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FIFTY YEARS of AMERICAN ARCHITECTURE

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APPROACH to this subject opens a long vista through which one observes a multitude of buildings, the serried achievements of an historic period. Almost automatically it wakes the instinct of the historian. I could follow, probably, no safer guide, yet I am given pause when I see what it leads to in the first architectural handbook that I take at random from my shelves. Each "school" has its chapter therein and this launches upon the subject with a careful enumeration of the "influences" determining its character—geographical, climatic, religious, social, political and historical. Impeccable, no doubt, but to me, in the present instance, beside the point. There are divers conditions with which to reckon in discussing the American architecture of the last fifty years and I shall not neglect them but as I look down the vista aforesaid my attention is irresistibly focussed upon a group of men in the foreground. I see Hunt, and Richardson, and McKim, and White, and Wells, and Burnham. I see the creative artists who brought our modern architecture into being and I realize that without their warm human personalities we would have gotten nowhere. In my youth I knew some of these masters, when they had fallen into their stride and were doing portentous things. Ever since that time I have been an ardent student of what they did and of what their successors have done after them. It is as though I had touched hands with the pioneers of an epoch, the makers of a new heaven and a new earth. Does the reader think that my own approach is set in too enthusiastic a key? Well, let him choose between it and the tone of a passage or two from the handbook I have mentioned, a publication of English origin:

The houses of small type have been very successfully treated...The plan of these houses often shows great originality, the staircase, sitting hall, piazza and a picturesque grouping of steep roofs, being main features.....

The designs of the various buildings for the Chicago Exposition (1893) differed largely from expectation...An exposition of architecture on the wilds of the western prairies turned out to be a collection of well studied Parisian designs.....

In conclusion, it is certain that there is a great future for American architecture if only the architects will, as much as possible, express themselves in the language of their own times. No advance can be made by the copying of ancient buildings, as has been done in certain cases, constituting a retrogressive movement, and showing a real want of the appreciation of the true value of art.

I love the unconscious humor of these sublime pronouncements. Could "a certain condescension in foreigners" any further go? And all the time we have around us the evidences that the story of American architecture in the last fifty years is akin to that of the fifteenth century seed-time in which Brunelleschi, Alberti and their kind were reviving Roman ideas and making the Italian Renaissance. The Americans to whom I have alluded ushered in one of the most amazing architectural developments the world has even seen, in volume, in variety and in organic character. Under their leadership the art of building has outstripped in this country the art of the painter and that of the sculptor. It has gone further than any of the sister arts in expressing the American genius. And, I repeat, it received its initial impetus from nothing so much as from personal inspiration. The only external elements to be considered are those which—characteristic of a democracy—gave the individual his opportunity.

The founders in all our arts were born prior to the Civil War. The architects I have already named, painters like John La Farge, George Inness and Winslow Homer, sculptors like J. Q. A. Ward and Augustus Saint-Gaudens, were all obliged to wait until after the conflict for the full encouragement of their gifts. When that came it came with a rush. Once reconstruction had got upon its feet the material progress which reanimated the East raced beyond the Alleghenies and while in the nature of things cultural advances were more rapid in the seaboard towns than elsewhere the leavening of the whole country was only a question of time. Nothing was more indicative of our awakening to the responsibilities that go with worldly prosperity than the rise of a finer ambition in respect to public buildings and I am strongly tempted to touch here upon Richardson's monumental structures, which specifically announced the change. But the needs of the man come before the needs of the community and our renaissance has always seemed to me to date from the erection of an artistic standard in domestic architecture. New ideas came in with new fortunes, and, as is the way in such matters, they filtered down from the top.

I should say that as representative a landmark as any that could be found was the architectural

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physiognomy given to the Cliff Walk at Newport around the early eighties. It is not as an array of masterpieces, to be sure, that I am recalling that series of dwellings. Looking at it in its present state, for example, I am inclined to regard it as one of the most fantastic agglomerations of incongruities on the face of the earth. But forty years ago it was the outstanding scene of our renovation of country architecture, the scene whereon the private house was most conspicuously envisaged as a work of art. Previously it had been a nondescript affair, abounding in fret-work, mansard roofs, pinnacles, and fragments of all the styles—if it had on it the mark of any style at all. I can trace no representative architect of that period nor do I need to do so. As Kipling says in the story: "His name was Dennis, and we'll let it stay so." But there can be no dubiety, I think, about the name or names that heralded a new dawn for the country house. McKim, Mead and White turned the trick.

That is where I come back to the essentially personal side of this whole matter. The moment had arrived, in the late seventies and early eighties. The clients were there, with plenty of money. I don't know how conscious they were, themselves, of the craving for more beautiful homes that was in the air, but by some lucky chance they sought their plans at the right address. When White designed the Goellet house at Newport he set a pace that little by little became canonical in the United States. I might enlarge upon the question of style that the episode brings up, speculating as to just how far he had the old French farmhouse in mind when he fashioned his façade. But the point that I want to bring out lies deeper than the particular school or period that may have inspired him. My argument is that the inspiration at work was even more White's own, inner property, that he functioned as he did not in obedience to alliance with any historical movement but quite involuntarily and because he was an artist. If that seems a truism you have only, for contrast, to look back at the buildings of the fifties. Was there an artist responsible for any of them? To this day the architect does his work in what he calls his "office" but I never can forget that when I knew the old quarters at 57 Broadway in which McKim, Mead and White were doing so much to make over American architecture they had the characteristics and atmosphere of an *atelier*. It is not from affectionate memories alone that I mention the circumstance. As a matter of fact, that *atelier* became famous across a continent. An immense amount of the architectural evangelism, if I may so describe it, in that constructive era, proceeded from that fount. The firm designed a great stream of city and country houses which established a new standard. The revolution magnificently culminated in the huge Florentine palazzo, embracing four or five separate homes in one flawless unity

of design, which lies on the east side of Madison Avenue, just across the way from St. Patrick's Cathedral. McKim, Mead and White owed much in the evolution of that masterpiece to their head man, the late Joseph M. Wells. He was a modern Bramante, worshipping the Cancelleria, and in the Madison Avenue building successfully emulating its serene perfection. It was in that earlier period that McKim conceived the Boston Public Library and White the Madison Square Garden. There was no end to their activities. The Morgan Library came into existence, the Tiffany and Gorham Buildings, the Pennsylvania Terminal and so on. Some of their best things have gone down the wind. The Pantheon-like church on Madison Square is no more. The beautiful bank building and apartment house at Fifth Avenue and 42nd Street has given way to a skyscraper from another hand. Even as I write the Madison Square Garden is coming down. But a truce to enumeration, which is tedious at the best. In the whole varied tale of these architects there is nothing that touches my imagination like their artistic fervor, their good taste, their election of beauty as their goal. When the historian at whose scientific methods I have glanced comes to treat this subject he will make a mistake if he seeks his issues in geography, climate and the like. What it will be transcendently important for him to note will be the fact that under the new regime to which McKim, Mead and White made such heavy contributions American architecture got a point of view.

It wasn't a matter of style but of fundamental artistic feeling. The proof of that lies in the characteristics of some of the firm's pupils, who went forth to carry on their broad tradition but did so in absolutely independent mood. Henry Bacon was born with the classic spirit in his veins and though he was ever glad to acknowledge a debt for much to McKim he was his own man, in the most central sense of the phrase, when he designed the Lincoln Memorial. Cass Gilbert, another of the flock, benefited enormously from association with the old firm but he got nothing from it, in the way of style, to foreshadow his masterpiece, the Woolworth Building. An imposing list might be made of their disciples, embracing a great number of the men who are in the front rank of the profession today, but it includes no imitators. No, the gift of McKim, Mead and White to our "fifty years" was primarily a gift of aesthetic stimulus. They were eclectic, with a strong leaning to the Roman and Florentine Renaissance and what they spread about them was not a formula but a sentiment. If they powerfully heightened—as they did—our sense of style, they did even more to deepen in us the mode of thinking and feeling which makes for purer taste and a keener search after beauty.

It has been perceived by this time, I dare say,

that in surveying our fifty years of architecture I have no intention of drawing up a catalog of buildings but am concerned solely with the imponderables, with general ideas and influences. And these, I cannot too often reiterate, lie singularly outside that more or less organized stream of energy which usually accounts for the formation and growth of schools. In this very matter of styles against which I have been brushing, the significant manifestation is always, with us, a distinctly personal affair. From what, for example, did the inspiration of Richardson flow if not from his own robust character? La Farge, who came to know him well at the time of his decorative work in Trinity, used to tell me about the large way that Richardson had with him. If he wanted milk he wanted a huge pitcher of it. If he preferred champagne it had to come in a magnum. Everything that he did was on that big, generous scale. He knew French mediaevalism at Carcassonne and elsewhere. He knew the Romanesque in France and he had had some experience in Spain. But Trinity Church in Boston is as original and personal a triumph as some painting from the brush of a great artist, full of idiosyncrasy. The tremendous force in the thing and its ample beauty are Richardson's. I have had the same consciousness of an individual, affirmative, autographic touch when I have stood before any of his public buildings. How profoundly he understood the value of a vast, rugged wall space! The association of ideas may make it seem a little strange to say so yet I protest that I get something like architectural rapture out of the bleak majesty of the jail at Pittsburgh. He could implant a kind of heroic beauty in that sorry stronghold. The mighty facades in the Smoky City are in no wise derivative. They came straight from his imagination and it is a striking testimony to the personal force in his work that no one has ever approached him in its idiom.

Richardson is exactly the sort of great man in our roll call that the foreign critics cannot understand. They keep looking to us from abroad for the production of something radically new, for the invention of an "American architecture." Meanwhile a man like Richardson comes along, adopts a more or less foreign vocabulary, and proceeds to fill it out and vitalize it in speech that is as individualized as it is eloquent of creative fire. His sheer genius is, of course, the thing. There have been other American instances of the revivification of an old formula. Bacon, as I have already indicated, supplied one of them. He handled the Greek idea with an authority and a spontaneity that the men of our old "Greek revival" knew nothing about. He thought, quite naturally and as a matter of course, in Greek terms. So it was with Bertram Grosvenor Goodhue, in his manipulation of Gothic. On our soil that style is surely exotic, if any of the his-

torical styles is. Its romantic, mystic character is alien from our national life, though the logical principle of thrust and counter-thrust at its core is somehow sympathetic to our practical habit of mind. But Goodhue—again, like Richardson, operating with the soul of an artist—erected in his churches so many fabrics of exquisite beauty. Isn't that enough? Does it matter that a Gothic edifice, even in the brilliance that he could achieve, remains in a kind of isolation, a detached *tour de force*? At any rate it confirms my hypothesis that whenever you find in American architecture anything of real consequence you find behind it a creative phenomenon, an original impulse, a man.

It might appear from this contention that the growth of our architecture has been a sporadic, capricious thing, dependent upon what the gods gave at birth to this man or that. The latter process, I firmly believe, has indeed been indispensable. But after the personality to which I would attach major importance there has come, paradoxically, the one influence for which you would ordinarily look last in a democracy. I refer to the educational developments that imply discipline. How gloriously they have flourished! I wish that my old friend Professor William R. Ware could see how far we have travelled since the days when he raised up the young architects of his time in the School of Mines at Columbia. The spectacle is one to warm the heart of such an enthusiast as was that devoted, useful, delightful and altogether lovable man. He taught the virtues of study and Richard Morris Hunt practiced them, a man to whom I must refer at this point because he so richly exemplified the strain of systemization that arose to balance originality in the American architectural cosmos. Hunt was a brilliant type of the French tradition. He had passed through the sternest phases of Parisian training, even working on the *pavillon* of the Louvre done when he was over there, and he had the exacting philosophy of the *Ecole des Beaux-Arts* at his finger tips. He was as temperamental as Richardson. He had an explosive personality, tackling a piece of work like a soldier taking a fort, calling a spade a spade with electrifying pungency, helping with both hands when you needed his aid, and uniquely warming men to him. But he was implacably for the mint and cummin of the law and was a mighty influence in the establishment of order in our architecture. He was an artist of wide range. Early in the seventies he designed the Tribune Building, the first of New York skyscrapers, though then only about ten stories high. He capped it with a Tuscan campanile but that was the only Italian note I ever observed in his work. He was by instinct and upbringing French in style, tempering the severity of the *Ecole* with the elegance and grace of the *chateaux* of the Loire. The W. K. Vanderbilt

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house on Fifth Avenue and the great place he built for George Vanderbilt in the south, Biltmore, show the combined scholarship and romanticism which distinguished his genius. There was a time when the vein of Ecole teaching that was in him was adopted with ill results by his juniors. American buildings, especially some of our "fashionable" houses, began to take on a thin, superficially decorative aspect. They were covered with meaningless doodads. Their "style" was neither French nor American but disgustingly hybrid. Fortunately the course of merely external Eclecticism was swiftly run. Today the admirable Beaux-Arts Institute of Design that Lloyd Warren founded is as salutary in its influence as McKim's American Academy at Rome. The tendency is the same at all the universities where architecture is in the curriculum, to promote the study of plan, to make design an affair of reasoned construction, to teach the young idea how, in the best sense, to build. The *projet* effective on paper, and only conceivable on paper, has had its day. Architectural training is all for the practical necessities of existing conditions.

They are thrilling conditions. I have compared our fifty years with the period of the Renaissance and have asserted that ours is one of the most amazing architectural developments the world has ever seen. Can anything like it in Europe be cited this side of the eighteenth century? There is something almost staggering about the area covered, the number and efficiency of the designers and builders always ready to cope with it, and, above all, the diversity of the works undertaken in our stupendous field. The foreigners who reluctantly concede that we have accomplished something in that field are wont to concentrate on the skyscraper as most characteristic. It is easy to understand this when we think of the ineffaceable impression they must receive as they steam up New York Harbor. Daniel H. Burnham was undoubtedly one of our most potent leaders. When he and his brilliant partner, John Wellborn Root, put up the Monadnock Building in Chicago they prefigured a distinctively American achievement. It involved more than the development of great height in building. It involved progress in design, the steel cage principle of construction, the solution of the housing problem for business in great cities, and the devising of all manner of ingenious expedients for the use of large numbers of tenants under one roof. Let us admit that the invention of the skyscraper constitutes a *coup*. But for my own part I have long been restless where its apotheosis as the type of our architectural individuality has been concerned. The test comes more significantly, I think, through the attack of American architects upon a variety of problems, for thereby is brought out what seems to me the important and veritably American thing, the play of individual genius.

The skyscraper is a momentous contribution, no doubt, and I like to dwell upon its multifarious examples, all the way from Burnham's Flatiron to the recent Hotel Shelton of Mr. Harmon. But musing on American architectural genius as a force, functioning all over the country as it is required, taking each new subject as just so much in the day's work, and treating it with learning, taste and original energy, I am disposed to dwell on certain edifices that have no sensational height at all. I think of Bacon's Lincoln Memorial and John Russell Pope's Scottish Rite Temple, both in Washington. I think of Charles A. Platt's Freer Museum, also in that city. I think of the Bowery Savings Bank and other similar structures built by York and Sawyer in New York and elsewhere. I think in one moment of McKim's Pennsylvania Terminal and of other railway stations throughout the land by other architects, and then in the next I think of the country houses of Harrie T. Lindeberg, the most original, most emphatically American designs in their field that our generation has produced. I think, in short, of that panorama to which I referred at the outset, a fairly overwhelming spectacle, having unquestionably a strong national character. For if, as I would persistently maintain, this immense bulk of architecture is due to our richness in architects who are artists, truly gifted personalities, it is due also to the hold which they have obtained upon the public imagination.

What has the layman been doing in the last fifty years? He has been travelling, for one thing, and delving much in books and magazines. He has come to a point where in phenomenally increasing numbers he demands interesting and beautiful architecture. When he goes to see his son graduated from Princeton or Harvard or Yale he is glad of the buildings erected there since his student days and when he and his family go abroad they drink in, even unconsciously, unforgettable lessons. When he goes to his bank he appreciates the investiture that York and Sawyer or Cross and Cross, or divers others, have given to "business." He delights in a monument like Ben Morris' Cunard Building. He finds architecture a living factor in his church, in his club, in the public library, in the railroad station through which he passes or in the bridge he crosses—he finds it everywhere. Is it any wonder that he is conscious of it when he begins to make his own home? The architect does not always realize, perhaps, how much he owes in the multiplication of his chances to the steady progress in reading, observation and reflection of the layman who has been keeping pace with him. What I am writing about is not simply "Fifty Years of American Architecture." It is "Fifty Years of the Growth of the Architectural Idea in the United States." It is as thus conceived, in fact, that the subject takes on its most beguiling colors. I see it as far more

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than a professional development. I see it as part and parcel of our civilization, saturated in our national taste, aspiration, vitality. That is what makes American architecture so exciting. How stupid it is to survey the host of buildings out of which I have cited but the sparsest few, with impatient solicitude for the disclosure of an "American style." American fiddlesticks! Art is art, mathematics is mathematics, said Whistler. Architecture is architecture. You can no more jettison or supplant its historic idioms than you can supersede the logic of algebra. Of course, the American architect goes wrong from time to time in his handling of a given motive. Some day, for example, he will have to answer in sheet and candle for the heterogeneous junk with which he packs a house, turning it from an American interior into a luxurious but otherwise indefensible approximation to some cosmopolitan hotel. But that foible, for which client and architect are, after all, equally responsible, will in the course of time wear itself out, and an American home will lose its resemblance to something in Baedeker. In all other respects the last fifty years have rounded

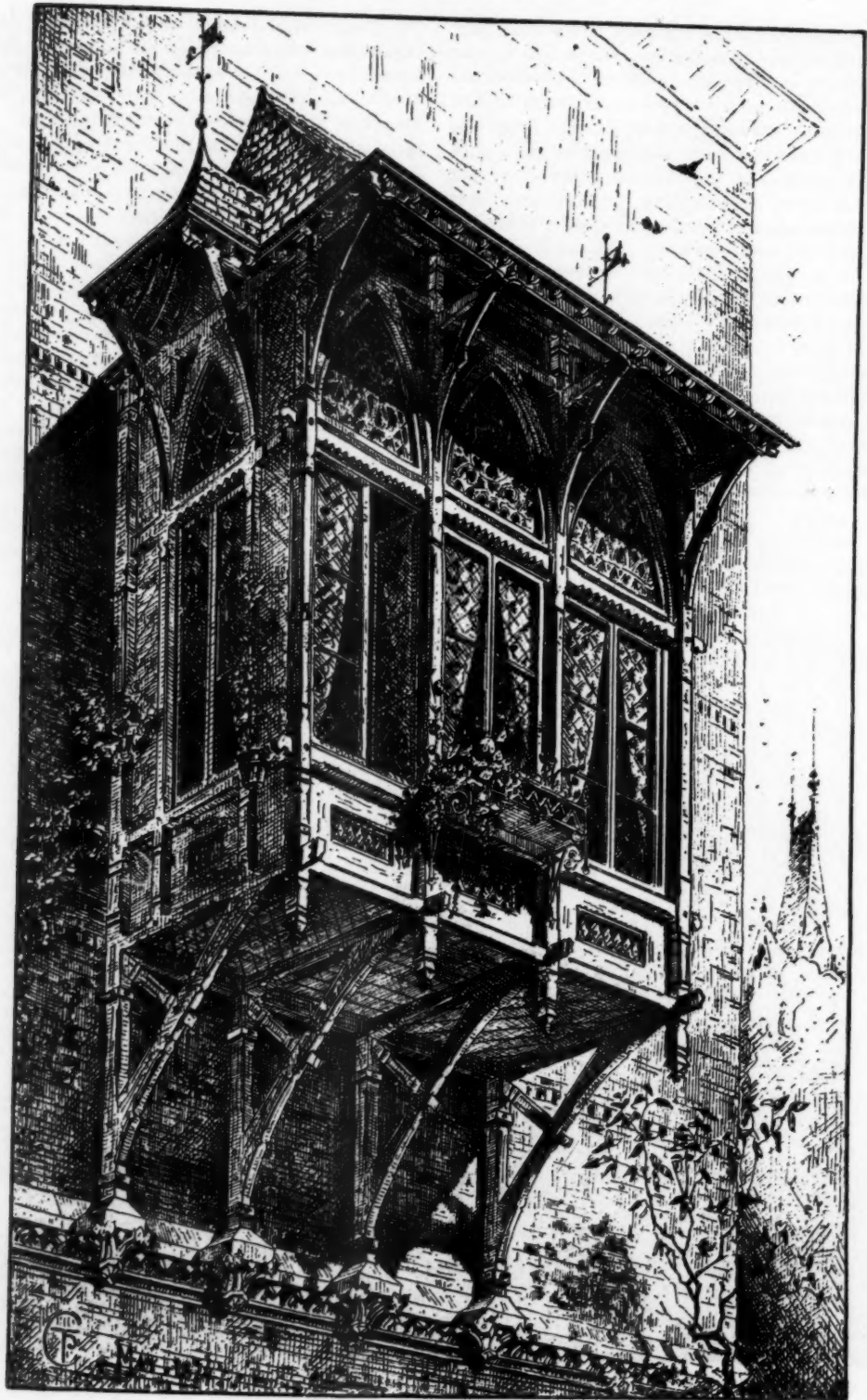
out a marvel. I have dwelt upon the founders because we owe them such an unpayable debt and I have named a few of their followers, but actually to cite all the men who keep the light burning would be to compile a prodigious table. And a body of craftsmen has been reared up to second their efforts. Our buildings are superlatively well built. I remember a document that Bacon once showed me. It was being inscribed with the name of every worker on the Lincoln Memorial, for everlasting preservation. There is some grand masonry in the United States. American buildings, public and private, contain, too, the most astonishing profusion of devices for comfort and convenience that it would seem possible to invent. Furniture is consummately made. In short, the art of living has received with us its requisite *enveloppe*. How did it all come about? Not alone because America is rich and progressive. But because, in extraordinary numbers, artists of creative gifts were born in this country to be architects. As I take leave of the subject I see in the foreground what I saw at the beginning, a group of men.



