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Bentley-Kent House, Chagrin Falls, Ohio

EARLY DOMESTIC ARCHITECTURE OF OHIO*

BY I. T. FRARY

Illustrated by photographs by the Author

THE state of Ohio might with propriety be called a "lost province" of New England. It is considerably removed geographically, but in traditions, ideals and architecture there is but little difference except that New England history stretches back a couple of centuries beyond that of Ohio. This advantage is, however, of minor importance, for Ohio drew her population, her architecture and her customs from the older states and appropriated for her own the fruits of their more mature experience.

*Editor's Note: In connection with Mr. Frary's article on the early houses of Ohio, attention is called to the illustrations of recent Ohio houses, by Frank B. Meade and James M. Hamilton, which are shown in this issue.

Immigration from the Atlantic states to the regions West of the Alleghanies began soon after the close of the Revolutionary War. Great tracts of land in what is now Ohio were set aside for veterans of the war, for those who had sustained losses due to the war, or were sold to land companies, which in turn disposed of them to prospective settlers.

The first settlement was made in 1788 on the Ohio River at the mouth of the Muskingum and was called Marietta in honor of Marie Antoinette. To reach this frontier post the pioneers followed trails across the mountains of Pennsylvania to the



Ohio Company's Land Office. Built 1788. Supposed to be the oldest building in State of Ohio

neighborhood of Pittsburgh, where they built boats in which they floated down the Ohio. By 1806 the traffic over the mountains had become so great that Congress authorized the construction of a road from Cumberland on the Potomac to Wheeling on the Ohio. This was known as the Cumberland Pike or the National Road and was later extended to Zanesville and thence across the state.

While streams of immigrants were pouring through this channel into the new frontier country, other settlers were taking a Northern route across New York State to Buffalo and from there by boat on Lake Erie or by land along its Southern shore. Cleveland was settled in 1796 and from that time on the two streams of settlers



House at Mesopotamia, Ohio

spread in all directions until in 1820 the population of the state had risen to nearly 600,000 and it had taken fifth place among the states.

The first shelters built by these pioneers were of the crudest sort, mostly of logs chinked with mud. Later, as security from the Indians was assured and wealth began to accumulate, they

built more comfortable and commodious houses which were, most naturally, similar to those to which they had been accustomed in their former homes. They had come equipped with their own tools and with skill in the use of them, and there were a few who were builders by trade. These brought with them not only a working knowledge of the architectural forms and details which their



House at Claridon, Ohio

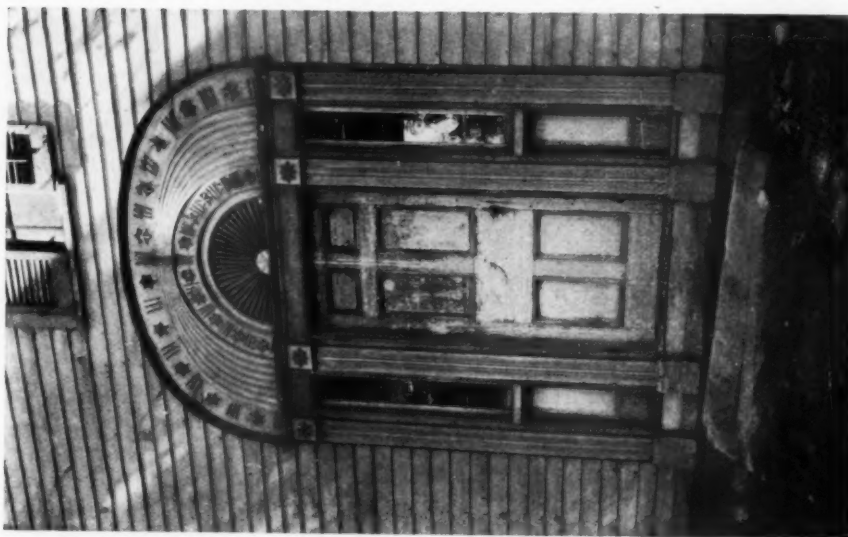
fathers had brought from England, but some at least possessed books of designs such as were published by Asher Benjamin.

In studying the work that has survived the jig saw remodelers of the Victorian era and the devastation of fire, flood, weather and misguided owners, it is surprising to find so many different types of Colonial and Post-Colonial work. The later periods are, of course, mostly in evidence, for the exodus from the East did not begin until the Greek forms had become dominant. There are to be found, however, examples from almost every period and locality except perhaps the very early Colonial. In spite of the absence of the early types and the more palatial ones, there are delightful surprises for the hunter with sketch book or camera who will explore the older towns and highways of the state.

Like their Eastern prototypes, the Ohio houses are simple in form, and ornamental detail on the



Elwell House, Willoughby, Ohio

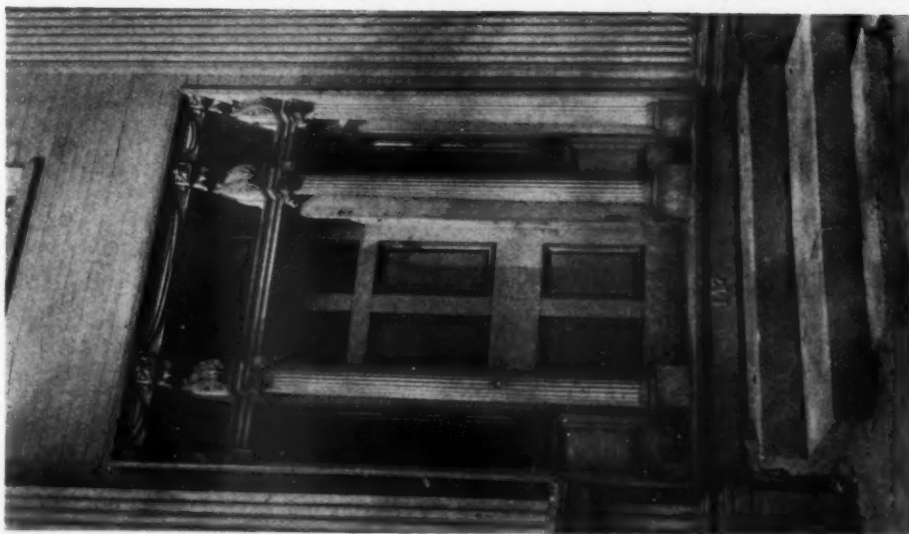


Doorway of house at Streetsboro, Ohio



Doorway of Gates House, Gates Mills, Ohio

DOORWAYS OF EARLY OHIO HOUSES



Doorway of Elwell House, Willoughby, Ohio

exterior is confined largely to doorways, cornices and fan lights. The doorway usually includes side lights and transom, the latter commonly rectangular, although in many instances they are semi-circular or semi-elliptical, especially in brick houses. The window sash are divided into small panes and are protected by blinds.

Brick houses are more common in the territory fed by the National Road than in the Northern part of the state, presumably because in the former locality were many settlers from Virginia and Maryland where brick was the common building material, while in the Western Reserve the people were largely from Massachusetts and Connecticut where timber construction was the rule.

In many places there are to be found local peculiarities that can be traced to the former homes of the settlers or to the taste of some local builder.

The variety of effects that were produced with a limited range of details is amazing, as is the

uniformly good taste shown in their use. Most of the houses were severely simple in form, their features of distinction ranging from a simple doorway framed with pilasters and entablature,

to an imposing, colonnaded portico adapted from a Greek temple. In other fronts the order was flattened back into terms of flat pilasters and entablatures; and there are gambrel roofed cottages which show unmistakable Dutch inspiration.

The work of these early builders was characterized by excellent craftsmanship.

The houses were substantially constructed and whether of timber, brick or stone were built to last. The heavy timbers of the wooden structures were framed together with tenons and pins and were usually covered with lapped clapboarding. In some instances the walls were filled in with brick between the timbers, but this practice was not as common as in the East.

A remarkable feeling for appropriateness of design to site is found, as for instance, in two



House near Chagrin Falls, Ohio



Major Horace Nye House, Zanesville, Ohio. Built 1813



Guthrie House, Zanesville, Ohio



Dr. Increase Mather's House, Zanesville, Ohio. Built 1818
EARLY DOMESTIC ARCHITECTURE OF OHIO

houses near Chagrin Falls, one of which tops a hill some distance from the road, while the other, the Bentley-Kent place, is down in the valley of the Chagrin River. The first is low and broad with dominating horizontal lines which tie it effectively to its hilltop. To be sure its columns seem light as compared with such a house as



House at Streetsboro, Ohio

Arlington, yet as it is seen from a distance, the deep shadow of the porch and the general low, heavy mass suggest an intelligent understanding of the problems and possibilities of its site. With conditions quite contrary, the Bentley-Kent house down in its valley seems to be stretching itself up from its high front basement and pushing back into the hillside, as if to avoid possible floods from the nearby stream.

A feature in some localities is the recessed porch, but as a general thing the pioneer farmer did not evince much interest in porches. He worked too hard and too long to find porches a vital necessity, and if his wife or daughters found time to sit down at all, it was presumably with apples or potatoes to pare or with sewing to do.

Doorways of every possible form are to be

found, ranging from such delicate, refined detail as is seen on the old Gates house at Gates Mills, through every variety of column, pilaster and architrave. Two curious doorways almost identical in design are to be found at Aurora and Streetsboro, the striking features of which are amazing fan light effects glorified by crude triglyphs and constellations of six pointed stars. Two others quite different from these in type are in Willoughby and Unionville and have carved corbels breaking the transom, above Ionic columns, while above the transoms carved festoons of drapery are caught up by square rosettes.

The early Ohio houses are, as a rule, rather simple when compared with the famous mansions of Salem, Portsmouth, Philadelphia or Boston, but this is to be expected in a frontier



House near Ashtabula, Ohio

country remote from the seaboard and from opportunities for amassing wealth quickly. It required a half century or more for the people to become firmly enough established to indulge in anything approaching architectural extravagance, and by that time the classical tradition had been discarded for the banalities of the Black Walnut or Victorian period.



Brick Makers of Camp, Kamerun, a German Colony of Western Equatorial Africa

BRICK—ITS MANUFACTURE

BY G. C. MARS, Ph.D.

TO look at a bit of silicon, a hard glass-like element, and a bit of aluminum, a very light silver-like metal, one would hardly believe that they may be mixed together in such a way as to form the soft plastic mud we know as clay. To be sure, it is not likely that the chemist in his laboratory, even if he cared to take the trouble, could make clay out of silicon and aluminum. But nature has done so, and perhaps is still doing so, on a grand scale; for clays in great abundance are scattered pretty generally over the entire surface of the earth. However, nature has taken millions of years to do it, and in order to do it, has gone far beyond making a simple mechanical mixture of the two elements,—which would get no real results,—and by throwing in a little oxygen and a little water has succeeded in making a chemical composition, which is known as a hydrated silicate of alumina. The feldspathic rocks in which this substance is found were in geological times worn down into a powdered detritus, which was either left *in situ* or carried away by wind or water to form beds of clay on river, lake, or ocean bottom. Through ages of geological change, these clays have been subjected to further depositions, subsidences, elevations, pressures and heats, besides being saturated with percolating waters, so that as we find them today, they not only present various mechanical formations, but are never found as chemically pure hydrated silicates of alumina containing, as they do in a bewildering variety of ways, sometimes in appreciable amounts, and sometimes only as a trace, such im-

purities as oxides of iron, calcium, magnesium, potassium, sodium, titanium, and sulphur.

While many of these clays as yet reveal no commercial value, many others are profitably utilized for making a wide range of useful and beautiful products from cements to face powders; and from drain tiles to porcelains, to say nothing of the vast quantities of aluminum extracted from them.

Aside from the varying degrees in which mineral and vegetable impurities are found in clays, the clays themselves differ in the proportions of silica and alumina contained, giving them different values in the arts. These proportions will greatly affect the plasticity of the clay, its coefficient of expansion, and its point of fusion. Nor are the so-called impurities without their effect. While some of them are troublesome in the process of manufacture, others have real value as fluxes and as affecting plasticity of the clay, coefficients of expansion, or color tones in the finished ware.

The various kinds of clays used for brick making may in point of physical formation be grouped under three heads, as surface clays, shales, and refractories; in point of color in the finished ware, they may be regarded as falling into three classes, red burning, buff burning, and gray burning clays, due to the varying amounts of mainly iron oxides, lime, or magnesia in the clay. Iron oxides tend to produce red, dark brown, and purple color tones in the burn, lime tends to whitish tones, and magnesia to light brown or tan. Lime *with* the iron runs to cream colors, while magnesia *with* the iron produces buff and yellow tones. Clays *without*

iron or magnesia burn white. The exact outcome, however, depends on the manner and the degree of the burn, on the amount of each impurity contained in the clay, and on the varying proportions of these impurities present.

The surface clays are naturally the most easily mined, as the overburden is light and readily stripped off, while the clay is gathered by scrapers or steam shovels. Shales are clays reduced by heavy pressure to a very dense mass, in some cases, to well nigh the consistency of slate. After being stripped of the overburden, a pit is developed, where necessary, so that the shale bank may be "planed" from top to bottom by machinery adapted to the purpose, "bitten out" by very powerful steam shovels, or, where too hard for such methods, blasted. The surface clays and shales burn to all imaginable shades of buff, red, brown, purple, green, bronze, and analogous tones. Refractory clays, which as the name indicates, resist the fire and fuse only at a very high temperature, are usually found in connection with coal measures and must be won by mining, very much as is coal. These burn to the buff, cream, light brown, and gray tones.

The physical characters of all clays, peculiar to them, which make them of value in the arts, are *plasticity* and *convertibility*. Just what makes clay plastic, no one knows, but a great many use-

ful and interesting things may be done with it because of its plasticity. When properly moistened, or tempered as we say, the clay is easily pressed or molded into any shape desired, which then becomes fixed as the clay dries. The prehistoric dwellers on the banks of the Euphrates

utilized this fact when they molded the argillaceous mud of the river bottoms into crude blocks and let them bake hard in the sun. Even today among primitive people, these sun-baked adobe brick are made.

But as widely used and as useful as adobies have been in the past development of construction, they do not reveal the full practical value of the clay, which attains its summit only when the clay is converted by

the application of fire to a finished product.

Doubtless the discovery that fire wrought a wonderfully useful change in clay was as accidental as that of roast pig, so delightfully recorded by Charles Lamb. At any rate, the discovery was certainly made at a very early day, for the Babylonians regularly made and extensively used hard burned brick. Some profound molecular or chemical change takes place in the clay when subjected to high temperatures by which it is converted into a substance of remarkable durability.

Up to very recent times, brick were generally made by hand; that is, the soft tempered clay was pressed by hand into wooden—subsequently iron or steel—molds of the proper shape and size, and



Interior of a Fire Clay Mine



Placing the green brick in the dryer



A Pug Mill

then slipped out carefully on the ground or on racks to dry until the brick were ready to be built into a kiln. To facilitate the slipping of the fresh clay from the molds, the molds before each operation were immersed or slopped in water, or sprinkled with sand. Hence the expressions "slop mold" or "sand mold" brick. The old expression "water struck" is another name for a slop mold brick, because the molder after dipping his "striker" into water scrapes it across the top of the molds to even up the exposed surface of the clay. In some localities the old methods still survive, but during the past fifty years the rapid expansion of trade and a growing demand have necessarily induced the invention of power machinery for the manufacture of brick, as of all other commodities. This has enabled the brick maker not only to improve and increase his output, but to add other methods of manufacture and refinement. As a result, nowhere else in the world as in America have the possibilities of building brick been so highly developed. While some architects have conspicuously succeeded in utilizing these possibilities in excellent examples of brick design, it must be said that the majority seem oblivious to the immense possibilities of artistic design in the wall surface afforded by the wide range of color and texture in brick which the American manufacturers offer. This matter will be treated in a subsequent article.

For machine made brick, the clay, after being gathered from pit or mine may be left for a period in the open to weather, or at once put into process of manufacture. Where the material comes in lumps too large for the dry pan it is put through crushers to reduce it to the proper size. The dry pan consists of an encased revolving perforated circular steel plate over which are run contrary-wise to the revolving plate a pair of very heavy rollers. The crushed clay falling through the perforations is conveyed by belts to screens of proper

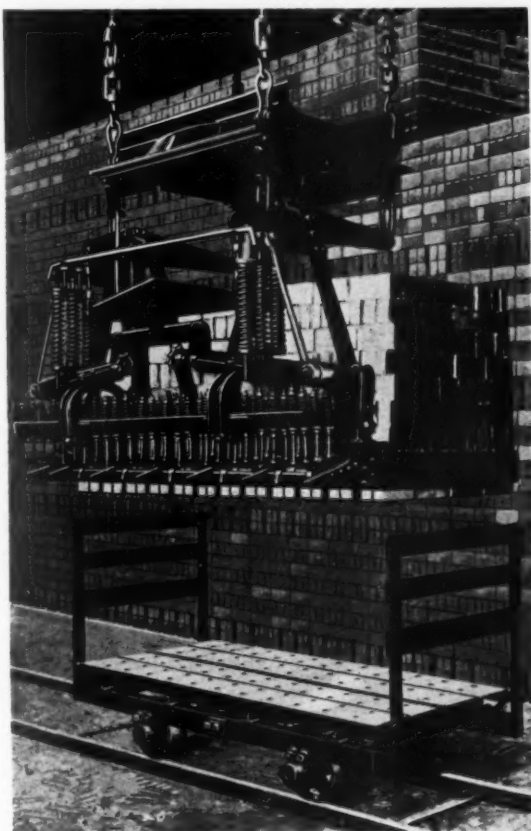
mesh for selection. Whatever fails to pass the screens is automatically conveyed back to the dry pan. The screened clay is then treated in one of three ways. It is thoroughly mixed or pugged, as it is called, in a box provided with revolving knives, to the consistency of a soft mud or a stiff mud, or directly used in the condition of a semi-dry powder.

In the soft mud process, the machine presses the pugged clay into automatically slopped or sanded molds and delivers them forward, whence they are slipped onto pallets which are placed by hand on cars for the dry house or perhaps carried thither by automatic conveyors.

In the stiff mud process, the pugged clay is forced by a powerful auger machine through a die of the proper cross section, in the form of a clay ribbon, which is carried on a moving belt to the steel cutting table. This table is slotted at the right intervals for the size of the brick wanted, so that a frame, strung with fine piano wires, may descend in the nick of time and cut the clay ribbon into the prearranged widths or lengths. As these fresh cut bricks car-

ried by the belt flow on in a constant stream, the workmen, known as "off-bearers," place them on the cars for the dry house. The dry house is a long low chamber in which the green brick on the cars are, so far as possible, rid of the excess moisture they still naturally retain as they come from the machines. The drying is done by the use of waste heat from the kilns, when other sources of heat are not employed, and must be very carefully manipulated to avoid cracking the green ware.

In the dry press process, the almost dry, powdered clay is forced into the molds by extremely heavy pressure and automatically released on the off-bearing table in front of the machine. As these brick need little or no drying, they may be taken directly to the kiln.



Machine for setting 1000 Common Brick in a kiln at one operation

The burning of brick is done in various kinds of kilns, the simplest and oldest type being the clamp or scove kiln. Here the green brick are built up, in the open, into the form of the kiln and covered with a temporary layer of old brick plastered over to retain the heat. Arched tunnels



The Brick machine at work, showing the off-bearers

at short intervals are built in at the bottom for firing, so that the flames and gases are directly carried up through the ware to the chimney stack. Some manufacturers of common brick on a large scale still use these kilns, sometimes built to contain as many as a million brick, and fire them with oil burners, but in the old days wood was generally used. It was from this method of burning that the term "arch brick," or those that arch over the fire holes, came to mean a very hard burned brick.

Most brick are now burnt in permanent down draft kilns which are either periodic or continuous. Periodic kilns are those in which the brick are set, burnt off, and drawn, to make way for the next batch; continuous kilns, as the name suggests, keep the process going without intermission.

Periodic kilns are built either in a rectangular or bee-hive form, and while some are still burned with an up draft, for the most part they are burned off with a down draft. That is, the flames and superheated gases from the fire boxes at the bottom are conducted by so-called bag walls or series of pockets to the top or crown of the kiln before striking the ware. As the flues, leading to the stack, are at the bottom of the kiln, the flames and gases are thus drawn down through the ware from top to bottom. Coal of a certain type is extensively used for burning these kilns, but to a considerable extent natural or producer gas, as well as oil, is used.

The continuous kiln, properly speaking, is a connecting series of chambers arranged around a rectangle or oval in such a way that the heat from

the burning kiln passes into the adjoining chamber or kiln, set with the green dried brick, and thus starts it on its way. When the first kiln is finished, the fire is turned off and started in the second kiln already advanced, the waste heat from the first kiln often being conducted by separate flues to the driers. In the meantime, the third kiln, which has been set with green brick, gets the superfluous heat, and when No. 2 is burnt off, will, in turn, have its own fire. Thus the burning keeps crawling from kiln to kiln in a continuous process around the whole battery of kilns, until by the time it gets around to No. 1 again, No. 1 has been emptied and reset with dried green brick ready for its turn. The proper fire boxes, gas or oil jets, flues, dampers, and stacks enable the skillful burner to regulate this process very nicely.

Another continuous process is that of the tunnel kiln. This does not consist of a series of connect-



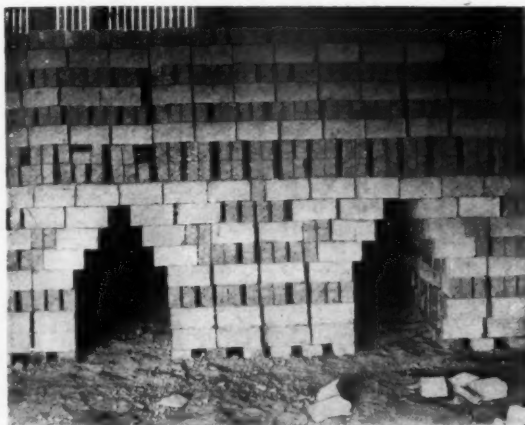
View of a Continuous Kiln, showing chambers closed for burning

ing kilns but of one long kiln through which the brick are continuously pushed. The kiln is a long, low tunnel of cross section to accommodate a small steel car loaded with upwards of a thousand green brick. The car itself, which is provided with a fire brick platform, is not endangered by the severe heat. The firing is so regulated along the length of the kiln that the brick is thoroughly burned by the time it reaches the end of the tunnel. As an uninterrupted string of these cars is being slowly pushed through the tunnel, the process of burning, as in the continuous kiln, is constantly going on. These kilns considerably reduce the period of the burn. Each type of kiln has its advocates for producing the results desired in the ware.

The burning of brick, under modern demands for quality in the product, has been greatly furthered by the application of scientific methods of firing and recording temperatures, but it still requires great watchfulness and skill on the part of the burner.

Three main stages in the process may be noted. In all stages, the utmost care must be exercised in regulating the fires, either in reducing or speeding them up. This care is needed in each particular case because of the particular kind of clay in the ware, but in all cases because of the peculiarity of each stage in the burning.

The first stage is that of dehydration or water smoking, which means not only that the superficial moisture, still remaining in the green brick from the driers or press machines, but that the H^2O , in chemical composition with the clay, is being



Building a Scove Kiln

driven off. As this action of the rising temperature in the kiln progresses, the period of oxidation begins, during which all the impurities in the clay are either entirely burned out, or oxidized, thus forming compounds that give various colors to the ware. Finally, as the point of fusion or vitrification approaches, some profound chemical, or more probably mechanical change takes place in the clay that converts it into brick. At this critical point, the skillful burner knows when to reduce his fires or draw them, for if he were to allow the temperature to advance too far, he would run his ware into a formless, vitreous mass. Depending upon the nature of the clay, or the results desired, the better qualities of brick are submitted to a temperature of from 1800° to 2200° Fahrenheit.

It requires time to turn clay into brick, ready for the mason's hand. Naturally a good deal depends upon the nature of the clay to be worked, the factory equipment and efficiency, and the sort of product to be made. Beginning with the machines, they differ all the way from 25,000 to 300,000 each for a day's output of green brick. The dry house will require from one to two days, and the time for setting the kiln will depend on whether the kiln holds 60,000 set by hand, or is a scove of a million brick built up by machinery.

The burning will run from five to ten days, and the cooling from two to three. The time required for unloading the kiln depends on whether kiln run is taken, or sorting is done either to uniform or mingled shades.

