Jefferson and Rand Streets, St. Louis, plans to build three-story, 50 x 250 ft., brick factory here. \$40,000.

GRANT CITY, MO.—Board of Education, Leo Phipps, secretary, is considering erection of high school building. \$50,000.

JEFFERSON CITY, MO.—F. B. Miller, Architect, proposes building 57 x 198 ft. brick and reinforced concrete theater on High Street for W. H. Mueller. \$60,000.

MACON, MO.—W. H. Martin, city clerk, authorizes improving power plant. F. L. Wilcox, Syndicate Trust Building, St. Louis, engineer. \$45,000.

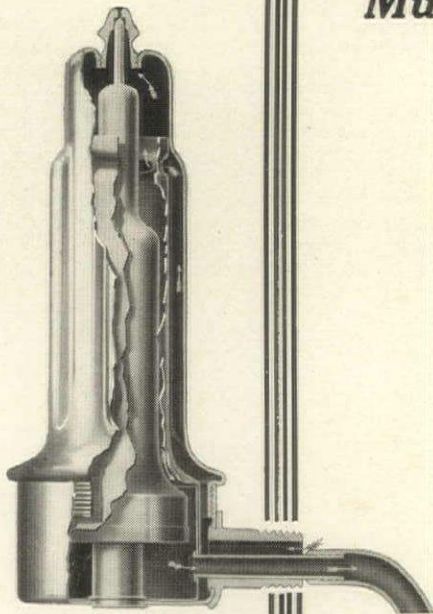
MARSHALL, MO.—City will build municipal electric light plant. Henrici-Lowry Eng. Co., Commercial Trust Building, Kansas City, engineers. \$75,000.

ST. JAMES, MO.—Missouri State Soldiers' Home plans to build addition to existing hospital to cost \$20,000; miscellaneous additions, \$20,000. W. V. Farris, president Board of Managers.

ST. LOUIS, MO.—L. Haeger, Architect, 3844 Utah Street, will build two-story, 60 x 100 ft., brick and con-

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CHICAGO

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LOS ANGELES

215 West Seventh Street

crete bank on Grand and Hartford Avenues for Tower Grove Bank, Grand and Juaniata Avenues. \$60,000.

ST. LOUIS, Mo.—Hotel Realty Co., Mercantile Trust Building, purchased site on Thirteenth Street, from Locust to St. Charles Streets, and plans to build twelve-story Hotel, 204 x 225 ft. F. J. Wade, president. \$2,000,000.

UNIVERSITY CITY (St. Louis P. O.), Mo.—City plans election to vote on \$250,000 bonds to build schools. J. M. Atkinson, 10 Radcliffe Place, chairman School Board Committee.

NEBRASKA

LINCOLN, NEB.—State Legislature appropriated \$5,000,000 to build Capitol here.

NEW JERSEY

AMPERE, N. J.—General Electric Co. plans to build one-story, 94 x 98 ft., concrete storage plant. J. H. & W. G. Ely, Firemen's Building, Newark, Architects. \$35,000.

JERSEY CITY, N. J.—Keystone Motor Car Co., Stegman Street, plans to build concrete and brick plant on Communipaw and Bergen Avenues. \$70,000.

NEWARK, N. J.—F. W. Wentworth, Architect, 140 Market Street, Paterson, proposes building two-story, 83 x 147 ft., steel motion picture theater on Branford Place, near Broad Street, here, for J. Fabian, 12 Union Street, Paterson. \$500,000.

NEWARK, N. J.—H. & J. Kruvant, 31 Walnut Street, let contract for five-story hotel, 68 x 150 ft., concrete, steel and brick, at 24-26 Park Street, to H. Kruvant, 189 Bloomfield Avenue. \$300,000.

ORANGE, N. J.—War Memorial Advisory Co. had plans prepared for civic center building. \$100,000.

TRENTON, N. J.—A. C. Nevius, 601 Rutherford Avenue, plans to alter five-story Y. M. C. A. on State Street into mercantile building. \$100,000.

NEW YORK

ALBANY, N. Y.—H. M. Biggs, Commissioner of Health, State Health Department, proposes building laboratory.

ALBANY, N. Y.—Lockwood, Green & Co., 101 Park Avenue, New York City, will build three-story, 80 x 90 ft., brick and mill construction factory for Van Slyke & Barton, 471 Broadway. \$75,000.

BATH, N. Y.—County Dairymen's League plans to build reinforced concrete and brick dairy plant here. M. W. Davison, director. \$150,000.

BLACK RIVER, N. Y.—Northern New York Utilities, Inc., Light and Power Building, Watertown, is having plans prepared for building reinforced concrete power house. J. B. Taylor, Watertown, president.

BROOKLYN, N. Y.—Ludlow & Peabody, 101 Park Avenue, New York, are preparing plans for a bank building, 40 x 75 ft., to be erected on Flatbush Avenue, Brooklyn, for the People's Trust Co.

BROOKLYN, N. Y.—A. Paoletto, 810 Fourth Avenue, had plans prepared by C. P. Cannella, Architect, 1163 Herkimer Street, for one-story, 22 x 41 x 72 x 102 ft., brick and steel garage on Twenty-seventh Street and Fourth Avenue. \$45,000.

BROOKLYN, N. Y.—Bedford Riding Academy, 13 Ocean Parkway, will build one-story riding academy, 102 x 189 ft., brick and concrete. \$60,000.

BROOKLYN, N. Y.—Interborough Iron & Steel Co., care of M. A. Cantor, Architect, 373 Fulton Street, will build one-story, 100 x 100 ft., steel and brick garage on Sixth Avenue and Sixty-second Street. \$30,000.

BROOKLYN, N. Y.—Shampan & Shampan, Architects, 772 Broadway, propose building two-story, 100 x 100 ft., brick auto service station and showroom on Montrose Avenue and Leonard Street for Lasky Motor Car Corp., 17 Graham Avenue. \$75,000.

BROOKLYN, N. Y.—Kings Highway Corp., 1817 Kings Highway, let contract to build two-story, 104 x 120 ft., brick and steel moving picture theater, concrete flooring, on Kings Highway and East Twelfth Street, to L. Gold, 44 Court Street. \$175,000.