THE STATE CAPITOL, HARTFORD, CONN.

R. M. UPJOHN, ARCHITECT

Reprinted from the issue of January 31, 1886



RENDERING OF ORIEL WINDOW MADE IN 1874

BY J. P. CHANDLER, ARCHITECT

Reprinted from the issue of July 1, 1876

FIFTY YEARS AGO

BY C. H. BLACKALL, F. A. I. A.

FIFTY years ago the world was our oyster and we, the young men just beginning, thought we had the whole world before us to be ours for the taking and were ready to conquer everything. But as I look back now, how much there was that we did not have. There were no well equipped schools though there were brave beginnings. Queen Anne was rampant through the land and Eastlake was the acme of decorative possibility. The architects were paid 5% commission, if they got it. There were no professional draftsmen and no corps of Beaux-Arts men to draw from. The architects who had studied abroad could almost be numbered on the fingers of one hand. There were no architectural papers, though *THE AMERICAN ARCHITECT* was making its first brave essay. The A. I. A. in those days was a struggling infant of less than ten years and while nominally national, was really a very small New York Society of elderly dilettante architects who looked with distrust on any young man who proposed to draw with anything softer than a 6H pencil. Typewriters were unknown and specifications were laboriously copied by hand, or by a diabolical invention known as the hectograph, whose chief mission seemed to be to smear very nasty indelible ink over the drawings. Blueprints were commercially impossible and photostats were not thought of. For drawing paper we used Whatman and a horrible Egg Shell and made our tracings on rank smelling oiled paper. We had no telephones to carry our messages, and no automobiles to carry our persons. Steel was a product reserved for cutlery and machine tools but was unthinkable for building purposes. Reinforced concrete had been used successfully in France but was unknown in practical work here. Fireproof construction had yet to be elaborated. We had no elevators and consequently no high buildings. Electricity was hardly more than a laboratory experiment and was not used at all for lighting or power. We had very hazy knowledge in regard to foundations and in Chicago they were even trying to float heavy buildings on soft mud. Steam heating and ventilation existed, to be sure, but none of us knew enough to question why the results of our so-called engineers were so unsatisfactory. We had no kodaks, no phonographs, and in fact, measured by the standards of today, we fifty years ago were a pretty poor profession, with very few experienced builders to back up our ideas, no aggregations of capital to draw on and a very restricted possibility in clients and in opportunity.

And yet there were a good many things we did

have. Though we did not know it, we had all the inventions of the next fifty years ahead of us, and that is something the young men of today cannot be sure about. Ethics at times meant then, as it does not now—get your job—but get it! Nevertheless the standards of the profession were high and based largely on gentlemen's agreements, and since there was so little work, practice was necessarily confined to those who were not wholly dependent upon the profession but who either brought family relations or comfortable bank accounts to back up their exclusive ethics. The architect in those days was considered primarily an artist. Our critics, and there were those then just as there are now, and even more pronounced in their views, were more concerned over our meticulous adherence to style than they were ready to recognize red-blooded architecture. How well we remember the battle which raged over Memorial Hall, when Ware & VanBrunt dared to build a vaulted ceiling in wood with curved wooden ribs and wooden sheathing between the ribs. All the precedent of Pugin, Sir Charles Barry and the rest of our foreign cousins proved irrefutably that such a combination could not possibly be good architecture, and this notwithstanding the constant use of wood both for sheathing on ceilings and for ribs in all of the great baronial halls in England. But the battle raged among the elders and we youngsters looked on in awe while men like Nathaniel J. Bradley oracularly declared that elevators were unnecessary, that a three story building was high enough for all business purposes, and if men could not walk up three flights of stairs they should stay at home, and he was the leading architect in Boston.

In those days we were on the whole pretty well satisfied with ourselves and thought we were doing pretty good work and were being quite progressive when we built a building eight stories high. Steel frame construction did not come in until eighteen or twenty years later, but the fact that the profession was ready to take it so quickly and so understandingly was due in no small measure to the point of view of the earlier architects who perhaps more than we youngsters appreciated, knew how much architecture must grow before it could be worthy of recognition. Then just about fifty years ago we had that beginning of the American Renaissance which was called the Centennial Exposition in Philadelphia, a wonderful awakening following the dreadful strain of the Civil War and touching with a new life all the arts and industry of a busy and prosperous nation which had everything to learn and whose prospects were almost

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entirely in the future. American art and architecture were at their lowest ebb in 1860, and as has been the result after nearly every war, the years between '67 and '76 were times when men's minds, hearts and pocketbooks were prepared for the possibilities of the new architecture which was heralded by the triumphs of the Centennial. Just think how much came right after the Centennial and came in such manner as to leave no doubt of the influence on the country and on our art of this gathering by the Schuylkill; and when we consider all the inventions which were there shown for the first time and try to enumerate the building operations which it stimulated, it is readily seen how appropriately it can be called the beginning of the American Renaissance. Architecture was still a hesitant fine art. It was not until later that the profession began to appreciate that it must be a business and a science as well. Richard M. Hunt, with aroma of his long Paris training under Lefuel, was at the head, and rightly so. Peabody & Stearns had just begun to practice. Professor Ware was then winning his laurels with Tech, and with a few notable exceptions, all of our architecture which has been at all worth while dates from after '76.

There was one mighty individuality of those days which was as potent as the Centennial. H. H. Richardson had been sent abroad during the Civil War to take him out of harm's way. There is a legend that he had to work his way in Paris and as a result thereof got an intimate, firsthand acquaintance with French ways, and when he returned to this country his virile imagination and his convincing ways brought him immediately to the foreground. And yet what a hard fight he did have. We young men used to tell with awe of how on one occasion he had prepared for a Church Building Committee a most elaborate, and as it proved, a most interesting and architecturally worthy set of drawings for a proposed new edifice, the only job he had, present or in prospect; but on carrying his wares to the place of meeting designated by the Committee, he was coolly informed by the secretary that the Committee had decided they would not build for the present. Any ordinary man would have been thrown down, but not Mr. Richardson. He went back to his hotel, cogitated awhile and then went around personally to see every member of the Committee and several members of the Church, got them to meet together that evening, argued them into reconsideration, and took the late train back to Boston with the commission for the building signed, sealed and delivered in his pocket. He was undoubtedly the most compelling personality the profession has ever seen and his influence on the rising generation was simply enormous. We all looked to him, though most of us never saw him in the flesh, but we copied his idiosyncrasies, thought we were using 6B pencils as he did, tried

to draw inspiration from the same sources which he found so fruitful, and above all we were inspired by him really to think architecturally. Mr. Richardson used books as no other architect before and few since. He had a wonderful library and knew how to study. His freshness of vision and absolute sincerity in design, though presented in a style entirely different from anything else in the country, prepared the way for all that followed. And yet even his genius was woefully handicapped. If one examines the details of Trinity Church, which was built by him about fifty years ago, the poverty of the details, the lack of technical skill in executing the carving are at once apparent, and especially by contrast with the porch which was added many years later when vastly more technical resources were at the hand of the architect. But in spite of technical poverty, Trinity Church is a monument for all time, by its mass and its general conception, and even the insufficient details were not able to rob it of its architectural dignity.

No, fifty years ago was not a golden period. It was a time of seed planting, of nurture and of hope, but not of fruition or harvest. The architect of those days was, as stated at the outset, essentially a dilettante. There were a few gigantic exceptions, but the rank and file of the profession took things very easily, had very few drawings to make and had a relation with their clients which was hardly more in most cases than that of a superintendent. We did not make working drawings then as we do them now, partly because there was no call for them, and partly because there were no draftsmen to get them out, and if we had to wait until after the Centennial before we did real architecture, it was simply because the country was not ready for it and we were not ready to take our places. But when we look over the possibilities of today and see how easy it is for a young man to get started, what a wealth of everything in the way of material, scientific data, improved constructions are ready at his hand and offered faster than he can take them, one appreciates that while today is the inheritor of fifty years ago, the child of those days has grown out of all recognition, and architecture, adding to its art the most exact science, and taking unto itself the properties of a hard-headed business man, has become what we then thought it was but did not appreciate, the finest profession in the world for one who likes it, is fitted for it and has the chance. Opportunities as we know them now simply did not exist then. We heard it whispered that Clinton & Russell had a job in New York for which they were to be paid \$50,000 in commissions. It simply seemed like a fairy tale and we wondered whether there was some comeback on it because it did not seem possible any client could pay that much for architectural services. Again we were told only a few years after '76 that it would be

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practically impossible to build a building more than ten or twelve stories high on account of various mechanical difficulties, which would make it wholly out of the question. Now we can go to limitless heights, we have untold millions at our command and many architects are earning, and fairly earning, paid commissions beside which \$50,000 would seem small.

Fifty years ago was worth living. Architecture was enjoyed then quite as much as it is now; we took a different kind of pride in our work and were more anxious to prove the authenticity of a moulding or an architectural feature than we might be now; but it was a joyous living and sometimes it seems as if the men of today do not fully appreciate how much more they have to enjoy and work out than we did in those days, or that the rising generation does not properly measure its blessings and its opportunities; and as we look backward we sometimes tell ourselves that we in those crude, unfinished days had an appreciation of architecture because we lived with it and did all of it and saw it all grow under our direct hands, whereas today the draftsmen are a part of an organization and do not see the whole working of the machine and are only connected with an individual fraction.

Probably the most significant change which has come about in the profession of architecture in the last fifty years has been in the matter of ethics. In '76 architects had a sort of feeling it was rather beneath their dignity to know much about construction. Mr. Richardson deliberately ignored it and claimed it was a builder's function and not an architect's. We have certainly changed all that, and though our friends, the engineers, take to themselves a considerable share in the structural changes which time has brought out, after all, in the last analysis, it is the architects, men like Jenny, William R. Ware, Treat & Foltz, Adler, to mention only a few, who devised and thought out the new schemes which have made our modern buildings possible. Fireproof construction was an architectural device to meet a condition and sprang up as a direct result of the Chicago and Boston fires; and had it been simply a question of engineering, it is doubtful if high buildings would ever have been devised, for the engineering attitude is the downward one and is concerned more with fundamental than with final, objective results, while the architectural attitude sees the thing from the beginning and forces the intermediate steps even at the expense of entirely breaking traditions. So it has been with reinforced concrete, one of the oldest constructions in one sense in the world, but one which has reached its wonderful development very largely because of the attitude of the architectural profession to it. Then again in '76 an architect was not supposed to know anything about money; in fact, he was classified as a sort of irresponsible poet and

never allowed to handle any money. Notwithstanding this earlier attitude, the architectural profession has developed a number of leaders who have taken the initial steps in financing and carrying out large building operations not merely as architects, but as business men and financiers, and though this function of the architect would have been severely criticised in those days as unprofessional, we cannot shut our eyes today to the fact that it has come to be accepted, the A.I.A. to the contrary, and even that most fundamental code of ethics—"Thou shalt not guarantee a contract" has positively been waived in many cases where the architect is expected to stand behind his own judgment with his own pocketbook. Nor has this attitude in anywise lessened the confidence of the public. As we look back at '76 we see how the architect was seldom really trusted, was always curbed and occasionally reprimanded. Today all architects are not good ones by any means, and there are disgraceful conditions incidental to the vast amount of building operations; still it is a fact that the profession today commands an influence with our clients such as we never dreamed of in '76 and is given powers and limitless opportunity which would then have been absolutely denied.

And finally the debt which the profession owes to *THE AMERICAN ARCHITECT* is something which should never be minimized nor forgotten, and in any remembrance of this fiftieth anniversary, the name of the founder and first editor, William Rotch Ware, should be spoken with reverence. He was a man who gave his life for the profession, who worked day and night always with limited means and few helpers, who evolved a magazine out of nothing and made it the power that it is today, the one man to whom more than to any other the profession owes its present high standards and great possibilities. American architecture could very probably have developed without a journal such as this and an editor so devoted and unswerving, but the development would have come slowly and might have taken a very different turn, except for the constant inspiration which Mr. Ware's tireless energies supplied and without the medium of exchange of thought which the illustrations and the pages of *THE AMERICAN ARCHITECT* offered to the profession. We do not get all our ideas from the architectural papers, but our thoughts are mirrored back to us from these pages and are rendered coherent and usable because of the comparison and criticism either presented in picture form, or in the written word, which enables us at least to try to excel and to work out our own thoughts. If the architecture of fifty years ago was less alive and had less possibilities than that of today, it was very largely because no opportunities of exchange of thought then existed and the vocabulary of the architect was constantly turning in on itself, save when a few men like Mr. Ware or Mr. Richardson gave it inspiration.

TYPES, PAST and PRESENT

BY THOMAS E. TALLMADGE, F. A. I. A.

I HAVE an old book. It is of the type they used to call, and perhaps still do, gift books. It is very large—not designed, obviously, for a student's book shelf, but to be laid, slightly askew, on the marble top parlor table. Its leaves have gold edges and across its blue cloth cover in large and picturesque letters is the title "Homes of America." Its glossy pages illustrated with skillful woodcuts, fall into three divisions: "Colonial Homes," "Later Homes," and "Modern Homes," and these "modern homes" were the latest word in fashion and architectural elegance about the year that THE AMERICAN ARCHITECT made its debut; for turning back to the title page we find that "Beautiful Homes" was published in 1879.

In the passing of old types and the creation of new in the last fifty years what more conspicuous example have we than the American home? In the mind of one author, at least, the American home was the home of the rich, or at least, the very distinguished, for society was divided in those days into three general types: rich people whose insignia was a mansion with a cupola, and a Victoria with a span of horses; another class, often sitting at the rich man's table, composed of professional people and educated people on salaries, or an unsuccessful business man whose insignia more often than not was the boarding house and the perambulator; and poor people. The poor people as like as not had to be helped by the rich on Thanksgiving and Christmas, and they included that great class of mechanics and skilled laborers who, today, own their own houses, drive their own automobiles and often send their boys and girls to college.

Even today when unparalleled and distributed prosperity has wiped out these distinctions, one pronounces the names of those merchant princes with something of the unction of our author of "American Homes." "Ogontz," the home of Jay Cooke, with its mansard roof and seventy rooms. "Rockwood," the home of W. H. Aspinwall, the great villa of Samuel Colt, the Swiss chalet of Albert Bierstadt, the dean of the Hudson River School of Painting, and way out on the shores of Lake Michigan, the gold fish castle of Potter Palmer. There were a few smaller, but scarcely simpler dwellings, such as those of Nathaniel P. Willis, F. E. Church and Charlotte Cushman.

Houses built fifty years ago are familiar enough but they should only be viewed in the woodcuts of their day to be sympathetically appreciated. The great mansion, with mansard and cupola and porches, oriels, bays, porte cocheres and green-houses attached, dominates the scene. Around it

are lugubrious bays and weeping willows which somehow remind us of Napoleon's tomb at St. Helena, and Christina Rossetti. In front is the broad and very smooth lawn, not always, but we must admit often, policed by the famous cast iron dog and his companion the notorious cast iron deer, but sure to be dotted with flower beds of cannas and gladioli curiously fashioned by the German gardener in the forms of stars, crescents, anchors, and so forth.

Out of a beautiful Victoria drawn by two "spanking bays," languidly steps Elsie Dinsmore with her buoyant skirts and bonnet and her lace sunshade. She is casting an arch, but maidenly glance in the direction of Uncle George who equipped with side whiskers and a high hat, tight pantaloons and a Prince Albert is expounding the wonders of nature to, we have to fear, the deaf ears of little Rollo, who appears to be shying a stick at the good dog Dash. In the distance are the broad reaches of the Hudson reflecting the extraordinary clouds that top this scene of refined and sumptuous felicity.

We must confer on the architects of those days, however, the jewel of consistency, for the interiors are exactly what you would expect. The straight narrow hall, the stairway in one run, except for a sharp turn at the top, where in a niche, presumably to warn you of the winders, stood Canova's Hebe, or Power's Greek Slave. High narrow windows, high narrow rooms, high narrow porches, and high narrow bathtubs, where there were any, carry out the high and narrow motive.

But we all know these houses. To many of us their ugliness is now covered with the veil of honorable old age and memory blows about them the mist of loving forgiveness.

Before we leave them, however, the chronicler should say something of the purely architectural modes of the time. There were two influences almost exactly contemporary. One was the French. This was evidenced, besides the use of the orders, by heavy cornices outside and in and mansard roofs, huge plate glass mirrors with elaborate gilded frames, marble fireplaces and marquetry floors. Garnier's Opera House was a mine and you see his robust garlands and beaded capitals in decaying splendor, far from home. The other and equally potent influence was English, not the English of Christopher Wren, but the English of the day, which was then in the throes of the Gothic Revival. The Victorian Gothic it was called, the child of Ruskin, Pugin, Gilbert Scott and Norman Shaw. There was another English influence more or less "caviar to the general" and that was the "Eastlake Style." Sir Charles Eastlake had

written a book on Interior Decoration. In it he had excoriated the Classic Revival, then on its last legs, and had made a plea for appropriate decoration; wood should be ornamented with carved not plastic forms; construction should be evident; a very sensible book illustrated with many original designs principally of furniture. It was a real, possibly the first, arts and crafts movement. These designs were very popular and what our "craftsmen" and decorators forgetting the traditions of Fyffe and Harrison, did to them was something terrible. The great top heavy walnut bedsteads with that curious incised decoration of discs and broken wheat stalks; the mantelpieces with innumerable stories of shelves on turned spindles, of chamfered and ceiled wainscoting, with insets of florid tiles, the lambrequins and Brussels carpets, the wax flowers "sous cloche" and the bronze Venus de Milo with a clock in her stomach (I actually have one in my attic) are all attributed to Eastlake; a curious example of a good and sensible man sowing the wind and reaping a whirl wind. His name will go down in history with those equally well meaning immortals who introduced the thistle to Canada and the rabbit to Australia!

The Pandora's Box that housed these architectural imps was often worthy of a better contents, for in general the houses in the Victorian Gothic style are better than those in the French mode. Their steeples, gabled roofs, with their covering of patterned slate, their wooden trellises, their iron crestings, their high chimneys are usually picturesque and often pleasing. The cupola, the crest of opulence and respectability, occurred, if the station of the owner permitted, on both types of houses. All of this melange came to be known as time went on as the "Queen Anne Style." This was probably because of the English Renaissance work after the Tudor. The work of Wren and Grinling Gibbons in the reign of Queen Anne was the most picturesque, and architectural critics of the 70's and 80's, admitting that our Victorian-Gothic-Eastlake infant was at least picturesque, named it after good Queen Anne, safely dead these hundred and sixty-two years. Whether Sir Christopher turned over in his "*Si monumentum requiris circumspice*" we know not, but we do know that no international complications ensuing, we were free for our next architectural adventure which was the Romanesque revival of the eighties. It is extremely easy to ridicule the period which we have been describing, and severe censure if not ridicule is deserved. The style and the whole attitude toward art, if not toward living, was parvenue. Architecturally, at least, it could be called the "Parvenue Period."

It is hard to think of a single type of building in use in the seventies that has not been entirely superseded. The office building has been revolutionized not so much by the advance in taste as by

the invention of skeleton steel construction and the passenger elevator. But without these it is hard to condone or understand the commercial building of fifty years ago—the dark, narrow hallways, the narrow stores, the narrow windows, the basement shops and the resulting ascending and descending stairs from the street level, must have made these buildings as impracticable and uncomfortable then as now, for business demands of air, light and convenience must have been much the same in 1876 as in 1926. Stylistically whether in the French mode or the Victorian Gothic, which always had the Venetian tinge of Ruskin, the ornament was coarse, stupid and unmeaning. An order for each story piled one on top of another, often of cast iron, may have been more logical than the frantic proportioning of the nineteenth hundreds, when each building was resolved into a base, shaft and cap, but reason, if there was any, was not the result of thought but merely the limitation imposed by naivete and ignorance. Railway stations, legislative halls, hotels, hospitals, churches, banks, college buildings, art galleries, even factories; where is there one that has stood the test of time or has originated a type that has endured? I will answer my own question by the mention of the only exceptions I can think of; so pitifully few in number as to prove the assertion—St. Patrick's Cathedral, New York, begun by Renwick 1856; New Old South Church, Boston, built by Cummings and Sears about 1875; Memorial Hall, Harvard University. There are college halls in various parts of the country rightly preserved and venerated on account of their associations, but not certainly because of their practicability or beauty.

Rational planning and an improved taste in design first appeared in the eighties. Not counting William Morris and the pre-Raphaelite movement in England, there were two agencies responsible for this beneficent revolution. The first was the personal influence of a limited number of architectural firms whose members had for the most part been educated abroad. Of these the outstanding ones were Gambrell and Richardson; McKim, Mead and Bigelow; and Richard M. Hunt. The second was the establishment of architectural education in the United States, beginning with the founding of a course in architecture at the Massachusetts Institute of Technology.