It must be evident from this brief outline that from the clay pit to the finished kiln, the process of making brick has its complexities and difficulties. In the first place, inasmuch as there is a great variety of brick clays, differing in quality, great care must be exercised in selecting the right clay for the manufacture of the particular product wanted. Aside from the economical question of its convenience to the plant, in uniform quality and abundance, it must have the right degree of plasticity, a moderate coefficient of expansion and contraction, a safe fusion point, and a good color possibility. It is not impossible to modify these factors by intermixing different clays, or perhaps by the introduction of metallic ingredients for the sake of color effects developed in the burning, but fundamentally they must be found in the clay as it comes from the pit.

But the great variety in brick does not depend simply upon the clay itself and its preparation. Many effects are secured in the process of machining or molding the brick, and in burning. Thus, to meet every requirement or demand of taste, the brick are made with every possible surface texture from the smoothest to the roughest. They may also be set in the kiln and the fires so handled as to brighten or darken the ware, or to produce either uniform shades or variations with delicate flashings.

Then, aside from these controllable methods, there is a variety in the product necessarily resulting from the kiln construction. In either up or down draft kilns the ware from top to bottom does not uniformly get the heat and gases, in consequence of which there is a difference, more or less, marked between the center, top, and bottom brick. In fact, where the clay and the burn are proper, these differences add a value to the ware, in that the run of the kiln may afford a most pleasing variety in the color scheme of the wall, or if uniform shades are desired, the kiln produces a series of zones from which the desired uniform color tones may be selected. Of course, this selecting to shade necessarily adds somewhat to the cost of the brick, for it involves not only time, but considerable experience and skill.

The methods of winning, machining, and burning clays are constantly being improved. But with the ablest ceramists, the latest inventions of manufacture and control, and with the most skillful artisans all thrown in, the complex and varied elements and processes in making brick leave out certain unknown and undefinable factors in the problem that should induce the architect to grant, under given circumstances, a certain margin of

difference between what he ideally expects and what he actually gets. The deliveries may not come on exact schedule time. Does the architect realize that the manufacturer has sweat blood because the run of the clay, unexpected to and uncontrollable by him and the burn, have resulted in off shades? Will he, as in many cases, realize that the manufacturer is trying out another kiln with the hope of meeting the exact requirements? Often the architect can easily utilize those off shades, in reality as attractive as any others, and work them into his color scheme. Perhaps the brick come slightly over or under size. Does the architect consider that in laying down the standards of size, the American Face Brick Association definitely states that the figures named are only approximate. There is an average run of clay and an average output of the kiln, but there is no

man living, learned, skillful, or wise enough to forecast with mathematical exactitude just what a particular burn will bring forth. Of course, flagrant differences from order should be corrected. There are careless or unscrupulous manufacturers, and there are careless or unscrupulous loaders, but these are the rare exception. As a rule, from the shrewd standpoint of his own selfish interests, the manufacturer is only too anxious to please architect or owner down to the last particular, so that when anything goes wrong, it is not due either to incapacity or indifference, but to one of those unexpected or unavoidable accidents with which all concerned must be patient until everything is agreeably adjusted.

Editor's Note—In Part II the structural value of Brick will be discussed.

FORTY YEARS AGO

Excerpts from *THE AMERICAN ARCHITECT*, April 7-14, 1883

A BILL before the New York Assembly provides for revision of the State building law. Exterior brick walls of dwellings not over 30 ft. high may be 8 in. thick from the first floor level to the roof plate. The present law requires all walls under 35 ft. high to be 12 in. thick. (The Recommended Minimum Requirements for Small Dwelling Construction, Department of Commerce, 1923, contains the same recommendation.) All structures more than 100 ft. high shall be fireproof throughout; "fireproof" is defined as a structure with floors of iron beams and brick arches.

* * *

Mr. F. L. Hagedorn writes on Artificial Stone as a Building Material, quoting General Gilmore: "I have no doubt that it is capable in a high degree of resisting the effects of heat, and the action of alternate freezing and thawing, and that it will be durable in the latitudes of the United States and the Canadas." * * Forty-five years ago (1838) a large mission was built on the North shore of Staten Island exclusively of artificial stone, every block of which was moulded on the spot. * * The first story of the J. V. Farwell & Co. store, Chicago, 360 x 400 ft., is entirely of artificial stone.

* * *

Mr. H. J. Bloor writes concerning a letter received by Mr. Napoleon Le Brun from Mr. Levi H. Willard after the latter's death. In this he announces a bequest to the Metropolitan Museum of Art to be devoted to the founding of a museum of architecture to be exhibited in its galleries.

* * *

Mr. Edison offers Columbia College the collection of electrical instruments exhibited at Paris



House by Frederick J. Sterner, Architect. Reproduced from the full page illustration in *THE AMERICAN ARCHITECT*, issue of August 11, 1883

last year, provided the college will establish a school of electrical engineering. The offer is under consideration, but the cost of maintaining the school will be considerable, and the trustees wisely refrain from making any promises without knowing whether they will be able to fulfill them.

* * *

The Brooklyn Suspension Bridge is rapidly approaching completion, and in a month or two, it will probably be open, at least to pedestrians.

* * *

Illustrations: House for A. T. Lyman, Esq., Waltham, Mass. Hartwell & Richardson, architects, Boston; Horatio Lyon Memorial Library, Monson, Mass. Stephen C. Earle, architect, Boston; House for Robert Magruder, Esq., Arlington, Md. F. E. & H. R. Davis, architects, Baltimore, Md.

EDITORIAL COMMENT.

THE PLANNING and construction of state owned buildings is a matter of considerable importance to citizens. This is particularly true when it includes the housing of those who are physically or mentally incapable of caring for themselves, as well as those who are restrained for the benefit of society. That the great responsibility for the proper design and construction of state owned buildings demands the best architectural talent available is not to be questioned. This work is usually done by a state architect appointed by the governor.

There is a bill now before the New York Assembly (No. 1336) which abolishes the office of state architect. The proposed law provides the office of state architect shall be transferred to and hereafter exercised and performed by the superintendent of public works. The head of the bureau of architecture shall be the state architect who shall be appointed by the superintendent of public works. The term of office would be concurrent with that of the superintendent of public works and subject to the possible biennial change in administration. Incidentally the state architect would have to take his orders from the superintendent of public works.

The bill contains dangerous possibilities for state owned buildings and the welfare of their occupants. The importance of the state architect's work justifies an independent department whose head is appointed by the governor and answerable to him only.

Investigation discloses the fact that the superintendent of public works is a powerful factor in the political organization which may be in power. He is more often not chosen for his technical knowledge of public works or experience in construction but rather for his ability to serve his political party. He is not expected to have appreciation or comprehension of architecture.

By removing the appointment of the state architect one degree from the governor, the governor's responsibility is lessened to that extent. This makes more easy the return of the old time contractor-ring control of state building planning and construction. The administration of the bureau of the state architect for the past ten years has been particularly free from control by political or contracting interests. The passage of this bill would open the doors to grave dangers and it should be defeated.

* * *

THE HARLEM RIVER, where half a century ago, the New Yorker found rest and recreation along its sylvan shores, has today become a bustling waterway. The grounds of fine estates

that sloped to the river's brim are now the sites of many manufacturing buildings. The rowboat and small pleasure craft no longer float on the swift moving tides of this river which forms the Northern boundary of Manhattan Island. Now noisily puffing tugs with long tows of deeply laden barges ply these waters. High Bridge, built more than seventy-five years ago to carry the pipes from the Croton Reservoir to New York, was a stately structure. A model of the finest co-operation of engineering and architecture. Three of the spans of this bridge find footing in the bed of the Harlem. And, now that the river teems with many large crafts, these spans present needles through the eyes of which it is difficult safely to steer a large vessel or a long tow of barges. The War Department has asked for the removal of this obstruction to navigation. It was first assumed that it would be necessary to remove the entire structure. But a widespread dissatisfaction on the part of the public has, fortunately, led to a reconsideration of removal and of the possibility, without architectural detriment to the structure, of the substitution of a single arch for the interfering spans.

It is gratifying to note that the Board of Estimate of New York has referred this matter to the Department of Plants and Structures with a request for the preparation of an accurate engineering and financial statement of a plan that will retain the structure while at the same time removing the obstruction.

While the objections to the removal of this bridge, which is only a bridge in name as it is not used for traffic, may be on purely sentimental grounds, it might be well for the people of New York to spend a little of the large annual wasteful expenditure in the conservation of an historical and architectural heritage.

* * *

"IMITATION," we are told, "is the sincerest flattery." We are reminded of this often quoted statement on reading in the promotion pages of a contemporary, certain claims of special features. We are told, for example, that its index is "classified and cross-indexed," so as to enable the reader to find quickly any desired article or illustrations.

It is nearing forty-eight years since **THE AMERICAN ARCHITECT** first appeared. During all that period it has been providing an index with each volume, classified and cross-indexed.

Of course, we cannot withhold praise from a contemporary who in this, and in other notable instances, has so closely followed our good example, even if some amusement is evoked.

SHORT TALKS ON LIVE TOPICS—I

AN Interview with John J. Donovan, Architect, of Oakland, California

PROBLEMS in the designing and planning of school buildings," said John J. Donovan of Oakland, California, when he was recently interviewed in New York by a representative of *THE AMERICAN ARCHITECT*, "naturally vary as to their regional location throughout the United States. In California we have certain features of climate and modes of living that do not obtain here, while here there are elements of congestion that we do not experience on the coast.

"When the architect becomes entirely familiar," said Mr. Donovan, "with what is daily going on in the schools he plans, and intelligently applies such knowledge, he will plan the perfect school-house."

Asked specifically his views as to width of corridors, as lately discussed in *THE AMERICAN ARCHITECT*, Mr. Donovan summed up his opinion by reference to his previous statement, adding that when the architect knew the real use of his school building such matters would adjust themselves.

"Schools are today," said he, "the most active part of our building operations. We are underbuilt as to schools throughout the entire United States. Some sections are fortunately realizing this present need. Let me cite my own city of

Oakland. Oakland has just completed a \$5,000,000 bond issue for schools and a further issue of \$10,000,000 is proposed. It should be \$15,000,000. Look at the situation right here in your own city. New York has a \$60,000,000 program. It does not seem possible to catch up with the needs of your school construction. Not only are these needs the result of a rapidly increasing population, but there is everywhere, on the part of the rising generation, a desire for a better, a higher position in life.

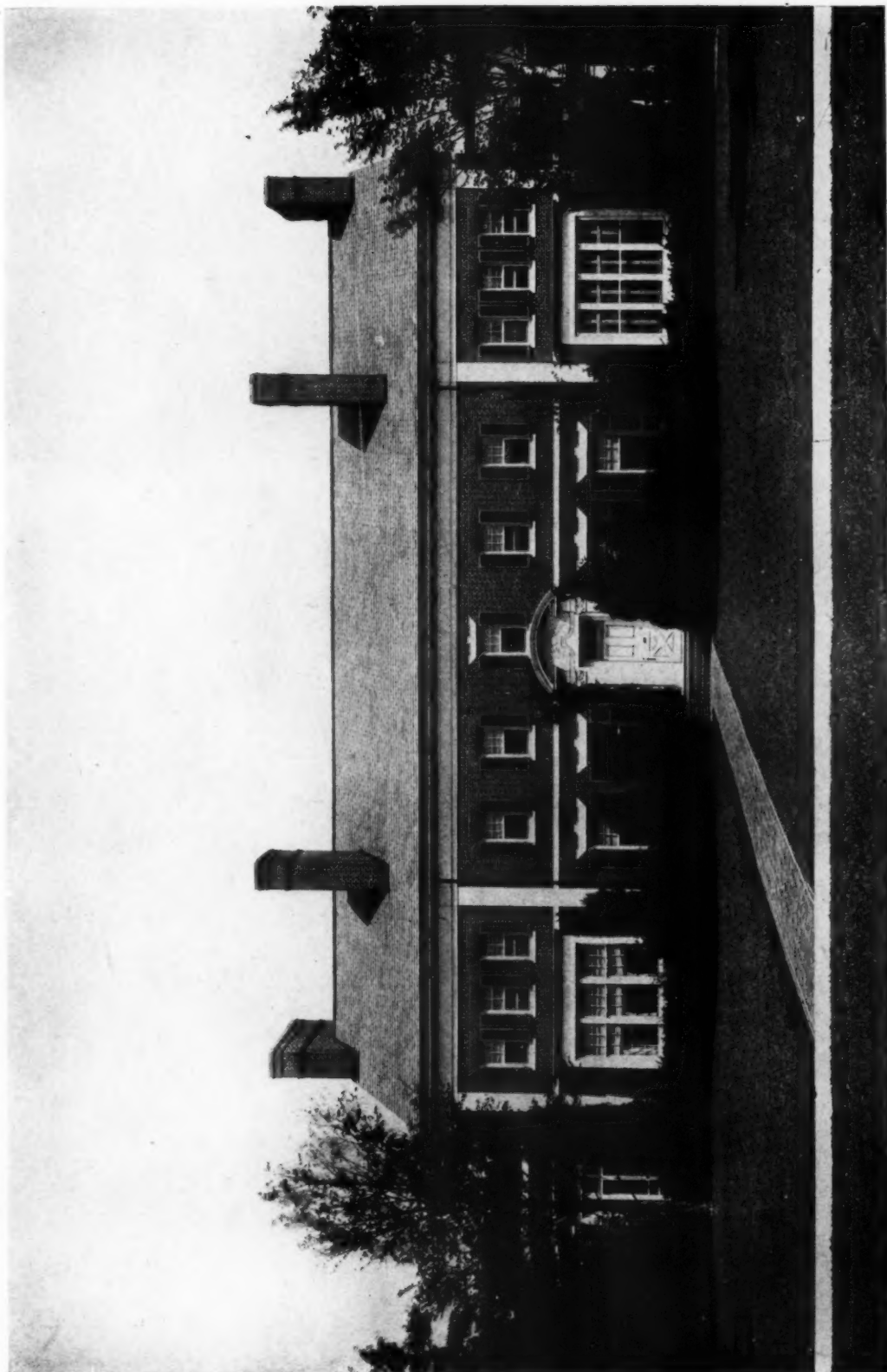
"The educational methods in this country are becoming so well organized, the great value of the Technical High School so well understood, and the belief that a man must have at least a high school education to get on so widespread that a prolongation of the years spent in school is a natural result.

"Why," he enthusiastically declared, "there has been at least 1000% increase in school enrollment all over the country and this increased percentage is constantly growing.

"Architects," stated Mr. Donovan, "have a grave responsibility in these matters. The problems presented have become increasingly more intricate."



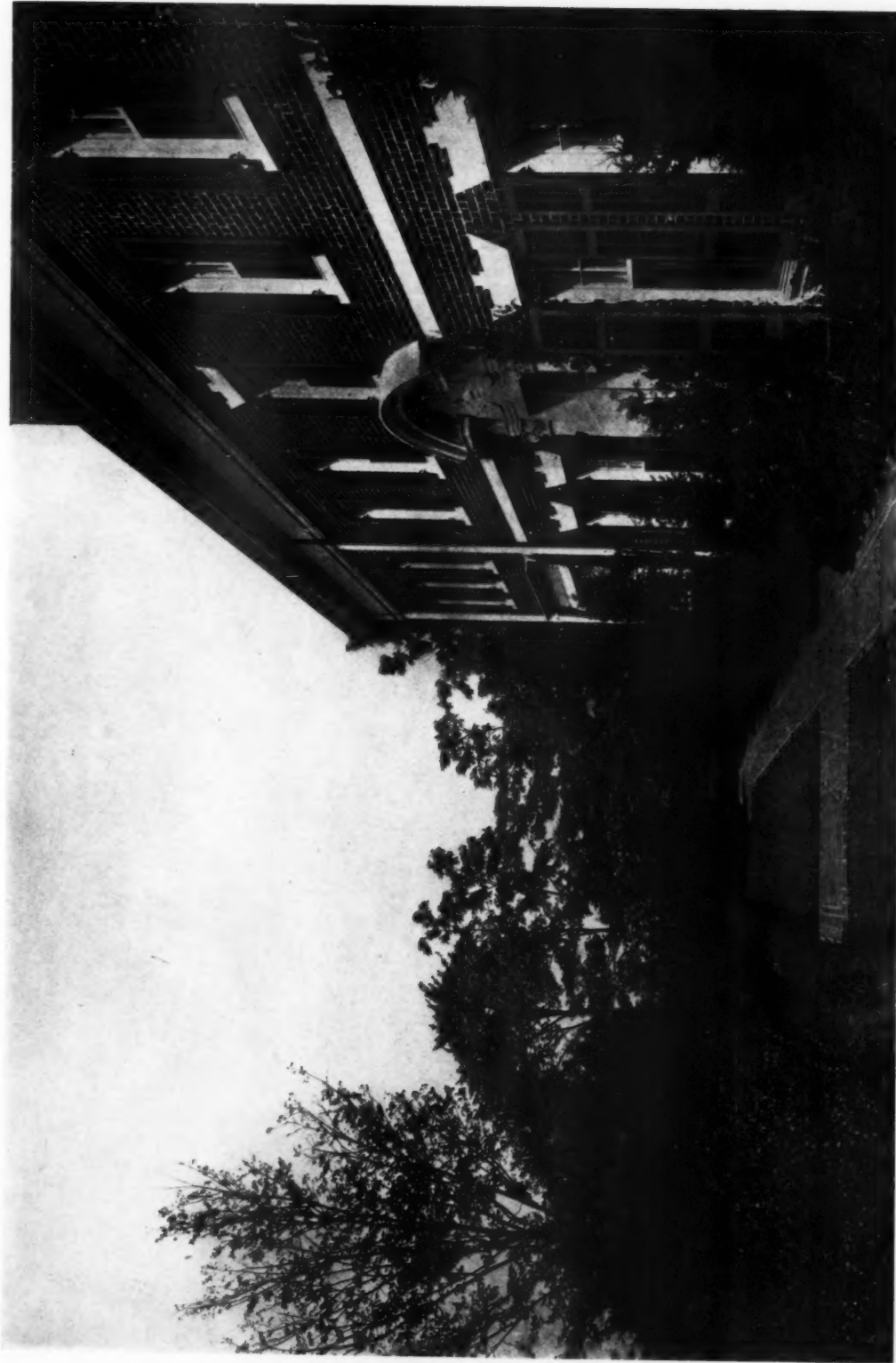
Early Spanish Plasterwork



HOUSE OF J. B. CROUSE, ESQ., CLEVELAND, OHIO

MEADE & HAMILTON, ARCHITECTS

WILLIAM PITKIN, JR. AND SEWARD H. MOTT, LANDSCAPE ARCHITECTS



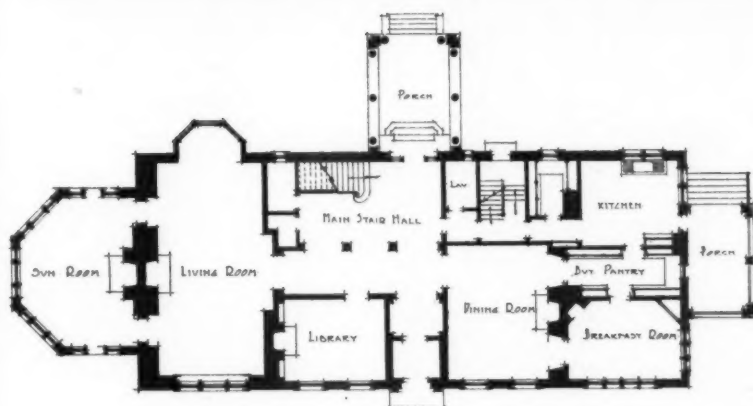
HOUSE OF J. B. CROUSE, ESQ., CLEVELAND, OHIO

MEADE & HAMILTON, ARCHITECTS

WILLIAM PITKIN, JR. AND SEWARD H. MOTT, LANDSCAPE ARCHITECTS

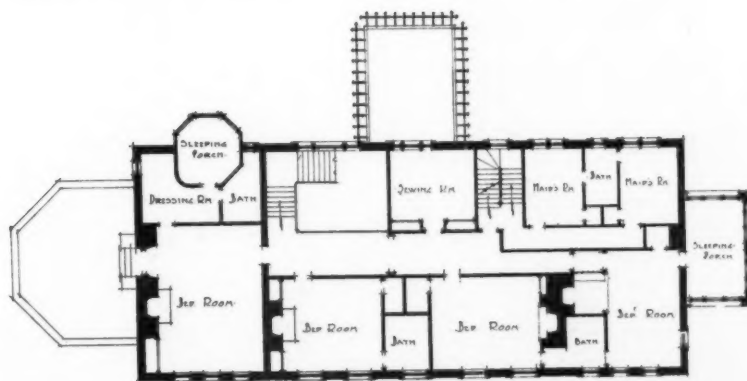
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MEADE & HAMILTON,
ARCHITECTS

HOUSE OF
J. B. CROUSE, ESQ.,
CLEVELAND, OHIO





DINING ROOM
HOUSE OF J. B. CROUSE, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS



THE HALL

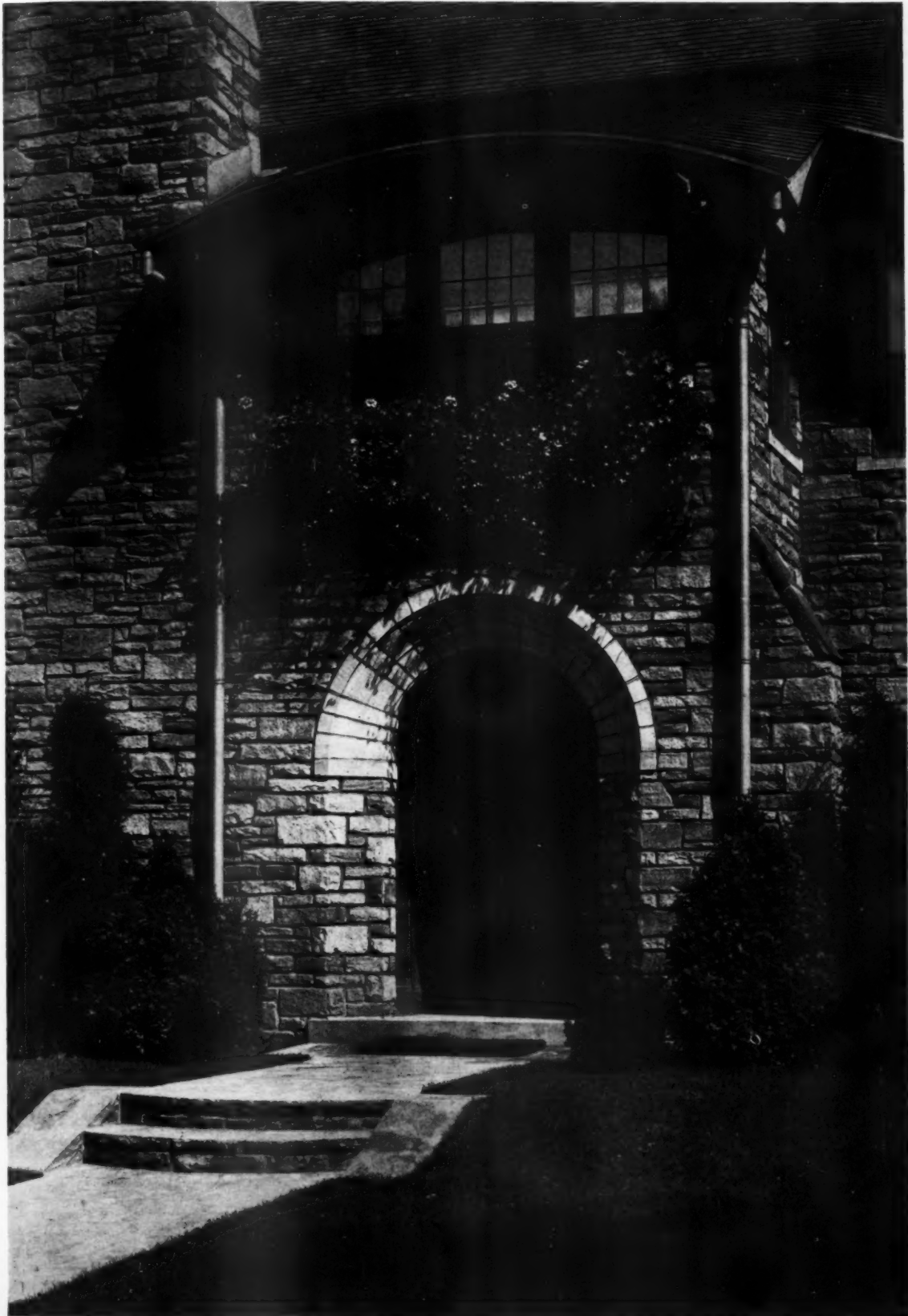
HOUSE OF J. B. CROUSE, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS

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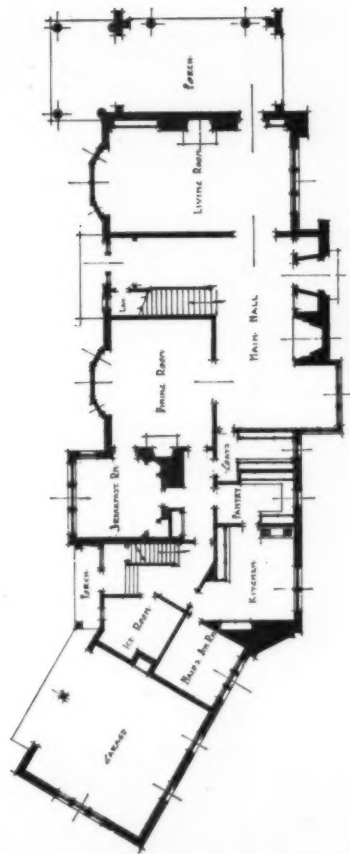
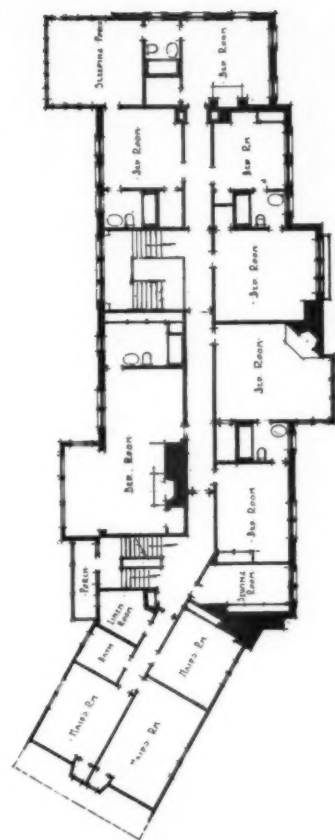
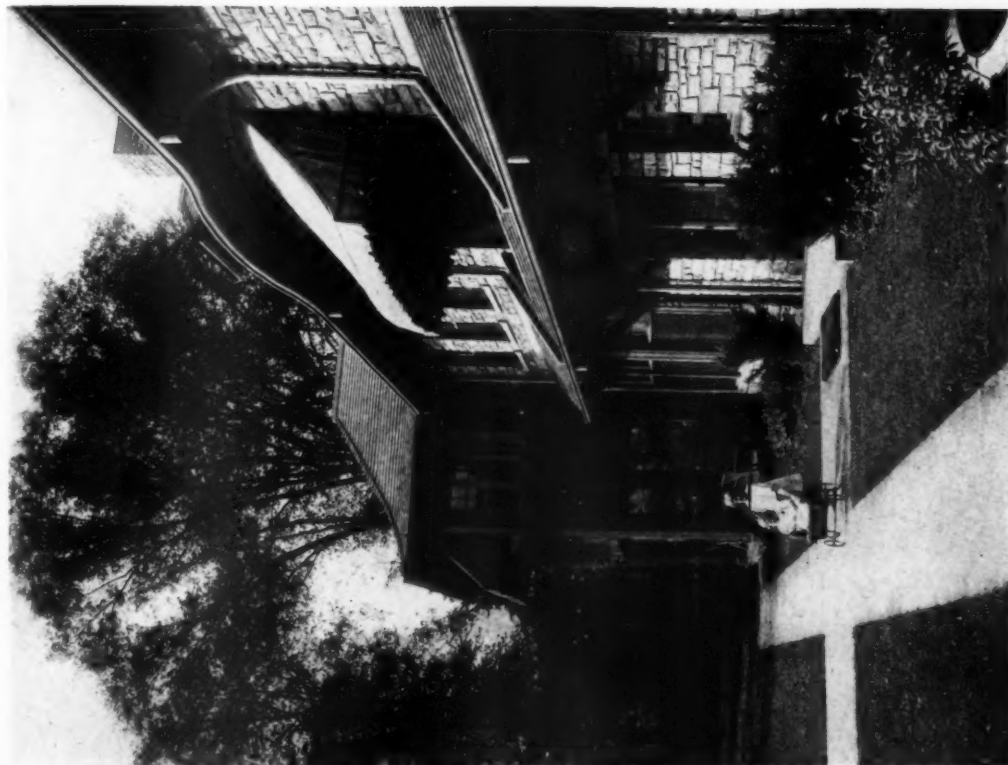
HOUSE OF JOSEPH EATON, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS

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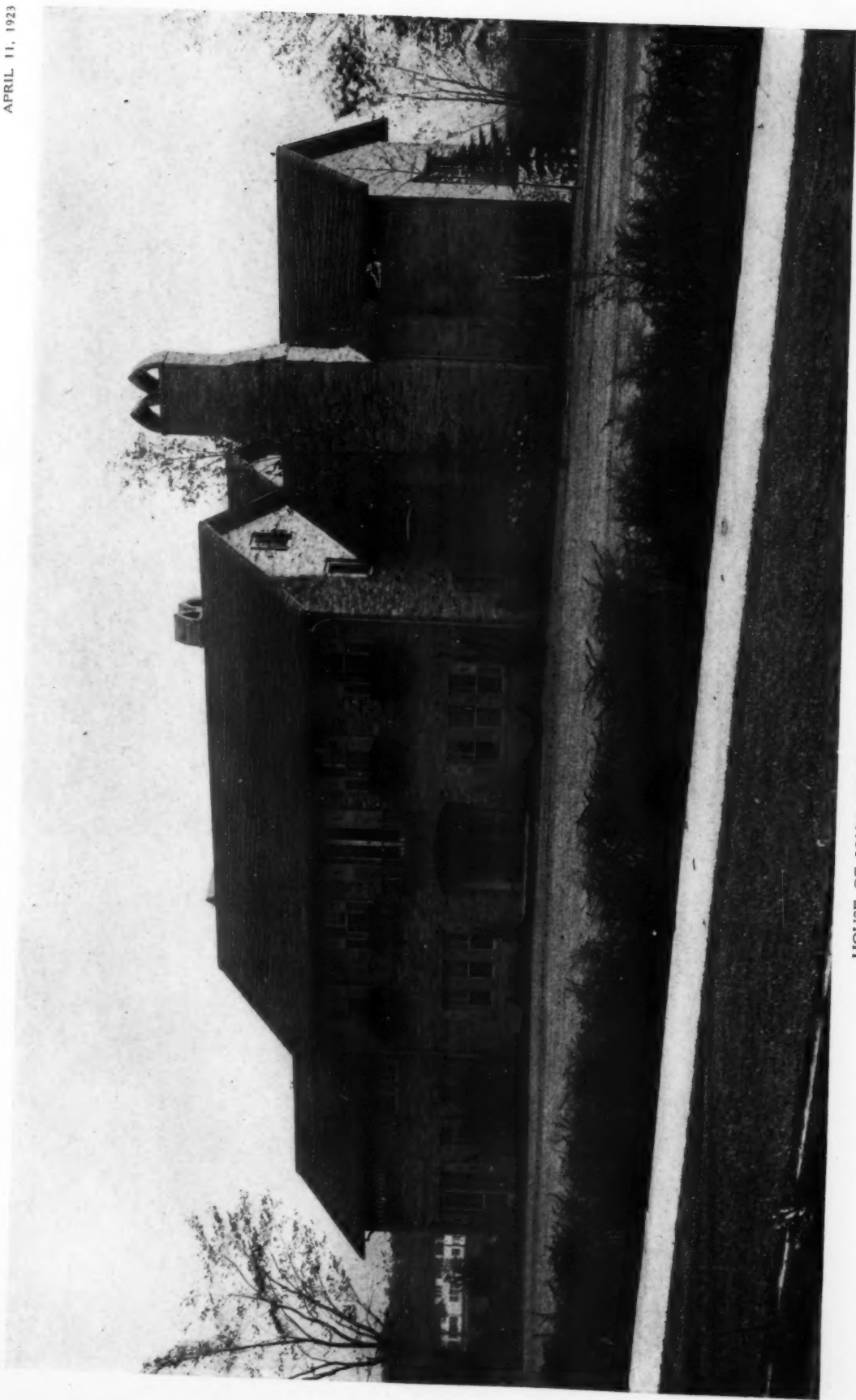


HOUSE OF JOSEPH EATON, ESQ., CLEVELAND, OHIO

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HOUSE OF JOSEPH EATON, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS

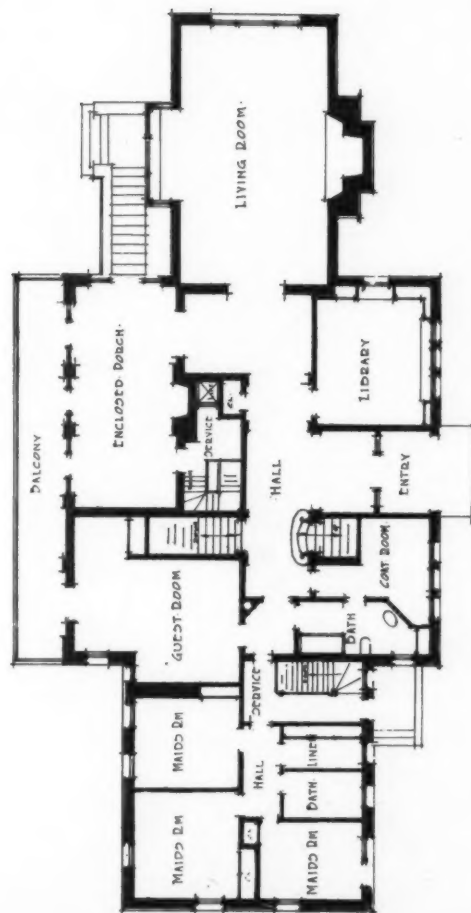
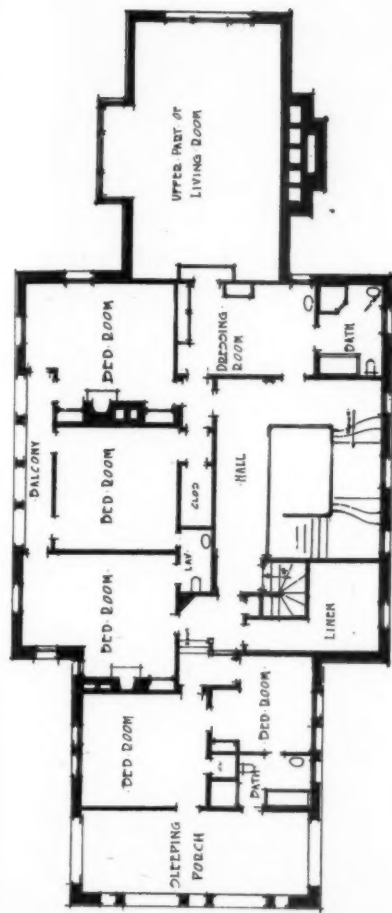


HOUSE OF JOHN STOCKWELL, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS



HOUSE OF JOHN STOCKWELL, ESQ., CLEVELAND, OHIO

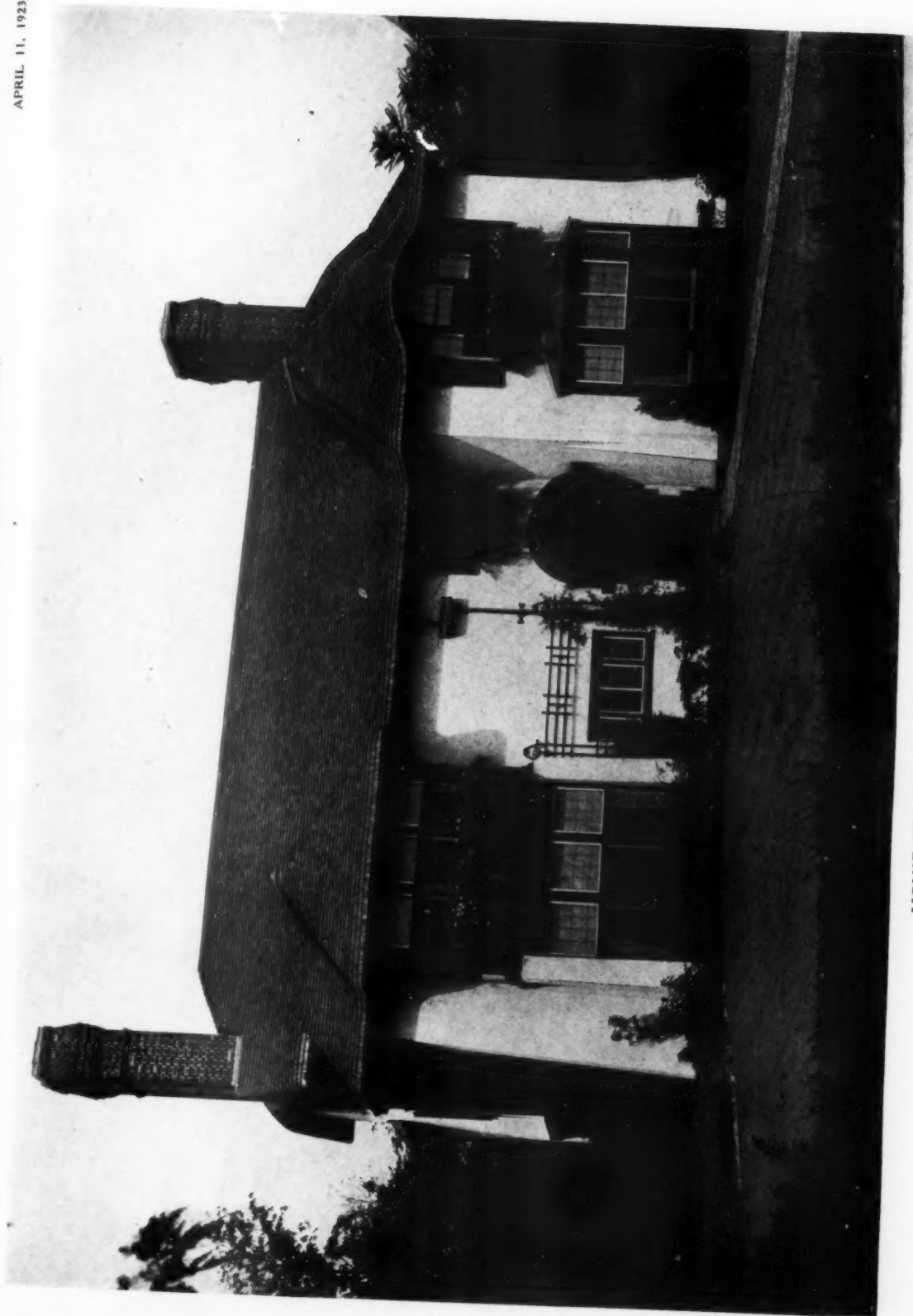
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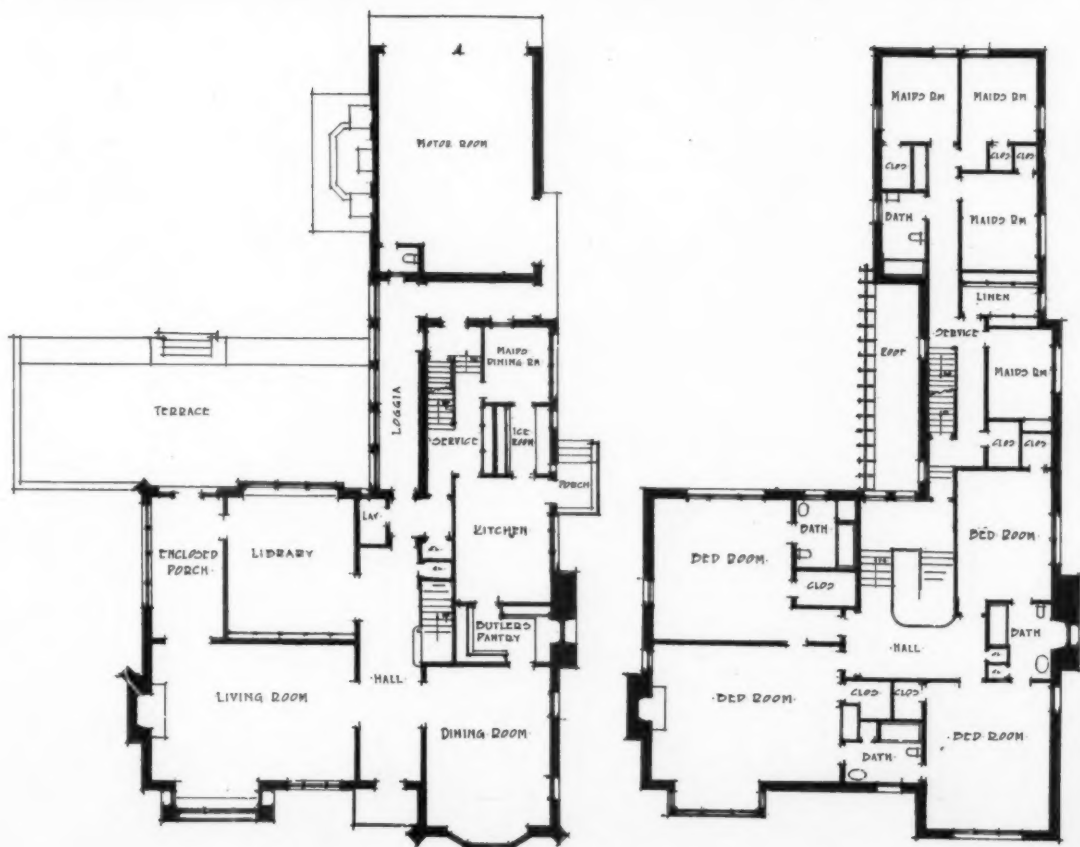
HOUSE OF JOHN STOCKWELL, ESQ., CLEVELAND, OHIO

MEADE & HAMILTON, ARCHITECTS

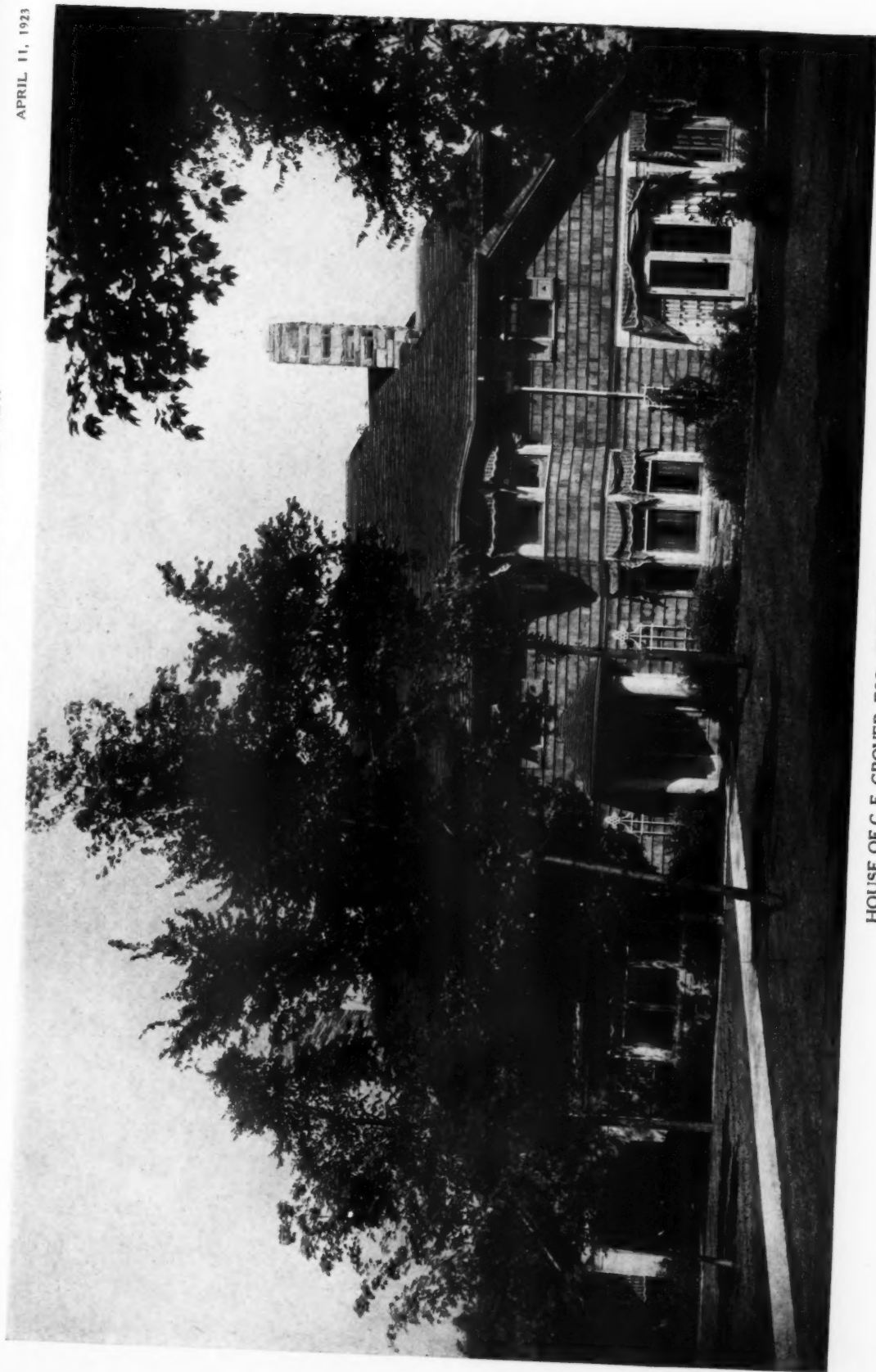
APRIL 11, 1923



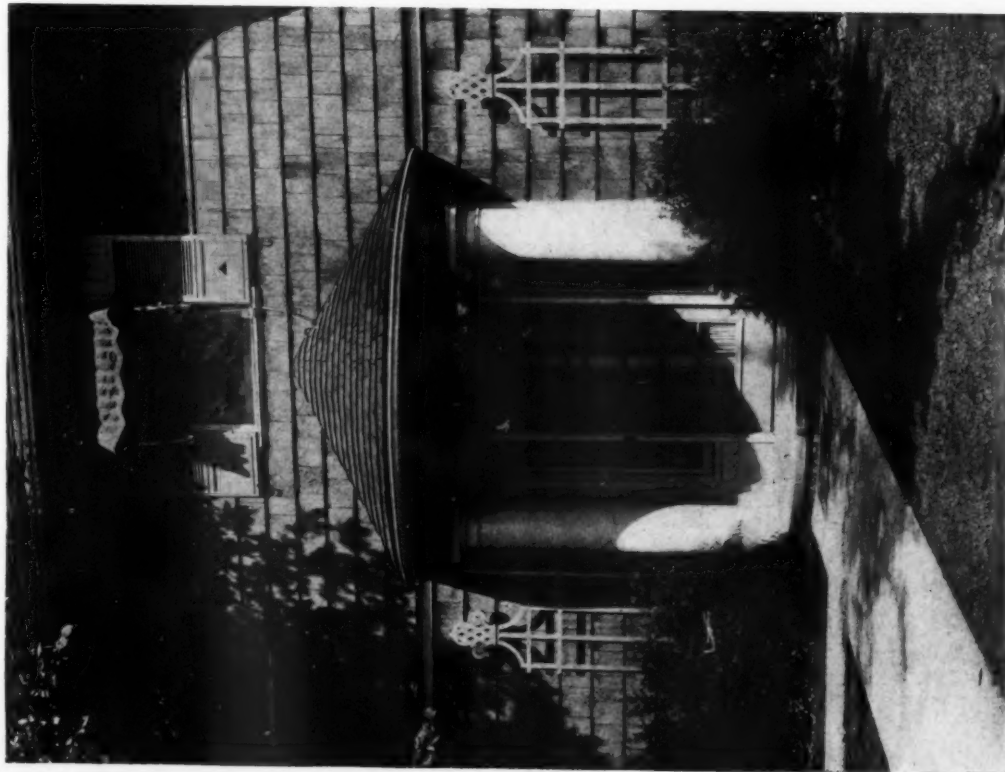
HOUSE OF LOUIS H. HAYES, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS



HOUSE OF LOUIS H. HAYES, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS

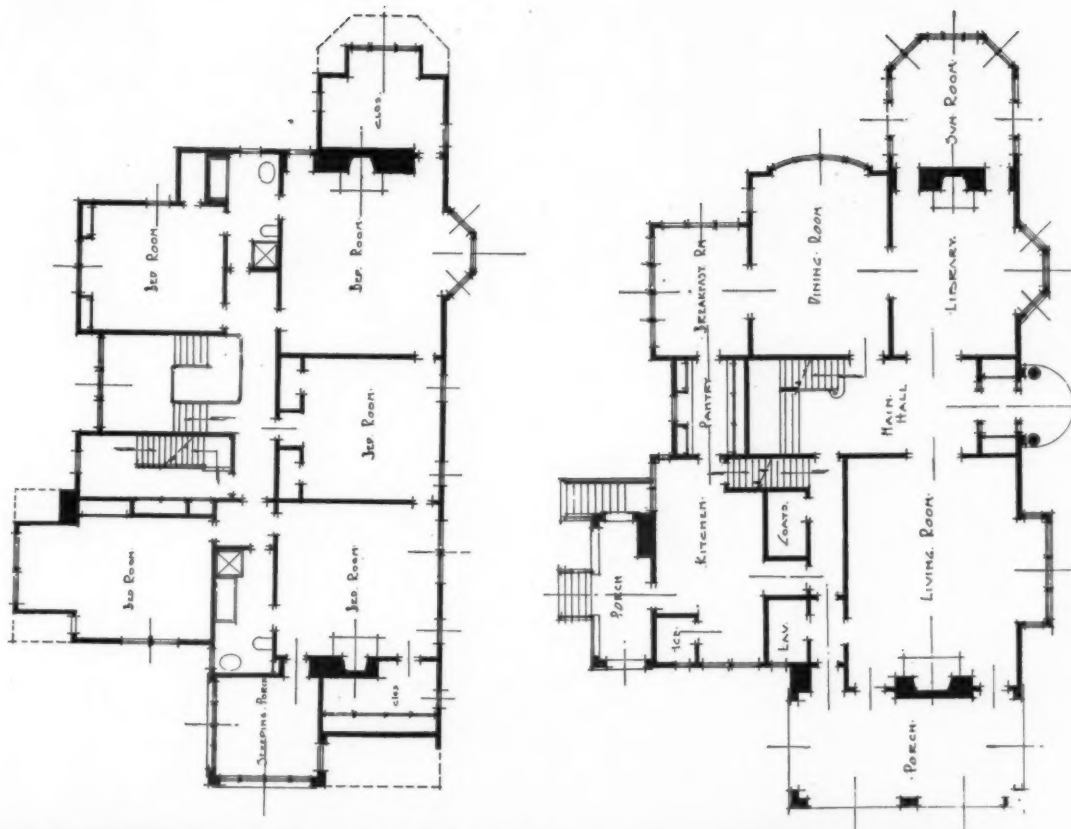


HOUSE OF C. E. GROVER, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS



HOUSE OF C. E. GROVER, ESQ., CLEVELAND, OHIO

MEADE & HAMILTON, ARCHITECTS



APRIL 11, 1923



SWIMMING POOL ON ESTATE OF R. H. WHITE, ESQ., CLEVELAND, OHIO
MEADE & HAMILTON, ARCHITECTS

A SERIES OF SKETCHES BY MEMBERS OF THE PITTSBURGH ARCHITECTURAL CLUB

THE series of sketches by members of the Pittsburgh Architectural Club, illustrated in this issue, are presented as examples of free hand drawing out-of-doors by architects, and further, to encourage other architectural clubs to pursue similar work.