BROOKLYN, N. Y.—Board of Education, 500 Park Avenue, New York City, will build P. S. 20, five stories, 92 x 193 ft., brick and limestone, on Roebling Street, North Fourth and North Fifth Streets. C. B. J. Snyder, Municipal Building, New York City, Architect. \$600,000.

BROOKLYN, N. Y.—Board of Education, 500 Park Avenue, New York City, will build P. S. 182, five stories, 118 x 192 ft., brick and concrete, on Dumont Avenue

and Wyona Street. C. B. J. Snyder, Municipal Building, New York City, Architect. \$543,474.

CORTLAND, N. Y.—Local Dairymen's League plans to build milk plant here. N. F. Webb, president. \$50,000.

EAST SYRACUSE, N. Y.—East Syracuse Bank, recently incorporated, plans to build bank. \$50,000. Address Town Clerk.

GREECE, N. Y.—Town plans to vote on project to build two-story, 45 x 90 ft., brick and concrete auditorium, town office and library. Cost between \$40,000 and \$50,000.

HOLCOMB, N. Y.—W. N. Clark Co., 333 Hollenbeck Street, Rochester, let contract for building concrete factory, consisting of one two-story, 50 x 130 ft.; one one-story, 50 x 150 ft., and one one-story, 70 x 80 ft., buildings, to L. J. Held, 153 Plymouth Avenue, Rochester. \$60,000.

NEW YORK, N. Y.—H. Claman, 241 West Forty-third Street, will build ten-story hotel, 100 x 100 ft., steel and brick, concrete foundation, on Forty-third Street, near Eighth Avenue.

NEW YORK, N. Y.—F. A. Munsey, 280 Broadway, will build addition and alter existing printing plant. \$50,000.

NEW YORK, N. Y.—Atlantic & Pacific Steamship Co., 7 Hanover Square, will erect five-story office, 70 x 80 feet, brick and steel, on Water Street and Old Slip. J. W. O'Connor, 3 West Twenty-ninth Street, Architect.

NEW YORK, N. Y.—C. B. H. Gilbert, Architect, 1123 Broadway, proposes building twelve-story office, 50 x 100 ft., brick and limestone, concrete foundation, at 6-8 East Forty-fourth Street.

NEW YORK, N. Y.—Baker, Carver & Morrell, 39 Water Street, are having plans prepared by Severence & Van Allen, Architects, 4 West Thirty-seventh Street, for nine-story, 28 x 83 ft., steel and brick office at 37 Water Street.

NEW YORK, N. Y.—L. A. Sheinart, Architect, 192 Bowry, will build two-story, 98 x 117 ft., brick and steel garage at 536-546 West Forty-second Street for S. K. W. Shellat, Newport, R. I. Marcus & Goldstein, 141 Broadway, lessees.

NEW YORK, N. Y.—H. Jaeckel & Sons, 16 West Thirty-second Street, let contract for building six-story, 25 x 155 ft., steel and brick addition at 546 Fifth Avenue to Wharton, Green & Co., 37 West Thirty-ninth Street. \$75,000.

NEW YORK, N. Y.—Board of Education, 500 Park Avenue, let contract for building P. S. 6, five stories, 60 x 142 ft., brick, on Tremont and Bryant Avenues, Bronx, to T. A. Clark Co., 122 Livingston Street, Brooklyn. \$206,000.

NEW YORK, N. Y.—Board of Education, 500 Park Avenue, let contract for building P. S. 6, five stories, 60 x 142 ft., brick, on Tremont and Bryant Avenues, Bronx, to T. A. Clark Co., 122 Livingston Street, Brooklyn. \$206,000.

NEW YORK, N. Y.—Buick Auto Repair Shop, 244 West Forty-ninth Street, had plans prepared by F. J. Bird, Architect, 101 Park Avenue, for one-story, 100 x 200 ft., brick and steel garage on Fifty-fourth Street, near Eighth Avenue. \$400,000.

NEW YORK, N. Y.—State Legislature, Capitol, Albany, petitioned to appropriate \$1,000,000 to provide for grain elevator at port of New York in connection with Gowanus Bay canal terminal.

NORFOLK, N. Y.—A. B. Hepburn, Ogdensburg, will build two-story ornamental brick library here as gift to town. \$50,000.

OGDENSBURG, N. Y.—A. Irving, president Chamber of Commerce, and associates plan to build \$200,000 hotel.

PENN YAN, N. Y.—A. H. Burns plans to build concrete and brick grist and grinding mill on East Main Street. \$60,000.

POTSDAM, N. Y.—Town is considering holding election to vote on \$150,000 bonds to build memorial building and community center. S. Watson, village president.

ROCHESTER, N. Y.—Yawman & Erbe, 242 St. Paul Street, are having plans prepared for addition to plant. T. Hough, purchasing agent. \$25,000.

ROCHESTER, N. Y.—Eastman Kodak Co., Kodak Park, had plans prepared for building six-story, 162 x 182 ft., reinforced concrete factory on Hanford Landing Road. \$350,000.

ROME, N. Y.—Board of Education plans to build two-story school, 100 x 125 ft., on Linden Street. W. T. Towner, 366 Fifth Avenue, New York City, Architect. \$120,000.

"1890-1919"

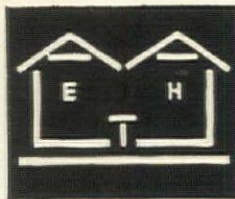
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Here is his report—

1. This lath can be put on much faster than wood lath.
2. The plasterer can cover nearly one-half more surface in a given time than ordinarily.
3. On the first coat a given quantity of mortar will cover double the number of square feet.
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5. Wood lath requires a scratch coat, a brown coat and a white coat, while as good a wall is made with only the scratch and white coat on Bostwick Lath.
6. The correctly-spaced openings hold the plaster with a firmer bond than on wood lath.
7. It is impossible for a Bostwick Metal Lath wall to crack.
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SONYEA, N. Y.—Craig Colony for Epileptics let contract for building one-story kitchen, 42 x 114 ft. and 42 x 80 ft., reinforced concrete, brick and steel, to A. E. Stephens Co., 318 Main Street, Springfield, Mass. \$49,300.