It is fascinating work looking through the early files of THE AMERICAN ARCHITECT for the first signs of an awakened art. Volume I published in 1876 gives us no example though there are hopeful signs. For instance, there is a mention for the first time of the youthful paladin, R. M. Hunt who, back from Paris, had just entered the lists; there is a protest against uniting different elements of design in one building and there is an article by a member of the R. I. B. A. who says that American architects are wholly

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untrained. One striking thing is the great interest shown by contributors in academic questions and hot discussions occur on the Queen Anne style, the refinements of the Parthenon, etc. In the second volume, 1877, there is a house by R. M. Hunt, but our young knight has not yet found himself as the house is an unbeautiful combination of the Neo-Grec of La Bruste and the style of Garnier. However, for the first time the mighty name of Richardson occurs, with a description but no illustration of the proposed Trinity Church, and later on an illustration of the Library at Woburn. Richardson had flung his Romanesque banner to the breeze! In the same volume is a fine Elizabethan country house by C. F. McKim and then the Lenox Library by R. M. Hunt and an article by an Englishman imploring American architects to return to the Colonial. In the third volume the slogan of an "American style" is first pronounced and the statement is made that "neither in painting, sculpture in architecture nor in the decorative arts does America show the slightest evidence of being able to strike a new path." A Colonial house appears by Peabody and Stearns while far out in Chicago the young fellows, Burnham and Root, show a house in the prevailing taste.

As we turn the pages from year to year we find Hunt, McKim and Richardson in the thick of the fray, fighting the good fight against parvenue taste and each with his own weapon,—Hunt with the Neo-Classical; McKim with the Renaissance and Richardson with the Romanesque. We in the West are perhaps inclined to overestimate the extent and importance of the Romanesque Revival. We have even advanced the theory that had it not been for the World's Fair of 1893 the Romanesque might have developed into that *Fata Morgana* of the architectural idealist "The American Style!" But the fact remains that outside of New York it swept the country like wild fire and in the Middle West where it found brilliant and sturdy protagonists in Burnham and Root, its use was well nigh universal. The gift of McKim, Richardson and Hunt and their disciples was not alone one of beauty and taste but of planning and construction as well. The early libraries, country houses and office buildings of any and all of them were revolutionary. As an instance, the plan of the Rookery Building in Chicago in the early 80's, by Burnham and Root, swept almost over night into limbo the childish office building of the preceding period. And in 1889 arose that mysterious steel skeleton, the like of which man's eyes had never rested upon, which should be clothed with brick and terra cotta as with a garment and which would herald a new era in man's effort to climb into the skies. The Tacoma Building in Chicago, by Holabird and Roche, the first skyscraper with a skeleton steel frame, is a real milestone in the march of architecture, the plain and niggardly

genitor of a glorious family, and from whose steel loins have sprung such mighty sons as the Woolworth Tower, the Tribune Tower and the Bush Terminal.

But we are anticipating. In 1891 the Romanesque style was weighed in the balance and found wanting. Its judges, if not its executioners, were the commission of architects whom Mr. Burnham had gathered about him to prepare the designs for the Columbian Exposition. I don't know the items of the indictment, but I suppose inelegance, certainly insuitability for the purposes of a great exhibition, perhaps a failure to live up to its opportunities, for the Romanesque in ignorant hands had been guilty of awful crimes. One voice which might have been eloquent in its defense had been suddenly stilled, for John W. Root had died just as the commission began its deliberations. The Classic style was chosen—so Greece and Rome rise again from their ashes. Minerva and Apollo are supreme on Olympus; Romanticism is in full flight and McKim has triumphed over Richardson!

The World's Fair set the style for the whole country and without a struggle. Large crops of young architects grown in classic soil were being harvested every year. The great problem in hand was the skyscraper and a whole generation of them made a lamentable failure of its solution. Seen only as a facade to be treated according to the rules that guided Vitruvius or Michel Angelo, it shows up the past generation as not only lacking in a sense of logic but in a sense of humor.

Such types as the First National Bank in Chicago or the Municipal Building in New York where the walls appear to be self-supporting and a huge cornice dominates the whole, is a type toppling on the edge of limbo. The classicist did much better with simpler problems. Libraries, art galleries, railway stations, residences showed continuous advance and produced great examples. These great examples served as types which have tended to standardize design in each particular class,—the Pennsylvania Station in New York and the great terminal in Washington, the University Club in New York, the Boston Public Library, the Post Office in Indianapolis, the Field Museum in Chicago, the Waldorf Astoria Hotel. But the architectural historian could hardly call the quarter century between the World's Fair and the World War Classic without sweeping reservations. Eclectic would be the better term. An architect with the treasures of the ages at his fingertips or on his library shelves, will naturally seek and find the mode that best expresses himself or his client. Eclecticism was best served by the brilliant and fearless young knights Cram and Goodhue, who in the middle nineties raised the gonfalons of the *Moyen Age* and with the cry "*Montjoie St. Denis*" charged full at the Attic phalanxes and Roman cohorts. It is given to few artists or prophets to found a school. The

brilliant series of Gothic churches that emanated from this office revolutionized ecclesiastical architecture in this country and gave to the Gothic style new breath and blood that it had not known since the fifteenth century. A host of younger men have been proud to follow in their train.

So the World War found us with all the old types and styles that had prevailed in 1880 entirely discarded. A new art virtually beginning in 1893 prevailed with great buildings serving as models and standardizing the types—outstanding here and there. The art of planning had especially been developed and American architecture had begun to be known for a certain breadth, simplicity and largeness. The possibilities for beauty and usefulness in group planning, discovered in the Columbian Exposition, were being utilized, and the new profession of town planner appeared. The great City Beautiful plan of Chicago by Burnham and Bennett was followed by similar plans for almost every metropolis. A necessary concomitant to the city plan was zoning, and it was found that, even where a grandiose scheme could not be carried out, zoning could.

About 1900 a new member of the famous family composed of post, lintel, arch and truss made its appearance: reinforced concrete. Still in its infancy, it is not only grabbing all the covers but will end in all likelihood in kicking its older brothers and sisters out of bed. It has, as every one knows, revolutionized the construction and design of factory building. Even the lowly engineer has produced some creditable designs. It will have a profoundly beneficial effect in the future in identifying the aesthetic and engineering elements of architecture.

The automobile had appeared and was beginning to present problems in traffic control. The institution of golf and the country club introduced a new type of building. The aeroplane and radio had as yet made no demands on the architect, but increasing prosperity and population and a national "elan" were leading to the denouement. It came in 1917 and the shock of the World War tore aside the chrysalis and America, radiant and all powerful, burst forth.

The phenomenon of the procession of the half millenniums has been noted most convincingly, perhaps, by Dr. Cram. If the half millennium which inaugurated the Renaissance began in 1420, it would be due to expire in 1920, and we would now be standing on the threshold of a new era; a rare station for the watcher of the human skies for to see a new era sweep into one's ken is more glorious than a new planet. And why not? We are here to point out architectural phenomena but these are dependent always on underlying social changes and conditions. These social changes at the present time are prophetic and profound. Certainly not less marked than they were in 500 B. C. at the beginning of Greek

democracy or 1 A. D. the rise of Roman imperialism or in 500 A. D. the beginning of feudalism; or again in 1000 A. D. when ecclesiasticism and Gothic art held Europe in ecstasy or even in 1500 when capitalism and science with art for its handmaiden had started on its five hundred year march of blood and healing, tears and laughter, destruction and upbuilding.

If there is such a thing as racial senility, the probable cause of extinction of the Dinosaurs, who had no known enemies, and which may finally quiet the human race in everlasting sleep, why is not such a thing possible as racial boredom or racial satiety, in which providentially is placed at five hundred year intervals a seventh inning in which the so-called human race, as Bert Leston Taylor delighted to call it, can get up, stamp its feet, swing its arms and throw a few bottles and cushions? Great changes are impending in architecture in the United States. The first is the solution of the skyscraper, unbelievably bungled for twenty-five years. The beautiful Woolworth Tower, the Bush Terminal and the American Radiator Company's building point the way. But the best solution so far—Saarinen's inspired second prize design in the Chicago Tribune Competition—is still on paper. The solution of the problems arising from the presence of one automobile for every four people in the United States will make great changes in the physical appearances of cities and suburbs. It is not only a matter of congestion and housing of machines, for the automobile has made every location near a good road a suitable place for a town—or at least a home. The immediate result of this condition will be that within a fifty mile radius of every metropolis the entire country will be laid out for close occupation regardless of present transportation systems and this is not reckoning in the effect of the airplane which might easily double or treble this radius. These homes themselves which have undergone such vast changes since the days of the mansard and the cupola, doubtless are destined for still more. It is only in the last twenty years that the plan for the small house has been perfected or even made sensible, and in the last fifteen we have seen the appended garage, the sleeping porch, the sun parlor, the wardrobe and kitchen closets and latest the oil burner appears, and parlors, pantries and attics disappear. It is hard to see how the house can be made more beautiful than some of the lovely creations of architects of the Pacific Coast or the best of those in the suburbs of our principal cities, but undoubtedly the average, in regard to architectural quality, will greatly improve, especially as fire-proof materials become more and more prevalent.

It is not in the province of an historical sketch to indulge in prophecy. Prophecy is supposed to be the result of revelation, the which certainly this author has not been vouchsafed. Anybody

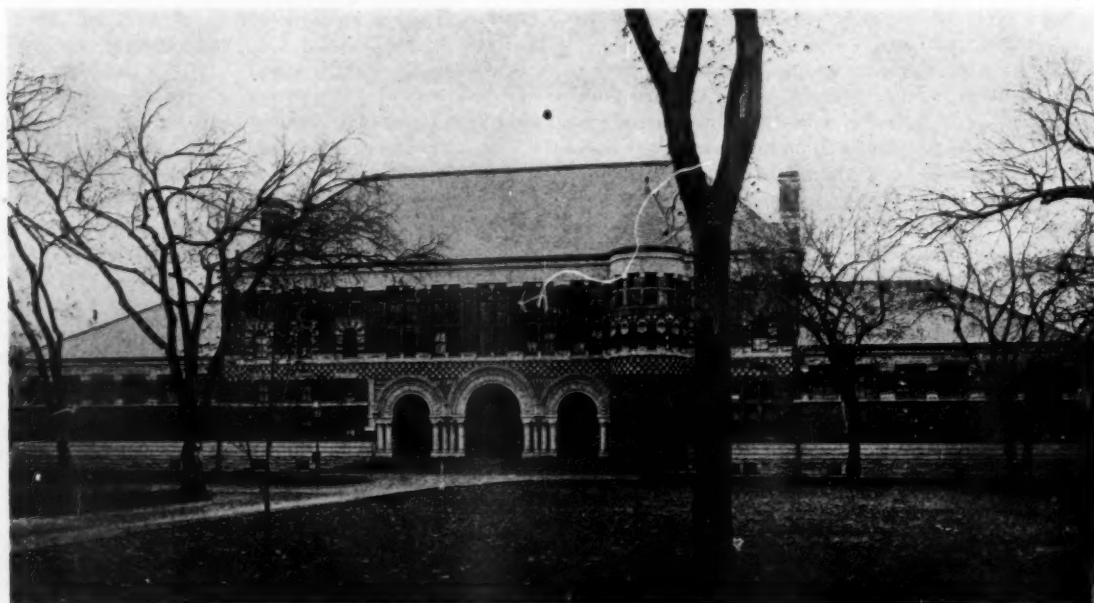
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can tell, however, that as a result of the inevitable increase in population, buildings for the multitude, such as railway stations, stores, hotels, etc., will become bigger, higher, more magnificent, subject of course to local regulations which will become increasingly a factor in architectural development. Witness the effect of the zoning law on the purely aesthetic side of the architecture of the skyscraper in, for instance, New York City. The extension of zoning laws, creation of park districts and art commissions and the gradual consummations of city plans will result in a more ordered and official beauty in our cities and towns. The greatest factor of all, save underlying social conditions in the development of architecture, is education. Education for the professional and the layman. A greater extension of architectural schools and courses and especially the addition of thorough courses of architectural training to the Institutions of Liberal Arts, and the requirement of a knowledge of art in the graduate of every institution of learning are necessary for the continued growth of our architecture and our ability to appreciate and partake of the beauty about us.

I am writing these closing paragraphs in Paris, having just come from the International Exposition of Decorative Arts. Notwithstanding its name, it is chiefly architecture. It is interesting, bewildering, beautiful. But straining for originality at any cost becomes painful. Because we have so far refused to do this very thing is a cause of much censure from our European friends. They forget, as many people do, that architectural

style is a garment and like other garments, is subject to fashions which change, if not from year to year, then from decade to decade. In the heroic days before the Renaissance, architecture was nude and unashamed. The great thing in our architecture is not the garment, but the body itself,—the plan, the construction, the solution that it offers of an American program; in short, the volente—the will to do. I think that there is no doubt that the garment that architecture will don during the coming season will be far more original than in the past, always excepting the almost tragic crusade of Louis Sullivan and his disciples a quarter century ago. Had Bertram Goodhue, who had turned from the pale fragrance of the Gothic lily, lived and had he built a few more buildings of the verve and originality of the Nebraska Capitol, he might with his tremendous prestige and authority, have done what Richardson did in the eighties and what Sullivan failed to do twenty years later. But let us have no illusions in regard to style. It is not, in these days at least, the life blood of architecture; more often it is but the jester's cap and bells, the motley for the crowd.

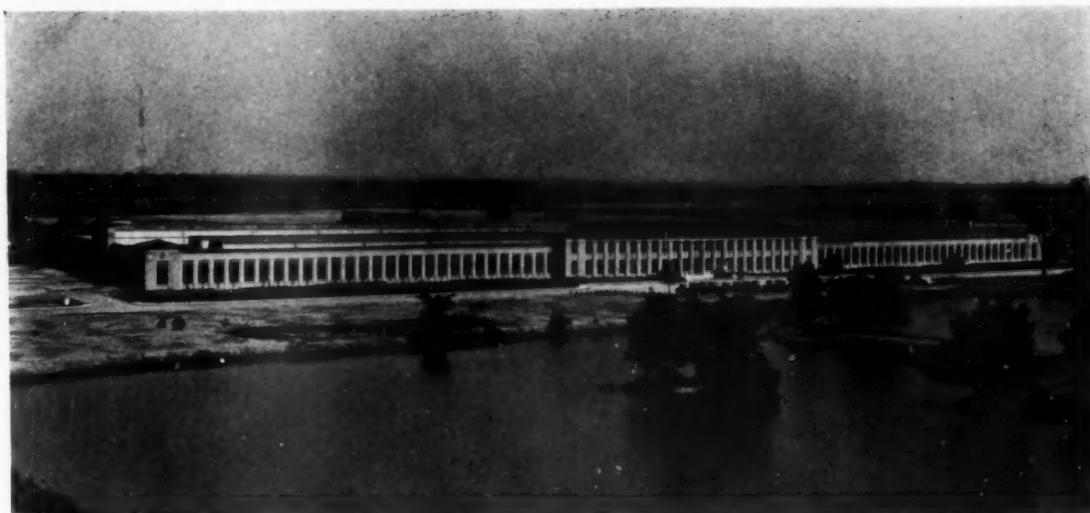
No, America in her position of world supremacy needs most to educate her sons and daughters in the creation and appreciation of the beautiful. Our stupendous wealth and an opportunity greater than that which greeted the Athenians at the close of the Persian wars or beckoned to the *tailleurs des pierres* in the thirteenth century, greet us on the threshold of a new era.



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ENGINEERING LABORATORY, FORD MOTOR COMPANY, DEARBORN, MICH.

ALBERT KAHN, ARCHITECT

INDUSTRIAL BUILDINGS

Their Great Architectural Opportunities and an Appeal to the Architects to Help the American Industries Whose Buildings They have Neglected in the past

BY GEORGE C. NIMMONS, F. A. I. A.

THE industries of America more than anything else, have given this country its prominent place among the leading nations of the world, and it is on this account that industrial buildings should stand high in importance in the architecture of this country.

Our industries have made their great development in the last fifty years, and it is to them that the people of this country have devoted their energy with an intensity and an untiring ambition seldom ever equaled. They have succeeded, and in a general way attained the objects of their highest ambitions. Industry occupies a place in the life of the American people that is probably only second to their religion.

In the light of all of this, a most pertinent question arises concerning the American architects, and that is whether or not they have contributed their full share toward this remarkable industrial development by giving industrial buildings in their practice the same relative importance which the people give them. Have the architects generally sought to secure commissions of industrial buildings, and apply to the planning and designing of these buildings, the skill resulting from the peculiar training and education of an architect?

Unfortunately for the architects and for the

industries as well, the architects generally during this great industrial development have not as a rule sought to secure industrial buildings for their practice. In very recent years, this situation began to change and there is now an increasing number of architects going in for this type of building. But the situation in the main has been most unique in that it is probably the first time that any nation ever devoted itself to any cause requiring buildings, that the architects of that nation did not make such buildings their first concern and devote their skill and ability to the improvement and development of those buildings.

Architecture has in the past always served to express the character of the people in whatever buildings the people were most interested, but in our own case, on account of this neglect by the architects, the industrial building, is, as a rule, the ugliest and most objectionable building that is erected in any community. This is true in spite of the fact that it is perfectly feasible, practical and not a matter involving any material increase of expense, to make most of the industrial buildings and their surroundings not only attractive but sometimes even beautiful in their architecture and landscape effects.

The reason that this condition prevails is largely due to the fact that the architects have permitted

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the engineers and building contractors to do the architecture of the majority of our industrial buildings. In this connection it should be said that there is no quarrel with the engineers or building contractors over this situation because there is no one to blame for it but the architects themselves.

In a great majority of cases, and particularly in connection with large and important buildings, the architect, engineer, and builder have established a basis for operating together in perfect accord and with the best of co-operation, and among the architects, engineers and builders of standing, there is nothing as a rule but the finest personal and professional relations. There are exceptions to this rule, however, which in recent years, on account of extensive advertising and propaganda used, are of such a nature as to retard somewhat the highest development of the architecture and building industry of this country. These exceptions apply not only to industrial buildings, but to other types of buildings, and consist of a practice carried on by a few in each of these callings whereby one member of this trio will undertake to dispense with the services of one or two of the others. For instance, there may be a builder who will announce his complete qualifications to serve as builder, architect and engineer, or there may be an engineer who claims that he is both an engineer and architect, fully qualified to do any kind of a building. Under this class there occasionally appears in the press an illustration of a plan to build some important building, costing perhaps millions of dollars, occupying a prominent site in some city, with a plan and design so faulty and terrible that if it were erected according to this scheme, it would not only stand as a disgrace to the architectural and engineering professions, but it would be nothing short of a public calamity as well.

Recently an engineering concern succeeded in interesting the owners of one of the most important building projects in the country, involving some \$10,000,000.00, to let them act as architects, engineers and builders for this project. They evidently had no one who knew anything about architecture in their combination, so they secured a terra cotta company, who was desirous of securing the terra cotta work, to paint them a picture. This they gave to the owners as the design of the building which they proposed to erect for them. They also made arrangements with some bankers for financing the project and were then given the job. Just before the final details were completed, it was disclosed that this ambitious building combination did not even possess an architect's license which was essential before they could get a building permit. They immediately assured the owners that this was of minor importance, and that in a few hours they could go before the state authorities and readily get one.

Fortunately another hitch occurred which upset the deal after months of negotiation, and the job was finally given to a firm of reputable architects.

As to an architect, engineer and builder, or as to a combination of even two of them in one person, it may be said that there is "no such animal," in the light of being fully qualified to give proper service in each of these callings. This is true for the simple reason that there is no architectural school which gives any such course or gives any such degree and no matter how a man might get his training, whether he went to college or not, the field of preparation for each of these callings has become so vast that no one, even if he were qualified naturally for all of these callings, would have time enough in the training period of his life to become proficient in more than one.

The common practice is for architects and engineers to associate themselves together on important work or to be associated with each other in the same firm, and the service rendered under such arrangements has proven to be most satisfactory. But the practice complained of, is the instance where an engineer or builder belittles or discredits the service usually performed by an architect, and undertakes to supplant it with the services of some relatively inexperienced draftsmen whom he employs.

It is perfectly apparent that if such practices increased materially, the high standards already attained in each of these callings must ultimately decline, and American architecture which is now accorded the highest of standing among the nations of the world, would soon recede to an inferior position.

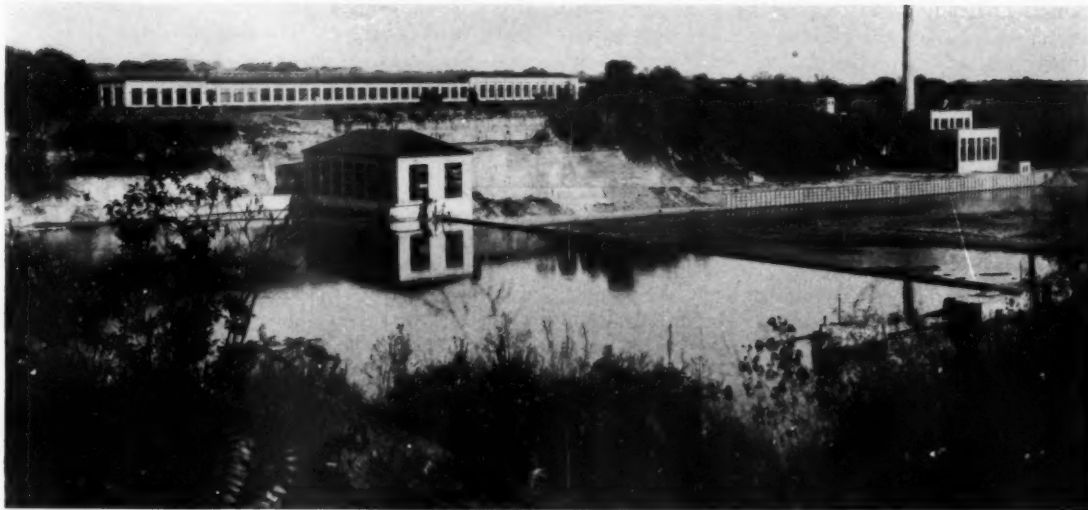
The fact should not be overlooked by the public that these three callings are mutually dependent upon each other, and that none of them can advance and develop without the corresponding advancement of the others.