During the Spring and Summer of 1922, this group of men spent their Saturday afternoons afield. We learn from a letter received from Mr. Oliver J. Robling, Chairman of the Sketch Committee, that much enthusiasm was displayed by the members of the Architectural Club who joined these sketching parties. As the season advanced,

the interest in these week-end outings increased. By arrangement, each week's sketches were deposited in the office of the Club's president. By this method none was lost or mislaid and at the close of the season a quantity of dignified and extremely interesting material became available for the Club's forthcoming exhibition. These sketching tours were found to be a very valuable means of providing an extremely fine social feature, and presented a healthful and enjoyable opportunity for relaxation. It is, we learn, the intention to continue these sketching tours this year.



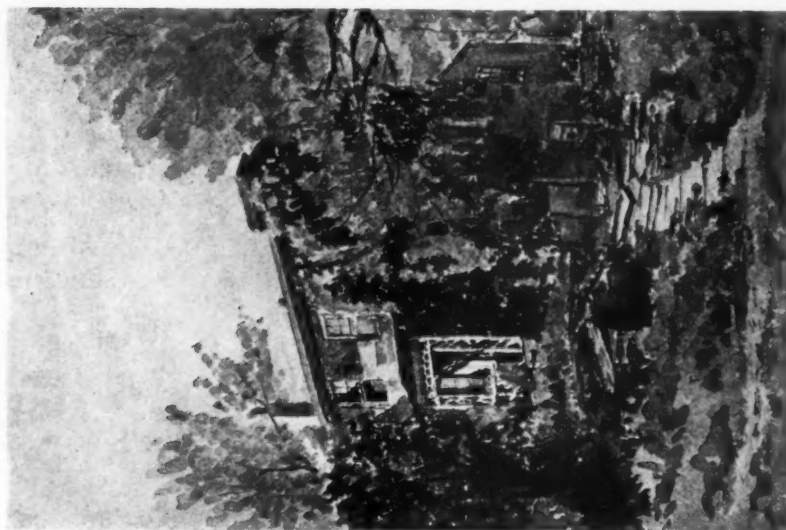
Edward H. Steffler



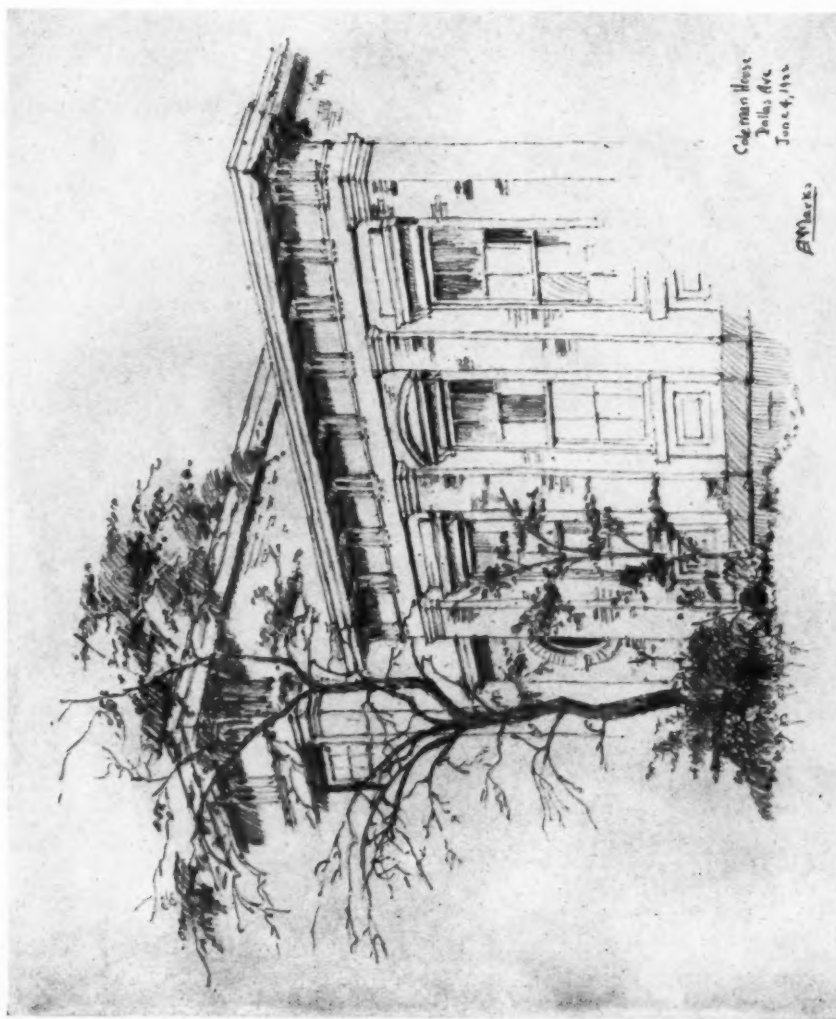
SERVICE WING, WILKINS HOUSE, BY ALFRED MARKS



BURCHFIELD FARM, PITTSBURGH, PA., BY OLIVER J. ROBLING
SKETCHES BY MEMBERS OF THE PITTSBURGH ARCHITECTURAL CLUB



OLD HOUSE, CRAFTON, PA.
FROM THE WATER COLOR BY SIDNEY H. BROWN



WEST WING, WILKINS HOUSE, PITTSBURGH, PA., BY ALFRED MARKS
SKETCHES BY MEMBERS OF THE PITTSBURGH ARCHITECTURAL CLUB



OLD HOUSE, OAKMONT, PA., BY E. C. STILES



HARPER'S FERRY, BY H. C. DOUDEN



SPRING HOUSE, CRAFTON, PA.

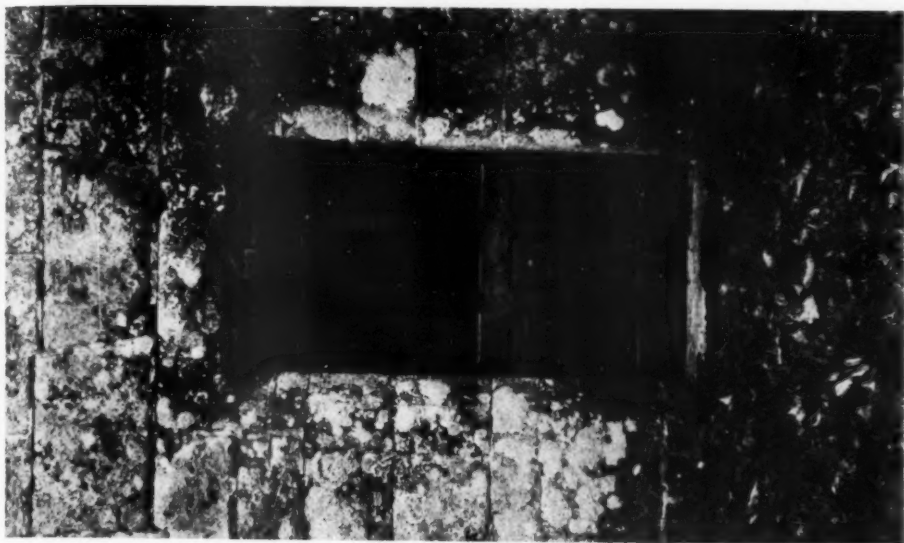
BY ALFRED MARKS



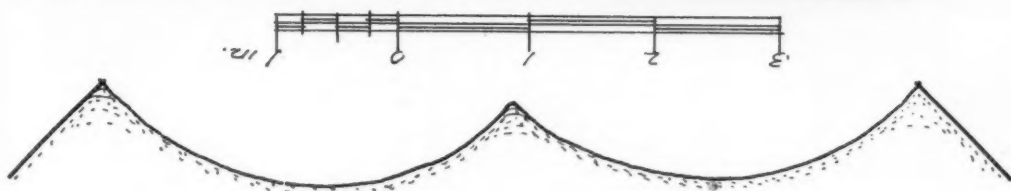
SIDE ENTRANCE, GREAT HOUSE, ECONOMY, PA.

BY H. C. DOUDEN

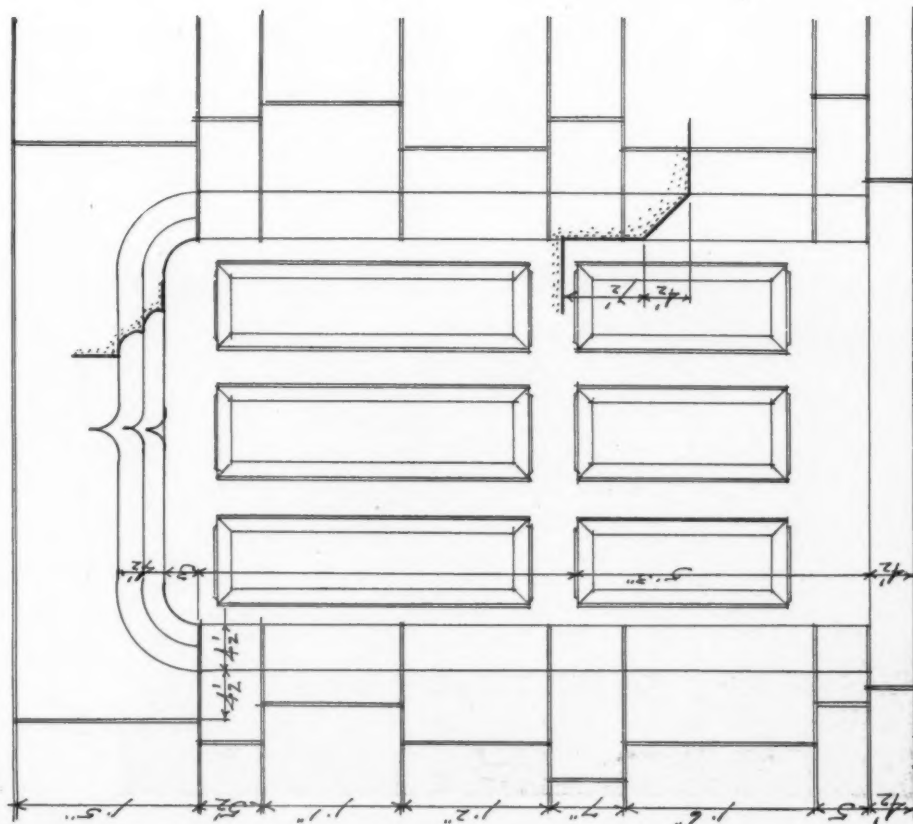
SKETCHES BY MEMBERS OF THE PITTSBURGH ARCHITECTURAL CLUB



DOORWAY, CHAPEL KERFONS NEAR LANNION



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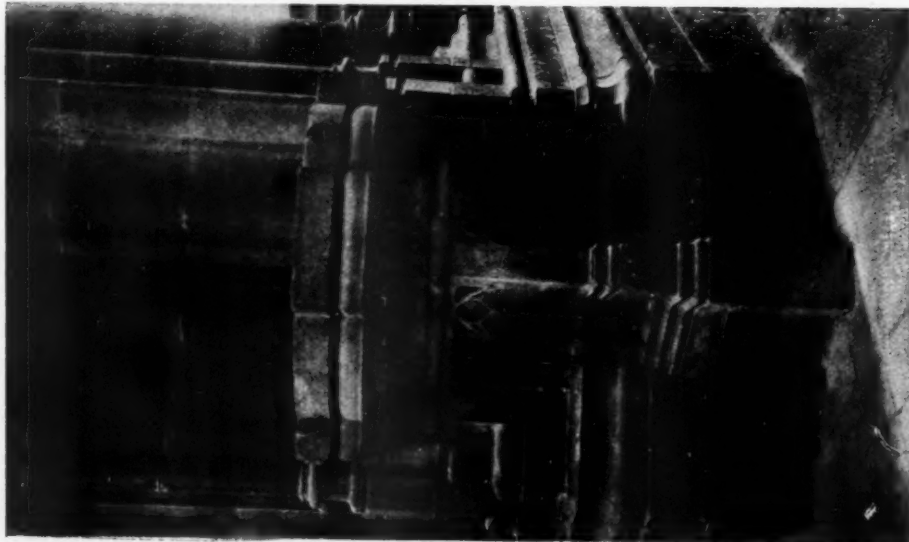
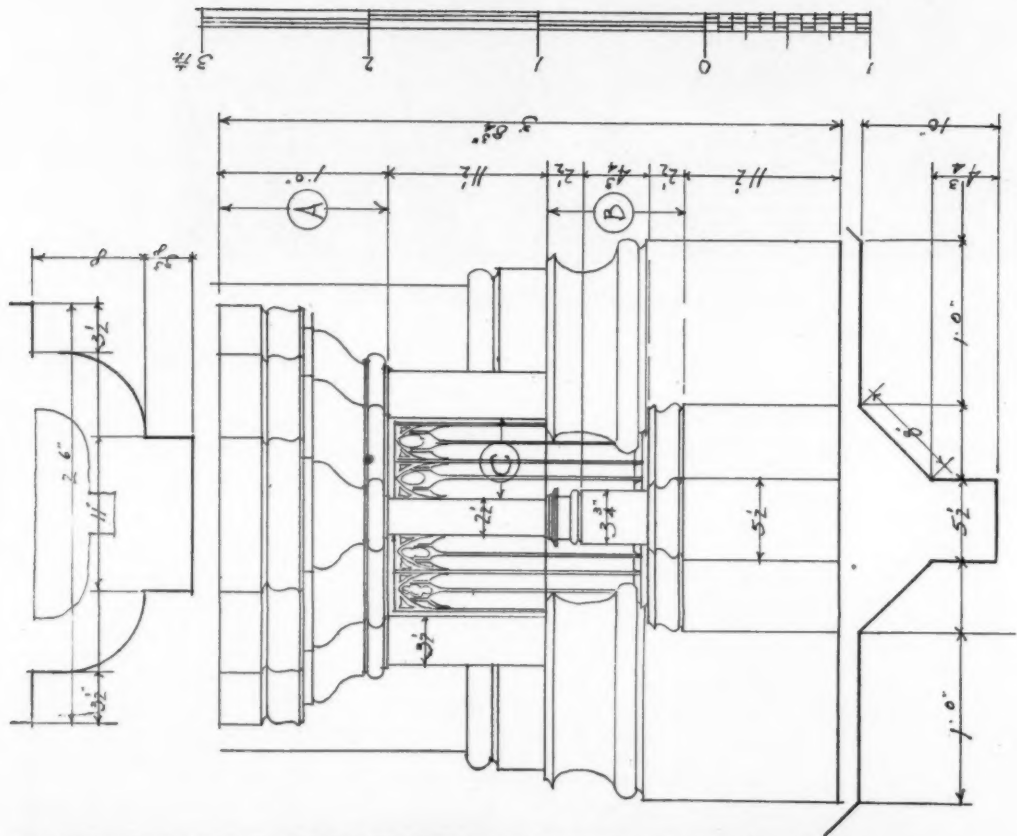


ELEVATION

MEASURED AND DRAWN BY ROBERT M. BLACKALL, 35TH HOLDER ROTCH TRAVELLING SCHOLARSHIP

THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS

MEASURED
AND DRAWN
BY
ROBERT M. BLACKALL,
35TH HOLDER,
ROTCH TRAVELLING
SCHOLARSHIP



HOLY WATER BOWL, MONT ST. MICHEL

THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS

BEAUX-ARTS INSTITUTE OF DESIGN

JUDGMENT OF FEBRUARY 20, 1923

CLASS "B"—III ESQUISSE-ESQUISSE—"A TICKET BOOTH FOR A MOTION PICTURE THEATRE"

In the center of the entrance of a Motion Picture Theatre is placed the ticket selling booth. This should have a floor area of not less than 12 square feet, and offers great possibilities for designs whether treated as a separate construction or as part of the whole entrance motive. JURY OF AWARDS:—H. O. Milliken, P. L. Goodwin, D. J. Baum, P. P. Cret, and H. Sternfeld.

AWARDS:—

FIRST MENTION:—G. M. Burch, Columbia Univ., New York City; K. McLeary, Univ. of Texas, Austin; H. W. W. Faulkner, Yale Univ., New Haven.

SECOND MENTION:—A. D. Reid and C. P. Zimmers, Carnegie Inst. of Tech., Pittsburgh; F. Fredericks, Jr., Cleveland Sch. of Art, Cleveland; A. E. Shrimpton, John Huntington, Poly. Inst., Cleveland; E. D. Woods, Atelier Memphis, Memphis.

CLASS "A" AND "B" ARCHÆOLOGY—III PROJET "A GOTHIC CATHEDRAL DOORWAY"

The main entrance of a Gothic Cathedral, located in the Northern part of France has never been completed. Recently funds have been raised to do this work and it is desired that it shall be built in absolute harmony and keeping with the fine, old Gothic Cathedral in which it occurs. The familiar type of motive will, therefore, be used, that is to say, the great pointed archway with its sloping reveals formed by concentric arch rings. The only limiting condition is that there are two great buttresses at either side and the entire motive must be included in the space between these buttresses which is 35'-0" wide. The height of the motive is unlimited.

JURY OF AWARDS:—F. A. Godley, W. E. Shepherd, Jr. and F. C. Hirons.

AWARDS:—

SECOND MEDAL:—D. M. Campbell, N. B. Mead, Jr. and E. Albright, Columbia Univ., New York City; L. Rombotis, W. E. Willner and S. Chao, Univ. of Pennsylvania, Phila.; W. Douglas, Yale Univ., New Haven.

MENTION:—S. R. Moore, Columbia Univ., New York City; G. S. Brock, Jr., and J. J. McNamara, Catholic Univ., Washington, D. C.; E. Malczewski and B. C. DeMello, Syracuse Univ., Syracuse; H. J. Toombs, Univ. of Pennsylvania, Phila.; K. McLeary, Univ. of Texas, Austin. P. E. Isbell, Yale Univ., New Haven.

H. C.:—T. M. Prentice and G. Oman, Columbia Univ., New York City.

CLASS "A" AND "B" ARCHÆOLOGY—III MEASURED DRAWINGS

JURY OF AWARDS:—H. O. Milliken, B. W. Morris, W. E. Shepherd, Jr., P. L. Goodwin, F. C. Hirons, P. P. Cret and H. Sternfeld.

SUBJECT:—The Colonnade, 430-432 Lafayette Street, New York City.

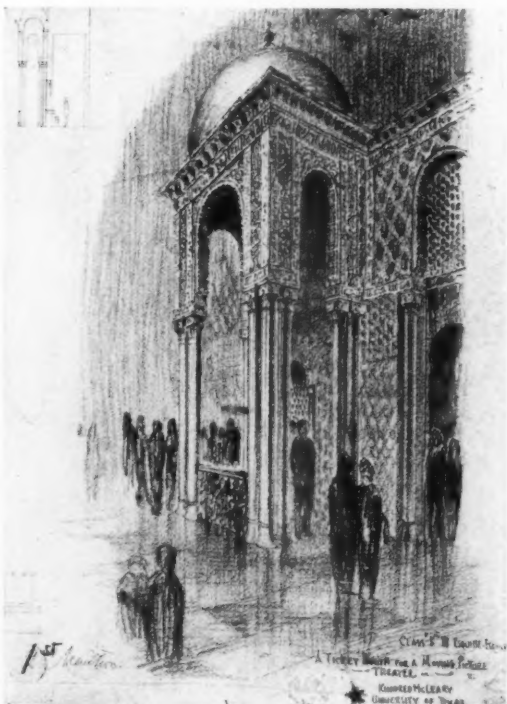
AWARD:—SECOND MEDAL:—J. Gambaro, Atelier Hirons, New York City.

SUBJECT:—Col. Stevens' House Doorway, Elbridge, New York.

AWARD:—SECOND MEDAL:—E. Malczewski, Syracuse Univ., Syracuse.

SUBJECT:—Doorway of the Crouse Homestead, Chittenango, New York.

AWARD:—SECOND MEDAL:—H. T. Woolley, Syracuse Univ., Syracuse.