SYRACUSE, N. Y.—H. H. Franklin Automobile Co., 302 South Geddes Street, purchased site at 215 Magnolia Street and plans to build addition to plant. Cost between \$300,000 and \$400,000.

SYRACUSE, N. Y.—Board of Education let contract to build three-story, 100 x 150 ft., school, steel and brick, on Madison Avenue and Walnut Street, to Schaefer Construction Co., 5 West Thirty-first Street, New York City. \$230,000.

SYRACUSE, N. Y.—Board of Estimate and Apportionment requests Council for authorization of \$500,000 bond issue. About \$200,000 will be used to build Prescott and Lincoln schools; remainder will be used to extend park system, purchase and develop playgrounds, build addition to city hospital and new firehouses, etc. H. A. Allen, City Engineer.

UTICA, N. Y.—Utica Co-operative Society, Inc., purchased site on Schuyler and Court Streets and plans to build two-story concrete bakery.

UTICA, N. Y.—L. F. Pilcher, State Architect, Capitol, Albany, let contract for building addition to central heating plant here to R. G. Lloyd, 113 South Street. \$29,832.

WATERTOWN, N. Y.—P. W. Davendorf, 145 Arsenal Street, had plans prepared for two-story, 72 x 150 ft., brick and tile garage and repair shop. \$40,000.

WATERTOWN, N. Y.—New York Air Brake Co., Starbuck Avenue; Northern New York Utilities, Inc., Light and Power Building; J. B. Wise, 401 Mill Street, and associates, plan to incorporate Beebe Island Corp. to develop power here. Plans include power house. \$500,000.

WATERTOWN, N. Y.—Northern New York Utilities, Inc., Light and Power Building, is having plans prepared for addition to existing generating plant at Effley Falls. J. B. Taylor, president.

NORTH CAROLINA

BOILING SPRINGS, N. C.—Board of Trustees, Boiling Springs High School, E. B. Hamrick, treasurer, plans to erect school building as memorial, to contain auditorium, society halls, music rooms, art and domestic science rooms, etc. Cost, \$25,000.

CHARLOTTE, N. C.—Board of Education plans to build three-story reinforced concrete, brick and tile high school. Edwards, Sayward & Leitner, Chamber of Commerce Building, Atlanta, Ga., Architects. \$135,000.

GASTONIA, N. C.—Charles C. Wilson, Columbus, S. C., is preparing plans for four residences. Total cost about \$150,000.

OXFORD, N. C.—City is considering election on \$50,000 bond issue to erect school building. W. J. Mitchell, Mayor.

SEDALIA, N. C.—Board of Education plans to build school. H. Barton, Greensboro, Architect. \$70,000.

NORTH DAKOTA

DICKINSON, N. D.—State Budget Committee, Capitol, Bismarck, plans to build dormitory at State Normal School here. \$55,000.

OHIO

CLEVELAND, OHIO.—Cleveland Automobile Co., East 131st Street, plans to build brick and reinforced concrete factory. E. McGeorge, 1900 Euclid Avenue, Architect. \$500,000.

CLEVELAND, OHIO.—Cowell & Hubbard, East Sixth Street and Euclid Avenue, are having plans prepared by Walker & Weeks, Architects, 1900 Euclid Avenue, for building two-story (ultimately eight stories), 80 x 200 ft., brick commercial building on Euclid Avenue and East Thirteenth Street. \$300,000.

CLEVELAND, OHIO.—Industrial Association of Cleveland, 607 Arcade Building, plans to build six or ten-story, 100 x 200 ft., industrial university, brick, steel and concrete. Plans include four large classrooms, auditorium, gymnasium, swimming pool, billiard rooms, etc. \$1,000,000.

COLUMBUS, OHIO.—Franklin Loan & Savings Co., 347 South High Street, will build six-story, 25 x 90 ft., brick and reinforced concrete bank and office on High and Main Streets. F. L. Packard, Hayden Building, Architect. \$163,000.

COLUMBUS, OHIO.—C. and E. Shoe Co., 56 East Ful-

ton Street, is having plans prepared by Richards & McCarty, Architects, Hartman Building, for six-story, 87 x 120 ft., brick and reinforced concrete factory on East Fulton Street. \$100,000.

DAYTON, OHIO.—Buick Automobile Co., 130 North Main Street, plans to build two-story, 78 x 100 ft., brick and reinforced concrete office and garage at 413 South Main Street.

FRANKLIN, OHIO.—Board of Education is having plans prepared by E. J. Mounstephen, Architect, 802 Union Bank Building, Dayton, for two-story brick and reinforced concrete school. J. C. Null, clerk. \$150,000.

KENMORE, OHIO.—Board of Education will build two-story, 69 x 127 ft., brick school on North Ninth Street. Cost between \$90,000 and \$95,000. A. R. Ritman, clerk. M. P. Lauer, 707 People's Saving & Trust Building, Architect.

PITTSBURGH, OHIO.—Board of Education is having plans prepared by E. J. Mounstephen, Architect, 802 Union Bank Building, Dayton, for two-story brick and reinforced concrete school in Monroe Township. \$100,000.

WEST UNITY, OHIO.—Board of Education and Howard & Marriam, Architects, 8 East Broad Street, Columbus, will erect two-story, 74 x 134 ft., brick and reinforced concrete school. \$125,000.

YELLOW SPRINGS, OHIO.—Board of Education plans to build one-story brick and reinforced concrete school. E. J. Mounstephen, 802 Union Bank Building, Dayton, Architect. \$50,000.

OKLAHOMA

BLACKWELL, OKLA.—First Baptist congregation will build three-story, 85 x 100 ft., brick church. J. E. Greene, 1204 Thirteenth Avenue, Birmingham, Ala., Architect. \$50,000.

HOOVER, OKLA.—School Board has plans by Mann & Gerow, Hutchinson, Kan., for school building, 54 x 94 ft., brick and reinforced concrete. \$40,000.

LANGSTON, OKLA.—State Board of Affairs, Oklahoma City, plans to erect industrial building and dormitory at colored Agricultural and Mechanical College. Cost, \$50,000 and \$5,000 respectively.

OKLAHOMA CITY, OKLA.—City votes on \$650,000 bonds for school buildings. John H. Hope, president Board of Education; J. G. Stearley, clerk.