The industrial building now awaits the serious attention of the architect. It offers great opportunities for improvement by him. Not until recent years was the industrial building anything more than four walls and a roof, while as a matter of fact, it should be in a sense, the chief tool in the operation of the business.

The American industries have gained their success so far largely by the invention and use of special machinery, which is often automatic, resulting in increased accuracy and production, at a material reduction in the cost of operation. This has enabled them to pay the high American wages and at the same time greatly increase the consumption of their products.

The time has come, however, when nearly every industrial concern has special machinery that has been developed to the highest degree in increasing production and lowering its cost. This means of meeting competition and particularly foreign competition, is apparently at an end, and if

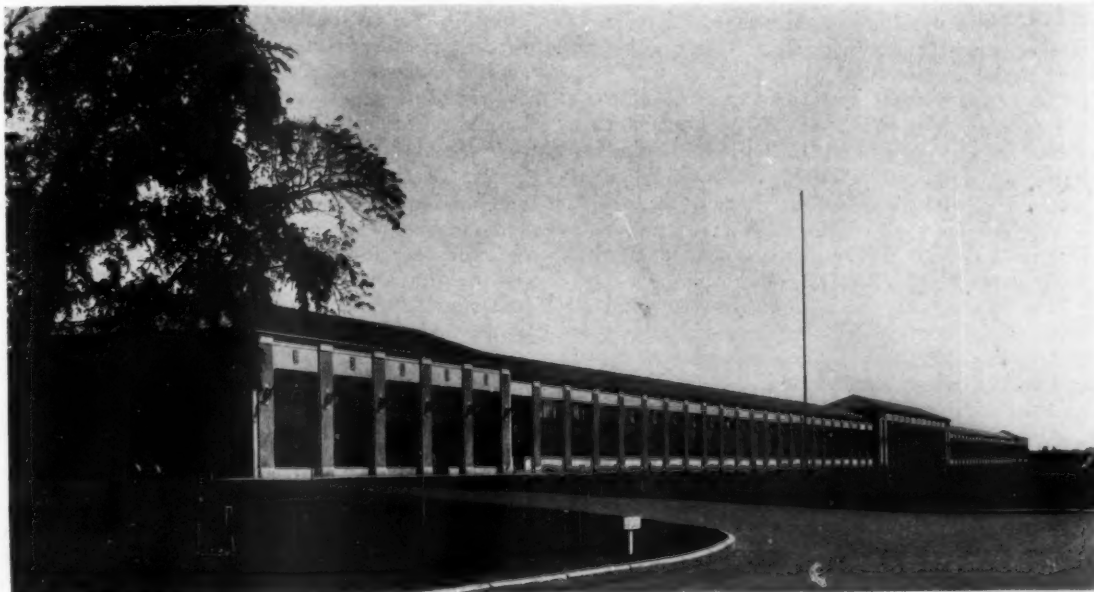
GOLDEN ANNIVERSARY NUMBER



THIS building is 1400 ft. long and 600 ft. wide and is designed as an assembly and manufacturing building, and in accordance with the advanced policy of the Ford Motor Company. It is a one story steel frame structure. On account of its location which is on a main boulevard and overlooking the Mississippi River, the exterior has been treated in an exceptional manner for an industrial building.

The material used is stone throughout, ornamented with carved panels on the pylons and fluted pilasters. The roof is of Spanish tile, the whole presenting a very massive and rich appearance.

In addition to the steam power house there is a hydro-electric station, power for which is supplied from a dam in the Mississippi River.



ASSEMBLY BUILDING, FORD MOTOR COMPANY, ST. PAUL, MINN.

ALBERT KAHN, ARCHITECT

American trade is to be stimulated at home and increased abroad, there must be some new opportunity by which production not only can be increased and its cost reduced, but also the quality of the goods improved as well. There is also room for improvement in the physical appearance and design of some of the American products, as compared with those of foreign make, and this is due largely to the lack of industrial art schools where good design is taught, but the chief opportunity by which American industries may continue to progress seems to lie along the path of developing and perfecting the industrial building.

Where a large force of men are at work, and where expensive machinery and power are employed and all the overhead expenses going on, it does not take a great deal of waste, resulting from inconvenient arrangement of the building, lost steps of the workmen, unnecessary travel of material, delays in various processes or operation of a plant, to eat up all of the profits or make competition impossible with concerns who have more efficient plants.

Then there are often the opportunities of increasing the quality of the product by perfecting the workshops where it is made, and often an opportunity to improve the conditions materially under which the employees work, that will aid greatly in reducing the loss occasioned by that most troublesome and costly feature of modern industries, *viz.* the turnover of labor.

These are some of the problems to be met in the establishment of almost every industry. The fact that the solution of some of these problems and the attainment of some of the chief benefits for the industries lie within the field of architecture, ought to be the strongest kind of an appeal to the architectural profession.

The improvement and perfecting of industrial plants vary, of course, with the various kinds of industries involved and the different kinds of buildings required. There are the industries which buy and sell their products with little or no change in their products, and others which buy the raw materials and manufacture in whole or in part, their products.

The different types of buildings vary all the way from the multi-story building of the crowded districts of cities to the plant with plenty of room to secure the best arrangement, light and ventilation for all of its departments.

The ideal location of an industrial building is at the center of the market for the sale of its goods, with convenient access to needed materials and supplies, adequate and economical transportation, opportunity for securing the most suitable employees, favorable building conditions and power requirements, room for expansion and extra ground around the plant for landscape effect and recreation of employees.

In a manufacturing industry, the making of

the product usually involves several distinct processes, which originate in the open yard, in separate buildings, or in different rooms or departments of the same building. The raw material may be a single substance or a number of substances that require preparation before they can be incorporated in the make-up of the product. As production proceeds, other substances or parts, made perhaps by some other manufacturer, may have to be combined with the original ones. The various processes may be simple or complex in the extreme.

In fact, the operation of a single plant may be so complicated that its various processes of manufacture may extend out from the main flow of production like the tributaries of a great river. However, the flow of the production must not be allowed to deviate materially from its direct course, and there must be no obstacles to retard its progress.

The parts of the building, therefore, should be so arranged that in the manufacture of the product, the raw material is made to travel logically and directly through the plant from one process to another, without lost motion, needless handling or delay until it reaches its finished state ready for the market.

To accomplish this is where the highest ability in the art of planning and designing the building should be brought into play.

To make a building serve best for the particular use to which it is to be put, there would be scarcely any part of it that might not influence its use in an important way, as, for example, its foundations, column spacings, floors, windows, overhead lighting, artificial light, elevators, stairs, conveyors, walls, partitions—in fact, everything that goes to make up the completed building.

One of the most important ways in which a building affects production is by its reaction upon the employees. A workman is influenced to do his best work in a perfect workshop. One of the greatest incentives to secure faithful, conscientious and efficient work and to arouse an interest in the work for the workman, is to plan and equip the building and its surroundings so that they are best suited for the work to be done, and complete in their provisions for the daily life of the workmen, and at the same time just as wholesome, attractive and pleasing, both inside and out of the building, as it is possible within a reasonable expense to make it.

The annual loss to the industries is so great from the turnover of labor that on this account alone, an owner could well afford to go to considerable expense in making his whole plant and its surroundings a most attractive and desirable place to work in from the standpoint of the employees. The average cost to replace a workman in his job is estimated by the authorities at \$50.00 per man, and the annual loss for this country by the



ENTRANCE TO OFFICES

ENGINEERING LABORATORY, FORD MOTOR COMPANY, DEARBORN, MICH.

ALBERT KAHN, ARCHITECT

THE Dearborn Laboratory is probably the only one of its kind in the world, being designed for Mr. Ford's personal experiments and embodying many special features not to be found in the ordinary laboratory building.

The building is 804 ft. long by 200 ft. wide, and is exceptionally well lighted in the center by monitors running the whole length of the building.

The steelwork has been designed upon architectural rather than structural lines. The monitors span 40 ft. between columns and are composed of steel and concrete trusses.

The floor is of maple from Ford's own saw-mills at Iron Mountain, and is kept as clean and polished as a ballroom floor.

The offices and printing presses of the Dearborn

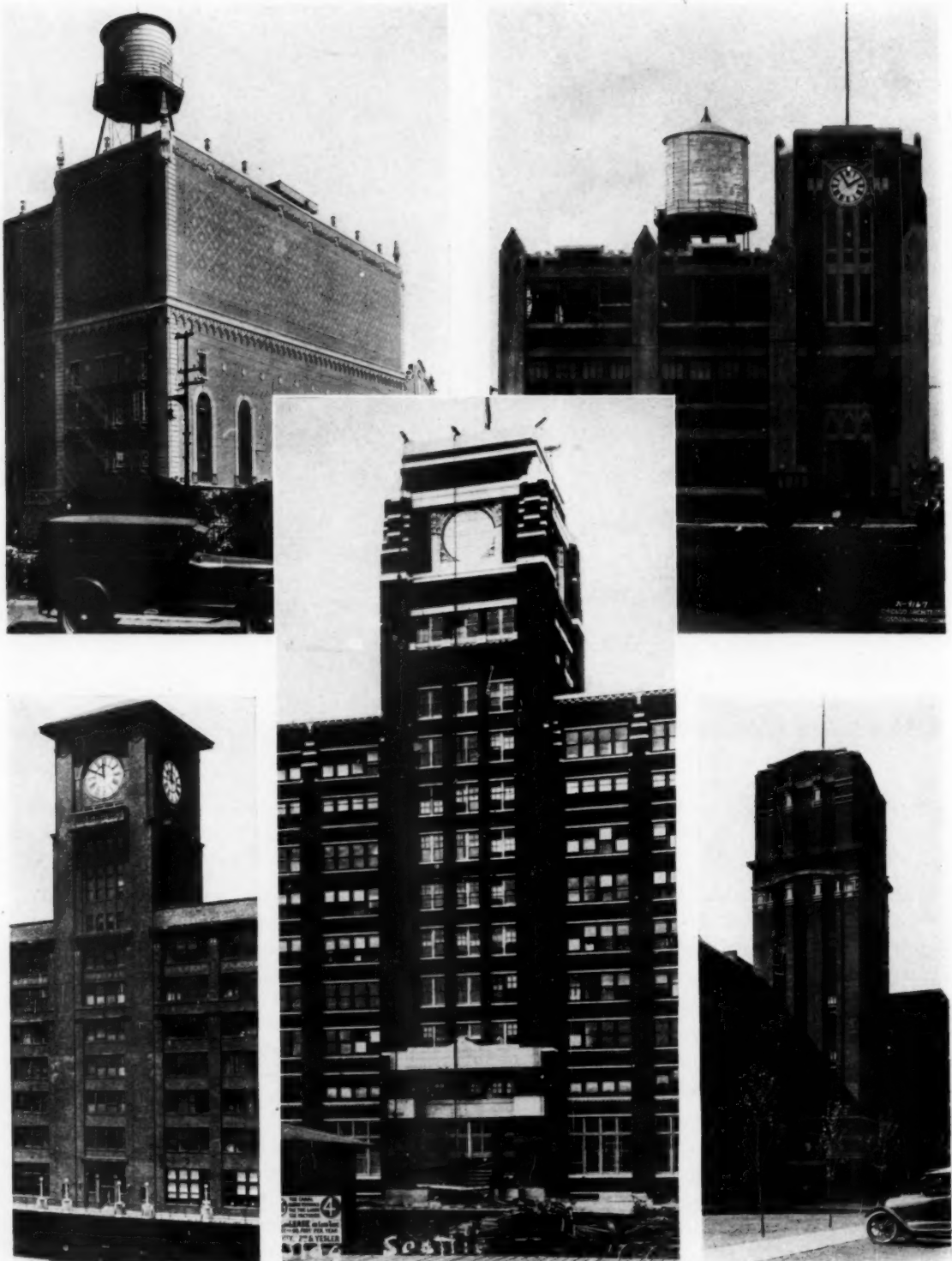
Independent are located in this building. The main offices in the front are reached through the lobby which is panelled in wood with a marble and iron stairway leading to the second floor.

The exterior is of stone with tiled roof and is ornamented with symbolical cartouches and with the names of men, famous as inventors and in the world of industry, carved over the window bays.

The building is located near Ford's air port, from whence his airships leave on their daily trips to Chicago and Cleveland. The dirigible mooring mast is also located in this vicinity.

An artificial lake of great beauty has been formed in front of the building, adding to its already picturesque surroundings.

THE AMERICAN ARCHITECT



AT TOP: TWO EXAMPLES OF EXPOSED SPRINKLER TANKS THAT SPOIL THE ARCHITECTURE OF THESE BUILDINGS.
AT BOTTOM: A GROUP OF WATER TOWERS OF INDUSTRIAL BUILDINGS WHICH ENCLOSE THE SPRINKLER TANKS AND
WHICH FORM THE DOMINATING ARCHITECTURAL FEATURE OF THE DESIGN IN EACH CASE

GEORGE C. NIMMONS, ARCHITECT

GOLDEN ANNIVERSARY NUMBER

industries from the turnover of labor \$400,000,-000.00.

These are some of the outstanding features of the problems of industrial buildings. Their nature is such that the solution of them falls largely within the field of architecture, because they all have to do chiefly with the planning, designing and the organism of the building, the very things which occupy the major part of an architect's training and practice.

No engineer or builder is likely to be skilled in the architectural planning or designing of buildings, because this is not an important part of their training, and when they undertake to do architectural design, they usually copy what the architects have done on other buildings, and consequently contribute little or nothing in this way toward the development of the buildings they undertake.

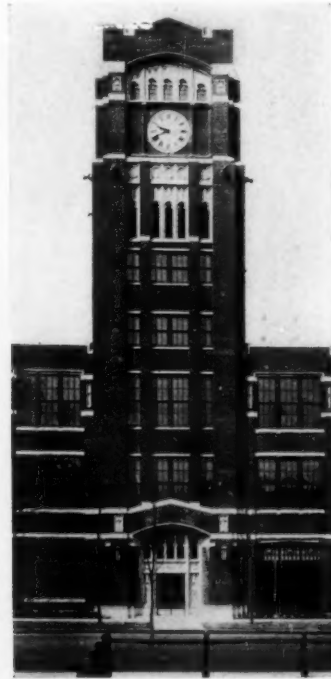
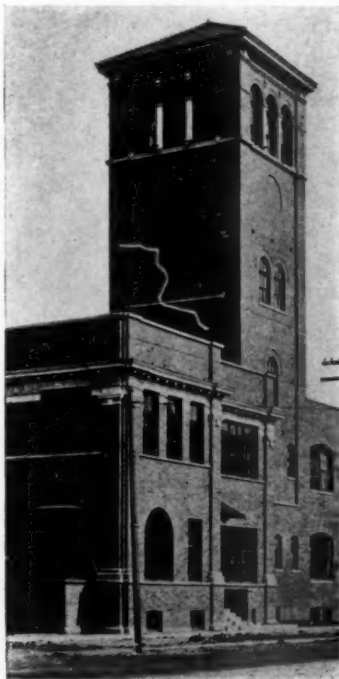
It is apparent to everyone whether a building is ugly or unattractive in appearance, but it is difficult to tell whether the plan and organism of a building are such as to produce the most economical and efficient operation of the plant without a diagnosis of it and a careful study of its possibilities.

There may be some single word or a phrase that an expert advertising man could suggest after

a study of the business, that when used in the advertising would result in the increased sale of millions of dollars' worth of goods, but it is unlikely that anyone but an experienced advertising man could suggest these magic words. So it is with the plan and organism of a building. The ideal and efficient plan or design of a building, which is the vital thing that gives the real character and determines the success of a building, does not come spontaneously from those who have little or no training in architecture.

No one could fail to realize that if industrial buildings are to be rescued from their unenviable position of being the ugliest and most objectionable buildings in the world, it is the architects who will have to do it.

The most important thing that an architect does in his practice is to create the arrangement of the parts of a building and then the form, with all its dimensions and relations which the interior and exterior of the building are to take, in a manner that will suit best the use to which it is to be put. The chance to short-cut the travel of material, and to co-ordinate the operation of the various industrial processes, do not depend primarily upon the engineer to determine the size and design of the structural parts, or the mechanical equipment of the plant, but upon the invention

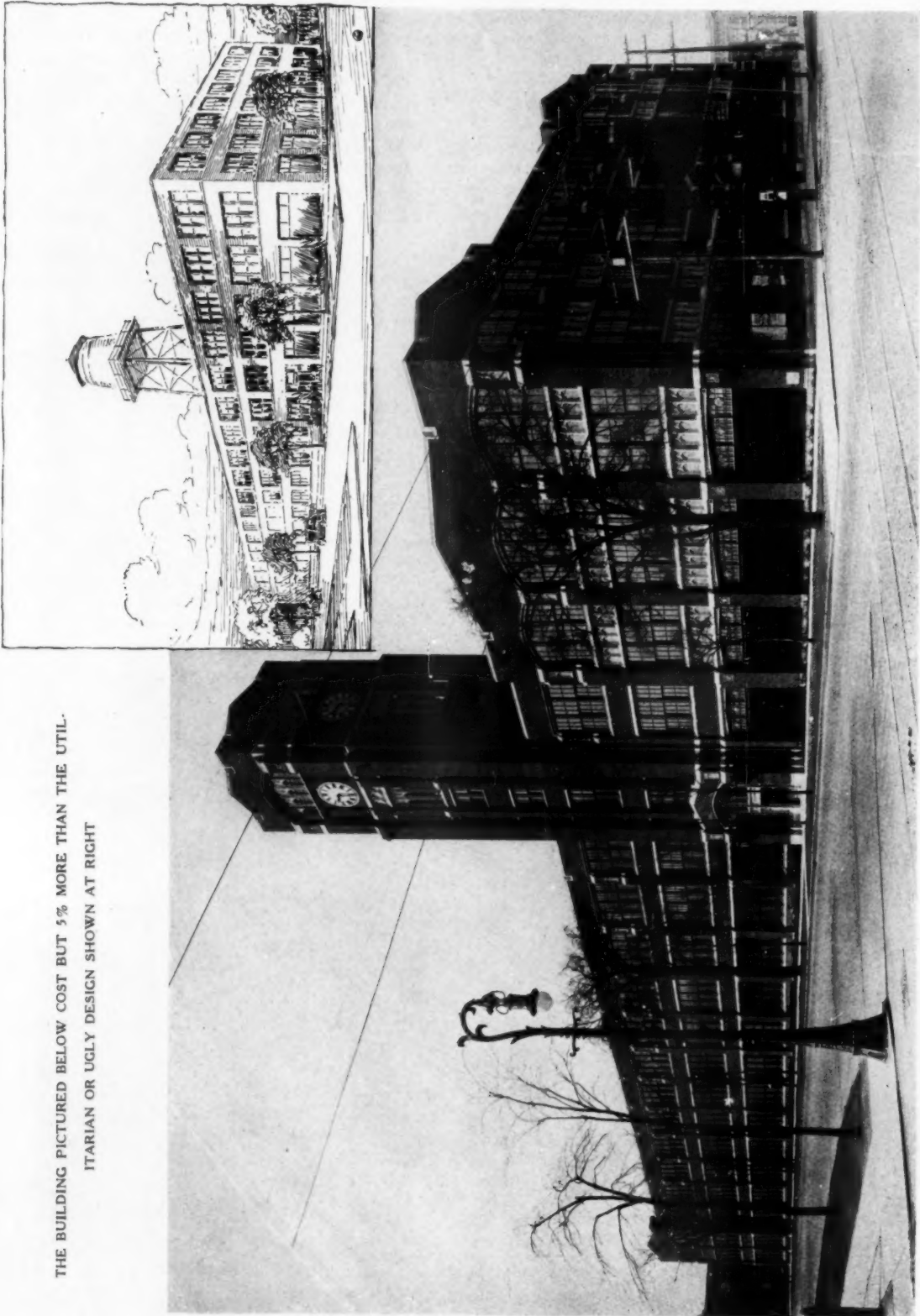


A GROUP OF WATER TOWERS OF INDUSTRIAL BUILDINGS WHICH ENCLOSE THE SPRINKLER TANKS AND WHICH FORM THE DOMINATING ARCHITECTURAL FEATURE OF THE DESIGN IN EACH CASE

GEORGE C. NIMMONS & COMPANY, ARCHITECTS

NIMMONS & FELLOWS, ARCHITECTS

THE BUILDING PICTURED BELOW COST BUT 5% MORE THAN THE UTIL-
ITARIAN OR UGLY DESIGN SHOWN AT RIGHT



BUILDING FOR C. P. KIMBALL & COMPANY, CHICAGO, ILL.
GEORGE C. NIMMONS, ARCHITECT

GOLDEN ANNIVERSARY NUMBER

of some ideal arrangement and design of the parts of the building by which these improvements in the operation of the plant can be accomplished, and that is exactly what constitutes the principal function of the architect. The statement that an architect can only do "the fancy work" of a building, is contrary to fact and a form of propaganda used by those who discredit the practical usefulness of architecture.