K. McLEARY

UNIV. OF TEXAS

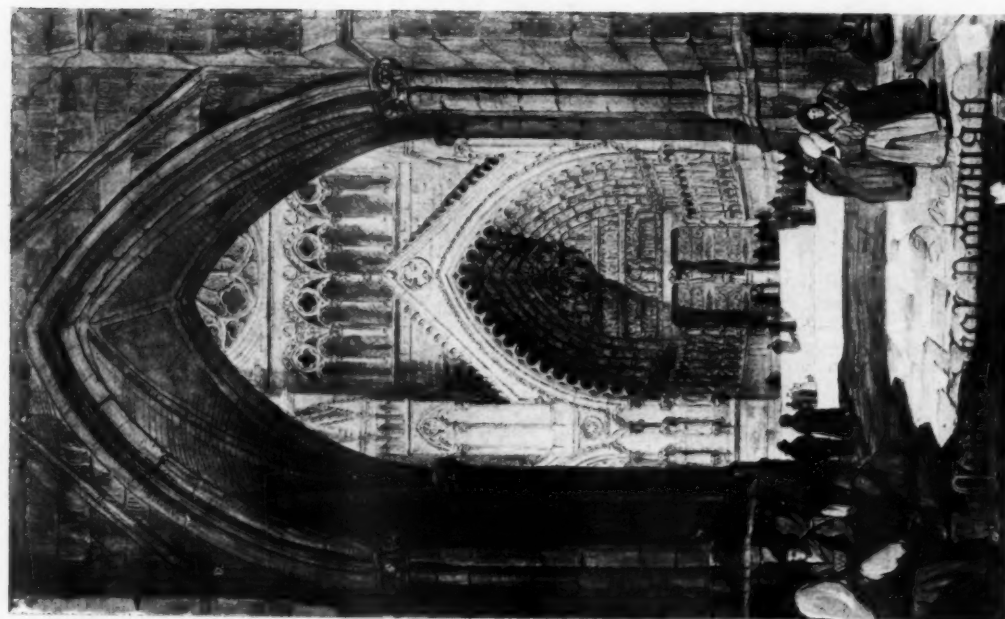
First Mention, Class "B"—III Esquisse-Esquisse—A Ticket Booth for a Motion Picture Theatre



H. W. W. FAULKNER

YALE UNIVERSITY

First Mention, Class "B"—III Esquisse-Esquisse—A Ticket Booth for a Motion Picture Theatre

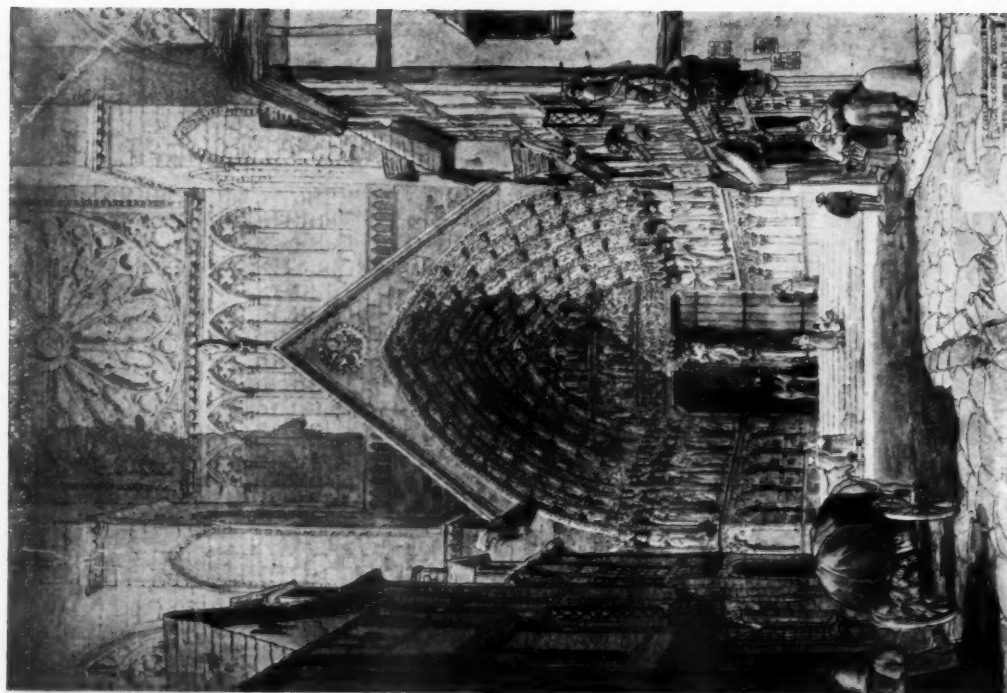


UNIV. OF PA.

SECOND MEDAL

L. ROMBOTIS

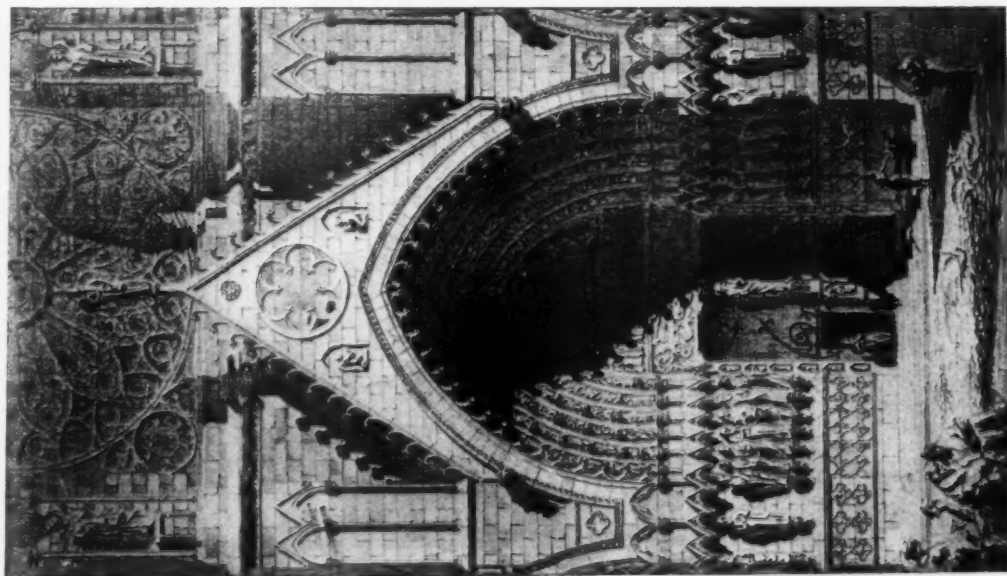
CLASS "A" AND "B" ARCHÆOLOGY—III PROJET—A GOTHIC CATHEDRAL DOORWAY
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



UNIV. OF PA.

SECOND MEDAL

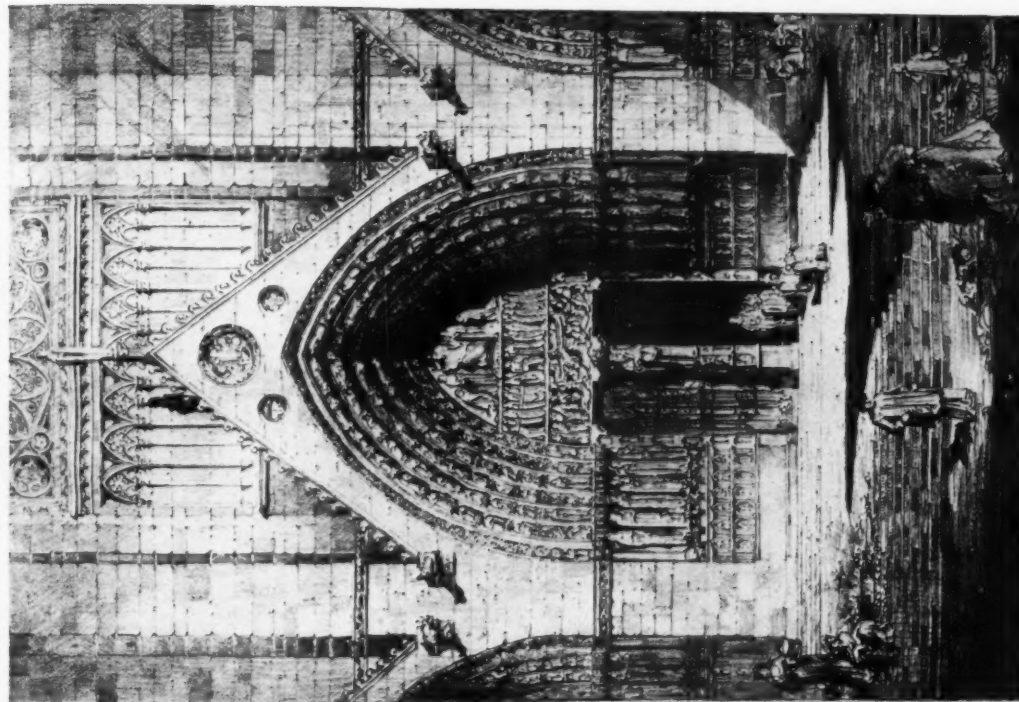
W. E. WILLNER



N. B. MEAD, JR.

SECOND MEDAL

COLUMBIA UNIV.



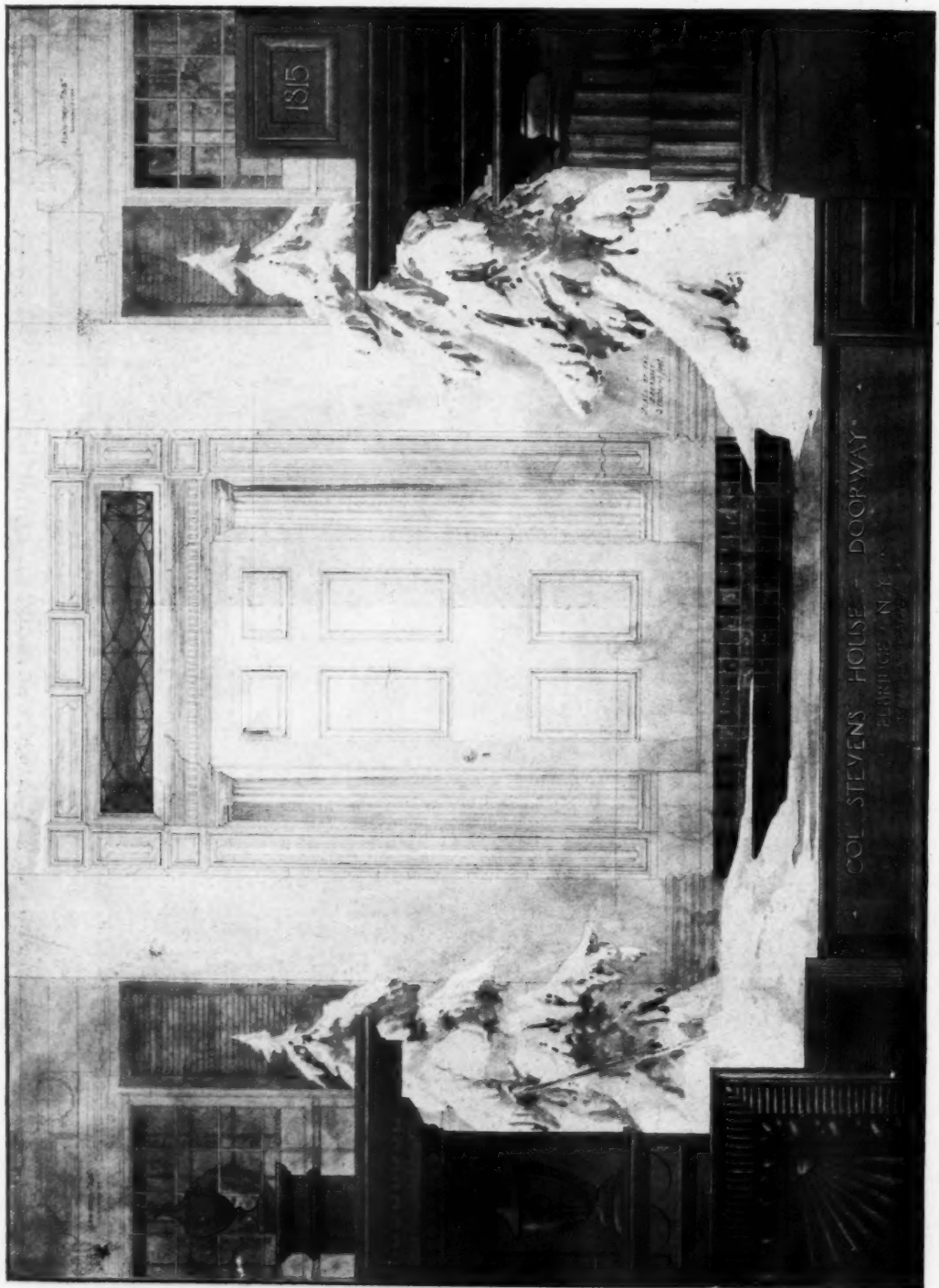
D. M. CAMPBELL

SECOND MEDAL

COLUMBIA UNIVERSITY

CLASS "A" AND "B" ARCHÆOLOGY-III PROJET—A GOTHIC CATHEDRAL DOORWAY

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



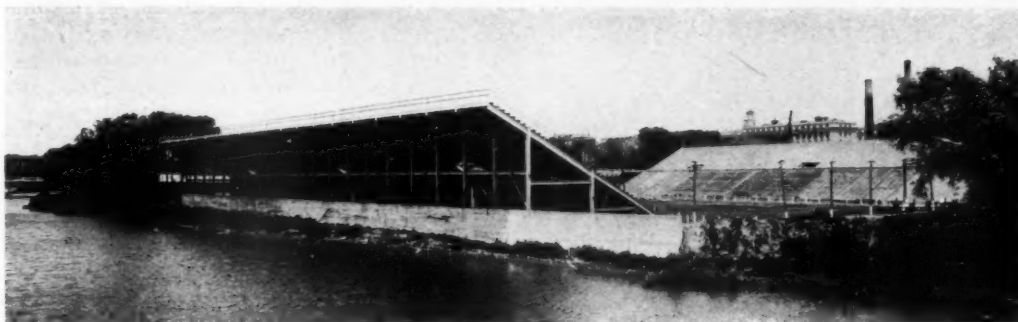
UNIVERSITY OF SYRACUSE

SECOND MEDAL

CLASS "A" AND "B" ARCHÆOLOGY-III—MEASURED DRAWING
DOORWAY OF COL. STEVENS' HOUSE, ELBRIDGE, NEW YORK
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN

E. MALCZEWSKI

DEPARTMENT OF ARCHITECTURAL ENGINEERING



General view of the stadium with river bank section in the foreground, the back seat of which is about 50 ft. above the water

AN ALL-STEEL STADIUM AT THE UNIVERSITY OF IOWA

THE stadium has become an important part of the equipment of the college and university. In some cases it is built in connection with large high schools. The cost of these structures, if fireproof, has prevented many institutions from building them and they have been compelled to make use of wood constructed stands. These are objectionable for several reasons, among which are liability to decay, deterioration in strength, expense of maintenance and danger from fire. There have been instances where serious injury has occurred to persons from the burning of grand stands. Any scheme of construction that will make possible the erection of durable and fireproof stadia and grand stands, is well worth consideration.

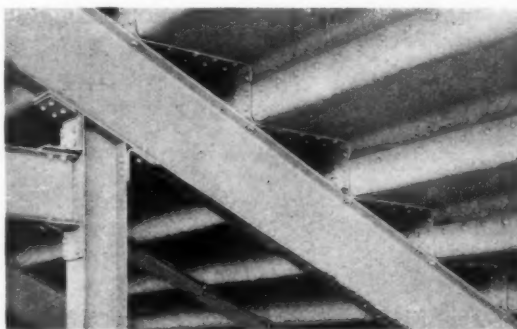
Some of the older stadia, built in the early days when the art of reinforced concrete was being developed, were not entirely successful from a structural standpoint. Deterioration in surface finish and cracks due to temperature stresses or

improperly designed foundations are quite common. Those constructed in these days give every promise of being entirely successful. Two notable examples are now under construction, one for the South Park Commissioners located in Grant Park, Chicago, and one at the University of Illinois.* Every precaution has been taken in these to secure satisfactory results. The use of these two stadia differs quite materially and the designs are made accordingly.

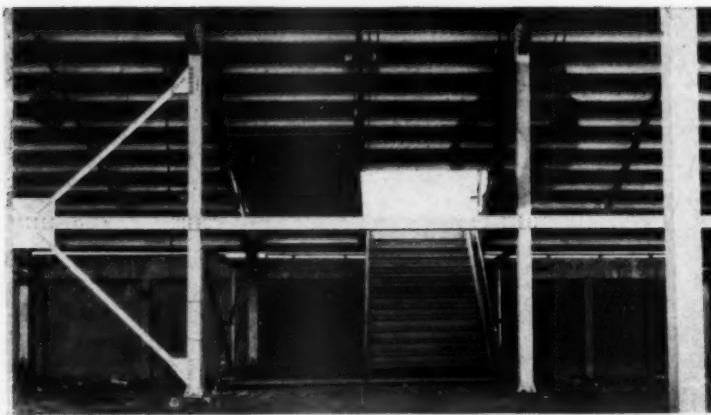
A new type of grand stand used in connection with a collegiate athletic field has been constructed at the University of Iowa located at Iowa City. It was designed by B. J. Lambert, Professor of Civil

Engineering, during a study for the improvement of the athletic field, while he was chairman of the Board in Control of Athletics. An unusual location of the athletic field had an important influence on the design. The field is

*Holabird and Roche, architects; H. J. Burt, consulting engineer, Chicago.



Underside of seat plates, supporting beams, angles and columns



Underside view of section over the railway track. The steel entrance and exit stairs, shown one up and one down, are counterweighted and easily operated. These entrances cannot be "rushed" by a crowd and when closed and chained up they are fairly "mob proof." The absence of interior cross bracing affords storage space and other uses

between the Iowa River and the Cedar Rapids-Iowa City Electric Railway. The older section of the stand is of concrete and twenty rows deep. On one side it is within 10 feet of the railway and the other side is at the river bank. To secure added seating capacity it was necessary to cantilever the structure over both the river and the railway or remove the athletic field to another location. It was this unusual condition and the endeavor to meet it, that led to the present design.

On the river side a concrete wall supports the outer row of steel columns. The four outer rows of columns and their foundations are designed to support a second deck which may be built in the future. The main 24 in. supporting I-beams and the seat plates are designed with an adequate factor of safety. Wind bracing is provided in all directions. Over the electric railway the cantilever beams are 18 in. I-beams supported on 8 in. H-columns. This side is also designed to support a future double deck.

The seat plates are of $\frac{3}{8}$ in. steel bent Z-shaped with 24 in. treads, and are riveted together at the center of the riser with a lapped joint. The upper plate overlaps the lower, making the joint waterproof. The supporting I-beams are spaced 17 ft. on centers and the seat plates are butt-spliced over this beam and also bolted to its upper flange.

The seats consist of 2 x 10 in. cypress planks supported on cast iron stools to which the planks are bolted close to the edge to prevent cupping. The

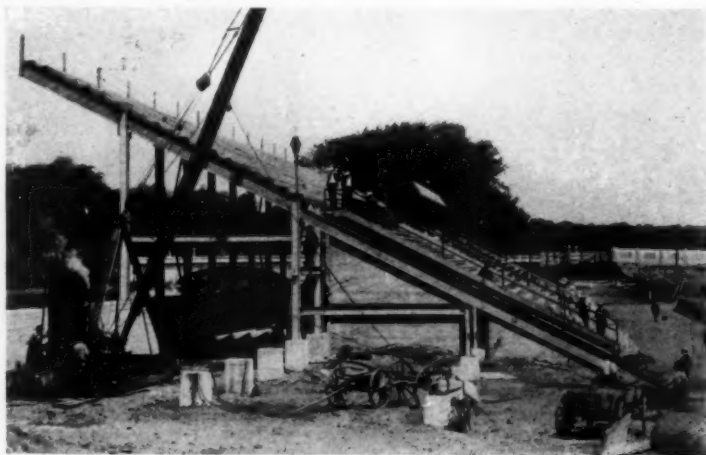
stools are placed 4 ft. 6 in. on centers and are attached to the step plates by machine bolts screwed into tapped holes.

If it were desirable to change the pitch of the steps it readily could be done, preferably by changing the risers in groups of about ten seat plates. Whatever height of riser is used, the seat height can be maintained constant by varying the height of cast iron stools supporting the plank seats. The allowance of 18 in. seat width per person has proved to be very satisfactory for this kind of usage.

The danger of this type of stand being noisy was considered and its use showed that there was practically no noise

whatever. The heavy plates have no tin pan effects; the shocks and noises are absorbed in the structure. This is due probably to its rigidity and weight. The structure was painted with an exterior lead and oil paint used for exposed steel structures. The unexposed surfaces probably will not require repainting in eight or ten years while the exposed surfaces may require repainting every two or three years. This could be done quite economically with a mechanical spraying machine.

In this structure the seat plates were shipped shop-riveted in sections of three plates and the field connections between these sections were field-riveted. The different sections fitted very nicely in the field and the cost of erection was not far from \$10.00 per ton. There seems to be no good reason why field bolts could not be used with entire satisfaction for all field connections.



Erecting the river bank section

Round headed bolts with lead washers were used to connect the plates to the beams.

One of the great advantages of this type of construction lies in the possibility of its ready removal to another site in case it was ever found necessary. In these days of rapid change, it is easy to see that a field and stadium that are adequate now may be entirely inadequate in ten years or so. In such cases the steel stands can be readily taken down and moved, added to or double decked—all with 100 per cent salvage. In the case of reinforced concrete, the salvage is nothing and the expense of wrecking, removal and disposal of waste is considerable.

An architectural treatment can be secured by covering the rear with a frame of angle irons, metal lath and stucco. By this means almost any desired architectural effect may be secured.

The estimated weight of this structure complete, built of all-steel construction is approximately 100 lbs. per seat of 18 in.

The cost of the steel in this stadium, fabricated, erected and painted was about \$80.00 per ton, costing \$4.00 per seat. The cost of footings and seats was about \$1.00 per seat, making the total cost about \$5.00 per 18 in. seat. With steel at \$100.00 per ton fabricated, erected and painted, the cost would be about \$6.00 per 18 in. seat. Plates $\frac{1}{4}$ in. thick would have sufficient strength to span 17 or 18 ft. with a 12 in. riser and a 24 in. or more tread. This $\frac{1}{4}$ in. thickness of plate represents



Main seat plates and supporting beams, cast iron seat stools and cypress plank seats. The plates were bent cold to a short radius with a slope of about $\frac{1}{2}$ in. to provide drainage. Butt joint splice plates shown, to which additional sections can be connected

sents a cost of about 60 cents per 18 in. seat with steel costing \$100.00 per ton.

This design has been patented and license to use the design will be granted for a nominal fee per seat constructed.

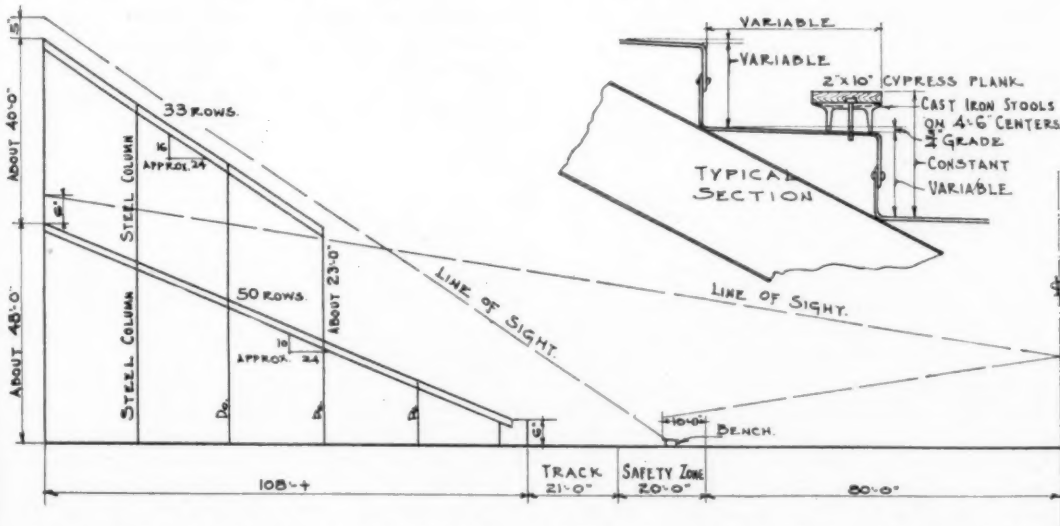


Diagram of single and double deck stand, showing the division of the field, sight lines, elevations and a detail of the seat plates with variable and constant dimensions

EXCESSIVE FLOOR LOADS SPECIFIED FOR SCHOOL BUILDINGS

BY NORMAN M. STINEMAN

A WIDE variation in the live floor loads for which school buildings in different cities must be designed is indicated in the following table, based on the requirements of a number of building codes selected at random. No attempt has been made to investigate all building codes available. The table follows:

Building Code	Live Loads in lbs. per sq. ft.		
	Class Rooms	Corridors and Assembly	Halls
Milwaukee	40		60
Flint, Mich.	40		70
Baltimore	50		75
Omaha	50		75
Seattle	50 — 75	75	—100
Detroit	50 — 60		80
Portland (Ore.)	60		75
Ohio State Code	60		80
Wisconsin State Code	60		80
Boston	60		125
Cincinnati	60	80	—100
New Orleans	60		125
Memphis	70		100
Bayonne, N. J.	75		90
Chattanooga, Tenn.	75		100
Columbia, S. C.	75		90
Everett, Wash.	75		125
Minneapolis	75		100
Newton, Mass.	75		125
New York City	75		100
St. Louis	75		100
Galveston, Tex.	100		125
Great Falls, Mont.	100		125

In Detroit the specified floor load is 50 lbs. per sq. ft. in class rooms with fixed seats, and 60 lbs. with movable seats. In Cincinnati the required floor load is 80 lbs. in corridors and 100 lbs. in assembly rooms. In Seattle the specified load is 50 lbs. in class rooms seating less than 100 pupils, 75 lbs. in class rooms seating more than 100 and in assembly rooms with fixed seats, and 100 lbs. in assembly rooms with movable seats. In Boston and New Orleans the load of 125 lbs. per sq. ft. applies to assembly halls only.