OKMULGEE, OKLA.—City voted \$215,000 bonds to build three-story high school and four-room addition to grade school.

PAWHUSKA, OKLA.—Board of Education is having plans prepared by Hawk & Parr, Architects, 501 Security Building, Oklahoma, for building two-story, 150 x 150 ft., brick and reinforced concrete high school. A. C. Seeley, clerk. \$95,000.

OREGON

ASTORIA, ORE.—Pacific Power & Light Co., Spalding Building, Portland, plans to build 4500-hp. electric generating plant at foot of Astor Street.

FREEWATER, ORE.—Milton First National Bank plans to build on Evans and Depot Streets here.

MARSHFIELD, ORE.—Elks' Club plans to build home. G. Dix, chairman. \$60,000.

PENDLETON, ORE.—Sisters of St. Francis, Catholic Indian Mission, plans to build hospital. \$100,000.

PENDLETON, ORE.—Gritman Bros. purchased site on Webb and Willow Streets and plan to build one-story, 50 x 100 ft., brick store.

PORTLAND, ORE.—Senate petitioned to appropriate between \$400,000 and \$500,000 to build State hospital here.

PORTLAND, ORE.—Board of Education is considering \$3,000,000 bond issue to build high and grade schools.

PENNSYLVANIA

BETHLEHEM, PA.—Traveler Tire Co., Traveler Building, Philadelphia, plans to build two-story, 80 x 250 ft., concrete, steel and brick factory near Reading R. R. here. J. O. Hunt, 114 North Montgomery Street, Trenton, N. J., Architect. \$250,000.

CHESTER, PA.—Foster Hotel Corp. is having plans prepared by E. A. Wilson, Architect, 1208 Chestnut Street, Philadelphia, for four-story hotel, 118 x 228 ft., brick and steel, on Ninth and Welch Streets. \$250,000.

PALMERTON, PA.—Board of Education will build grade school. C. H. Lloyd, Telegraph Building, Harrisburg, Architect. \$100,000.

PHILADELPHIA, PA.—Taubel Bros., Cedar and Huntington Streets, plans to build three-story, 48 x 70 ft., brick and timber factory. \$30,000.

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PHILADELPHIA, PA.—Pennsylvania R. R., Broad Street Station, let contract to build one-story, 24 x 468 ft., concrete, steel and brick roundhouse on Forty-eighth Street and Parkside Avenue to W. Steele & Sons Co., Sixteenth Street and Parkway. \$85,000.

PHILADELPHIA, PA.—Armory Board, Capitol Building, Harrisburg, will build one-story, 154 x 282 ft., reinforced concrete, steel and brick drill shed on Cuthbert Street, Thirty-second to Thirty-third Street.

PHILADELPHIA, PA.—A. A. Ziegler, Architect, Bailey Building, is receiving bids for seven-story, 41 x 91 ft., brick building on Seventh and Delancy Streets for Babies' Hospital of Philadelphia, 1126 Walnut Street. \$80,000.

PHILADELPHIA, PA.—Powers, Weighton & Rosengarten, 916 Parrish Street, awarded contract for four-story, 28 x 40 ft., brick and timber factory on Ninth and Parrish Streets to R. C. Ballinger & Co., 218 North Thirteenth Street. \$30,000.

PHILADELPHIA, PA.—L. W. Hirsch Co., 923 Market Street, let contract to remodel five-story, 46 x 200 ft., building adjoining present store into addition for its own use, to Melody & Keating, 1322 Race Street. \$195,000.

PITTSBURGH, PA.—Board of Education will build three-story, 30 x 80 ft., brick, steel and stone school on Twenty-fourth and Birch Streets, and three-story, 30 x 80 ft., addition to school on Eighteenth and Ferry Streets. \$50,000.

POTTSTOWN, PA.—Hill School Alumni Association plans to build memorial hall. \$100,000.

TEMPLE, PA.—Temple Malleable Iron & Steel Co. awarded contract for building one-story, 340 x 380 ft., steel and brick plant near Pennsylvania R. R. (Schuylkill Div.) here to F. D. Chase, Peoples Gas Building, Chicago, Ill.

RHODE ISLAND

PROVIDENCE, R. I.—City plans to build garage on Harris and Kingsley Avenues. W. E. Hartwell, Commissioner of Public Buildings. \$75,000.

SOUTH CAROLINA

CHARLESTON, S. C.—J. D. Newcomber, Architect, Broad Street, will build two-story, 100 x 120 ft., reinforced concrete garage on Meeting Street for Sottile Cadillac Co., 261 Meeting Street. \$50,000.

GREENVILLE, S. C.—Working Benevolent Realty Co., capital stock \$30,000, incorporated by E. W. Biggs, James A. Talbert and W. E. Payne, will erect store and office building at East Broad and Falls Streets, three stories, brick. Cost, about \$70,000.

LAKE CITY, S. C.—Baptist Church has plans by Charles C. Wilson, Columbia, for brick building, 75 x 100 ft. \$25,000.

SOUTH DAKOTA

HURLEY, S. D.—Hurley Consolidated School is having plans prepared by Perkins & McWayne, Architects, 322-324 Paulton Building, Sioux Falls, for two-story school, 60 x 134 ft., brick, steel and concrete. \$85,000.

MADISON, S. D.—Madison Hospital Association is having plans prepared by Perkins & McWayne, Architects, 322-324 Paulton Building, Sioux Falls, for building three-story, 38 x 92 ft., brick and terra cotta hospital. \$75,000.

SIoux FALLS, S. D.—Dakota Iron Store, Weber Avenue, is having plans prepared by Perkins & McWayne, Architects, 322 Paulton Building, for two-story, 90 x 150 ft., brick and concrete factory on Sixth Street. \$40,000.

TEXAS

BELTON, TEX.—Baylor College, J. C. Hardy, president, is having plans prepared by R. H. Hunt, Chattanooga, Tenn., for enlargements to college.

DALLAS, TEX.—Southern Methodist University, Dr. R. S. Hyer, president, plans to erect gymnasium. Cost, \$25,000.