One of the arguments used is that an architect habitually adds ornament and architectural features to his design which unnecessarily increase the cost, and that an architect by reason of his being an artist, is not utilitarian in his practice. Nothing could be more unfair or farther removed from the facts than this statement. When an architect plans and designs any building, he is entirely controlled first in this operation by the requirements and uses of the building. He usually makes many sketches during his study of the problem, and by a process of elimination, addition and perfecting of the arrangement and design of the parts of the building, and at the same time using his experience as an architect and knowledge of the best buildings of the world, he finally completes his preliminary sketch, that is based entirely upon the functions of the building. All the while he is doing this, he has in mind how the requirements may enable him to mould the different parts of the building into pleasing forms which have to be there, and as a rule do not cost a dollar more to make them attractive than ugly in form.

After he has the floor plans all drafted into shape and the elevations of the exterior all formed in the mass, then he begins to think about what style or architectural treatment will best suit the problem, and after that, last of all, he attends to the ornament or "fancy work." If the owner does not want any ornamentation, he leaves it off, but he still may have an attractive or even a beautiful building at exactly the same cost of an ugly one. There are buildings that have little or no ornamentation that are beautiful by reason of their good proportions and the attractive forms into which their different parts are moulded.

Careful calculations and estimates have been made by different architects of the cost of making industrial buildings attractive by the use of the finer materials and the addition of ornamental architectural features, and this extra cost varied only from two to five per cent of the total cost of the many buildings considered.

As an example of this, the two designs made for the Kimball Building of Chicago are herewith shown, for which actual estimates of cost were made by contractors. Although this instance probably shows the two extremes to which a designer would go in designing an industrial building, the actual difference in cost of erecting the building according to these designs was only five

per cent of the total cost of the building, which in this case cost the owner only about \$15,000.00 to save the building with its exposed sprinkler tank above the roof, from being one of the ugliest buildings in its community.

In designing industrial buildings, there is an opportunity for an architect to make them attractive and even beautiful in appearance at little or no extra expense. In every industrial building there are certain elements necessary for its construction such as window sills, lintels, copings, piers, doorways, windows, etc., which are capable of being moulded into attractive forms and



DETAIL OF END OF BUILDING
ASSEMBLY BUILDING, FORD MOTOR COMPANY,
ST. PAUL, MINN.
ALBERT KAHN, ARCHITECT

grouped into pleasing combinations or made to accent different features of the facade in a way that will create a good architectural design, and then there are often most interesting irregularities in the plan, causing all sorts of variation of form in the exterior that readily lend themselves to all sorts of good design.

A most interesting feature of industrial buildings is that nearly all of them are required to have a large water tank elevated above the roof in order to secure low fire insurance rates. The Fire Underwriters' requirements for these tanks, in almost every case, are such that if they are enclosed in masonry towers, the height and width of them will be almost ideal in proportions for a good looking tower. In fact, some of them have already been built in the same relative proportions as the finest towers in the world, such as

STORE FOR SEARS, ROEBUCK & COMPANY, KANSAS CITY, MO.

GEORGE C. NIMMONS & COMPANY, ARCHITECTS

THIS includes the latest developments in plan and design for a mail order plant. It contains 1,455,000 sq. ft. of floor space, built of reinforced concrete, faced with light rose colored brick and Bedford stone trimmings. Maximum speed had to be a feature of its construction, in order to be ready for the Fall trade of the mail order business and the retail store trade which occupies the right hand corner. The contract was let to Buttas Brothers of Chicago, February 3, 1925, and the building was completed, ready for business, September 14, 1925, about 7½ months.

As much as 1,835 cu. yds. of concrete were poured in one day, which produced the concrete for approximately 60,000 sq. ft. of floor construction. In the supervision of the work by the architects, a special expediting organization was formed, in order to make this rapid progress possible. All building operations were done under schedules of time, and a continual supervision was made of all materials from their source to their place in the building, which in some cases of essential material included sending men along with the freight cars

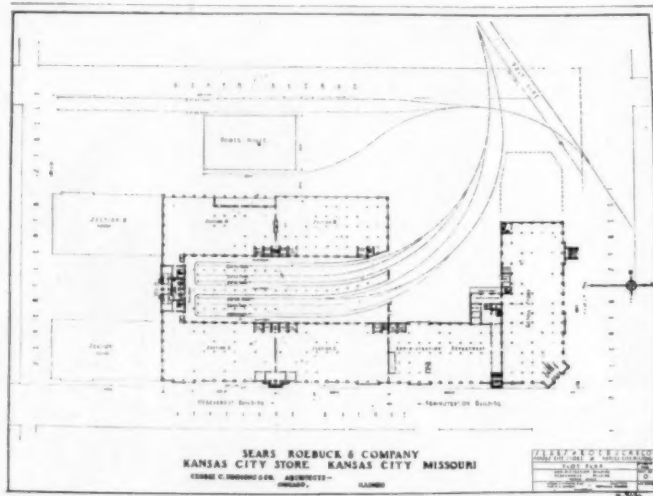
containing it, to insure its speedy delivery.

The U-shape of the main building allows the location of the railroad depot with a capacity of 50 freight cars or their equivalent of mail cars, in the center of the plant. The goods are received and stored in the nine story building. Goods are bought from a catalog, by filling out order blanks in the form of letters. Upon arrival, the orders, after being duly recorded, are broken

up and sent by pneumatic tubes to the various departments who select the articles ordered and transfer them into the conveyors and mechanical devices which transport them to the packing and shipping rooms and then on into the mail bags or freight cars which take them to the customers. All of this is done under time schedule and special systems, to insure

accuracy and prompt service for the customer. Good provisions are also made for the welfare and recreation of the employees.

A farsighted policy was adopted in planning this building and provision has been made to extend three wings of the main building as future expansion may require, as indicated on the plot plan.



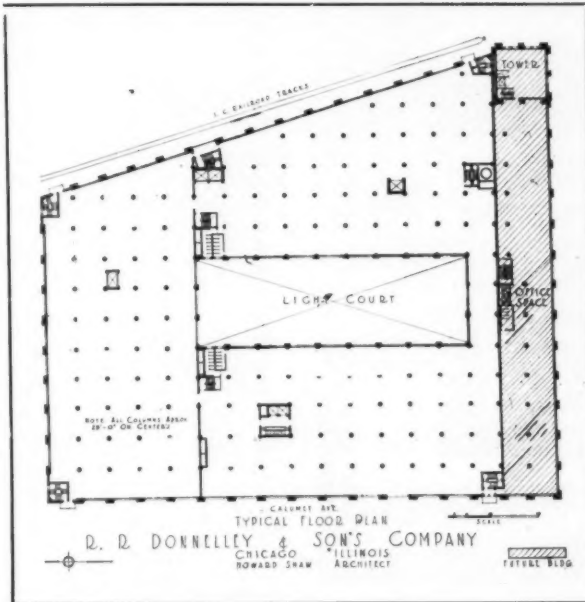
PRINTING HOUSE FOR R. R. DONNELLY & SONS COMPANY, CHICAGO, ILL.

HOWARD SHAW, ARCHITECT

THIS is an example of one of the largest and most modern printing houses. It is a reinforced concrete structure, finished on the outside with red brick and Bedford stone.

The outstanding feature of greatest value in the architectural treatment of this building is the good deep reveals of the piers, the solid masses of masonry at the corners and the attractive handling of the details. The motives of ornamentation in the spandrels are some of the historic bookmarks or seals of the early printers. The sprinkler tank is enclosed in the ornamental tower.

In plan the building is well provided with exit facilities. These at once afford safety in an emergency and easy communication between floors.



Column spacing in any manufacturing building is an important consideration which is very often affected by the requirements of each individual problem.

Windows make up a large percentage of the exterior walls. The interior light court, 70 x 200 feet, because of its size is thoroughly practical as a means of lighting the interior and affording natural ventilation.

Due to vibration and heavy machine loads, a printing establishment re-

quires a type of stiff construction suitable for these conditions of static and impact loads.

The planners of modern manufacturing buildings have given serious consideration to the problem of circulation to avoid the crossing of incoming and outgoing materials and products.





DETROIT FREE PRESS BUILDING, DETROIT, MICH.

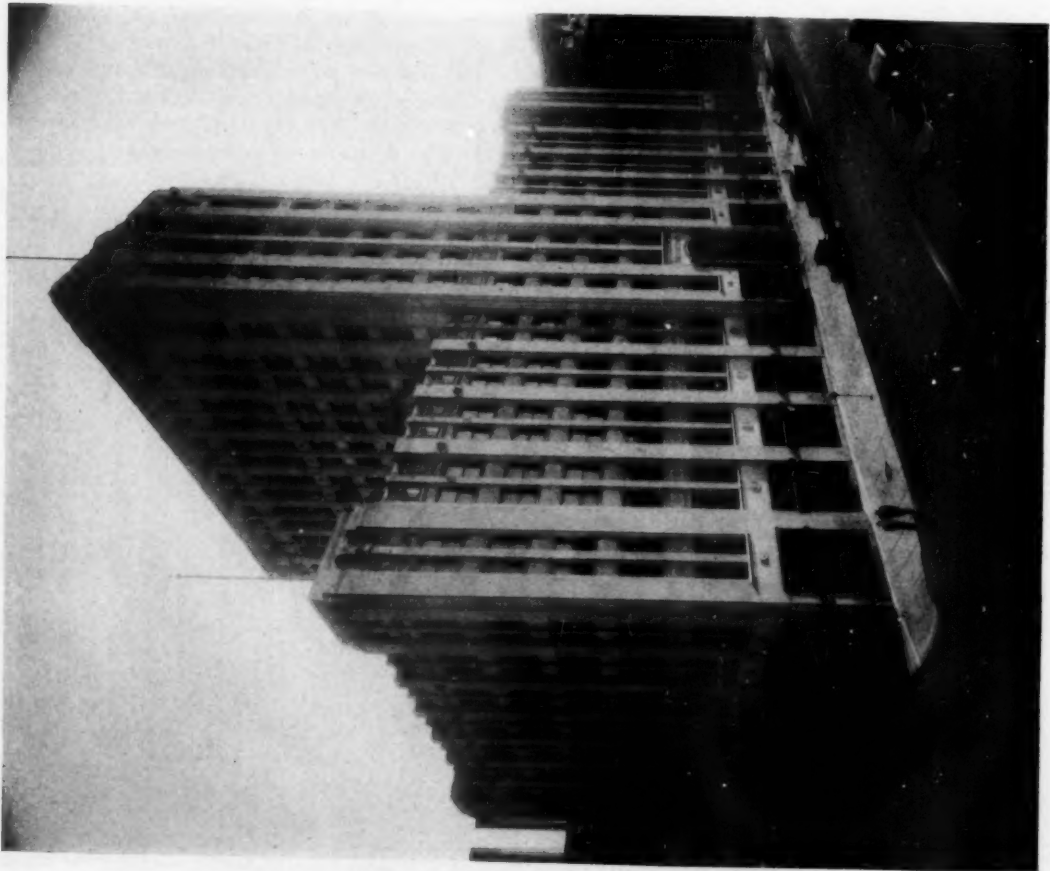
ALBERT KAHN, ARCHITECT

BUILDING is 212 ft. by 130 ft. in size, 6 stories high in the wings and 13 stories in the tower. The exterior is of stone designed with a German influence and presents a very massive and pleasing appearance.

Printing presses are located in sub-basement and basement. The first floor is occupied by the advertising, circulation department, news boys and drivers rooms, stores for rental and a lobby for the Detroit Club which is located in the adjoining building.

The second and third floors are occupied by the Detroit Free Press, the balance of the building being rental spaces.

The main lobby has been carried out in marble with plastered ceiling, decorated in colors.



GOLDEN ANNIVERSARY NUMBER

St. Marks at Venice and Giralda in Spain. By enclosing these sprinkler tanks of industrial buildings in towers, the cost of maintenance is greatly reduced, and the saving in fuel to heat the exposed tanks in winter are, together, usually more than the interest on the extra cost of enclosing the tanks in masonry towers, so that in this way a tower may become an essential part of the design of an industrial building.

A tower, a dome, and a colonnade are the *ne plus ultra* of architectural design, and therefore an industrial building is most fortunate in having requirements that will justify incorporating in its design one of the most important and attractive architectural elements.

Fortunately, too, for the design, the necessary water pipes and equipment of the water tank are such that the tower can be located almost anywhere, so that this gives an opportunity to put the tower in the front elevation and to make the main entrance through it, if desired, with good offices above for use in connection with the administration of the plant.

An industrial building unless it is to be built in the crowded part of a city, can usually be set back from the lot line and have a space for planting. Nothing improves any building so much as a foreground of grass, trees, flowers or shrubs. If the unused space be large, then there is an opportunity to use it in a most valuable way, not only as an attractive setting for the building but also for the recreation and pleasure of the em-

ployees. Lawns, with walks, gardens and playgrounds may be incorporated in the grounds, and if a reservoir for an extra supply of water for fire protection happens to be a requirement, as it sometimes is, then this can be formed into a miniature lake or pond, with its planting of overhanging trees and shrubs that will make a most attractive feature of the landscape. An example of a miniature lake in the foreground of an industrial building is shown by the illustration of the Engineering Laboratory of the Ford Motor Company at Dearborn, Michigan.

The surroundings of an industrial building usually afford opportunities for improvements of this kind which, if made, would often result in making it attractive and welcome in its community.

These are some of the ways by which the architectural profession can aid the industries of the country by lending its skill and the results of its training to bring about the improvements and betterments heretofore referred to. There is no other profession so well fitted to do it, and it is work which by its nature belongs to architecture.

The appeal comes not only to help the owners and stockholders of the American industries, but it comes also from about 8,000,000 men and women, whose daily life can be uplifted and brightened by the improvements and developments of their workshops, which the architects know best how to bring about.



DETAIL OF END OF BUILDING

ENGINEERING LABORATORY, FORD MOTOR COMPANY, DEARBORN, MICH.

ALBERT KAHN, ARCHITECT

To Manufacturers and Dealers in Building Materials and Building Appliances.

WHEELER, JAMES B. Osgood & Co., Publishers, Boston.

NEW YORK, JAN. 16, 1877.
Messrs. J. M. OSGOOD & Co., Publishers, Boston;
Gentlemen, — At the close of the first year of the *American Architect and Building News* we desire to express our satisfaction at its establishment, and at the way in which it has been conducted. The excellent literary character it has maintained is calculated to commend it to persons of intelligence and culture outside the profession; and thus interesting the public in professional matters at the same time that it presents them from a strictly professional point of view. It is going to both the profession and the public the best service.

It would be a great gratification to us if it could also be made, as it deserves to be, the customary and recognised channel of communication, through its correspondence and its advertising columns, between architects, the makers of building-appliances, and the public.

This would be a **personal convenience** indeed to ourselves, as the pages of the journal are more handy and **easy of reference** than cards and circulars. You are at liberty to make any use of this communication that you may judge best adapted to forward the interests of the journal, — interests which are, in our judgment, also those of the profession itself. Wishing it every prosperity, we are

Very respectfully yours,

Very respectfully yours

Mrs Hunt.
Henry Dudley
Wheeler & Wright
Elias W. Haystack
Livingston
H. A. Brown.
Eugene L. Atwell
Miss Terry Stone
Carl Gussner
Geo. Warrington
Robert E. Dwyer
John Roper
Charles F. McKim
J. H. Watson & Co
Thomas M. Crawford
H. W. Kneass & Sons
Richard D. Emerson
J. S. Hunt
North Crown
S. B. Robertson
P. R. Hastings
D. H. Perkins
Gerrit P. Baker

NEW YORK.

The above letter is also indorsed by the following named architects:

[illegible]

D. C. Nash
 Jas. W. Laughlin
 S. H. Rogers
 Chas. Draper
 A. C. Fulton
 St. Bivie
 Geo. W. Peck
 C. Andrus
 Samuel Thompson
 Edwin C. Corbitt
 CINCINNATI.
 P. Cadogan
 Edwin May
 T. J. Brown
 P. P. Roberts
 J. A. Whelan
 G. W. Sumner
 W. Grant
 H. T. Gardner
 W. L. Brown
 J. H. Smith

INDIANAPOLIS.

E. G. Lundy
Wm. Mendenhall
Henry Brown
Lang. Walker
December 16, 1877
Indianapolis,
Amos Bryant
E. H. Waldman
Charles E. Russell
John R. Newman
Dwight Carson
Geo. H. Hendricks
J. Appleton Wilson

BALTIMORE.

G. E. CARPENTER,
ALP. C. MOSES,
GEO. W. CADY,
C. P. HARTSHORN,

GEO. C. MAROT, JR.,
ALFRED STONE,
GEOR. F. WILCOX,
E. L. NICKERSON,

OTHER REFEREES.

WALTER DICKSON, Albany.
A. B. CORBUN, New Haven.
WALTER BLYTHE, Connecticut.
GORDON & MOORE, Toledo.
ARTHUR BATES, Milwaukee.
C. E. LILLEY, St. Louis.
FRANK GARDNER, Springfield, Mass.
JAMES G. CUTLER, Rochester, N. Y.
E. E. MYERS, Detroit.

[illegible]

PITTSBURGH

PHILADELPHIA CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS. PHILADELPHIA, MAY 16, 1877.

MESSES. JAMES H. O'NEILL and Co., Boston, Mass.

SIR:—In answer to your letter of the 10th inst. in the manner in which you are conducting the *American Architect and Building News*, I am glad to express to you our high appreciation of the work.

As the information it conveys, render it indispensable to practising architects, the decided literary taste with which it is presented, it is intelligent and cultivated, and it is a credit to the profession, thus rendering it the means of promoting a general diffusion of knowledge relating to our art.

It is obvious that whatever tends to bring architects and their patrons into closer relation, and to give them a more intimate acquaintance, to the profession and the general public; and being of the opinion that the *American Architect and Building News* is calculated to produce important results in that direction, we take pleasure in extending to you our cordial regards.

[illegible]

The title pleasure in buying
that publication is the only one
worth of the time & price ex-
amined in the country
I am, respectfully,
Yours, J. W. Johnson

3.

INSTITUTE OF ARCHITECTS.
PHILADELPHIA, May 14, 1877.

Every manner in which you send
News," we deem it proper to
information it conveys, reader
literary tone with which it is
and cultivated minds outside of
moting a general diffusion of
itects and their patrons into
the interests both of the profes-
tion that the *American Architect*
important results in that direc-
development.

Wm. H. Woodruff
E. Brown
W. Sidney
from W. T. ...
Miss Eaves -
David Lane
Edward C. Young
Hart Baldwin
... William
W. F. ...
Edgar ...

PHILADELPHIA.

FACSIMILE OF ENDORSEMENT BY PROMINENT MEMBERS OF THE ARCHITECTURAL PROFESSION AT
THE END OF THE FIRST YEAR OF THE AMERICAN ARCHITECT

THE AMERICAN INSTITUTE of ARCHITECTS—ITS POLICIES and ACHIEVEMENTS

BY GLENN BROWN, F. A. I. A.

THE American Institute of Architects may be considered under four periods, at times when material changes were made in the methods of Government.

- First—Organization and formative period
- Second—Consolidation with the Western Association
- Third—Government by delegates
- Fourth—Non-professional Executive Secretary

ORGANIZATION AND FORMATIVE PERIOD

The Institution of Architects organized in Philadelphia in 1837, was contemporaneous with the Royal Institute of British Architects. If we could trace a direct connection between the Institution of Architects and The American Institute of Architects, it would give the American society the age dignity of the British organization. I regret to say that our two societies were apparently distinct. The only connection between the two, as the record shows, was that Thomas U. Walter, one of the principal men of the first society, attended the second meeting of the younger society and was the man to suggest the adopted name, The American Institute of Architects.

Richard Upjohn, the sire of three generations of architects, was the man to organize the society in 1857, which since that date has held its prestige as the national organization of our profession. The new society, while anxious for members, was very careful as to the standing and ability of those requested to join. As it required a two-thirds vote before an invitation was extended, it is needless to say that only those prominent in their day were admitted.

Richard Upjohn was elected president, and Richard M. Hunt secretary, both men who became famous in architectural history.

The objects of this association were the discussion of all branches of the arts and sciences directly or indirectly bearing upon architecture. Carefully prepared papers were read and discussed pro and con at their meetings. These papers with the principal points brought out in the discussions, were published and distributed to the members.

It is difficult for the architects of the present day to appreciate the inspiration of this clash of intellect and experience to these pioneers in our profession, who had no magazines to keep them in touch with architectural progress.

This phase of the Institute's work continued until the Civil War in 1861, when the association ceased its work and remained quiescent until 1864, when meetings were resumed. Richard Upjohn was retained as president until his death

in 1876. Among the men who became famous who served him as secretaries, it is interesting to note Richard M. Hunt, Henry Van Brunt, C. D. Gambrill, F. C. Withers, and Russell Sturgis.