A glance at the above table will readily explain why it is that school buildings in some cities seem to cost too much money. The table indicates also that the requirements of state building codes and those of large cities are not so severe as those of medium sized cities. The reason for the difference is that states and large cities have better facilities for revising their building codes and

that on the average they *do* revise them more frequently than the smaller cities do; consequently the code of the large city is kept more nearly abreast of modern ideas.

Cities that require school building class rooms to be designed for a live floor load of 100 pounds per square foot, and the corridors, assembly halls, and laboratories for 125 pounds, are practically demanding warehouse loading for school rooms. They are wasting the money in their treasuries which is contributed by their own taxpayers.

A good way to obtain an estimate of the actual live floor load in school buildings, or any other buildings for that matter, consists in actually weighing or computing the weight of the school furniture, adding the estimated combined weight of the people occupying the school room, allowing additional weight for books and similar objects, then dividing the total weight by the area of the school room. A fairly accurate estimate can be made without the necessity of conducting an actual test. A standard class room is 23 by 32 feet in plan and has a capacity of 45 pupils. The floor area is 736 square feet. The weight ordinarily imposed on the floor may therefore be estimated by assuming the average weight of the pupils and the teacher at 100 pounds, making a total of 4,600 pounds. The weight of 45 desks at 40 pounds each is 1,800 pounds. The teacher's desk, including the books and papers in it, will weigh hardly more than 400 pounds. The books in the possession of each pupil may average as much as 10 pounds per pupil, making a total of 450 pounds. Allowing 250 pounds for a few small charts or other minor objects, we obtain a total live floor load of 7,500 pounds, or only slightly more than 10 pounds per square foot of floor area.

Ten pounds per square foot may therefore be considered the average live floor load in a class room. The *maximum* floor load may be estimated on the assumption that the room would occasionally be filled with grown people, two persons occupying each seat and 30 people standing around the walls, making a total occupancy of 120 persons having an average weight of 150 pounds, or a total weight of 18,000 pounds. The other items would remain as in the first estimate, so that the total weight would be 20,900 pounds, or an average of 28 pounds per square foot. This figure can surely be accepted as the extreme load likely to be imposed on a class room floor.

What, then, is the excuse for specifying loads

such as 100 pounds per square foot, as some cities do, or even 75 pounds, specified in many large cities? The 60-pound load specified by the state codes of Ohio and Wisconsin, although in line with modern practice, seems very conservative in view of the facts.

Perhaps city officials, or those responsible for the requirements of building codes, do not fully comprehend the effect of needlessly heavy floor loads. When the specified load is two or three times as heavy as necessary, the excess weight obviously requires the floor to be designed to carry a load which never will be imposed upon it. It is equally obvious that the floor itself will be considerably heavier than it would be if it were designed to support a reasonably heavy live load. Consequently this additional dead weight of the floor must be added to the excess live load in order to obtain a proper conception of the waste involved. The sum of the increased dead load and the excess live load represents the additional and wholly unnecessary weight for which the columns, the foundation walls, and the footings must be designed. This additional weight is imposed at each floor level, so that the effect of an excessive live load is cumulative in its nature, increasing the weight and the cost of the building at every step from top floor to footings.

Certainly the loads specified in the building codes of Wisconsin and Ohio could be accepted as the maximum necessary, inasmuch as they still

leave a large margin of safety. There is ample justification for the lower figure specified in some cities. Because of the large volume of school building work in prospect, cities in which the required floor loads are excessive should lose no time in eliminating this wasteful requirement. School buildings of a high grade of construction (and progressive communities want no other kind) cost quite enough under the most favorable conditions.

Note: We cannot quite agree with Mr. Stineman's acceptance of a 60-pound live load when he figures a probable maximum load of 28 pounds. We think 60 pounds is altogether too conservative. It is probable that his acceptance of 60 pounds arises from a desire to avoid "frightening" anyone by suggesting a figure which on first impression might appear extremely low. This is indicated in the last paragraph of his article, where he suggests that there would be ample justification for a figure lower than 60 pounds.

It is obvious that if a live floor load of 40 pounds per square foot is sufficient for the school rooms in Milwaukee, the load of 75 pounds specified in New York City and the load of 100 pounds specified in Galveston must be excessive and represent just so much waste. We are not aware of any structural weakness in school buildings in cities that permit loads of 40 pounds per square foot.

The conversion of a schoolhouse into other uses is infrequent and it is safe to design for continuous school occupancy. It seems as though the live load for class rooms could well be limited to 40 pounds per square foot or less. This would permit their use as laboratories, offices or any other purpose except commercial warehouses and such occupancies. The loads for corridors and assembly halls could well be limited to 60 pounds or less per square foot.—Editors.

Bureau of Standards Tests Weathering of Limestone

A SERIES of tests to determine the resistance of limestone to frost action is now under way at the Bureau of Standards.

Small samples cut from the stone are soaked in water and are then frozen. After freezing they are put back in the water to thaw.

Of the samples tested many showed serious disintegration after they had been frozen seventy-five times. Others have now been frozen as many as eight hundred times and show as yet no serious disintegration. The samples come from different localities; and when the tests are completed the data will be of value to architects in the selection of building stone.

Limestone is now used extensively as a facing stone. It is less expensive than granite and more easily cut, which makes it quite popular. It is not so durable as granite, however, and is apt to show surface weathering within a hundred years.

Other tests being undertaken at the Bureau have to do with waterproofing compounds. The purpose of such compounds is to lengthen the life

of the stone and prevent the absorption of unsightly stains.

Wood in Sports

IT is believed that man evolved from his animal ancestry in some ancient forest. He probably lived on trees in the childhood of the race and ever since he has been dependent on trees and wood. Somebody has pointed out the extent of the consumption of wood in one of its minor phases, namely, in the recreational world. More than 25 million board feet of 32 different species of wood are used every year in the United States in the manufacture of equipment for sports. Among the forms of such equipment are dumb bells, wands, trapezes, vaulting horses, Indian clubs, horizontal bars, reins and other pieces of apparatus. Canoe paddles, row boats and oars, fish poles and baskets, croquet mallets and croquet balls are wood products. Then, too, wood enters into golf clubs and tennis racquets, base ball bats, Lacrosse sticks, roller skates, ten pins, bowling alleys, bowling balls and pins, billiard cues, billiard tables and counters.—*National Lumber Manufacturers Association Information Bureau.*

A SOUND ABSORBING PLASTER

BY ARTHUR L. FOLEY*

IN discussing with a number of architects the subject of building acoustics the writer has been led to the conclusion that many of them are more or less indifferent to the question, and that their indifference is due to their skepticism as to the existence of a real science of architectural acoustics. This skepticism is easily explained.

When most of these men took their college degrees there was no such science, not even the semblance of such a thing. A thorough examination of the literature of the subject, so far as there was any, would have revealed nothing more definite than the statement that, for good hearing, the dimensions of an auditorium should be in the ratio 1:1:2, according to other writers 2:3:5, while still others maintained that the ratio should be 2:3:4; that pieces of statuary, vases, etc., should be placed about the room to insure good hearing, as in the old Greek theatres; that all auditoriums should be elliptical because the Mormon Tabernacle is elliptical and is good acoustically; that poor acoustics can be corrected by stretching wires about the room; that plaster on walls and ceilings should be left in the rough and not smooth coated, and other such statements—all without any foundation in either theory or experiment. As long, I say, as such ideas were the only ones a student could find in the literature of the subject, architects cannot be censured for steering clear of the question.

There was not even a suggestion of such a thing as a science of architectural acoustics until the year 1898 when the late Professor Wallace Clement Sabine, of Harvard University, published his first paper on the subject in the proceedings of the American Institute of Architects. This paper was followed at intervals by ten others, the last one published in 1915. At the time of Professor Sabine's death in 1919, his researches represented practically all that had been discovered and his publications contained all that was known on the subject of architectural acoustics. But by him the subject had been taken from the domain of fallacy and guesswork and elevated to the plane of a real science. Much remains to be done, and is being done, as in any other science. But enough has already been done to make it absolutely inexcusable on the part of any architect to plan a building with acoustics so faulty that thousands of dollars must be spent for its correction. Rather should I say, in its improvement, for the methods used in acoustic correction can correct perfectly

for excessive reverberation but cannot correct perfectly for unequal sound distribution due to the shape of the room.

A few months ago the writer visited a city in Michigan which had lately completed a fine memorial building. On the completion of the building the acoustics of the auditorium had proved to be so bad that the city and county had gone to an additional expense of several thousand dollars to correct the trouble. Though much better than before the "correction," the hearing was not good. A glance at the plans of that auditorium would have been sufficient for their condemnation (from the standpoint of good hearing) by anyone who had digested Sabine's papers or who had learned to interpret such pictures as were published by the writer in the November 8, 1922 issue of *THE AMERICAN ARCHITECT*.

One reason for the fact that architectural acoustics is a so seldom applied science is that the few who know it are slow in bringing it to the attention of those who would be most vitally interested in it if they but understood it. It would seem that a physics textbook is the proper place for bringing before science students a few of the fundamental principles of the subject—sufficient, at any rate, to arouse the interest of prospective students of architecture. Of twenty college texts in physics now lying on my table only three mention the matter at all, and but one of the three gives even a brief discussion of the topic. Of eight institutions having either departments or schools of architecture I have failed to find one whose catalog mentions the subject, directly or indirectly, notwithstanding the fact that these eight catalogs list more than sixty different courses that are entirely within the departments or schools of architecture, and many more which are given in other departments and schools but are open to students of architecture. Ventilating, decorating, seating, seeing, plumbing, heating, lighting,—are all cared for by special courses. Hearing is left to chance. There is nothing to suggest that an auditorium is a place for auditors.

If there is an architect, a builder, anywhere who doubts the deductions of architectural acoustics and who thinks that the acoustics of a room are largely a matter of chance and largely independent of the materials of construction (and there must be many such since no attention is given to these matters in making their plans and specifications) he has but to visit the Riverbank Acoustic Laboratory at Geneva, Illinois. He need not study curves and data, witness experiments or

*Waterman Institute for Research, Indiana University, Bloomington, Indiana.

perform any himself; he needs no apparatus. All he needs to do is enter a room, speak a word or two, pass into an adjoining room, and speak the words again. These two adjoining rooms are in a concrete building of modern fireproof construction. The rooms are of exactly the same size and shape, both have painted cement floors, windows and doors of the same number and size and in the same relative position with respect to one another, the doors being of steel. In fact the rooms are identical in every respect save one. The side walls and ceiling of one of the rooms are plastered with unfibred gypsum plaster applied to six inch hollow clay tile, with what is known as a "lime putty finish." The other room is plastered with a scratch coat of ordinary gypsum plaster, over which is a coat of sound absorbing plaster about one-half inch thick. The difference in the acoustics of the two rooms is so pronounced as to be startling. No one in passing through these rooms for any purpose whatever could possibly fail to notice the difference. The difference in the sound of one's footsteps would surely attract one's attention, even if no other sound were made. In the one room the reverberation is very pronounced; in the other the sound is quite "dead." Conversation is rather difficult in the former, and music in it would be anything but pleasing.

The writer found the acoustics of the two rooms so strikingly different that he concluded to make some measurements for publication in a short paper on the subject, in an endeavor to arouse the interest of architects in the little used but exceedingly useful science of architectural acoustics. The two rooms were built and are being reserved, unoccupied, for the sole purpose of convincing the skeptical or indifferent visitor.

In small or moderate sized rooms, due to the rapid succession of wave reflections from floor, walls and ceiling (usually low), variations of sound intensity from point to point in a room are of much less moment than is the reverberation resulting from those reflections. The rooms in question are, in round numbers, thirty feet square, with ceilings ten feet high. In testing their acoustics the writer made five observations for each of ten different positions of the sound source—an organ pipe. The observations showed the existence of intensity variations—sometimes called sound patterns. However, the intensity differences at different points were not large enough to make the hearing bad from that cause alone. But the reverberation in one of the rooms was very pronounced and the hearing correspondingly bad because of it.

It is evident that the longer a sound is prolonged by reflection after the cessation of the original sound, the greater will be the confusion of sounds at any point. If in a given room (the one with common plaster, for instance) a sound

can be heard for eight seconds after its cessation, there would arrive at the ear of an auditor the waves due to all of the words uttered by a speaker during the previous eight seconds, resulting in very troublesome confusion. The duration of the audibility of the residual sound is consequently a quantity whose values indicate the acoustic quality of the rooms we are considering.

In the following table, column 1 gives the pitch of the organ pipe used as a source of sound, column 2 the duration of the residual sound in room C, the one with common plaster, and column 3 the duration in room A, with a half-inch coat of absorbent plaster:

1 Frequency of Organ pipe	2 Audibility duration Room C, with common plaster	3 Audibility duration Room A, with ab- sorbent plaster
128	8.32 sec.	4.03 sec.
256*	7. sec.	2.7 sec.
512	6.5 sec.	1.0 sec.
1024	5.5 sec.	0.3 sec.
2048	4.4 sec.	? sec.
4096	2.2 sec.	? sec.

*Middle C

It will be observed that, starting with a sound an octave below Middle C for which the absorbent plaster in Room A reduced the reverberation time to less than half its value in Room C, that the plaster became more and more efficient as a sound absorber as the pitch was raised until at two octaves above Middle C the duration of audibility was only one-nineteenth its value in Room C. For sounds of still higher pitch the absorption was so great that the reverberation period could not be measured with any accuracy. As a matter of fact, no high degree of accuracy is claimed for any of the data in the above table. It was raining all the time the observations were being taken, the noise making it impossible to determine the limits of audibility with great precision. Doubtless all the times are shorter than they would have been had there been no noises to drown out the feeble reverberation. However, this point is of little moment so far as the conclusions to be drawn from the data are concerned. It is not a question of the absolute periods of reverberation, but of relative periods. For instance, absolute values would depend upon the sensitiveness of the ear. Relative values would be practically independent of the sensitiveness of the ear, providing only that the sensitiveness be constant.

The apparatus used in making the observations summarized in the table was essentially that described by Sabine and pictured in his second paper.*

*The Accuracy of Musical Taste in Regard to Architectural Acoustics. The Variation in Reverberation with Variation in Pitch. Proc. Am. Acad. of A. and S., Vol. XLII, Collected Papers on Acoustics, p. 91.

Calculations from the rough data given show that the absorption coefficients of the absorbent plaster are many times as great as are those of ordinary plaster, especially for the higher tones which are important in music and speech. The acoustic properties of this material are so remarkable and promise to be so useful that a much more complete study of it should be made and published.

The materials employed consist of granulated slag, now produced in large quantities from steel furnaces, and a specially prepared bonding material of magnesium oxide and magnesium chloride. The choice of materials, the method of preparation of the separate ingredients and of mix-

ing, all with a view to securing a final product that should satisfy all the requirements of an ordinary plaster, and at the same time be highly sound absorbent have been a matter of some three years of careful experimentation. Its density is little more than half as great as that of ordinary plaster, a point of some importance, both from the standpoint of cost of handling and shipping and in the case of high structures from the standpoint of dead load to be supported.

The development of a material of this character seems to the writer a most valuable contribution to the practical solution of the problems of securing desired acoustical conditions without resorting to the expedient of incorporating felt and similar materials in auditorium walls and ceilings.

To Standardize Symbols and Abbreviations

A RECENT conference held in New York City under the auspices of the American Engineering Standards Committee revealed a sentiment among engineers, scientists, government officials, business paper editors, and industrial executives, emphatically in favor of the unification of technical and scientific abbreviations and symbols.

It was agreed on all sides that the standardization of abbreviations and symbols would result in inestimable mental economies. The present situation with respect to the use of abbreviations and symbols in engineering, architectural, scientific, and other technical fields is comparable to a language which has degenerated into a multiplicity of dialects each of which has to be translated for the users of the others. Abbreviations and symbols constitute an ever growing and important part of the language of engineers, architects, scientists, industrial editors, and other technical men. The use of one symbol or abbreviation for several different terms and the use of several different symbols or abbreviations for one meaning are, however, at present causing a great deal of

confusion, misunderstanding, and, often, serious errors.

The conference was called upon requests from the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the Association of Edison Illuminating Companies, to consider abbreviations and symbols, but after some discussion of the subject it was thought desirable to include as a part of the project, the graphical symbols which are used in architectural and engineering drawings, diagrams, and the like, for representing instruments and apparatus and components of them.

It was agreed that the co-operation of foreign standardizing bodies should be sought, in the development of the work. The importance of international uniformity in symbols is great on account of the international character of much architectural, engineering and scientific work, and the importance of reference books and periodicals in foreign languages.

The work will go forward under a committee organization developed in accordance with the rules and procedure of the American Engineering Standards Committee, 29 West 39th Street, New York City.

THE ARCHITECT AND THE LAW*

IF I were to sum up the elements that enter into the making of a successful architect under present day conditions, and if I were to use the word "successful" in the sense of financially successful, I think that I would put these elements in about this order: business ability, artistic and technical ability, and tact. And, if I were going to use the word "success" in the broader and truer sense of success in putting through creative work, work that is worth while, irrespective of the money remuneration—of doing something worth while in the profession and not simply making money at it—I think that I would still use these three headings, but I would put first the artistic and technical ability and second business ability, and third this same element of tact.

The architect, of course, to be a successful architect in the true sense must have this artistic and technical ability; he must be able to visualize the work that he wants to do, he must be trained on the engineering side and have the technical ability as well.

This third element of tact! I wonder if any of you realize just what an important element that may be in your dealing with your clients and with your contractor. I think it goes further in many cases than real ability. If, as an architect, you are able, in dealing with the contractor who is in difficulties, who is having a hard time on the job and yet means well, to handle him with consideration, without at the same time jeopardizing in any way the interests of your client, it will help immensely in getting the work done on that job. And, if, in your dealing with the owner, you can appreciate his feelings and his intentions, and how the ordinary owner expects usually that the house will be built in half the time it takes to build it, and handle him with the same degree of tact as you do the contractor, that will be a wonderful help to you also.

I said here, when I last talked to you, that if I were going to summarize in any one phrase the most important element in your dealings with your clients, to give to you the most important bit of advice that can be packed into two words, I would say, "Be definite." Be definite with your client as to just what you mean when you are dealing with him. When he talks over his building plans, be definite; find out exactly what it is that he has in mind, and see that he understands the basis on which you are going to deal with him.

I suppose the things that, more than any others, give rise to differences between architects and clients, are the payment for preliminary sketches,

where the work does not go ahead, and the payment of the architect's fee, where the work costs more than he estimated it would cost.

Of course, the law is, that if a man comes to you and asks you to prepare sketches for a house, and nothing else is said and you prepare those sketches and give them to him and he takes them, and if they are what he asked for, you are entitled to recover the reasonable value of the work which you have done. But in ninety-nine cases out of one hundred, the ordinary man, going to the ordinary architect, believes that, when he asks for sketches and looks them over and says, "They are very nice, but I have decided not to build, and here are your sketches," he is under no obligation to the architect. He thinks that the architect has presented those sketches on the chance that he may be going to build, and that, if he does build, the architect will then make more detailed sketches and plans and will be paid for those, but that, if he does not build, he is to be under no obligation to pay for the preliminary sketches.

This situation should be covered, preferably in writing—at the least covered in the form of some oral statement to the owner when he comes to see you—so that the owner will know that you expect to be paid for your sketches, and paid a certain definite agreed amount, whether he proceeds with his building operation or whether he does not proceed with it.

There is another point which is of yet more importance to an architect, because it may cost him not only what he would have gotten for the work that he has done if he received payment, but in addition, a large amount in damages. I refer to your statements to your clients regarding the cost of the work. Of course, it is the most ordinary and reasonable thing in the world, if I come to an architect and ask him to give me plans for a building, that I should ask him what that building will cost, and it is entirely reasonable that he should say, "I should say it would cost approximately so many thousands of dollars." Now the client goes ahead and erects the building and it costs twice that sum, and a dispute arises at once on the claim by the client that the architect guaranteed in effect that the building would not cost more than \$100,000. when it in fact cost \$200,000.

I have a case now in my office where a man went to an architect and told him that he wanted to erect a building at a cost of approximately \$100,000.—a private house. It was the alteration of an old building, and the architect made some preliminary studies and the client paid him for them. Then the architect said, "I think you are foolish to attempt this alteration. I think the

*Lecture delivered by Clinton H. Blake, Jr., to the Students of the School of Architecture of the Massachusetts Institute of Technology.

thing to do is to tear down this semi-Colonial—Early Pullman style of architecture. I can build you a new house, a much better house than you can get by changing this old one, and it won't cost you over \$125,000." The client said, "Go ahead," and they went ahead, and the client and contractor, on the recommendation of the architect, signed one of these cost plus contracts. The cost today is about \$220,000, and the end is not yet.

Now, there is a very pretty question involved in that case. As this letter of the architect is worded (I happen to represent the owner in this case), and on the basis of his talks with my client, there is a very pretty question, whether he did not in effect guarantee to the client, and say to him, in substance, that that building, based on his expert knowledge as an architect, would not cost more than \$125,000, and whether the client was not justified under the circumstances in that case in depending on that statement, and also on the recommendation that he build it on the cost plus basis, and, when it costs him twice that, whether he cannot get damages.

That is an unusual case, but a perfectly possible case in the practice of every architect, and the best way is to have a short memorandum form of contract, or a more elaborate one if you will, setting forth just what your relationship is, setting forth that when your preliminary studies are made you are to be paid a certain proportion based on the estimated value of the building stating what this estimated value is, so that when your certain per cent becomes due there is a guide there by which to measure. If the work is not gone ahead with, you have all the figures necessary to determine what amount is due. If the work does go ahead, then your fee is based on the actual cost.

On the other hand, it is a simple matter to put in the contract a statement that the architect, in giving estimates, merely does so as a convenience to his client, and does not guarantee that the building will be put up and completed for the estimate he gives.

There are various forms of contract. There is one simple form which is not really a contract at all, but which is much better than nothing, which one architect uses. He prints on a sheet of paper, "Professional Practice of John Jones." Under that, he lists just what his charges are and he hands to a client one of these sheets and says: "Here is a form or statement of what my charges are." Usually, the man takes it and does not look at it. But in a number of cases for that architect we have been successful in holding that, when he gives that statement to a client and the client says to build the house, he does it on the basis of that statement and that is a contract.

It is much better to use a contract in a more definite form, either to use the Institute form of contract, or, better, to use a form drawn up with

the peculiarities of your own practice in view. The Institute form is the best, I presume, that could be done with a standard form, but personally, I am not in sympathy with some of the clauses in it, nor with the way in which it leaves things wide open to arbitration on a great many points. Arbitration is a good thing in moderation, but there are some fundamentals that ought to be definite and not so worded that if the contractor sees fit to "lie down," you have got to have arbitration. I think, too, it takes away some of the authority of the architect which he should have. The firmer the position of the architect as supervisor—as arbitrator in the sense in which I have used that term—the firmer that authority is, the better, in a great many ways. You have a trained man in the architect, trained in that particular job, a man that the contractor accepts, and the client accepts. It is very much better to make his judgment just as final as it can be, and the client and contractor, each of them, should be encouraged to make him the judge as far as can properly be done within the limits of his work.

Of the other forms of contract that you can have, there are two or three different forms that are in use by various architects. One is the short form, which consists of about twenty lines on the front of the sheet and about one thousand on the back, and it simply says that the owner (giving his name) employs the architect to perform the following work on the following building. (Then four lines are left blank. The usual words filled in here are "to prepare plans and studies, prepare working drawings, etc." That is all you need.) It then provides that the client will pay you the fixed commission, the compensation of ten per cent, or whatever it may be, on the actual cost of that building, payments to be made in accordance with the conditions printed on the back of the agreement, and then a clause that the architect accepts the agreement and agrees to give his best attention to the work. It is so worded as to protect the architect and yet be fair to both sides.

On the back are certain provisions covering these various points, and a great many others. It looks very informal, and there isn't anything in it, even though all this printing on the back is carefully read, at which the owner need shy at all. Many architects have an idea that you cannot go to a client and ask him to sign a contract—that you will lose your client. Practice shows that, where this is done—in the offices where the contract plan is adopted—this is not true. It is not true because the ordinary man who is going to build a house or any sort of a structure is a business man and would prefer to have an agreement with his architect and to know exactly where he stands, before he goes ahead. If I were to employ one of you as my architect, I should wish to know just what your charges were going to be.