DALLAS, TEX.—C. R. Miller, 5112 Swiss Avenue, and associates are having plans prepared by Lockwood-Greene Co., 60 Federal Street, Boston, Mass., for cotton mill. \$500,000.

DALLAS, TEX.—Y. M. C. A., care of B. B. Taylor, president, Baton Rouge, La., will construct four-story, 75 x 112 ft., building, to include social and class rooms, gymnasiums, swimming pool, bathrooms and dormitories. Shattuck & Hussey, 19 South La Salle Street, Chicago, Architects.

FORT WORTH, TEX.—Farmers' and Mechanics' National Bank, J. W. Spencer, president, will erect building at Seventh and Main Streets, 100 x 95 ft., twelve to sixteen stories, fireproof. Cost, \$800,000 to \$1,250,000.

SAN MARCOS, TEX.—San Marcos Baptist Academy trustees plan to erect \$100,000 administration building which will contain classrooms, auditorium, library, laboratories, president's and registrar's offices, commercial, music, domestic and manual arts departments.

VERNON, TEX.—Commissioners of Wilbarger County will vote on \$50,000 bonds to build memorial hospital.

UTAH

OGDEN, UTAH.—California Packing Corp., 101 California Street, San Francisco, is having plans prepared by P. Bush, Architect, 101 California Street, San Francisco, for packing plant and warehouse here. \$200,000.

VIRGINIA

CHARLOTTESVILLE, VA.—National Bank of Charlottesville is having plans prepared by Marsh & Peter, Architects, 522 Thirteenth Street, Washington, D. C., for eight-story bank, steel and brick. \$200,000.

LYNCHBURG, VA.—Rivermont Avenue Methodist Church, Rev. J. C. Robertson, pastor, 1110 Early Street, is having plans prepared by Craighill & Cardwell, People's Bank Building, Lynchburg, for Sunday school building, probably brick, two stories. Cost, \$20,000.

NORFOLK, VA.—City appropriated \$300,000 for new schools, as follows: One in Colonial Place, addition to Lott Cary School, one at Lamberts Point and completing addition to Walter Herron Taylor School.

NORFOLK, VA.—R. T. Lipscombe, 34 Virginia National Bank Building, and associates, plan to build 100 x 400 ft. brick and steel ice cold storage and dehydration plant. B. Mitchell, Seaboard Bank Building, Architect. \$225,000.

WEST VIRGINIA

ELKINS, W. VA.—Davis and Elkins College, Dr. James E. Allen, president, plans to erect building, two and one-half stories, about 110 x 40 ft., stone. C. L. Harding, Architect, Woodward Building, Washington, D. C. \$60,000. Address Dr. Allen.

HUNTINGTON, W. VA.—Chesapeake & Ohio R. R., Ninth and Main Streets, Richmond, Va., plans to build additions to its shops here. F. I. Cambell, chief engineer. \$500,000.

MORGANTOWN, W. VA.—State Board of Control, Charleston, plans to build steel and cement law building at West Virginia University. H. C. Jones, dean. \$125,000.

WISCONSIN

BEAVER DAM, WIS.—H. J. Esser, Architect, Camp Building, proposes building four-story, 52 x 250 ft., factory, with 38 x 60 ft. wing, mill construction, concrete foundation, for Weyenberg Shoe Co., 130 Reservoir Avenue. \$75,000.

JANESVILLE, WIS.—Parker Pen Co. is having plans prepared by F. A. Carpenter, Architect, 420 Brown Building, Rockford, Ill., for building three-story reinforced concrete and brick factory and office on Court Street. \$100,000.

MADISON, WIS.—City plans to build City Hall. O. S. Norsman, City Clerk. \$300,000.

MILWAUKEE, WIS.—O. Webb, Architect, 544 Forty-ninth Street, is preparing plans for twelve-story, 75 x 120 ft., brick and steel hotel.

MILWAUKEE, WIS.—A. Kuenselmann, 450 Mitchell Avenue, is having plans prepared by W. G. Herbst, Architect, 114 Grand Avenue, for one-story, 140 x 160 ft., reinforced concrete market on Mitchell and Eighth Avenues. \$175,000.

MILWAUKEE, WIS.—Board of Education plans to expend \$800,000 to build schools here.

SUPERIOR, WIS.—City plans to expend \$250,000 to build ward school. E. McKeagul, City Clerk.

WAUBESA, WIS.—Madison-Kipp Lubricating Co., Madison, acquired site here and had tentative plans prepared for one-story, 150 x 200 ft., concrete, brick and steel machine shop here. T. E. Coleman, vice-president and general manager.

WATERTOWN, WIS.—Lutheran congregation plans to build addition to home for feeble-minded. \$75,000.

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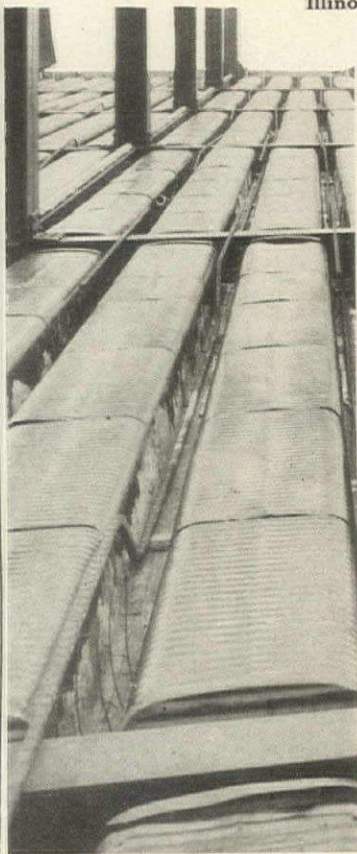
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and others.	

CHURCHES

	Date
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Seventh-day Baptist Church, Newport, R. I.....	1729
Christ Church, Alexandria, Va.....	1767
Christ Church, Philadelphia, Pa.....	1727
St. Paul's Chapel, New York, N. Y.....	1764
Old South Church, Boston, Mass.....	1729
First Church, Hingham, Mass.....	1681
St. John's Chapel, New York, N. Y.....	1803
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The headings and sub-headings are arranged alphabetically and have been selected in accordance with the intent of meeting the architect's thought in preparing his specifications.