The other president during this period was Thomas U. Walter, who does not need a more noble memorial than the wings and dome of the United States Capitol. He served from 1877 to 1887. Among the notable secretaries who served under T. U. Walter may be mentioned A. J. Bloor, Charles F. McKim, Henry M. Congdon and George C. Mason.

While the accomplishments of this period were not equal to the aspirations of its founders, the intangible results were far-reaching. There was a growth in good fellowship and appreciation of each other. The pure motives and high ideals of the profession became apparent. There was a constant striving for better construction, and for more artistic designing. The business end was kept on a high moral plane. Education of the young men was carefully fostered.

It fostered and assisted the publication of THE AMERICAN ARCHITECT AND BUILDING NEWS, which was first issued in 1876, as the first architectural periodical of the country. The members of the Institute agreed to secure and furnish material, and to make it the organ of the Institute for publication.

The publication of the yearly proceedings of the work done at conventions began in 1867. The papers read at the various conventions give a true index of the architectural practice of the period. A list of these papers may be found in an early issue of the Quarterly Bulletin.

From a practical business end, it established a schedule of fees and encouraged proper competitions.

An effort to secure legislation which would assure the best talent for Government buildings was begun in 1876. This culminated in later years in the Tarsney Act, which produced a marked improvement in the designs of Government buildings.

The organization was controlled during this period by fifteen trustees. Members were first admitted as associates, and as their achievements justified, they were made Fellows. Fellowship was a distinction spurring associates to good work so they might be worthy of the distinction.

CONSOLIDATION WITH THE WESTERN ASSOCIATION

Early in the eighties young men of the Middle West agitated a new architectural organization. Some were chagrined because they did not qualify

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for membership in the Institute, others because they thought the older organization lacked pep and hustle. In addition, some thought the Institute ignored the problems of the Middle West. This feeling culminated in the formation of the Western Association of Architects, in 1884.

It was soon appreciated that clashes of interest and sectional feeling were detrimental to the interest of architecture, and the wiser heads of each association advocated the consolidation, which was consummated at the Cincinnati Convention in 1889. The constitution of each society was materially changed in making the new constitution, the local chapter organization of the older body being retained. The title of associate was dropped, and all members from either association were made Fellows. The title The American Institute of Architects was retained. The title of Fellow which had been the inspiration leading the associates to higher aims and better work, under the new constitution was dropped. This levelling process followed the lines of labor unions, to lower the able and skillful to the level of the unskilled. This was a mistake, as ability should be recognized and encouraged.

Before the consolidation, the presidents, as long as they represented the highest type of the profession, were kept in office. Under the new constitution, the presidential term was limited to two years, with the object of rotation and getting new blood in the Institute management. R. M. Hunt, president of the A. I. A., was elected president and John W. Root, secretary of the Western Association, was elected secretary. Several new chapters were added from the Middle West. The governing body consisted of twenty-four directors. Although the membership was small, four hundred, the prestige of the Institute as an instrument of public service was materially increased during this period.

They secured the passage by Congress of the Tarsney Act in April, 1893. After a serious battle between John G. Carlisle, Secretary of the Treasury, and D. H. Burnham, they secured its enforcement under Lyman J. Gage. In this controversy with the Treasury, THE AMERICAN ARCHITECT took an active part, devoting a whole issue to an article which I prepared, comparing in cost, design and construction, Government with the best private work. This issue was sent by the Institute to every member of Congress and was one of the factors in winning the game. The Tarsney Act which placed a large part of the Government buildings in the hands of the best private practitioners, materially improved the character of Government work, not only that done by the private practitioners, but the work done from that time on in the Supervising Architect's office.

The organization of the International Congress of Architects at the convention held during the Columbian Exposition, 1893, added to the

prestige of The American Institute of Architects.

The officers during this period were noted for their capacity and nationwide standing. Richard M. Hunt, enthusiastic and persistent in all that pertained to his loved profession or allied arts, honored abroad by membership in the Societe Centrale des Architectes Francais, medalist and member of The Royal Institute of British Architects, and Chevalier of the Legion of Honor. Daniel H. Burnham, noted for his executive ability, grasp of broad effects combined with utilitarian results. The breadth, character and effectiveness of his executive ability were shown in his management of the Columbian Exposition, 1893. This will remain as one of the ideal architectural achievements of the age, and the results in improved architecture throughout the country will be placed to his credit. George B. Post—when the magnitude of his business interests is remembered, his forty years' service in the advancement of his profession has shown a disinterested zeal which is rare. Honorary member, Royal Institute of British Architects, Chevalier of the Legion of Honor, permanent member of International Congress of Architects, Gold Medalist A. I. A.

GOVERNMENT BY DELEGATES

The constitution was radically changed at the convention held in Washington, in 1898. During this period of fifteen years I was secretary of the Institute, which makes this part of the article, to a certain extent, a personal reminiscence.

Before this, 1898, the conventions consisted of members who found it convenient to attend. The larger number, as would be expected, consisted of local architects, and frequently in this way the action of the convention had an objectional sectional character. This was rectified by the new constitution which required the various chapters to elect delegates in proportion to their Institute membership. The new constitution reestablished the grade of associate membership, which had been abolished by the consolidation convention, requiring all new members to enter in this grade. In this way the dignity of Fellowship was again established.

Henry Van Brunt was elected president and Glenn Brown secretary and treasurer. This was the first time the two offices were combined. A new principle was inaugurated for the conduct of conventions, focusing the interest upon a major object which would advance the Fine Arts and be of public service.

An early and notable achievement was the prevention of a movement to destroy the dignity and beauty of the White House by crude and ill considered additions. This campaign resulted later in the wonderful restoration of the White House by McKim, Mead & White.

In 1899, the Institute was first internationally recognized when members of the A. I. A. were

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placed on the permanent committee controlling International Congresses.

The papers and discussions at the first convention held in Pittsburgh were devoted to the artistic side of architecture, as the constructive side had apparently monopolized the consideration of former conventions.

The convention held in Washington, in December, 1900, began a most important service to the country, which kept the Institute membership alert and busy for the following fifteen years.

THE PLAN AND DEVELOPMENT OF WASHINGTON

The organization for this purpose began some eight months before the date of the meeting. The convention was held in Washington while Congress was in session to secure legislative notice. Members who attended the International Congress of Architects in Paris in the Summer of 1900, collected illustrations of city and landscape treatment in Europe. Architects thought best fitted were requested to prepare papers on the development of our Capitol; others because of their known knowledge, were requested to prepare papers upon European gardens, as bearing upon city landscape. The essays on Washington were considered news and the daily papers gave them front page display. This attracted the attention of Senator McMillan, chairman of the District Committee, and he through Charles Moore, requested a conference with the officers of the Institute, Robert S. Peabody then being president. This conference resulted in the appointment by the Senate of a Park Commission consisting of the men recommended by the Institute as best fitted for this purpose, as follows:

Charles F. McKim, artistic, refined, persistent, incapable of doing a bad thing, certain to do a good one.

Daniel H. Burnham, commanding executive, yielding to McKim in design, well able to browbeat Congressional Committees when necessary.

Augustus Saint Gaudens, sculptor, our greatest artist, well equipped for advice and criticism, knowing and appreciating the abilities and idiosyncrasies of both McKim and Burnham.

Frederick Law Olmsted, Jr., brought up by the older Olmsted in contact with greatest landscape work, and inheriting his talent.

This ideal commission, with the varied talents necessary to make a strong team, enthusiastic, serving without remuneration, immediately started on the study and solution of their problem.

The plan was a new subject to them. They were in no way bound to follow the L'Enfant plan.

A copy of the first volume of my History of the United States Capitol, then just issued, was sent to them, and McKim told me they spent half the night studying it. From that time on I was taken in the confidence of the Park Commission, and its memories I treasure.

The Park Commission report made January, 1902, created enthusiasm from one end of the country to the other. It was the first well considered report on city development, leading other cities and other countries to take up the subject. The Commission was broad enough to take the plan L'Enfant left and simply extend its principles to cover the new park areas acquired by filling the marshes.

This Commission was a Senate body. The House, although importuned to join with the Senate, declined and, consistently under "Uncle Joe" Cannon, fought its execution, but with the enthusiastic and intelligent Roosevelt in the White House, and the wise and efficient McMillan in the Senate, and the alertness of the Institute to bring proposed deviations to their attention, the opposition of the House was futile.

The first apparently insurmountable obstacle the Park Commission encountered was the right given only the year previously to the Pennsylvania Railway, to four blocks across the mall, between the Capitol and the Washington Monument. The Commission determined nothing satisfactory could be done if the railway was built on this area. The abrogation of these valuable rights, a station in the heart of the city, was only accomplished by the breadth of view and character of the men in charge at this time, Roosevelt in the White House, McMillan in the Senate, Cassatt, President of the Pennsylvania Railway, Burnham for the Commission, and McKim, to insist that no compromise in design was possible. As soon as the railway moved from the old station on the mall, Roosevelt, after assuring himself of his rights, ordered the station dismantled and removed, at the time the House was considering enclosing the shed for offices. The House was hysterical, but the old station was gone.

Another critical time was connected with the Agricultural Building. Speaker Cannon wanted it placed between the Capitol and the Washington Monument, forever destroying the open vista between these points. The Secretary of Agriculture, Mr. Wilson, wanted it nearer the center line of the mall, so as to get more building between the park front and B Street, South. Roosevelt insisted on keeping to the spirit of the park plans.

Here a dramatic event was staged by those who wished to encroach upon the open mall area. Two parallel lines, some 300 feet apart, were surveyed and marked by red flags, as it were, an advertised effort to auction off the park scheme. The District Committee of the Senate and Roosevelt were carried down, and the flagged area shown. It looked wide. Those interested called it a slight modification of the park scheme, but wide enough for anything. And also Roosevelt and the Committee thought it was wide enough for anything. This flagged way was seen, and the Park Commission was informed. McKim immediately applied to

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Roosevelt, who appreciated the force of McKim's arguments, regretted his acknowledging it wide enough for anything, and said "You must get Senate action, and I will back up the Senate."

The Senate District Committee was immediately requested to give a hearing upon the subject. We were met with the assertion that the committee had seen the flagged way, it was simply modifying the park plans slightly, in fact it was wide enough for anything. They had made up their minds and there was no use for a committee meeting. Senator Newlands, after much effort, prevailed upon them to give a hearing.

The Park Commission drawings were hung around the committee room. McKim, Burnham, and Saint Gaudens demonstrated that narrowing the distance between building lines would destroy the dignity and beauty of the whole plan, showing that the modification would make a mere roadway instead of an imposing park area. The committee yielding to the reasonable demonstration of these big men, submitted a resolution which was carried by the Senate that "no building should be erected on the mall less than 450 feet from a line between the center of the Capitol and the Washington Monument. With this resolution, and Roosevelt's support, the Park Commission building line was retained and fixed.

Another contention arose on this building—the first floor grade. The secretary wished to place it so high that it would be necessary for the mall to grade up from the Grant Monument to the Agricultural Building, and down to the Washington Monument. I spent several hours with McKim when he studied the question from this standpoint. He thought it would be fatal, and said the only proper treatment is a gradual rise from the Grant Monument to the Washington Monument. Such a fatal defect was illustrated in the rise and declivity of the main axis of the Buffalo Exposition, where the effect of the Electric Tower and the principal view on the main axis were marred if not destroyed. This question was taken to Roosevelt, and the Secretary overruled, and the Agricultural Building was placed at its proper level.

The Lincoln Memorial was given the most important site on the Park Commission plan, forming the western end of the composition. From 1902, until the question was settled some fourteen years later, private interests, congressional aggrandizement, a feeling of some that the site was a blunder, all combined against the park site, and vied with each other to secure a location, which they thought would serve their interests. Congress wanted it somewhere near the Capitol, no matter how unsuitable. The railway authorities wanted it to complete the Plaza of the Union Station. Private interests on Capitol Hill joined with the railway to enhance the value of Capitol Hill property. The Arlington Cemetery and the

Soldiers Home both wanted it, not only because of their veneration for Lincoln, but as lending distinction to the Home or the Cemetery. The Park Commission site had no interested advocates. The American Institute of Architects advocated it, only because of the eminent fitness as shown on the park plan, placing Lincoln on a par with Washington and Grant.

So the Institute fought its location on Capitol Hill, where it would be minimized by the Capitol, its being made an adjunct to the railway station, and as an isolated attraction at Arlington Cemetery, or the Soldiers Home, and defeated the interests. When it was thought finally won, the Automobile and Good Roads Association, and those interested in property, joined forces and requested that the \$2,000,000 appropriated for the memorial be used for a Lincoln Highway between Gettysburg and Washington. This was supported by a well organized campaign, and was finally fought out on the floor of the House of Representatives. They were, according to circulars, going to make an Appian highway.

The Institute had figures made showing what an adequate memorial highway would cost, still not approaching an Appian roadway. Col. Judson, Engineer, Commission D. C., supported us, although he made congressional enemies, verified our estimates of something like \$30,000,000 with a maintenance of \$5,000,000, showing that the \$2,000,000 asked for would only make a very ordinary narrow gravel road between Washington and Gettysburg.

Senator Root, at the request of the Institute, made a public speech, in which he brought forceful public attention to the activity of land syndicates between Washington and Gettysburg, and the grasping efforts of Good Road and Automobile Associations to get roads wherever and however they could. The papers published this speech in full. Two weeks before the question came up in the House, Senator Root, who was backing the Park Commission site in the Senate, and Congressman Slayden, who was backing it in the House, told me that in their opinion the money would be used for a roadway.

Neither appreciated the effect of Senator Root's speech, or Col. Judson's verification of our estimates on cost and maintenance of an adequate highway. When these were presented to the House, the bill failed by a large majority and the Park Commission plan won.

One of the last acts of Roosevelt's administration, when the question of the importance of a fine arts council was presented to him by the Institute, was the immediate appointing of a fine arts council, making it their first duty to study and report on the various sites for the Lincoln Memorial. They made a careful report on all the sites suggested, showing the unfitness of all except the one shown on the park plans

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which they advocated strongly. Again this site won, and now even "Uncle Joe" Cannon is pleased that he did not succeed in his long and strenuous opposition.

One day after the Lincoln Memorial was nearly finished, I found myself sitting next to "Uncle Joe" in the street car. After his determined opposition for years to the Park Commission site and his knowledge of my active work for the commission plan, I could not resist the temptation: "I hope you approve of the Lincoln Memorial as it now appears. While the Institute many times opposed your views, we always considered you a man of honest convictions and worthy of our steel." He said in effect: "I have had many battles in my life, sometimes I have won and sometimes I have lost; it may have been better if I had lost oftener. I am pleased that I lost on the Lincoln Memorial."

The American Academy in Rome is a post-graduate school for selected men in architecture, sculpture, painting and music. This school originated among the group of men brought together at the Columbian Exposition in Chicago in 1893. It had been financed largely by Charles F. McKim and D. H. Burnham, and was a private enterprise. McKim was most anxious to have it recognized as incorporated by the United States, and then secure an endowment that would put it on a sound financial basis. Speaker Cannon, the watch dog of the treasury, for years had opposed this incorporation, as he asserted it was an opening wedge for an appropriation. The Institute was called on to secure the act of incorporation. The interest of Senator F. G. Newlands, and representative H. K. Porter, was secured in their respective bodies, and the bill of incorporation was presented. After persistent effort, the Senate passed the measure, and Speaker Cannon allowed the Committee to bring it before the House, where one vote would prevent action. There were five or six who, it was known, would almost certainly object. Architects from home states of these representatives were requested to see that they refrain from objection and allow the House to express itself upon the subject. One objector had few if any architects in his district, so a friendly member promised to take him down to the bar for a drink just before the measure was presented. The home arguments and the bar ruse were successful; the bill came up and was passed. Slight modifications were made in the House, which made it necessary to resubmit it to the Senate. I got it as soon as it passed and carried it to Senator Newlands,—I did not wait for clerks or messengers with possible pigeon holing,—who immediately presented it to the Senate. He went over and sat by a Senator who could, and he thought would, stop action by an objection. After the amendments were read, Senator Teller arose to object, when Senator Newlands literally pulled him

down by the coat tails, asking him as a personal favor to let the Senate express itself. He yielded and the measure became a law March 2, 1905.

The incorporation secure, the next step was the endowment, not from the Government, but from individuals. The Institute undertook, following its precedent through a convention in Washington, to put the value and importance of this school before the public. McKim, for this purpose, organized a dinner where he desired to gather at one table, the leading men in diplomacy, the legislative and executive branches of the Government, the army and navy, the church, finance, literature, science, industry, architecture, sculpture, painting, illustrating. It is still the tradition that this dinner brought together more distinguished men than had ever been gathered at one time. A few may be mentioned among the seventy-five invited guests: Roosevelt, John Hay, Ambassador Jusserand, Joseph Cannon, Elihu Root, Cardinal Gibbons, John LaFarge, Augustus Saint Gaudens, J. Pierpont Morgan, Henry James, Thomas Nelson Page, Dana Gibson, Cassatt, General Chaffee and Henry Walters. The speeches made at this dinner by Roosevelt, Root, Butler, Cardinal Gibbons and others, all had a bearing upon the importance and value to the country of post-graduate study in Rome. The dinner ended with the loving cup passed from guest to guest, and the outcome resulted in gifts of \$500,000 to the Academy, the beginning of a firm financial foundation.

McKim as president, believed in the prestige and good effect of social functions and staging them only in the most dignified and impressive style. There was nothing shoddy or Bohemian in affairs which he directed.

He started what we call his dinner by interesting Elihu Root six months ahead of the occasion, and Root and he worked together to make it the unprecedented success it was.

McKim ran a special train at his own expense, bringing and returning many of the prominent guests from New York, Philadelphia and Baltimore. Seating the guests well illustrates his care and zeal. He and I worked over the guest table all day at the Arlington. When five o'clock came, he had to meet an engagement in Boston, must leave on the Federal Express at five o'clock and the guests were not yet seated.

"Get on the train with me and you can get off at Baltimore," he said. So in a state room we renewed work. Baltimore was reached, it was not done; Philadelphia was passed, and the table plan was finished as the train ran into Jersey City. I took the midnight train back to Washington, with the plan ready for the printer.

Soon after McKim was elected president of the A. I. A., he said to me, "We should own our home, what could we buy the Octagon for?"

"I believe we could get it for \$30,000 dollars."

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He said, "Offer them thirty thousand, ten thousand cash upon showing a clear title."

"But, Mr. President," I said, "we only have five hundred dollars in the treasury."

"You make them the offer," he said, "I will see that you have the \$10,000. If others will not assist, I will give you my personal check for the amount." The offer was made and accepted. McKim by a simple request, secured the \$10,000 from five firms, including his own, and the Octagon became the property of the Institute.

To the efforts of Cass Gilbert is due raising the money to pay off the mortgage of twenty thousand dollars, the purchase of the two lots north of the property, with the idea of a meeting hall and office rooms, and the establishment of a reserve, or endowment fund.

It was during Gilbert's term, that the Institute held the exhibition of Saint Gaudens' work. As he was a sculptor of international character, it was determined to make it an international tribute. All the Ambassadors in Washington were invited to speak. They accepted. The first floor of the Corcoran Gallery was given over to this exhibition of a hundred and fifty pieces of Saint Gaudens' work. The backgrounds were draped with unbleached cotton, the principal pieces were so disposed as to secure the best vistas and were isolated by graceful cedar trees. The floor was covered with green matting. The effect as a whole, Roosevelt remarked, was "great."

Roosevelt and Root, from Saint Gaudens' adopted country, Ambassador Bryce, from his native country, and Ambassador Jusserand from the country of his ancestry, paid intelligent tribute to his genius. The audience of diplomats, cabinet and official Washington, men of distinction in all branches of life, with their wives and daughters, beautifully gowned, made an attractive and effective tribute in appreciation of his fame.

During Eames' administration, Mr. Elliott Woods, superintendent of the Capitol, whom Roosevelt had refused to appoint as architect because he was not an architect, proposed to design with very ordinary draftsmen, the office buildings of the House and the Senate, and remodel the east front of the Capitol. The Institute, with the aid of allied societies, prevented this misfortune, and by their action, architects of prominence were employed.

The Institute, in the case of the White House and the Capitol, performed a distinct public service, as the designs proposed for remodelling these structures were exceptionally bad.

There was a feeling that the members should be kept in closer touch with actions of directors and chapters which were scattered throughout the country. For this reason, the Quarterly Bulletin, (1900-1912) the forerunner of the *Journal*, was started. It was specifically understood at the time, that it was in no sense a competitor of current pub-

lications, but it was to give space to all official board and chapter meetings, and be the means of spreading information in which the Institute was actively interested. Among other useful objects it gave an index of architectural periodical literature, American and foreign, enabling any member who was interested in a topic to secure it. Advertisements were only accepted with the distinct understanding that they were valuable to the advertiser. Several important firms who offered advertisements to help the Bulletin along were rejected. The Bulletin continued to serve its purpose with about \$2,000 to its credit, when it was thought a monthly magazine was necessary. The new publication committee changed the name to the *Journal*, made it a competitor of current magazines, canvassed for advertisers, gave small space to routine chapter news, and dropped the index of periodical literature, and instead of sending it free to members, charged \$2.50 for subscriptions. While nominally in charge of the Institute, its financial success does not show in the treasurers' reports.

Quite an effort was made during this period to collect a reference library, and have the office serve as a bureau of information with the idea of securing material that could not be found in other places. An effort was made to secure everything on city planning, as we felt the Institute started this revival through the Park Commission.