DEPARTMENT OF SPECIFICATIONS

SPECIFICATIONS FOR BRICK MASONRY

THE first paragraph in Brick Masonry specifications should refer to the General Conditions of the contract as has been suggested heretofore for other sections.

The second paragraph is to be devoted to the Scope of Contract in which there should be scheduled all major portions of Brick Masonry work that are to be done by the contractor. These specifications may include the furnishing of stone such as granite and limestone or as is often the case, they may include only the setting of this material after delivery at the building site. Where the stone has been cut in a district away from the site of the building, it must be delivered to the locality in which it is to be used. The brick masonry contractor then probably would receive the stone on railroad siding and transport it to the building. The furnishing of stone must be made sufficiently clear so that responsibility for handling it may be placed on the person who properly should be held accountable for its condition.

Other items such as anchors for granite and limestone or sandstone and miscellaneous anchors that may be used for carpentry work or other purposes, may properly be included in brick masonry specifications. There are a number of other miscellaneous items that the contractor for this portion of the work is often called upon to furnish and all such items should be listed in the schedule of work to be included, rather than to leave the character of the work to more general terms.

Occasionally, more especially in small operations, the brick masonry contractor may be called upon to include the furnishing and setting of terra cotta. Probably in most cases the setting of terra cotta is done by the brick masonry contractor, quite often under the supervision of an expert setter in the terra cotta contractor's employ. The scheduling of the various items may be somewhat as follows:

- a. All common brick masonry
- b. All face brick masonry
- c. All firebrick work
- d. All hollow tile wall partitions and furring work
- e. All clay tile flue lining
- f. All glazed tile wall coping
- g. All gypsum block partition and wall furring
- h. All special brick masonry such as that for hearths, surrounds, and linings of fireplaces

- i. All concrete block work
- j. All waterproofing materials, such as liquids used for making mortar waterproof, or materials used for making parapet walls watertight
- k. Raggle blocks for receiving roof or other flashings
- l. Setting of stone and terra cotta, including where necessary the receipt at point of delivery when material is shipped from out of town
- m. Pointing and cleaning down of all common and face brick work and all stone and terra cotta
- n. Other items peculiar to the special work

The above schedule would contemplate the use of foundations of concrete or of brick masonry or other similar materials. If rubble stone is to be used for foundation work, it should be scheduled at the head of the list so that it will be in its proper sequence.

As has been suggested heretofore, it is quite as important to schedule work not included in the particular section for which specifications are being written if there is any reason for the assumption that the estimator may include masonry work that the contractor usually does, but which is to be done by another contractor. The most important of these exceptions is concrete masonry. There may be other branches of the work that are scheduled above, such as the setting of stone or terra cotta that should be excluded if necessary. The paragraph devoted to work not included should be treated as being quite as important as the paragraph devoted to scope of contract.

The specifications then should schedule the drawings that are to be furnished to the contractor for purposes of estimating and to indicate the complete set of drawings that will form part of the contract documents.

The next paragraph should specify the quality and character of workmanship that is to be expected. If the specification writer is satisfied to permit Articles 11 and 12 of the General Conditions of the Contract of the American Institute of Architects, to control this subject, nothing more need be said; however, it is quite often expedient to emphasize the necessity for good work, even though it be repetition. This may be worded somewhat as follows: "All work which is to be performed under this contract shall be done by mechanics skilled in their respective trades, in order to produce first-class construction and installation of the work. Mediocre workmanship will not be acceptable."

The next paragraph should include a statement as to the general quality of materials, and should be followed by separate paragraphs describing the desired characteristics and governing or limiting factors of each material. The first two paragraphs may read as follows:

"All materials that are to be furnished hereunder shall be the best of the kinds as specified, subject to the approval of the Architect.

"Samples of all materials shall be delivered to the Superintendent at the building site or to the office of the Architect, when or as directed by the Architect, for his written approval."

MISCELLANEOUS SPECIFICATION DATA

Believing that readers will appreciate suggestions regarding actual wording of specifications, and the accumulation of data that must be referred to when writing specifications, this department will devote a portion of its columns in each issue to the reprinting of specification clauses that have been used successfully on operations in different parts of the country. No attempt will be made to follow any certain sequence in the suggestions thus given.

The following clauses are taken from a specification for Concrete Masonry for a two story and basement fireproof constructed commercial building, built by owners who desired the best materials and workmanship:

TESTING OF CEMENT:

All cement will be tested by a Testing Engineer employed by the Owners. All facilities shall be provided for obtaining samples of cement at such times as to enable the testing engineer to make tests and submit reports on same before the cement has been incorporated in the work.

Copies of reports of all tests will be sent to the Contractor and to the Superintendent on the premises.

Unless otherwise approved by the Architect, all tests of cement shall be made from the material as it is delivered at the building. A sufficient amount of cement shall be kept on hand at the building site to enable making of seven day tests before cement is used.

WRECKING OF OLD FOUNDATIONS:

All buildings now occupying the premises, including all enclosing walls and all pipe, fittings and other equipment, down to and including the existing first story floor construction will be wrecked and removed by others. All rubbish falling into the basement spaces will be removed by others.

This Contractor shall wreck and remove from the premises all of the existing foundations, footings, all sidewalks and curbs and all other parts of the building below the first floor construction, the removal of which will be necessary for the

proper reception, construction and installation of all work shown on the drawings. Walks and curbs shall remain until just prior to installation of new work.

All wrecked and removed materials and rubbish shall become the property of this Contractor, shall be removed from the premises and, if there is any salvage in such materials, the value thereof shall be taken into consideration in preparing the bid. All wrecking and removal shall be done in such a manner as to cause the least possible disturbance or damage to the adjoining properties and in such a manner as to comply with all state and municipal laws or ordinances and as directed by the Architect.

This Contractor shall examine carefully the condition of the West wall of East adjoining building and if any part or parts of it are found to be in a condition that would endanger seriously the stability of the adjoining structures when any parts of the present structure below the level of top of first floor construction forming lateral supports are removed, he shall report all pertinent facts to the Architect before proceeding with the wrecking.

CONCRETE PROPORTIONS:

The unit of measure shall be the barrel, which shall be taken as containing 3.8 cubic feet. Four bags, each containing 94 lbs. of cement, shall be considered the equivalent of one barrel. All cement shall be measured in its packed condition, in its original container and in no other way. Fine and coarse aggregates shall be measured separately as loosely thrown into the measuring receptacle.

All reinforced concrete except that for cash vault and all plain concrete below elevation plus 123'0" unless otherwise indicated on the drawings, shall be composed of one part of cement, two parts of sand or fine aggregate and four parts of stone or coarse aggregate. The concrete for cash vault walls, floor and roof shall be mixed in the proportions of one part cement, one and one-half parts sand and two parts coarse aggregate. The proportions of the two aggregates shall be varied, if ordered by the Architect, so as to produce the maximum density.

Except where otherwise particularly specified or indicated, plain concrete mixture for work which is not reinforced, shall consist of one part cement, two and one-half parts of fine aggregate and five parts of coarse aggregate.

MIXING OF CONCRETE:

All concrete shall be machine-mixed in a mixer of a type which will mix one batch at a time and discharge it before another is introduced. The mixer shall be operated at least one minute for each batch at such a rate as to turn the concrete

over at least once for every revolution. The use of an automatic measuring mixer is prohibited.

The ingredients of concrete shall be mixed thoroughly to a plastic consistency unless the Architect directs a stiffer or drier mix and the mixing shall continue until the cement is uniformly distributed and the mass is uniform in color and homogeneity. The consistency shall be varied to suit the particular detail of construction and reinforcement. Overly wet concrete will not be acceptable.

The concrete shall be of such a consistency as will flow readily into the forms and about the reinforcement and, on the other hand, may be conveyed from the mixer to the forms without a separation of the coarse aggregate from the mortar. There shall be no appreciable free water when deposited in forms.

Retempering of concrete will not be permitted. No concrete shall be used that has set partially before final placing.

DAMP-PROOF CONCRETE:

All concrete above the level plus 91'-97/8" shall be damp-proofed with hydrated lime, using 1:2:4 concrete eight pounds to a bag of cement and for 1:2 1-2:5 concrete twelve pounds to a bag of cement.

DEPOSITING OF CONCRETE:

Before placing the concrete the forms shall be wetted, the spaces to be filled shall be cleaned of debris and the placing of all reinforcing approved by the Architect.

Concrete shall be placed on the work immediately after mixing and shall be deposited, rammed and agitated with suitable tools in such a manner as to produce thoroughly compact concrete of maximum density. Concrete shall not be placed in piles in forms to be hoed later to a level, but shall be deposited uniformly.

When the placing of concrete is suspended it shall not be agitated to such an extent as to produce "laitance," and 2" x 4" grooves shall be formed in walls for joining future work.

When the depositing of concrete is resumed, the surface of the concrete previously placed shall be roughened, thoroughly cleaned of dirt, loose material and "laitance" and given a coat of Living-Stone binder.

Reinforced concrete shall be stopped at such points that the points will have the least possible effect on the strength of the structure. Construction joints shall be in the center of spans and no

joints will be allowed between the slabs and beams or girders. Construction joints in beams or girders shall be at right angles to sides and bottom face.

All footings shall be cast to their full depth at one operation and brought up to level below the finished basement floor level as shown on the drawings.

Work in columns shall be stopped at the underside of the lowest beam or girder bearing on the columns. Each story height of columns shall be poured in one continuous operation.

Any concrete which may run past the bulkheads shall be removed before the concreting of the next section is started.

Girders, beams and slabs shall not be poured over freshly formed walls or columns without allowing a period of at least two hours to elapse for the shrinkage and settlement of the concrete of these walls and columns.

The faces of concrete exposed to premature drying shall be kept wet for a period to be determined by the Architect.

Concrete shall not be placed in freezing weather except with permission and on instruction of the Architect as to heating materials, precautions to prevent freezing and to prevent damage from expansion of concrete while green.

CONSTRUCTION JOINTS AND WORK PLANES:

Construction joints not indicated on drawings nor specified shall be located and formed so as to least impair the strength and appearance of the structure. Horizontal construction joints shall be formed by embedding stones projecting above the surface or by roughening the surface in contact, or by mortises or keys formed in the concrete. Sufficient section shall be provided in horizontal, as well as vertical keys to resist shear.

Construction joints in columns shall be made at the underside of the floor. Haunches and column capitals shall be considered as part of, and built monolithic with, the floor construction.

Construction joints in floors shall be located near the center of spans of slabs, beams and girders, unless a beam intersects a girder at this point, in which case the joints in the girders shall be offset a distance equal to twice the width of the beam. Adequate provision shall be made for shear either by sufficient reinforcement, or by sloping the joint so as to provide an inclined bearing.

Girders and beams designed to be monolithic with walls and columns shall not be cast until two hours after the completion of the walls or columns.

Unknown Works of Art Discovered

THE experiment of removing the varnish from the tomb of Edmund Crouchback in Westminster Abbey having succeeded, the same methods have now been applied to the stone shields in the North and South choir aisles of Louis IX of France, Henry III, Simon de Montfort, and others, states *The Building News*, London. These shields have now been restored, and the colors, with the exception of the blue on the shield of Edward the Confessor, now stand out clearly. Another shield is that of Abbot Islip. His rebus represents a man in red trousers slipping off a branch of a tree, a pun on the Abbot's surname. Mr. Tristram, who has been responsible largely for these discoveries, is hopeful that further efforts will discover many other unknown works of art at present hidden behind black varnish and whitewash.

An Art Students' Tour

AMERICAN students of architecture will be interested in the opportunity offered by the Institute of International Education to study the development of architecture in Europe next Summer under Professor Albert C. Phelps, professor of architecture in the College of Architecture, Cornell University. Professor Phelps will be a member of the faculty of the Art Students' Tour which has been organized for the Summer of 1923 under the sponsorship of the Institute; other members will be Miss Edith R. Abbot of the Metropolitan Museum of Art, New York City, as a lecturer on the history and appreciation of painting and sculpture, Mr. John C. Tidden of Rice Institute, Texas, as instructor in painting and lecturer on the fine arts from the standpoint of the creative artist, and others whose names will be announced later.

The group will sail from New York on June 30, 1923. Professor Phelps will lecture during each day of the transatlantic voyage, as a means of sketching in the broader outlines of the development of architecture and of preparing for the more specific lectures during the land portion of the trip. His lectures on shipboard will be illustrated by stereopticon slides from the collection of the Cornell College of Architecture.

The group will visit Paris and Versailles, Rome, Perugia, Assisi, Florence, Venice, Milan, Ghent and Bruges, Brussels and Antwerp, the Dutch cities of Amsterdam, Haarlem and the Hague, and finally England. The return voyage will be by the "Saxonia," due to arrive in New York, September 4.

The Institute of International Education, under whose auspices the Art Students' Tour has

been organized, has for many years been carrying on an important work characterized by such activities as exchange scholarships, exchange professorships, etc. During the last two years it has been extended to include also European travel for college students, organized so as to permit students to travel more inexpensively, more conveniently, and with greater educational return, than they could do otherwise.

Complete information may be secured from the Institute of International Education or from Irwin Smith, 30 East 42nd Street, New York City.

Art and the Olympic Games

A COMMUNICATION has been received from the Marquis de Polignac, President of the Art Sub-Committee of the French Olympic Committee for the Olympic Games of Paris, 1924, with reference to a "Concours d'Art" which will form an integral part of the Eighth Olympiad.

It has been from the beginning the purpose of those who have revived and organized the Olympic Games to associate Art and Thought with athletic exercises. The Congress of Art, Literature and Sport, convened in Paris (1906) by the International Olympic Committee resolved to establish competitions in Art and Literature.

The French Olympic Committee will give to these competitions a special importance in the Eighth Olympiad.

The competitions will be international, and will be five in number, viz.:—

Architecture, Literature, Music, Painting, Sculpture.

As in the Olympic Games of Ancient Greece, the prizes in these competitions will be identical with those for the Athletic contests. These prizes will be distributed by the President of the Republic at the same time as those of the athletes.

Further details as to entries, etc., will be issued later. It is sufficient for the present to state that the competitors will be absolutely free in the choice of their subject, and in the form and dimensions of their work. The only condition imposed is that the work shall not have been previously published or exhibited, and that it shall be directly inspired by the idea of sport.

Communications may be addressed either to Marquis de Polignac, 11 Rue Anatole de la Forge, Paris (170), or to one of the British members of the International Olympic Committee, viz., Colonel R. J. Kentish, C.M.G., D.S.O., Army and Navy Club, Pall Mall, S.W.1, or Rev. R. S. de C. Laffan, 1 Brunswick House, Palace Gardens Terrace, W.8.

AS OTHERS SEE US

TO know how we appear to others is always interesting and often beneficial to ourselves. Unless one is saturated with egotism with a component of ignorance, intelligent criticism is always welcome. American architecture has been questioned by many competent foreign observers. They can see no reason for literally transplanting an English cathedral, French chateau, Roman villa or Greek temple to this country and to them it appears to be exotic. America has kept pace with and often excelled other countries in invention, production, commerce and especially in building construction and equipment in the structural sense. To many foreigners it appears strange that we have developed no distinctive architecture in the sense of aesthetic design.

To paraphrase an eminent American essayist—"These Americans (architects) are barbarous, living in a present with no future or past. There is something impotent and unrealized in the life of such architects; they do not feel living with enough vigor to carry it backward or forward; they cannot carry their own egos into designs where others like them made a different design for themselves out of a different environment. Take the design out of their street and they will not follow it. Their minds will not travel and therefore they do not properly design."

In a recent letter written by Mr. Eliel Saarinen of Finland to his American representatives, Messrs. Dwight G. Wallace and Bertell Grenman, architects of Chicago, he made some observations concerning American architecture which are worth considering. By permission, the letter was printed by *The Chicago Tribune* as Mr. Saarinen was the winner of the second prize in the recent *Tribune* competition. It is here reprinted in part.

"In my opinion an important principle in the designing of a skyscraper is that the top be formed so that the logical construction can be followed by the eye in all the different parts of the building clear up to the highest pinnacle, not only from a longer distance but also at close range. A skyscraper may not always remain free standing forever, but will be surrounded by other buildings of similar height, and it must consequently be looked at from a slight distance.

"I must admit that earlier I took very little interest in the American endeavors in architecture as they appeared in the business districts of the great cities with their monster buildings. There was something blocklike and hard in the whole that shocked me as a

city builder, through the lack of harmony.

"Other thoughts have come to me.

"More and more it is to be observed that the horizontal feature, borrowed from the antique and the renaissance, is giving way to the vertical of the Gothic.

"This is very natural, because emphasis on the vertical is more logical and purposeful for a kind of architecture which, like the Gothic, reaches to the heights.

"While working on my design for *The Tribune* competition I gradually became interested in the whole American skyscraper problem. I discovered that it probably is the most interesting problem offered by the building art of our time.

"Emphatically it is not a problem for the individual architect. It is a problem that becomes universal. It is all around us in this age of the rebuilding of great cities. It, together with its solution, is in the air, if I may so express myself.

"It is a problem fit for a whole epoch of culture.

"This I have already observed through the latest creations in the skyscraper field. My observation is confirmed now that I have seen the results of *The Tribune* competition.

"Ours is a period of seeking, and the distinguishing feature of it thus far is that the Gothic and the Gothic forms are more and more victorious.

"However, one must consider the Gothic contribution as a transitory period. A new architecture must in time create a new form language of its own, and it is apparent that American building art is headed toward this new architectural expression.

"As a city builder I should like to go still further.

"The skyscraper problem is not alone a problem of the simple structure. It is also, and naturally, a problem and a factor in the whole city plan and picture—a problem for the community at large.

"That is its glorious inspiration.

"I have studied very carefully the book prepared by Daniel H. Burnham and Edward Bennett and published by the Commercial club, describing the new Chicago Plan. The publication is meritorious in every respect, and shows a mind for big views and broad monumental qualities. It seems to me, however, that they have labored too much with European principles regarding street contours and horizontal limitation. It looks as if there had been a desire to eliminate the characteristically American skyscraper, or at least to press

it into forms and dimensions totally foreign to it. This can, of course, be done on paper, but it cannot be attained in practice.

"Why not, rather, create principles of city building which collaborate and harmonize with the sound and natural and characteristically American development?"

"There is a problem for you.

"It appears to me as if in this effort a bypath has to be taken through the spirit and principle of the Gothic city type in order to reach the right way.

"While working at the skyscraper design it occurred to me to find out how a whole city picture would appear, under the vertical system throughout and eliminating the horizontal element.

"I procured a photograph of New York City, showing a forest of skyscrapers with the greatest imaginable variation in height and width, placed a

sheet of tracing paper over it and drew faithfully the same conglomeration of buildings, using, however, an exclusively vertical style of architecture.

"I believe that the picture obtained by this means is, on the whole, the logical city picture for large American cities, and discloses the rules that ought to be promulgated in the creation of an American art of city building. This, of course, is said with all the reservations that are necessary when an outsider expresses himself on these questions, since he, for the moment, is taking into consideration only the general architectural feeling and, at the same time, lacks close acquaintance with American psychology and with America.

"It has been my desire to disclose to you these viewpoints, which have served me as a directing motive in the preparation of the competitive design. As you see, the problem has interested me not only as an individual but also from its aspects as a whole system."



Back Drawing Room in the Hogarth House, London, England

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The purpose, simply stated, is to afford an organization which, it is believed, will become a most important element in architectural practice and building operations, a medium through which it may, without expense to itself, reach a class of readers that are most intimately identified with the field of the activities of The American Specification Institute.

Publishers, THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW.

Bulletin No. 28

Outline of

TENTATIVE SPECIFICATIONS FOR WATER TUBE BOILERS

(The form of this bulletin conforms to the arrangement of Elements of a Specification as given in Bulletin No. 5, ANALYSIS OF A SPECIFICATION, Revised January 20, 1923.)

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1. Parties:
2. Drawings:
3. Agreement:
4. Terms of Payment:
5. General Conditions:
6. Regulations and Codes:
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SCOPE OF CONTRACT:

9. Work Included:
10. Schedule of Work:
11. Work Not Included:

METHODS OF ANALYSIS AND COMPARISON OF BIDS:

12. Methods:
13. Basis:
14. Form of Bids:
15. Conditional Payments:

III. GENERAL DESCRIPTIVE

16. Characteristics:

SERVICE CONDITIONS:

17. Location of Boilers:
18. Railroad Siding:
19. Visiting Site:
20. Working Facilities:
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ULTIMATE REQUIREMENTS:

23. Smokelessness:
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41. Feed Pipe and Fittings:
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Announcing a Traveling Scholarship

THE Alabama Marble Company announces that it has made arrangements to finance a Traveling Scholarship in Architecture with special emphasis laid upon the use of Interior Marble. This scholarship will be conducted under the guidance of the Committee on Education of The American Institute of Architects. For details apply to Walter D. Blair, Architectural Adviser, 154 East 61st Street, New York, N. Y.

Industrial Teachers' Scholarships

THE State of New York is offering twenty-five (25) industrial teachers' scholarships of \$1,000 each to qualified trade and technically trained men. Persons selected to hold these scholarships will spend one year at the Buffalo State Normal School preparing to teach their subjects in the public vocational schools of the State. The satisfactory completion of the one year course by scholarship holders will entitle them to secure a life license to teach a specific trade, industrial or technical occupation. The annual salaries paid vocational teachers now range from \$1,800 to \$3,500 after a period of experience.

The twenty-five scholarships will be awarded to qualified persons who have had at least five years of all round experience of journeyman grade in one of the following trade, industrial or technical occupations: (1) automobile repairing (2) machine shop work (3) electrical constructing, repairing and operating (4) machine drafting and

designing (5) electrical drafting and design (6) architectural drafting and designing (7) brick-laying (8) sheet metal working (9) painting and decorating (10) carpentry (11) printing, including composition, press work and bookbinding (12) men's tailoring and garment design.

Applicants for appointment to industrial teachers' scholarships must be not less than 21 or more than 36 years of age, residents of the State of New York and citizens of the United States. A good general education is required and ability to speak, read and write the English language. Good health and moral character are absolute essentials.

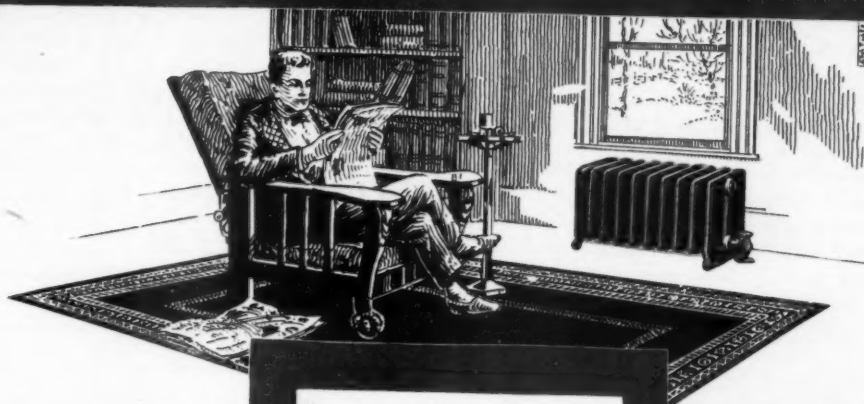
Applications for scholarships will not be received after June 1, 1923. The State Department of Education, Albany, will furnish detailed information concerning the scholarships.

City Planning Conference

THE annual National Conference on City Planning will be held in Baltimore, Md., April 30, May 1 and 2.

The Conference will be entertained by the City of Baltimore in co-operation with many civic and professional organizations. The usual very complete program has been arranged and it is believed that the proceedings will present matters of unusual interest. Sessions will be held at the Southern Hotel, and will be open to the public.

Information may be obtained by addressing Flavel Shurtleff, Secretary, 130 East Twenty-second Street, New York City.



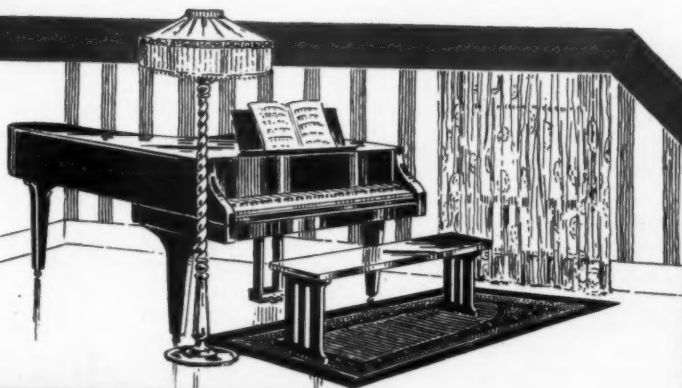
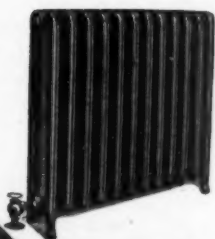
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**A Nation Wide Service by Architects to Provide
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at Minimum Cost**

THE housing shortage due to the cessation of building during 1916, 1917 and 1918, the high cost of material, the uncertainty of values and markets, and the increasing unsightliness of small houses due to cheap construction resulting from these conditions, were factors in creating the Architects' Small House Service Bureau organization, and the perfecting by architects of a service that is greatly needed.