If the information desired is not found here, it will gladly be supplied by the Service Department of THE AMERICAN ARCHITECT.

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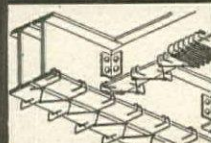
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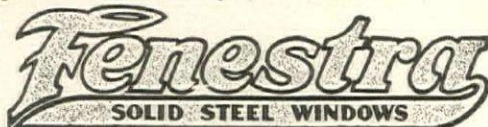
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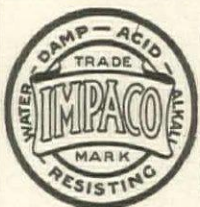
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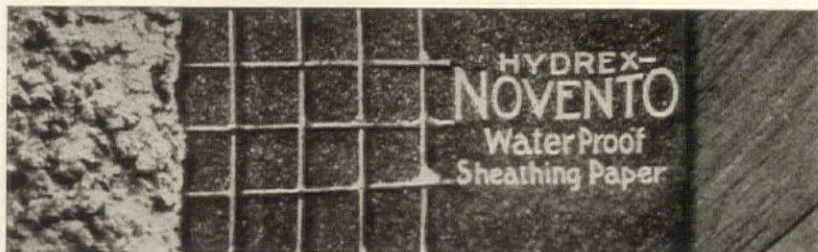
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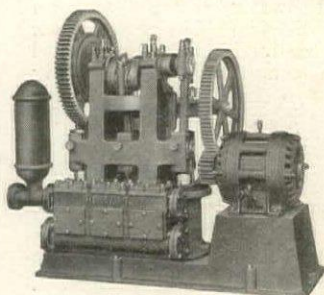


Fig. 50 Deming Triplex Power Pump

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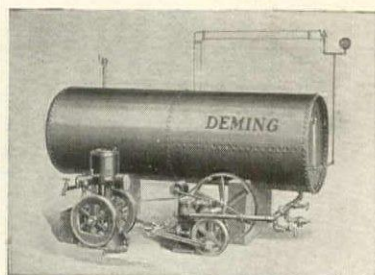
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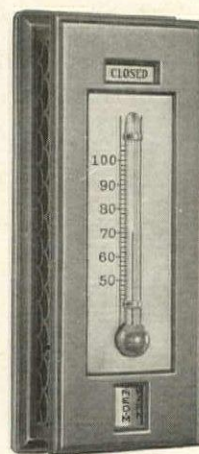


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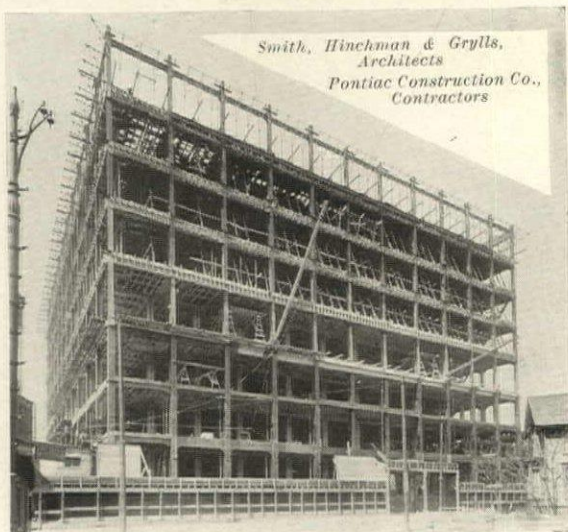