After the International Congress of Architects in Paris, 1900, the Institute, through its members, became officially a part of the World Congress held in London and Rome, and they are represented on the management of the Congress to be held in Belgium in 1926. The World War prevented at least two meetings of the International Congress. By participating in these meetings the Institute for the past twenty-five years has become a factor in the architectural problems of the world.

Following McKim's advice the presentations of the Gold Medal were made imposing social functions. Sir Ashton Webb was the first recipient, followed by Charles F. McKim, George B. Post, J. L. Pascal, Victor Laloux, Henry Bacon, and jointly Bertram Grosvenor Goodhue and Sir Edwin Landseer Lutyens.

The publication of European and Japanese Gardens, a well prepared and thoroughly illustrated book on the subject, was highly appreciated.

The monograph on the Octagon, the home of the Institute, was an unusual undertaking, as it called for a complete set of drawings, including details of this charming old house.

The fiftieth anniversary was participated in by all the principal allied art societies of the country, and the presidents of the principal educational institutions. Word was received from the principal architectural societies of the world, tendering congratulations and good wishes.

It was fitting that the Institute should be the

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body to honor the memory of Peter Charles L'Enfant, with the Washington plan to his credit. Ignored by the Government, for whom he exerted his best efforts, his later years he lived on the charity of Dudley Diggs, upon whose farm he died and was buried. His grave remained neglected, almost lost. The Institute, to revive his memory and his work, determined to remove his body to a site secured in Arlington Cemetery. He being of the Engineer Corps of the Army, his final resting place in Arlington was most fitting. The site chosen was a hill, near the Lee Mansion, where it overlooked the City which he had planned. After a hundred years all were eager to honor his remains. His body was laid in state in the rotunda of the Capitol for twenty-four hours, where appropriate ceremonies were held, Vice President Sherman, Ambassador Jusserand and Com. McFarland speaking. His body was carried from the Capitol to Arlington with a military escort, where he was reinterred April 28, 1909. A monument was erected over his grave, designed in the Georgian style in vogue at the time of his activities. L'Enfant's plan of Washington was carved upon the marble slab. This monument was unveiled May 23, 1911. Speeches were made from the flag staff plaza by Taft, Jusserand and Root—all expressing their appreciation of his ability, and the debt the country owed him. General Leonard Wood was the principal representative of the Army, and Cass Gilbert of the Institute.

NON-PROFESSIONAL SECRETARY

The convention held in New Orleans, 1914, was the occasion of radical changes in the constitution of the Institute, which altered not only the business methods of the society, but its traditions. The secretary was made more or less of a figurehead and the office work was placed in charge of a clerical executive secretary—non-professional. The treasurer was again made an independent officer. The initiative was largely taken from the officers and delegated to committees. In this way the management was scattered over the whole country. Whether this was wise, time only will tell. The new methods of managements have delegated their publications to a press bureau, which has the prestige of the Institute, but which is independent of Institute control.

They have revived the project of a meeting hall on the two lots north of the old stable, for which my son and I made sketches, approved in 1907 at the Chicago convention. The work has been put in the capable hands of Charles A. Platt, and I understand arrangements have been made to finance the much needed undertaking.

In conferring the medal on Henry Bacon after a Bohemian tent dinner, a spectacular pageant was arranged, marching on each side of the mirror basin, east of the Lincoln Memorial, with members carrying banners and draped in different colored

capas, from the dinner tent to the Lincoln Memorial. The medalist and the distinguished guests were carried on a barge, decorated with banners and drapery.

The medal was conferred by Chief Justice Taft, who was chairman of the Lincoln Memorial Commission. The ceremony took place on the plaza of the Lincoln Memorial, where the lighting effects culminated and where the invited guests were seated. From the descriptions of the events it made it a very impressive ceremony and was a just tribute to the work of Henry Bacon.

For twenty years an active participant in Institute work, and for the past ten years an observer, justifies me in reviewing and advising—the Institute achievements have been told—what it has failed to do, and what it may accomplish. They failed to grasp the importance of encouraging the education of the young architects. For this reason younger societies like the Architectural League of New York, and the T-Square Club of Philadelphia were organized. The Architectural League became national with ateliers in all the larger cities. Through them the Beaux-Arts problems were distributed and drawings made under competent instruction, with individual and atelier rivalry, the competitions being held throughout the country. At stated periods the drawings were sent to New York where they received competent judgment and the award of prizes and honorable mention, followed by yearly exhibitions. The League was a great factor in improving the design and draftsmanship of the zealous and talented young men of the country.

This is a work many besides myself have felt the Institute should have done, both in the cause of education and from a more selfish one, a feeder for the association membership, making honor men juniors of the Institute, with the right after practice of full membership.

The Institute started in the Park Commission Plan systematic city planning, and architects should be responsible for all great schemes for such work. Instead of keeping it under the auspices of the Institute, many thought it was necessary to start a City Planning Association, when I feel it is decidedly for the interest of the public to have this great branch of our work in the hands of architects.

There are certain branches of the profession—legitimately a part of architecture—which it would be much better for the public and the profession for architects to control, such as city landscape, and things connected with building, however indirectly as interior decoration and furnishing, and structural engineering. We now have an independent Landscape Society and City Planning Association which control these architectural branches.

It has been too much the principle, because it saved trouble, to delegate structural engineering

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and interior decoration to outsiders—frequently to the detriment of the building and client. The Institute has failed to keep these branches in the hands of the profession where they belong.

I recollect making a plea on these questions some twelve years ago in the *Quarterly Bulletin*.

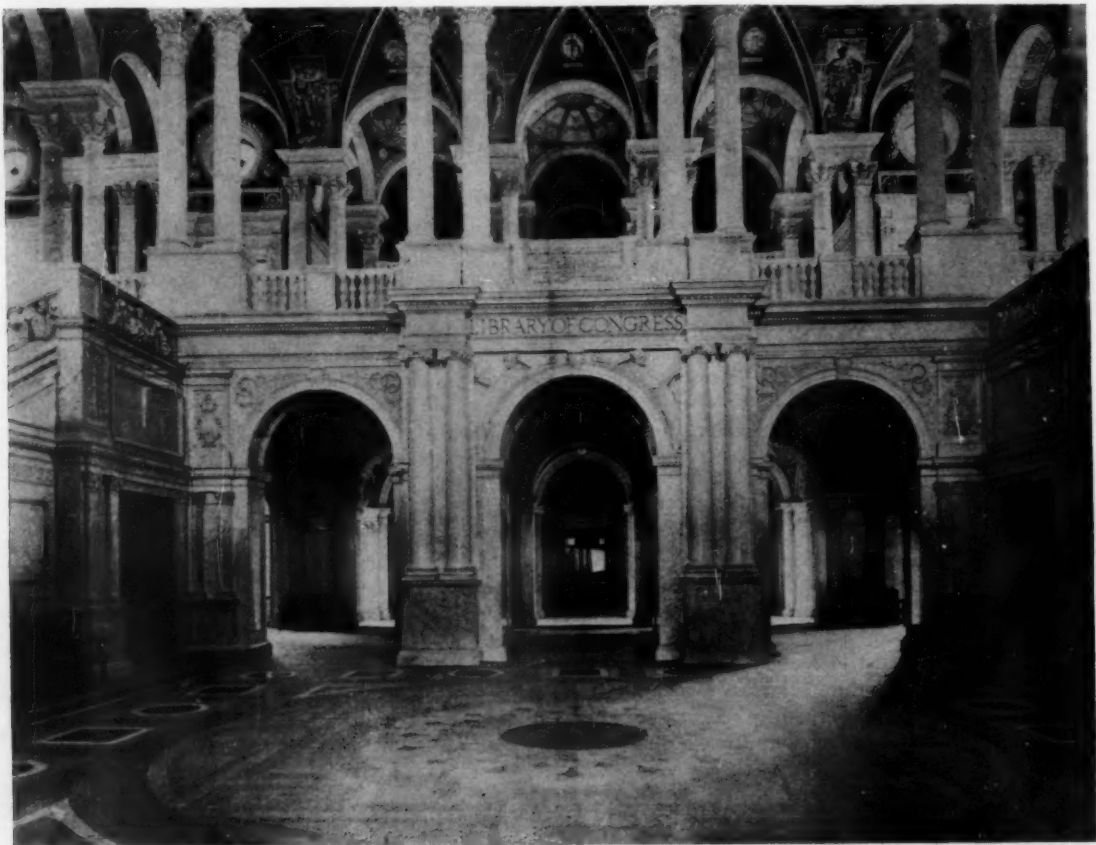
The Institute failed to prevent the intrusion of the ugly army and navy concrete structures on the mall. These buildings planned in the form of a huge fork have the head on B Street, with the prongs, some twenty of them, monotonous, ill proportioned, ugly in mass and detail, built out into the park, projecting some hundred and fifty feet over the building line. This ugly mass spoils the appearance of the Washington Monument and the Lincoln Memorial. It covers ground the Park Commission intended for a forest.

It is not too late to rectify the failures if all will work together and enthusiastically. A start was made at the last convention, A. I. A., in the

passage of the resolution, asking the President to call upon the National Commission of the Fine Arts for an opinion as to the possibility of remodelling the buildings so they may be in harmony with the park, not an eyesore, and so they will not detract from the dignity and beauty of the Washington Monument and the Lincoln Memorial.

Let the Institute call upon all its chapters, the American Federation of Arts and all its chapters, municipal art societies and museums, sculpture, landscape and painting societies—in fact, upon all elements who are interested in the Fine Arts; first to secure action by the Fine Arts Commission, and then to see that they are remodelled or removed in accordance with their report.

United and continuous action of the artistic and intelligent people of the country will have its effect both upon the legislative and executive branches of the Government, and after long and serious effort the Institute will win.



MAIN STAIRCASE HALL AND ENTRANCE TO THE ROTUNDA

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THE BIRTH and DEVELOPMENT of the TALL BUILDING

BY HARVEY WILEY CORBETT, A. I. A., F. R. I. B. A.

BACK in 1776 America and Independence were synonymous terms. In 1926 America and Skyscrapers are synonymous terms. I would not want to suggest that we have any less independence (although there are those who have voiced such unpatriotic sentiments) but I know we have more skyscrapers, and the inhabitants of the Old World who think of us at all, think of us in terms of the long pocketbook, limitless resources, the land of opportunity and the tall buildings.

Is there, in fact, any single feature of this broad land more characteristic of America than the tall building? Most of our towns are big enough to have one; no town is too small not to want one. Any farm hand will walk a mile to see one, every small town Chamber of Commerce will say "Eventually we must have it, why not now?"—and the traveling salesman from neighboring towns meeting in the Pullman Smoker will ask "Have you a little skyscraper in your Home?"

In order better to understand the problem of the tall building, let us ask ourselves a few questions—when is a building tall? Where did the tall building start? What made the tall building possible, and how tall can a building be?

Tall is a comparative term. I can remember when the World Building near City Hall, New York, was heralded abroad as the final, maximum, *ne plus ultra*, and the "height of acme" of tall buildings. Engineers pointed out that the greatest economic height had been reached. Architects declared that anything higher would be impossible of architectural treatment. Now, in less than twenty years, the above mentioned building has become a "low" building! How soon will the Woolworth Building be low?

I think for the purpose of this discussion, we must define the tall building as any building in which the circulation through it is only possible by means of elevators because the internal problem is very much the same whether we are dealing with 14 stories or 40 stories. Historically speaking, the tall building started approximately in the early part of the last decade in the nineteenth century.

It is generally assumed that the elevator made the tall building possible, but I like to think that the tall building made the elevator *practical*. Some form of elevator was in operation long before any building exceeded the stair climbing height. No building exists in London today that is really beyond this stair climbing height. Even London's so-called skyscraper "Bush House" with its bank of six high speed elevators, has only eight floors above the level of the principal Kingsway

entrance and the great staircase which runs through the entire height of the building is continually in use. In fact, what has happened is simply that the elevator mechanism has kept pace with the growing demand for higher and higher buildings. Old Mrs. Necessity, in other words, has been doing a little more mothering,—and I must admit that in the field of vertical transportation she has produced some very precocious progeny.

Now as to our last question,—“How tall can a building be?” As we say in little old New York “that is something else again.” Fifty years ago six stories were a maximum height. And it was the maximum endurance of the average tenant, who had to climb the stairs. Then he, the tenant, advertised his non-success by occupying these remote places for there rent was cheaper. Today, the higher we go the more rent we pay, and altitude becomes a certainty of success. In 1876, we did not dream of the marvels of vertical transportation that now we regard with the indifference born of daily association. The hydraulic, plunger type of elevator, which sometimes functioned and more often did not, carried us a few stories beyond the common or standardized six, but not so high as to create comment. We had not harnessed electricity then as now; we were in the cast iron age of construction, and the steel framed, reinforced concrete building was in its early, experimental stage. The enhancement of real estate values made the cost of an ordinary site mount to high figures. There was a commercial insistence for more revenue, which meant added stories, as lateral extension was not possible, and like in a poker game, “the blue sky was the limit.” So capital said to art, which is an old-fashioned term for architecture, “Go higher up.” And art, or architecture, said to science, “Hear that? Hear what capital says? Now it's up to you to boost this thing up in the air,—and just how do you propose to do it?” So science,—and that's an old term for engineering, said, “Just sit tight, we've something up our sleeve.” Sure enough, they had. They perfected the electric motor until it was capable of hoisting tons of human freight to unendable vertical mileage. They evolved a method of construction so simple yet so safely calculated to bear the loads imposed that construction heights kept pace with elevator heights.

Speculative interests were keen to realize the income bearing possibilities of tall buildings and in the greed for dollars, built so high and so closely that the health and beauty of the cities were menaced. Narrow streets became canyons

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where sunlight only appeared for brief minutes at noonday. It was then that a group of men, practical in their ideas and profound in their knowledge, set about the application of a theory of zoning that for years had been the day dream of the early town planners.

Zoning and height restriction have redeemed the tall building from the monotony of a foursquare box-like pile, to a beautiful result. Like any other innovation that invaded the field of speculative building and sheared profits from an already expensive income, zoning has been attacked and efforts made to nullify some of its wisest provisions. Fortunately, zoning has



AMERICAN CITIES WERE PLANNED FOR THREE AND FOUR STORY BUILDINGS SO THAT EVEN ON COMPARATIVELY NARROW STREETS THE BUILDING WALL WAS NOT AS HIGH AS THE STREET IS WIDE. THE MASS OF MOST BUILDINGS AND CERTAINLY THE MASS OF A BLOCK OF BUILDINGS WAS HORIZONTAL. MASONRY CONSTRUCTION WAS THE BUILDING METHOD, HORIZONTAL COMPOSITIONS WERE THE NATURAL RESULT. SUCH STREETS ARE STILL SEEN IN PARTS OF NEW YORK AND CERTAINLY IN ALL CITIES OF EUROPE AND THERE IS A HARMONY OF ASPECT DUE LARGELY TO THE BROAD STRETCH OF SKY VISIBLE FROM THE STREET

been upheld and the modern American city presents today a skyline that is one of architectural interest to say the least, architectural charm in places, and architectural inspiration in a few spots.

Admitting all this, our last question still remains unanswered. When the zoning law appeared it was spoken of as the death-knell of the skyscraper, but the 25% tower permit, that clause which allows the owner to erect on one-quarter of his lot area a tower of indefinite height, means simply that operators will assemble larger plottage in order to have larger tower area. Elevator speed and structural steel capacity to carry the load, are the only factors to



WHEN BUILDINGS BEGAN TO PILE UP HIGHER THAN THE WIDTH OF THE STREET, THEY STILL CARRIED THE IDEA OF THE HORIZONTAL LINE OF MASONRY CONSTRUCTION, BUT THEIR MASS HAD CHANGED FROM HORIZONTAL TO VERTICAL AND THEIR CONSTRUCTION HAD CHANGED FROM MASONRY TO STEEL. THE STREET BECAME A CANYON BECAUSE ITS WALLS WERE HIGHER THAN THE STREET WAS WIDE. THE VISIBLE SKY BECAME A STRIP,—HORIZONTAL LINES CUT THE BUILDINGS INTO PILED UP BOXES AND ALL HARMONY WAS LOST



THE FUTURE CITY MAY BE BROUGHT BACK TO A SPIRIT OF HARMONY BY DOING THE OBVIOUS THING. THAT CAN BE ACCOMPLISHED BY PLACING THE VERTICAL COMPOSITION ON THE VERTICAL MASS. TO BE SURE THE STREET IS STILL A CANYON, BUT THE VERTICAL LINES OF THE BUILDING WILL CARRY THE EYE UNCONSCIOUSLY TO THE STRIP OF THE SKY ABOVE. HOWEVER NARROW THE CANYON MAY BE, AND THE HARMONY OF THE STREET RE-ESTABLISHED BY THE HARMONY IN COMPOSITION OF THE INDIVIDUAL ELEMENTS WHICH COMPOSE IT

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set the limit, so I am not going to attempt to answer the question of "how tall a building can be," but certain things do occur to one in this connection which are worthy of discussing.

In Colonial days, if we may judge from the remaining examples which we still have left, men built not only with respect for their neighbors but with regard for the community as a whole. A flagrant effort of individualism would have been frowned upon by everybody and the author ostracized for his evidence of bad taste. On the other hand, each building had its personal interest and charm,—there was no lack of individuality but it was never an offensive or blatant individuality.

But in the last fifty years, or at least since the days of the long lines of brownstone fronts, those somber symbols of persistent and continued ugliness,—which still stand a mute evidence of the dark ages of American architecture—there has developed a period of individualistic effort, exceeding anything ever known or imagined in the world before. Every owner wants his building different, and nearly every architect agrees with him. Why respect the community when nobody else does? And if one really wanted to build in harmony with one's surroundings, what in God's name would one build in harmony with?

Going down the Hudson on a ferry boat one afternoon a short time ago, I was with three other architects, all men who think deeply on architectural problems and their relation to human progress, when the question was asked "who is the greatest General in the U. S. A.?" The answer came unanimously "General Mess!" Of all the conglomerate, helter-skelter, jumbled-up, mixed in and scattered about architectural messes,—New York viewed from the Hudson on a bright clear day takes the prize. To be sure, it is fascinating, it is inspiring, at points it is exciting,—in certain lights it has a great charm, from certain angles it is almost appalling—but one has the feeling that if it could only be screened, sorted, analyzed, separated, some order brought out of the present chaos, all that is really worth while could be retained, and the joy of it all enhanced by the sense of order that is only possible through intelligently guided community effort.

But this is not an article on town planning, but a discussion of the tall building. What can the little architect do as an individual with the design of his particular tall building, to help harmonize his work with his neighbors and with the street on which he is to build and with the city as a whole? Professor C. H. Reilly of Liverpool University in his book on "Some Architectural Problems of Today," which by the way every architect should read, says "In civic architecture the clothes are the man. We can judge other people's buildings only by their appearance. * * * As citizens we are interested only in the exterior of

the vast majority of buildings. We want them built of sound materials, which will last and weather pleasantly, because we do not want to see our towns look shoddy. These towns are the most self revealing things we make, because they are to a very large extent the unconscious expression of ourselves in the mass. Each person within the limits of certain rules laid down for public safety and health builds as his fancy dictates. * * * * *

"There is every reason, therefore, why the public should take as keen an interest in its new buildings as it does in its new books and plays—more reason indeed, because the latter need not be seen, and the buildings must. No man builds for himself alone. His building is there, if in London, for some ninety years or more. It may even descend to our great, great, grandchildren to show them what sort of animals we were. The unveiling of a great building when the scaffold first comes down should be an important event, much more so than the unveiling of the ordinary statue. Architecture, then, for some obscure reason, although she is the ancient mother of the plastic arts, and the one from whose embraces none of us can escape, herself escapes criticism. * * * * * In these days, when in the arts, at any rate, national feeling is dying down * * * * * it is all the more necessary to make sure that the character of our town buildings conforms to some standard of public decency.

* * * * * "Good form" in every sense of the term is what is needed more than anything else today in civic building. The old words, 'civic architecture,' express exactly what is desirable. Our town buildings should pay a conscious tribute to our civilization instead of being merely an unconscious revelation of it."

If architects of today cannot design their buildings in harmony with, and with respect for, their surroundings because there is no harmony in those surroundings, then they must at least design with respect for harmony in the future. Certainly, our American cities are rebuilding rapidly enough to justify the belief that the present hodge-podge will soon be changed. Must it change to a still worse hodge-podge, or can it be guided toward an increasingly harmonious outcome? The tall building, because of its size,—its great bulk,—its outstanding silhouette,—its inspiring height,—is a potent factor in this possible future harmony. I see more and more tall buildings, fifty,—sixty,—seventy stories even are rumored possibilities. The street capacity necessary to feed these great beehives of activity is the only factor which threatens this bulk,—and we know the ingenuity of architects and engineers will meet that demand just as the elevator answered the call of steadily increasing numbers of stories.