For many years architects throughout the United States have endeavored to solve the problem of the small house, to provide for the small house owner plans of substantial, artistic homes designed to eliminate waste without sacrificing home comforts, convenience and architectural features which lend to it individuality, distinctiveness and charm. But, the cost of preparing plans and rendering service for the small house is as great as that for larger dwellings, and unfortunately the small house builder has come to consider the elimination of the architect's fee the first point of economy in his home building project.

In most every field of endeavor, except architecture, methods have been evolved to serve the masses, and this has been accomplished through quantity production and distribution. The logical conclusion of the architects interested in a service for small home builders was that through co-operation in the production of designs, and large production and large distribution of plans, they would be able to render their professional services at a fee within the means of all small home builders.

This idea was successfully worked out by a group of Minnesota architects who organized The Architects' Small House Service Bureau of Minnesota (now the Northwestern Division) and, upon obtaining the endorsement of the American Institute of Architects and the United States Department of Commerce, The Architects' Small House Service Bureau of the United States was incorporated. This body is purely executive, and has control of the policies governing the Bureau's work and shapes the national programs. Upon the zoning of the United States into thirteen regional divisions, architects of the various regions were urged to incorporate Divisional Bureaus to carry on the work of the Bureau in their territories.

The progressive spirit of the West was shown by the prompt action of Colorado architects. They organized The Mountain Division in July, 1921, and began immediately the work of designing plans to be included in a book "How to Plan, Finance and Build Your Home," which was published, in April, 1922, and contains fifty-two

distinctive designs for small homes ranging in size from three to six primary rooms. The book is designed to be of every assistance to the inexperienced home builder and also contains many chapters, compiled by experts in their particular fields of endeavor, such as Financing, Planning and Interior Decorating. The price of the book is \$2.00.

Broadly speaking, the Bureau idea is not a money making enterprise. The surplus income of the Bureau is to be used to further this work to the best advantage of the small home builder.

Postoffice Lock Used in 1798 is Unearthed

A CENTURY and a quarter old, a battered old lock, hand made, and bearing the inscription "General Postoffice, U. S. America—1798," has recently come into possession of the Postoffice Department, and will be placed with other relics of the department in the Smithsonian Institution, Washington, D. C.

It was sent to the department by Rufus S. Smyer, postmaster at Birmingham, Ala., who acquired it from Charles Schwend, who is in the lock and key business in that city. Schwend obtained the lock about fifteen years ago when an old darkey asked him to make a key for it, saying that his old "Marster" in South Alabama had given it to him before the Civil War.

Destinations of British Emigrants

FROM a recent issue of *Commerce Monthly*, it is learned that the United States stood second only to British North America in its appeal to emigrants from the United Kingdom in 1920 and 1921. Australia, British South Africa, New Zealand and British India came next in the order named. There was a marked decline between the two years, being especially noticeable in the case of British North America. A feature of the emigration to the United States in 1921 was the excess of women over men, which amounted to 7,592 as compared with an excess of 8,092 women in the total to all countries. The table shows the number of emigrants from the United Kingdom in 1920 and 1921.

COUNTRY OF DESTINATION	1920	1921
British North America	118,837	67,907
United States	77,151	56,393
Australia	28,974	27,751
British South Africa	15,157	12,903
New Zealand	14,853	11,513
British India	12,188	9,830
Other countries	17,942	13,180
Total	285,102	199,477

How to Get Funds for Building Construction



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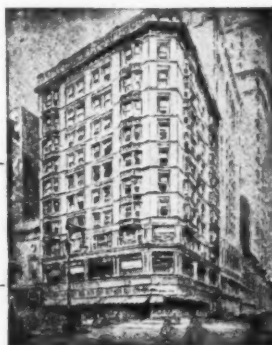
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PERSONALS

Dwight G. Wallace, Eliel Saarinen and Bertel Grenman have formed an association for the practice of architecture, with offices at 22 West Monroe Street, Chicago, Ill.

It is announced that Julius Gregory, architect, has moved his office from 56 to 49 West Forty-fifth Street, New York City.

Good & Wagner, architects, announce the removal of their offices to the Mohawk Building, 209½ Water Street, Akron, Ohio.

I. V. Van Duzer, architect, announces that he has removed from Cazenovia, N. Y., to 202 O. C. S. Bank Building, Syracuse, N. Y.

Carl C. Ade, architect, announces the removal of his offices from 344 East Avenue to 104 East Avenue, opposite "The Sagamore," Rochester, N. Y.

Edward T. Flaherty announces the removal of his offices from 434 to 633-34-35 I. W. Hellman Building, 124 West Fourth Street, Los Angeles, Cal.

Hubert Miller, architect, announces the opening of an office for the practice of architecture at 431-32 Monger Building, Elkhart, Ind. Manufacturers' samples and catalogs are requested.

Walter P. Marshall has opened an office for the general practice of architecture at 1108 East Henry Street, Savannah, Ga. Manufacturers' samples and catalogs are desired.

George Bain Cummings, architect, has moved his office to 520 Security Mutual Building, Birmingham, N. Y., where he will be pleased to receive manufacturers' catalogs and data.

Bradford Hardie, Jr., has opened an office for the practice of architecture at 648 First National Bank Building, El Paso, Tex. Manufacturers are requested to send catalogs and samples.

M. L. Barker announces the removal of his offices to the Bogardus Building, 1505 North Western Avenue, Los Angeles, Cal. Manufacturers are requested to send catalogs and samples.

Joseph Van G. Hoffecker has opened an office at 803 Eighth Street, Ocean City, N. J., for the general practice of architecture, where he would be pleased to receive manufacturers' catalogs and samples.

Announcement is made that William G. Perry and Shaw & Hepburn have formed a partnership under the firm name of Perry, Shaw & Hepburn for the practice of architecture at 177 State Street, Boston, Mass.

Irving D. Harris, architect, has opened an office for the general practice of architecture at 304 City National Bank Building, Galveston, Tex. Mr. Harris will be pleased to receive manufacturers' samples and catalogs.

Jos. R. Fallon, architect, has moved his office from 105 McFarlan Building, Connorsville, Ind., to 606½ Central Avenue, Smith Building, that city, where he would be pleased to receive manufacturers' catalogs and samples.

Announcement is made that the partnership existing between Benton & Bengston, architects, has been dissolved and that L. T. Bengston is now practicing architecture independently at Room 510, Travelers Building, Richmond, Va.

Alexander G. Brach has moved his office from 21 South Parkway, East Orange, N. J., to the Proctor Theatre Building, 116 Market Street, Newark, N. J. Manufacturers' catalogs and samples are requested.

It is announced that J. A. Lohman & Son, architects, formerly located at 570 Donner Avenue, Monessen, Pa., have moved their office to 114½ East Market Street, Warren, Ohio. Manufacturers' samples and catalogs are desired.

D. Knickerbacker Boyd, architect, Otis Building, Philadelphia, Pa., took a brief trip to Bermuda, from which he recently returned, after making for the second time a study of the interesting domestic architecture and building materials and methods in these attractive Islands.

Herbert M. Greene of the Herbert M. Greene Company, architects and engineers of Dallas, Tex., announces that Walter C. Sharp, W. Brown Fowler and Ralph Bryan are now associates in the firm. The firm name of the Herbert M. Greene Company remains the same, as does the present address of 620 North Texas Building.

It is announced that Franz & Bond, architects and engineers, 189 High Street, Holyoke, Mass., have dissolved partnership in order that Philip E. Bond may give his entire attention to his duties as city engineer, to which office he has recently been appointed. Fred H. Franz will continue the business at the same address.



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BOOK NOTES

Concrete Construction for Architects

THE purpose of this book is not clear. If it is to instruct the architect in reinforced concrete engineering, thereby enabling him to design structures in this material, sufficient fundamental theory is not presented; and if the purpose is to explain to the architect in a broad way the physical requirements of this type of construction, then the problems are worked out in too much detail. The impression gained from this volume is rather that of one architect pulling aside the veil to disclose to his associates a glimpse of the tortuous maze of mathematical currents which the engineer must follow to reach the goal.

Without a knowledge of the fundamental principles of mechanics and of reinforced concrete theory and economics, the application of the examples given would produce amateurish if not dangerous results. For example, the author states, "Concrete floor slabs are considered as continuous beams — $M=1.12 Wl$. It will be noticed that this is only slightly different from the formula for bending for simple beams, or $1.8 Wl$." As a matter of fact the slight difference is that the simple beam has a bending moment fifty per cent greater than the fully continuous beam.

There are many things the architect in the practice of his own profession should know about concrete construction, but a detailed knowledge of formulas and of the mathematical calculations involved is unnecessary. The architect should know the various types of floor, column and foundation construction which may be employed and the conditions under which they best serve their purposes; he should have a conception of the economical proportions of concrete framing; and he should have a knowledge of the material itself and of its manufacture.

Constant reference is made to the New York Building Code and its various rules. This is an unfortunate limitation of the various examples which are worked out.

However skillfully the concrete design may be worked out in the office, the final result is far from attained. The matters of specifications, field supervision and the construction operation are not discussed. It would seem that the title chosen is broader than the content.

While the chapter headings include in a broad way the component parts of a concrete building, many varieties of these parts are not mentioned nor is the design always carried out as completely as it should be. For example, while the total number of stirrups in a concrete beam is determined, nothing is said of their spacing.

In general, there are few typographical errors

and the book is well gotten up from the printer's standpoint.

FRANK A. RANDALL, C. E.

Concrete Construction for Architects. By DeWitt C. Pond. 204 pp.; size 8 x 10 in. Illustrated. Price \$4.00. New York, Charles Scribner's Sons.

Elements of Reinforced Concrete Design

IT is known generally that concrete is strengthened by the addition of steel. There are many men who have no wish to become designers who want to know just why and how much stronger steel does make concrete and these men are repelled by the appearance of the complete treatises written for designing engineers. To meet the needs of such men Dr. Oscar Faber, whose two volume treatise on Reinforced Concrete Design is well known, wrote a series of articles in *Concrete and Constructional Engineering*, in simple and clear language.

This series of articles has been put together in book form for comparatively non-technical readers. It accomplishes nicely the purpose of the author and may be recommended as a good introductory work on the subject treated. The discussion of shear is satisfactory and more simply presented than is usual in books prepared for men who are not well drilled in the mechanics of materials. The discussion on the importance of considering bending in columns and beams caused by rigidity of joints is very good and many specialist designers will be benefited by reading it. The reviewer being an American is surprised at the stand taken by the author on the subject of spirally reinforced columns. They are apparently not in high favor in England, whereas in America the vertically reinforced column is not highly regarded for heavy loads. Aside from this the book should be as serviceable in America as it is in England for the class of readers for which it is designed.

Reinforced Concrete Simply Explained by Oscar Faber, D. Sc., A. M. Inst. C. E., etc. New York, Oxford University Press, American Branch. 77 pp. Ill. 5 1/2 x 8 3/4 in. Cloth \$1.70.

Classic Details

FOR the student of architecture and the designer who seeks inspiration at the source the new edition of Northern Italian Details will hold a charm.

Put up in a durable and handsome appearing portfolio are 143 sheets containing drawings and photographs by Walter G. Thomas and John T. Fallon, many of which first appeared in the



Most types of old-style windows are neither weather-tight nor rattle-proof. As a consequence, drafts and irritating window noises result.

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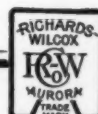
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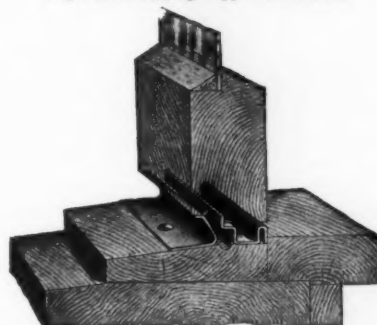
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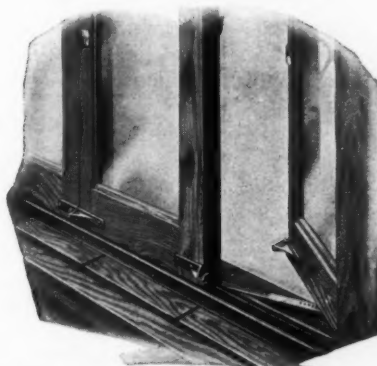
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Cross-section through sash and window frame at top, showing installation of AiR-Way track and the tight application of sash.



Cross-section through sash and window frame at bottom, showing installation of AiR-Way track and the tight application of sash. Note grooves in window sill and bottom of sash, which prevent moisture from seeping through.



A link connects each sash, at top and bottom, with the sash adjacent. When the windows are open, or partially open, the links prevent them from slamming or banging. When closed, the safety locks hold them tight and prevent rattling.

pages of *THE AMERICAN ARCHITECT*. Mr. John Mead Howells has written for the new work an appreciative introduction.

Northern Italian Details. Drawings and Photographs by Walter G. Thomas and John T. Fallon. Introduction by John Mead Howells. New York, U. P. C. Book Company, Inc. 9 x 12½ in. Cloth protected board covers. \$7.50.

The Construction of the Small House

THIS book treats of the essential elements that comprise dwelling house construction. The planning of such structures is not included. In a clear and interesting manner are explained the relation of general style to cost, the standards which determine the quality of materials, the development and characteristics of the different forms of frame construction, the materials of masonry construction and the ways in which they are used—stone, brick, hollow tile and concrete.

A valuable chapter on the important element of firestopping is included, followed by a chapter describing the poor methods employed by some contractors. This is an especially valuable chapter for the layman who contemplates the purchase of a dwelling and who makes his own inspection of the building. Many of the hidden mysteries of the speculative building are explained. The essential features of the mechanical equipment, plumbing, heating and electric work are described, followed by chapters on roofs and roofing materials, interior trim, painting and varnishing and the labor saving devices to be incorporated in the modern dwelling. An instructive chapter on how to analyze building material advertisements will enable the reader to form reasonable and proper conclusions as to the merits of the various articles advertised. The book concludes with a chapter on financing the construction work.

Every practicing architect should have knowledge of the contents of this book; it will, however, be of value to the student or draftsman who aims to engage in this class of work. Any layman who is interested in dwelling construction or who contemplates erecting such a building can well afford to study this book carefully as it will be a good investment—and then employ a competent architect.

The Construction of the Small House, by H. Vandervoort Walsh, with many illustrations by the author. 269 pp. 7 x 10 in. New York, Charles Scribner's Sons. Price \$5.00.

Architectural Drawing

IMPORTANT as may be the subject of free-hand drawing for architects it is no less essential that every architect should understand how to make working drawings for the guidance of contractors and artisans. Books treating on this kind

of drawing are not plentiful and many of them are somewhat old.

For the instruction of young men in architects' offices and to enable artisans intelligently to read architects' drawings and take off quantities therefrom, Mr. Field has prepared a book that can be recommended. The author is a graduate practicing architect and assistant professor of engineering drawing at The Ohio State University.

The book begins with the manipulation of drawing instruments and geometrical constructions. The subjects from this point are taken up in the sequence in which the work naturally goes forward on the board and are as follows:—Preliminary Sketches, perspective, isometric, oblique, shades and shadows, rendering; Scale Drawings; Detail Drawings; The Orders of Architecture; The Acanthus Leaf; Mouldings; Architectural Lettering; Outline of Study in architectural design and engineering; Reference Books; Architectural and Building Terms.

Architectural Drawing. By Wooster Bard Field, Architect, Assistant Professor of Engineering Drawing, The Ohio State University. New York, McGraw-Hill Book Co., Inc. 161 pp. 84 full page plates. Colored frontispiece. 9½ x 12 in. Cloth. \$4.00.

Cements, Limes and Plasters

THE work of Edwin C. Eckel on the manufacture and use of cements, limes and plasters has been a standard for about seventeen years. A new edition has just appeared thoroughly revised to date and partially re-written.

Following the Introduction which contains interesting and valuable historical and statistical data, there are five chapters on gypsum. Lime is treated in five chapters, in which the manufacture and every possible use of this standard material is discussed. Magnesia and oxychloride cements fill two chapters; hydraulic limes, sepietic limes and grappier cements three chapters. Four chapters are devoted to natural cements, nineteen chapters to Portland cement, and five chapters to puzzolan cements.

The author was a Major of Engineers, U. S. Army during the war and had much to do with the emergency manufacture and supply of cement for the army. He was able to learn a great deal about European methods and materials which he has put down in this book.

Cements, Limes and Plasters, Their Materials, Manufacture and Properties. By Edwin C. Eckel, C. E. Second Edition, revised. 655 pp., 156 figs. in text. Many tables. 6 x 9 in. Cloth, New York, John Wiley & Sons, Inc. \$6.50.

Hendricks for 1923

THIS reliable old register is now 31 years old and the 1923 edition contains 150 pages more than were in the 1922 edition. The com-



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OF close grain, fine fiber and satin-like surface—non-resinous in make-up and of uniform texture, it meets every requirement prescribed by the modern vogue of painted woodwork. Does away entirely with shellac priming coats, evenly absorbing the primary color when applied to its properly sanded surface.

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plers state that 125,000 changes and additions were made in the new edition. The lists of manufacturers of over 18,000 products are separately classified with the name and address, together with the trade name or brand (if any) and also essential facts regarding the products of many of the leading firms. There is an admirable system of indexing and cross-indexing.

Hendrick's Commercial Register of the United States. 31st (1923) edition. Annual. 2,482 pages, 8½ x 11½ in. Cloth. New York, S. E. Hendricks Co., Inc. \$15.00.

Good Practice in Construction

THIS book consists of 52 pages of details of building construction. The drawings are made to a scale large enough to show very clearly all of the detail, to which are added explanatory notes. The rendering of the drawings and style of lettering are good models of draftsmanship. The scope of the details embraces practically every element of building construction. Details of special requirements are not given, but rather those in general use. The details are taken from those made in offices of several leading architects for work actually constructed. The book might be more universal in its contents if details had been secured from some cities not represented and where local codes require certain desirable things not shown. The preface is written by Mr. Thomas Hastings.

This book is eminently usable, of convenient size and adequately indexed. There is a place for it in every drafting room.

Good Practice in Construction. By Philip G. Knobloch, with a preface by Thomas Hastings, F. A. I. A. 52 plates with index. 9 x 12 in. New York, The Pencil Points Press, Inc. Price \$4.00.

Distinguished American Artists

UNDER the above title, the Frederick A. Stokes Company, of New York, is publishing a series of monographs on American painters. In each volume a brief but comprehensive biography is presented, followed by about fifty half-tone reproductions of the artists' best known works. Thus far, two volumes have been issued, Childe Hassam and Robert Henri.

Such publications are of considerable interest and of the highest value as a means of developing a taste for good art. As a matter of fact, these cheap and attractive books,—they cost but \$1.00 per volume,—might serve as guides to good pic-

torial composition and may safely and advantageously be placed in the hands of students.

We are advised that it is the intention to carry these publications forward until the best exponents of the painter's art in this country have been set forth in this attractive form. When this aim is reached, the student of art will have at his command a series that will be encyclopedic in character.

Forty Years of Landscape Architecture

PROBABLY no one man is more directly responsible for the very wonderful advance that the art of landscape architecture has attained in the United States than Frederick Law Olmsted. A most interesting work has been edited by Frederick Law Olmsted, Jr. and Theodora Kimball, of the early years and experiences of Frederick Law Olmsted, who died in 1903, together with a number of carefully prepared biographical notes. This publication marks the centennial year of the birth of Olmsted, and it will be appreciated by every one who is interested in the very rapid and remarkable development of landscape architecture in the United States. This work is published by G. P. Putnam's Sons, New York and London, and its price is \$2.50.

Thumb Tack Club, Detroit

WE have received from the Thumb Tack Club of Detroit, a copy of the Year Book and Catalog of the Second Annual (1922) Exhibition. As an example of recent work in architecture by the members of this progressive organization, this Year Book is exceedingly interesting. It favorably compares with the catalogs of other art organizations, East and West, and should become a valuable reference book in the architect's library. We are advised that a few remaining copies may be had for \$1.25 each by addressing Mr. C. Wm. Palmer, chairman of the Exhibition Committee, 405 Moffat Building, Detroit, Mich.

Concrete Work

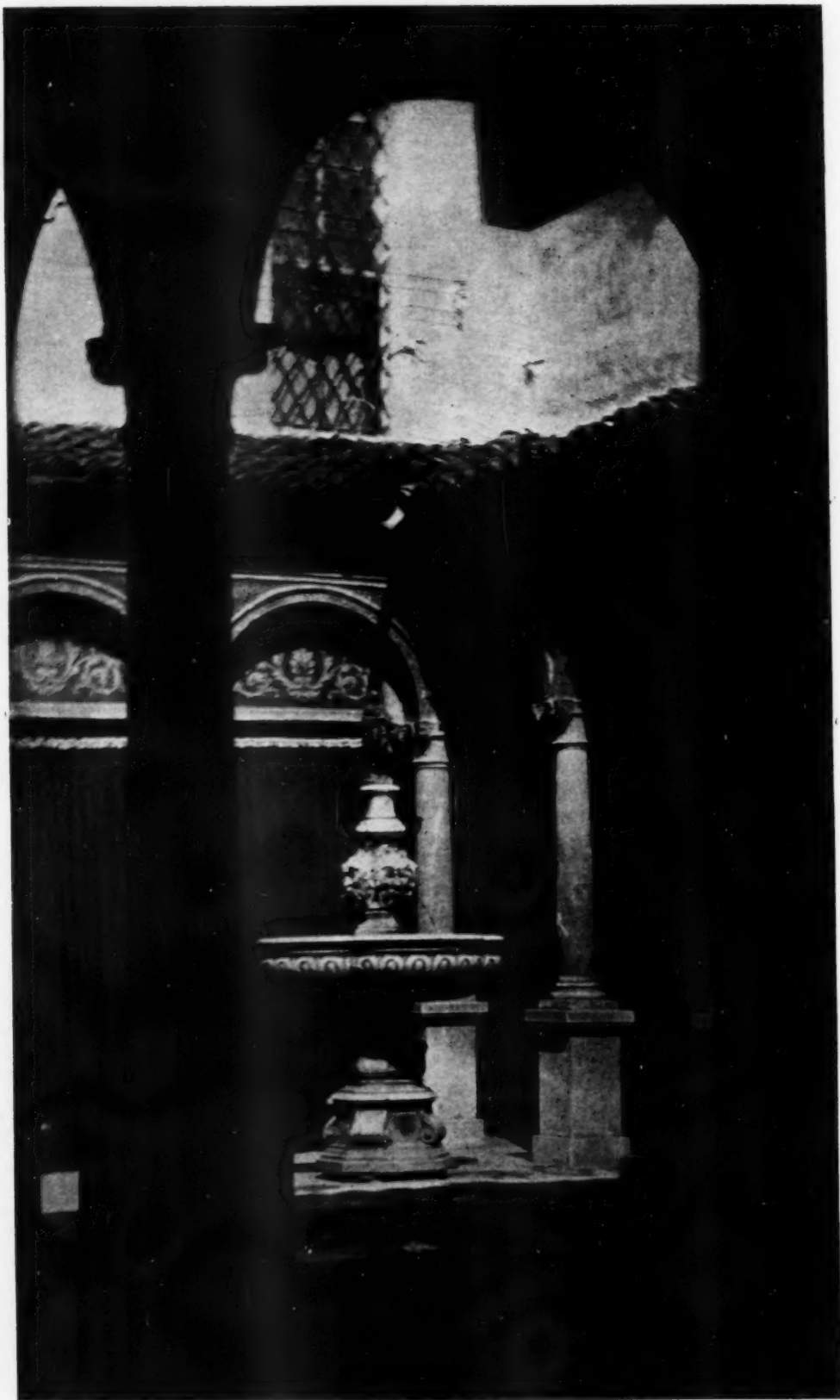
THE Norman W. Henley Publishing Company, New York, has reprinted as No. 2 in the series of Concrete Worker's Reference Books, the well known book *Concrete Floors and Sidewalks* by A. A. Houghton. It contains 63 pages with eight line drawings. It is 5 x 7 in. bound in heavy paper. Price 75 cents.

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SANTA MARIA DELLI GRAZIA, BRECIA, ITALY

(From the photograph by Atlee B. Ayres)