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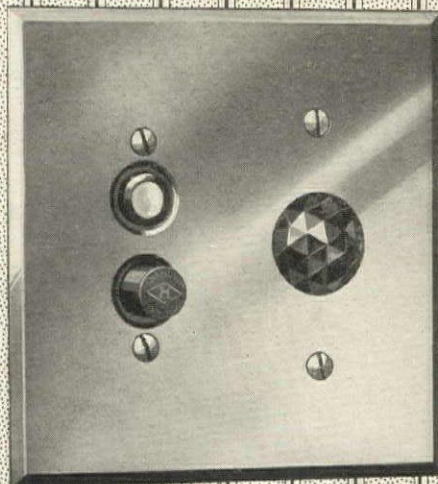
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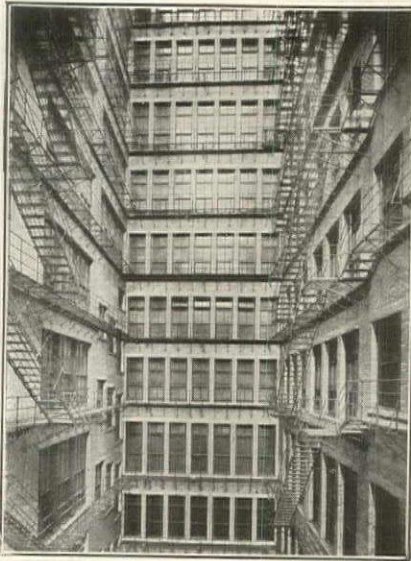
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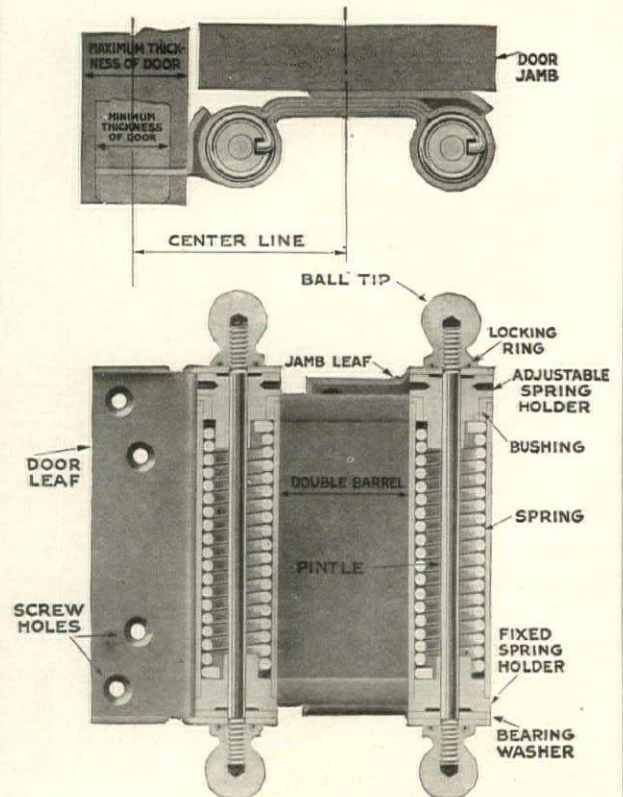
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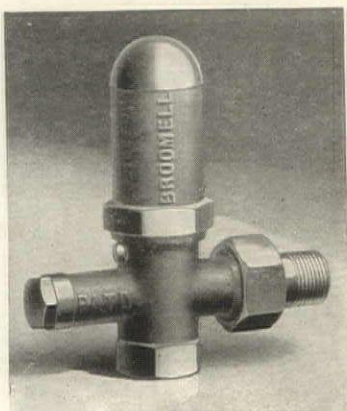
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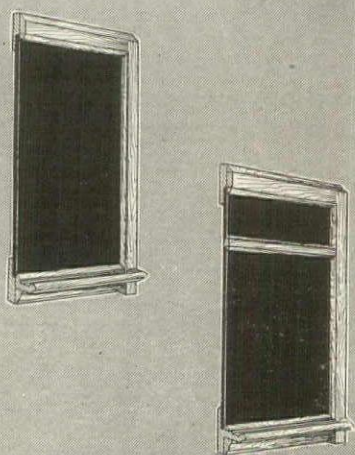
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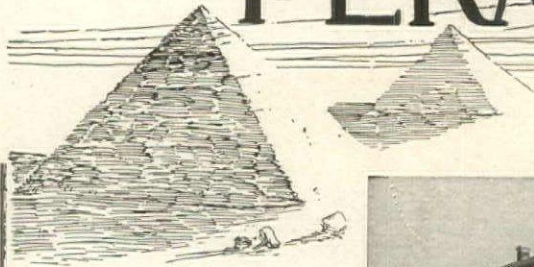
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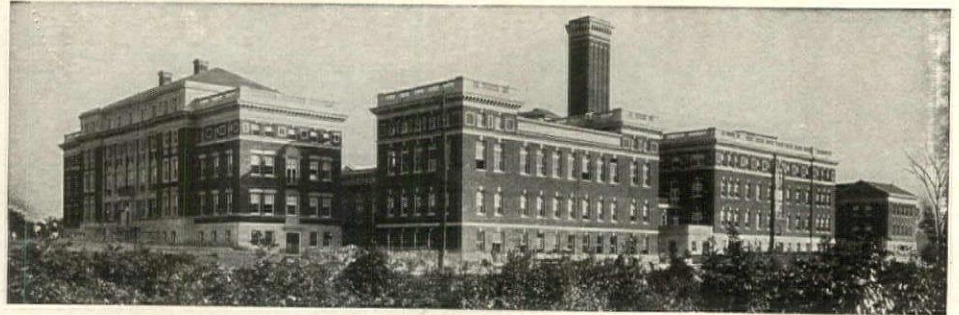
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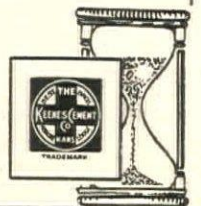
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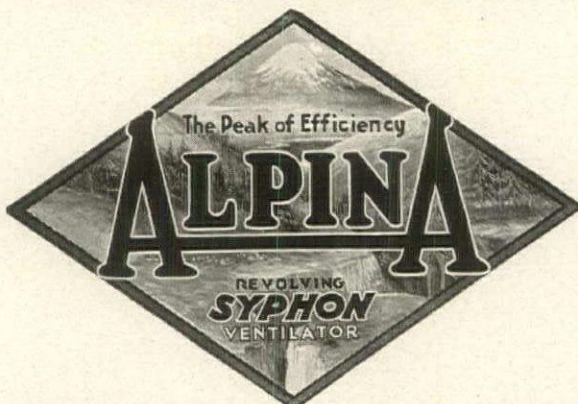
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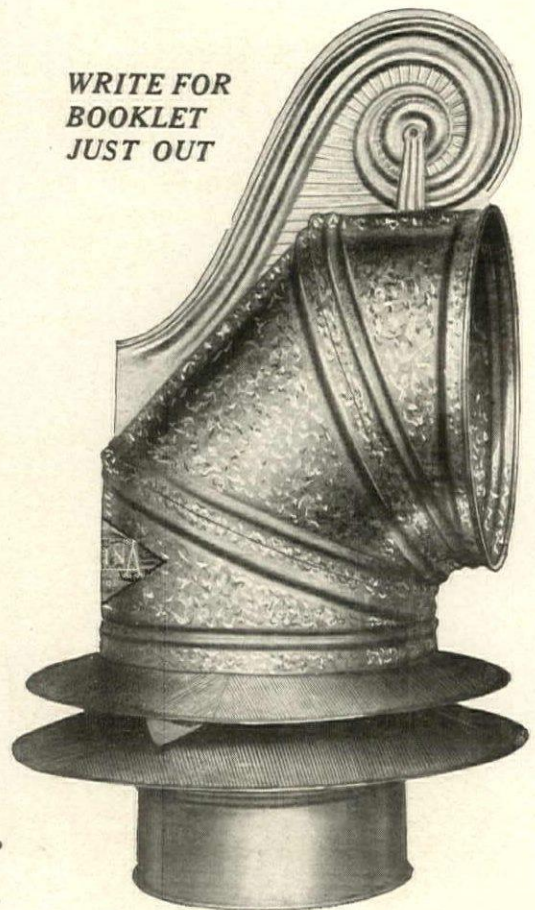


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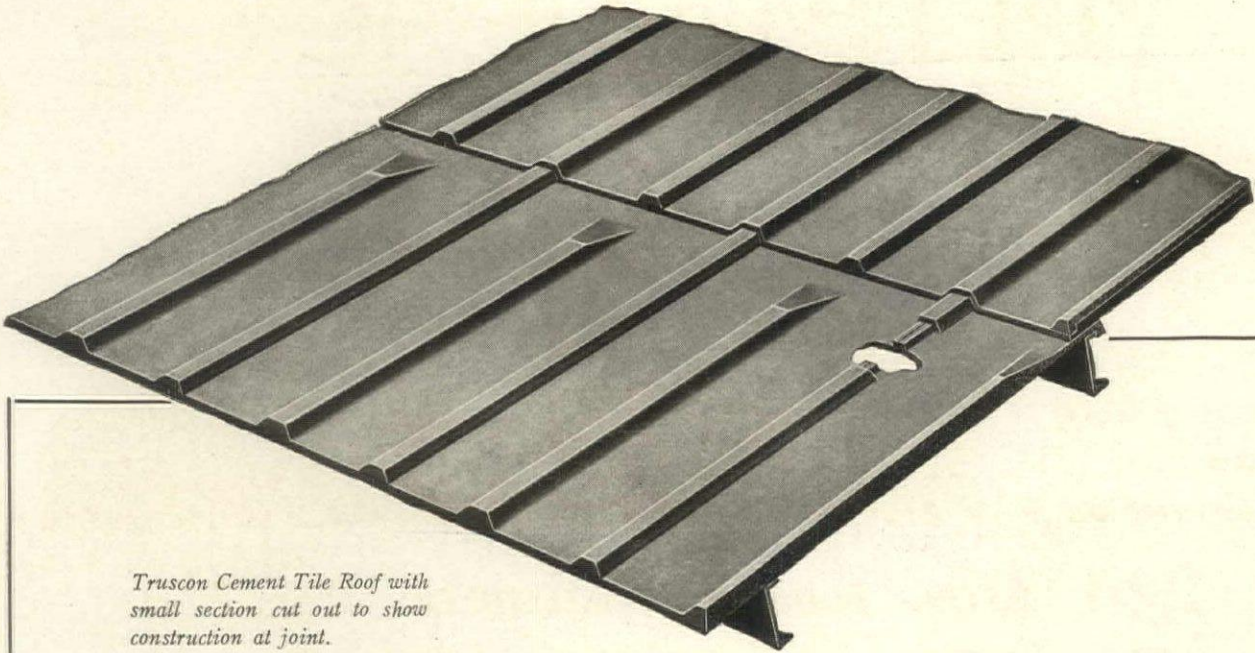
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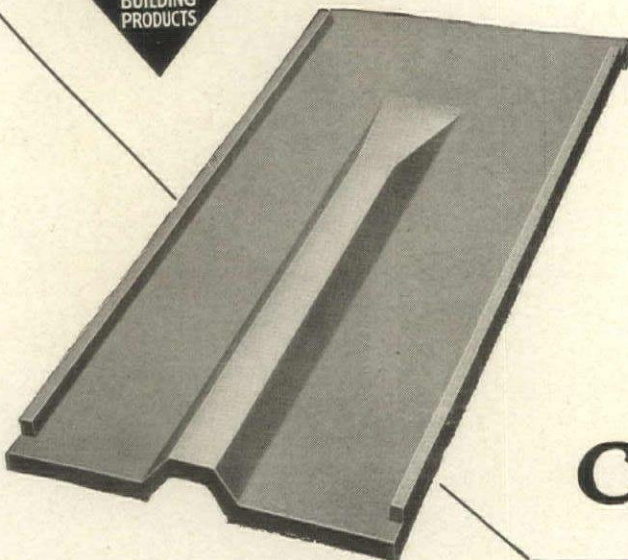
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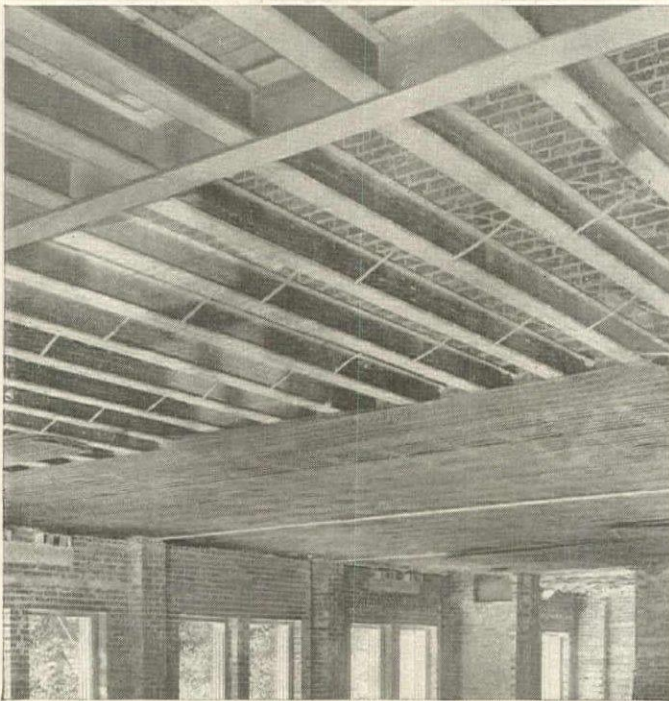
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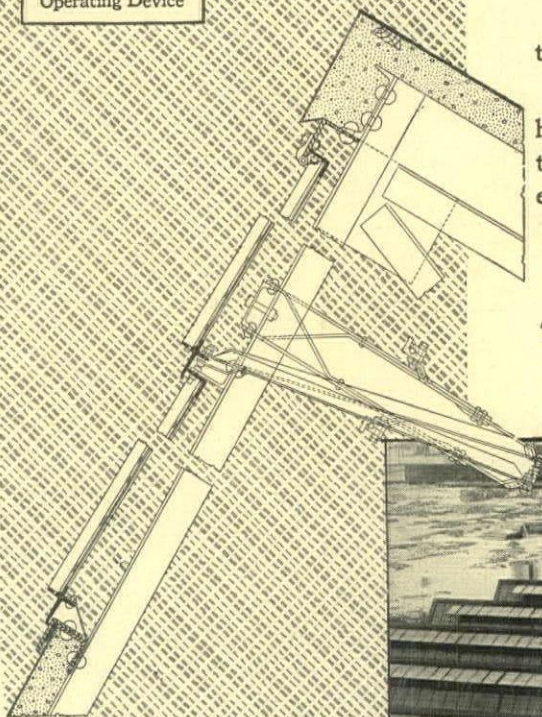
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