While the New York zoning law, the pattern of most city zoning laws throughout the United States, has placed a limit on the height of the walls

which flank our streets, that height in nearly all business districts is greater than the width of the street, so that the silhouette one gets looking along the street will be that of a flat bottomed "U". Above the straight wall will rise the set-backs and above these, the towers,—our street will still be canyons in which the sheer walls, the set-backs and towers will vie in grandeur with the pinnacles and turrets, the cliffs and precipices of the Grand Canyon. What can the individual owner and architect do to bring harmony if such a principle of verticle composition suggestion to offer at this time, which I hope may prove constructive,—the kind that can be used at once,—the kind that can be put into effect on the project now on the boards in the drafting room. It is not a new idea in any sense,—Cass Gilbert had it in the West Street building; he proved its supreme effectiveness in

the Woolworth; Helmle & Corbett followed it in the Bush Building. A large proportion of the modern zoning buildings, whenever any attempt at general composition is tried, have followed it. I think the designers have simply followed the natural and self-evident principles of treating a vertical mass with a vertical composition, the principle is that of making most of our conditions instead of fighting against them. I don't believe one realizes what it means in ultimate harmony if such a principle of vertical composition for all buildings higher than the street is wide could be carried out universally. The sketches submitted herewith tell their own story. If they don't, then words of mine however flowery or forceful will not convey to the architectural designer's mind, what I believe to be a very fundamental truth.

The PRACTICE of ARCHITECTURE

BY WILLIAM P. BANNISTER, F.A.I.A.

IN considering the changes in the practice of architecture which have come to pass during the past fifty years, let us pay a little visit to the office of the reputable architect engaged in practice during the first years of that era. We will probably find his office in a building not quite ready for the housewrecker but always near at hand to the offices of potential clients in more elegant environment.

As we look around we do not find a telephone, typing machine, blueprinting apparatus or electric lights; we did not expect to see them as we knew nothing of them. You would probably find a stove as the heating unit instead of a radiator. If the architect was established in New York City and was prosperous, you would probably find his office in the old Trinity Building where he could gaze on a good example of his art as shown by Trinity Church and at the same time contemplate the way of all flesh in the foreground of the picture. His office was comfortably near Wall Street. If he located on Wall Street in a building having a back door to Pine Street, the Pine Street address would not appear on his letterheads. The office was usually in the fifth story back.

If you had curiosity you would probably note that in some of the corners too dark for the use of the drawing board, there would be an accumulation of samples of building materials modestly blanketed under a mantle of dust and spattered by mud cast by an unappreciative scrub-woman. On the walls there might appear some dejected looking renderings of several of the more important designs of the peaceful dweller in this environment.

We meet the occupant and it is likely that we will find that he had been a student in the offices of either Upjohn, Renwick, Hunt or possibly Richardson. We find that he has grown from the tree of architectural practice on which but few branches survived the destruction of the Civil War. That war was a veil of darkness that absolutely shut off all vision of the architecture of the past for the time being. The architect was engaged in a profession so little known, that if he mentioned his occupation to "the man on the street" that man would look wise and walk off wondering.

The architect himself, was a man of extremely interesting personality. He was capable of receiving the impression of the art (?) of that period, but it was generally a bad impression. He was usually amiable, particularly with his draftsmen but he had to draw into some seclusion if he obtained a large job because of the certain appeal of some of his draftsmen for an increase in salary. In those days such appeals were a little too personal to be pleasant. He was somewhat addicted to the use of expletives due possibly, to limitation of vocabulary. He was kind to the office boy if he happened to be in a good humor. Every draftsman in his office who had any ambition and who showed promise of competency, was a person of interest to him. If the draftsman had a visit from a relative even to tell the news of some tragedy, the architect would likely be interested to take a peep into the home of his employee which such a visit permitted. He was apt to say "good morning" to the office boy because he appreciated the monotony of that young life, spent in grinding

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India ink, making more or less accurate copies of specifications in long hand from an original, possibly of more than one hundred pages written by his employer. If the boy was not doing this he was stretching Whatman's paper that the draftsman might make his laborious drawings, ink them in, wash them and tint the walls with crimson lake and partitions with gamboge.

If the architect had a rich wife or obtained money from some other easier source to approach, he might visit the "other side"; if he did, he was likely to bring some token of his trip to his faithful draftsman and office boy. Even though he might be lurid in speech he was generally a very kind man. Some of us like to remember these architects of that dismal period following a horrible war. We hear their daily greetings.

The practice of these architects was usually a private residence, a bank, a church or an office building limited in height by the ability of the average person to climb stairs. The draftsmen in his office having ambition could obtain a very thorough knowledge of practice. The absence of the typewriter made it necessary to study letter composition, the copying of specifications informed him of the essential requirements of description and if he had curiosity he would learn much about materials. The continual tracing of drawings due to the fact that blueprinting was not in general use, led him to read plans whether drawn by himself or others. Through tracing he also had an opportunity to study architectural details. There being no telephones the contractors in the various trades frequently visited the office. The general contractor was hardly known so the information obtained from the trades as they were represented in the office was not likely to be colored in the interest of a general contractor who might be biased. The personal element was always in evidence in the relations between the architect, his employees and the heads of the various trades serving the building operation. Even the client seemed to enjoy visiting the office and sometimes talked with the office boy. The pipe of peace after debate was usually smoked at a mid-day meal and not infrequently the architect was in a better mood to approach in self interest after the cheer of that meal with the owner or contractor. Of course, there was the underworld of architecture then as now but it does not belong in our picture of architectural practice. The real architect of fifty years ago was a real gentleman, just as he is now.

It was in the offices of these architects where it all began. As Professor Hamlin has noted, a great impetus was given by the Centennial Exposition of 1876. It was an added force to the development as shown in the works of Upjohn, Renwick, Hunt and Richardson. These men and a few others were the roots of the tree which began to grow in that awakening. The elevator, telephone,

blueprinting, typewriter, electricity all came to us in rapid succession from the beginning of the "eighties." The architect above described was the man who had to meet the mighty change which had come with such a violent impact. It is wonderful to see how well he met the change. He began with the six story structure made possible by the steam elevator. He continued with the nine, ten, eleven and twelve story building made possible by the hydraulic elevator and some remained to solve the problems of still higher structures made possible by the highly perfected electric machine. He surrounded himself with an organization of engineers, structural, mechanical and sanitary. He discarded brick walls, first using iron and the steel to carry the concentrated loads with a minimum wall area. He met his problems successfully.

His successor is the man who with many others, ran to the schools of architecture, here and abroad, for that basic training which it was no longer possible to obtain in an office built up with more or less co-related units, each one specializing. These men of today passed from the schools to the offices of those of the old school who still remained in practice. They did not stay there for many years as the allurements of the complex organization of today was too impelling.

A contrast of the office of those few who now serve in the erection of great structures with that of the office of fifty years ago is of interest. One's first impression in entering one of our modern offices of this class, is the suspicious attitude of the young lady switchboard operator or an office boy who is as likely to become an architect as to become an emperor in Russia. The architect has built a stockade almost impenetrable to any person other than a client. If the barrage of typists is successfully passed, the visitor may be fortunate enough to meet an "office manager." The private office is truly private. If you happen to be a personal acquaintance, the meeting ground is apt to be a good sized room with some built-in bookcases filled with books with impressive titles, sometimes in foreign languages, books that every architect should have and display; although it is pretty certain that he never looks at them beyond the bindings. If the office is particularly exclusive, the drafting room may be on another story and in some cases a draftsman might be employed some months without knowing his employer by sight. The average draftsman in such an office is practically shut out from any opportunity to learn anything about "the practice of architecture." He might not be permitted to enter the room where engineering problems are solved. He may never read or write a specification; that is done by the "specification writer." The visitor is generally impressed by the furnishings. A carved seat in Florentine oak or a box in kind; a bas-relief or two and maybe a plaster model. The

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drafting room is seldom in evidence. The man who conceives the design knows but little about the practice that leads to its becoming a building. A draftsman who might venture to visit the work under construction might be reproved by his employer if he met him and was recognized. This is not a reflection on the personality of the heads of the modern office having to do with great structures. As a matter of fact, they are as a class most genial, refined and intellectual men. Their office environment is an absolute necessity. Their burden is too great to be borne by one person. The machinery of their organization must be adjusted as a watch if it is to function successfully. While they may not be in social relation with those in their service, they give generously of their time and money to support training schools for students in architecture. In service for public welfare they are probably the most self-sacrificing of any one class of our citizens. From these offices there comes not only the design for the skyscraper but sometimes beautiful conceptions for works of monumental character.

These large combinations of talent have their troubles. They are passing more and more responsibility to the general contractor and with that responsibility they are passing power and authority. The owner is becoming more and more interested in the general contractor because the contractor is so closely related in the financing of the work. The large office is becoming a central organization for the convenience of the owner and general contractor. A business head is rapidly displacing such architects in power, simply looking to them to prepare drawings for the proposed building subject to limitations agreed upon by the owner and contractor. Sometimes the whole organization of the architect is more or less in control of some corporation and lives but as a subordinate department.

Passing from the offices having to do with great commercial structures, we come to an entirely different class—those who have to do with the large apartment houses in our great cities. The combinations designing great office buildings are very few in number, almost a negligible percentage of the whole number engaged in the practice of architecture. Those engaged in apartment house design constitute a large portion of the profession. This class has grown from a different root from that of the office of fifty years ago. Seldom did it occur that the prominent architects of that time had a commission for such buildings unless they were large structures for the time and were investments of their clients. This is generally true today. It must be said that at the beginning of multi-family housing in our cities the conditions were a disgrace to our civilization. The men who were engaged in planning these buildings were hardly known to the profession. It became necessary to pass laws to curb the

greed that led to the crowding of the poorer of the population into dark rooms and under unsanitary conditions inviting sickness and death. The underworld of architecture sold itself as a miserably paid servant to the builder of this type of dwelling. Within the past twenty-five years there has grown up the large office which has taken the major apartment house as a specialty. They work well within the specifications of law. Plan is largely fixed by statute, particularly with relation to light and ventilation. In some cases exterior design is good but that effort seems to be passing, most of these structures presenting but a childish effort in art. This practice is becoming more and more a commercial proposition. A well organized office with favorable loaning connections. Shrewd business ability that brings the potential speculator in contact with the realtor, the financier and the contractor. Success in this endeavor means a maximum tenancy within the limitations of space allowed by statute, that loans may be secured by maximum income. By a few this class of work is carried on creditably, but it offers an invitation to the underworld; a practice that extends into the slums of architecture. There are so many crowded into this practice that there is no possibility of a decent and honorable living for all. Those at the bottom of the ladder of tenement house practice suffer to an extent that their brothers higher up in the profession seldom realize. Out of the lower class in this work some men have come to be specialists in the evasion of statutes and ordinances. A keen able class in their way, but destructive in their works and enemies to society.

From this class to whom we would gladly say good-bye we pass to the offices of possibly as numerous a group,—architects who seldom have a commission for a building costing more than one-half million dollars. These men are the backbone of architecture as an art. The child is theirs from conception to reality. Others assist them in their works but always as subordinates. Their field is usually varied. The personal element enters their offices and the atmosphere of business with them is generally pleasing. Their works are those which are most frequently published in our architectural publications, and are best appreciated by the cultured citizen. If they are able men the full force of their individuality shows in their art. The brute power as manifested by the skyscraper is not there, but the appeal to the sense of refinement is.

These are the men who first peeped behind the dark veil of the Civil War and have brought to light the best works of a past era. Their ideals appear in the country estates of the wealthy, the simple American home, the small office building, the churches, a bank or a club house. Their works are within the power of the average person. Their practice is their life. Their financial return for their labors is small. They face a small feast or

a serious famine. If famine overtakes them, they seek refuge as the servant of some large building corporation where they may receive a net financial return greater than they can expect in individual practice. They have joined the forces which strike at the heart of regular practice, but it is not their fault and it is a misfortune to architecture. If they do not give up, they face the competition of "small house" bureaus, "mail order" housing and the "development" corporations to which many of their peers have fled. Their only chance to continue in practice is to insist on receiving the full compensation set by The American Institute of Architects as a reasonable return. They are apt to seek other fields, such as real estate, to add to their income. They generally fail in such endeavor. If they obtain moderate wealth from sources other than architecture, they usually maintain their offices on a very small scale and practice for the pleasure of seeing their conceptions translated into the material. Sometimes they step aside from active practice and teach their art to the youths who will in their turn become a small part of a large organization or will fight their battle

with the "small house" bureaus, developers and mail order housing. All of which in turn are fighting among themselves.

The practice of architecture during the past fifty years involved as strenuous effort to keep up with the inventions of our time as that of any scientific pursuit. The young men entering the field are better prepared than they have ever been; they must be. The changes caused by the elevator and the marvelous use of electricity have caused the greatest change in practice that has ever occurred as far as we know. The beginner is now required to have certain minimum training fixed by statute. He must start with a knowledge about equal to that of the practicing architect fifty years ago. Architecture is now a known occupation, but as it raises its head, many forces seek to grasp it and to subordinate it to their own gain. No matter how the architect may fit in in the order of human effort, he will always contribute a fine gift to humanity. One of our keenest joys is to meet with the reputable architects of our time. They have truly built well on the foundation laid by the architects fifty years ago.

FIFTY YEARS' PROGRESS TOWARD *an* AMERICAN STYLE in ARCHITECTURE

BY ALFRED C. BOSSOM, F. R. I. B. A.

HAD there been no Plymouth Rock, nor Jamestown, nor St. Augustine, nor Santa Barbara, there would have been no question as to whether or not an American style of architecture was our goal.

Architecture is of the soil, the air and the customs of a country. It springs from the needs of a race. It is a portrait in stone of the type of life lived. If a people be at business all day; dines at public restaurants, and wanders in the dancing pavilions of Jazzmania all night, it needs an entirely different architectural setting from that needed by feudal lords who fought enemies and guarded themselves night and day against attack and surprise. As architecture more and more meets the requirements of life; as the rearing of its cottages or castles or skyscrapers is controlled by the culture a nation develops, if true, it automatically becomes a style. If the American people were not of the melting pot, if it had emerged from protoplasm to Pelmanism all of itself, it would have now architecture which would have been as much of it as a shell is of the oyster it shelters.

Suppose, there existed in this continent a race, which at first lived in caves to protect itself from bears and panthers; then grew stronger and dared

to live more in the open, to depend upon its weapons to resist attack, and finally took to building forts and houses, and eventually palaces? What have they left? There were on this continent, in fact long before Columbus, peoples who were much the same horizon of culture as the archaic Greeks. If Mound Builders, Mayas, Toltecs, Aztecs, the subjects of the Incas, had not been put out of their stride by certain Europeans who "discovered" them, they would have probably gone onward and upwards and developed more of art, literature, science and all the finer embellishments of civilization than any other people. Then there would have been an American style in construction independent of all orders, and developed without light from any lamps of architecture kindled in other climes.

Of course, no type of national architecture can throw aside all that has been developed since the world began; every country is susceptible to foreign architectural influences. There can, for all that, be no question but what the United States is more than merely groping its way toward an architecture of its own. It is progressing though with travail of spirit, because it is trammelled in so many ways by the traditions of the lands from which its many racial strains originally sprang.

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When the Puritans and the Cavaliers came to this country from England they had much the same architectural backgrounds. First, as primitive man, making his way in a new environment, might have done, they built for themselves log cabins, stockades, forts and defenses. After they had killed off a reasonably large number of Indians, the early settlers of the United States bethought them of schoolhouses, churches and more fitting and more decorous homes. Instead of letting nature and architecture and actual human needs control, however, they proceeded to rear buildings from imported designs. They ignored all the aboriginal races here had done to evolve an architecture and proceeded to fasten upon themselves foreign geographical influences. Just as they brought from the other side their furniture in the million trips of the Mayflower more or less, and their axes and their books and all their adornments of the culture they had known beyond the seas, so the Colonists reared European houses on American foundations.

And yet, into this Colonial architecture, what-

ever its nativity, they did put something of a more creative spirit. There were architects in those days who fashioned gems out of stone and brick and hand hewn beams. We had Colonial country houses in Virginia, and charming old homes with their widows' walks in professionally antique Nantucket, or in what we were wont to call America's architectural capital, Salem. There were, at the same time, hosts of servile imitators among the carpenter-architects of that time who took drawings from the works of Chambers or of Wren, clumsily copied structures meant for the heart of London and set their products down in an unconvincing rural environment. However, a domestic architecture based on the English Renaissance or Georgian did flourish in grace and symmetry. There came a Dutch Colonial, too, imported from Holland, just as were the bricks brought in ballast from the Land of Dykes. Further south, a Spanish Colonial style of a mystic beauty grew like an exotic flower.

After the United States had achieved its independence, it was for a time in revolt against the established forms of British architecture and British art. Other European influences became more pronounced. There was a great deal of a creative spirit in the work of Thomas Jefferson, who made a startling design himself in the building of his home at Monticello and in the planning of the noble buildings of the University of Virginia. The city of Washington, capital of the nation, was begun in accordance with the plans of L'Enfant, the French engineer.

It has been the custom to refer to the next phase of the building art on this continent as a period of decadence. Probably architecture here was in no better nor no worse condition in the middle of the last century, than it was elsewhere. It was still based on Old World models. It was under the benumbing influence of what some of the cynics insist on calling the Mid-Victorian. Why that gracious sovereign should be held responsible for the atrocities of architecture perpetrated in Europe and elsewhere during this period, is past finding out. Then as now, lay magazines published plans for building houses. The Godeys Ladies Book had Italian villas and farmers tore down Colonials to build them alongside their barns. Then came the days of the Queen Anne front and the Mary Ann back. The



MUNICIPAL BUILDING, NEW YORK
McKIM, MEAD & WHITE, ARCHITECTS
CITY HALL IN THE FOREGROUND

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hard and cold and prim architecture of an uninspired age, crowned with a turret or lantern and draped with the print of the jig saw, appeared in the United States in the guises of Early Pullman and Late North German Lloyd styles. Houses were filled with huge furniture, platform rockers, horse hair sofas; with ponderous chairs with curved and carved backs, on which rested coarsely woven fabrics—absorbents of hair oil brought from far Micassar.

In the city of New York, beautiful, well proportioned dwellings, many of which still remain in Greenwich Village, were scorned and the horrors of the Brownstone Age of Innocence came upon us. The craze for this material was stimulated largely by contractors and quarry owners, often with a little help from Tweed. The stone itself has nothing to commend it in color or in tone nor texture. It is loose, friable, and prone to flake off and even such precautions as setting it on its natural bed were most carefully ignored. For all that, fortunes were made out of it and everybody wanted it. The fad was so marked, that when the architect had designed the lower Vanderbilt mansions on Fifth Avenue, New York, for marble or limestone, which would have been appropriate because of the many finely executed carvings on them, the reigning head insisted that brownstone only be employed. What the designs or patterns of the high stooped houses of this period were is more or less of a cross street puzzle. They might have served for a city with canals for streets, and the stoops suggest landing stages for gondolas. They are as much Venetian as American.

One of the most significant steps in the progress toward an American style was taken when the Massachusetts Institute of Technology founded its school of architecture, the first of its kind in the United States. Its director, William Robert Ware, was a pioneer who blazed the path through the forest of foreign influence toward the American City Beautiful. His guiding impulses coming close after the close of the Civil War were exerted in a time given to material achievements—and it was not to be expected that he could do much more than show the way.

Wealth increased, large fortunes were accumulated and then came the American Renaissance, of which the symbol was the Centennial Ex-

position in Philadelphia. At that time a spirit of independence came into American architecture as well. It is more fitting, as the time draws nigh for a sesquicentennial in the City of Brotherly Love, that we should be congratulating THE AMERICAN ARCHITECT upon its semi-centennial which synchronizes so well the close of a half century of progress of American architecture with the earnest inquiry as to the development of a distinctive style. The international fair at Philadelphia brought a kindling interest in art and architecture to this country based even then on Old World ideals, but it brought to us at the same time a great era in the progress of American ingenuity. There were shown the crude models of the first telephone, of the typewriter, and of many devices which have contributed to the upbuilding of the spirit of co-operation or teamwork which is the very essence of American life. The American style which is being developed more and more every day, is an architecture based upon the needs of a people who work in organizations and groups and are more and more living in dwellings



WOOLWORTH BUILDING, LOWER BROADWAY, NEW YORK
CASS GILBERT, ARCHITECT

THE AMERICAN ARCHITECT



MAGNOLIA BUILDING, DALLAS, TEXAS

ALFRED C. BOSSOM, ARCHITECT

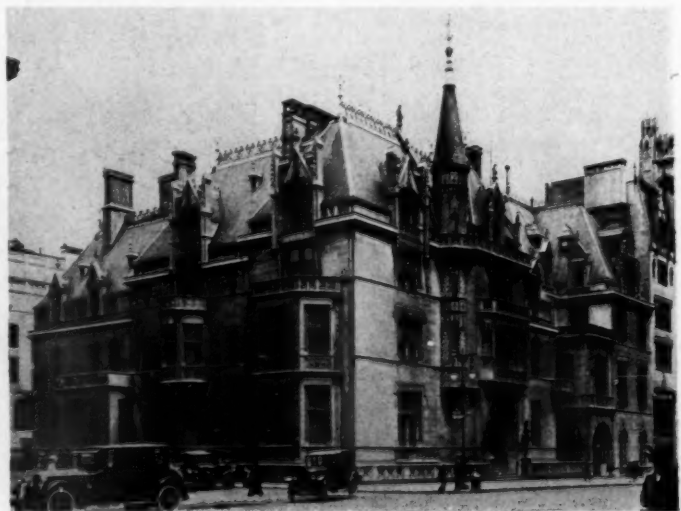
intended for the occupancy of many. While this country was preparing for the great festival of awakening in 1876, the modern movement in the building art of the United States began to stir the dry bones of imitation.

There have been in the last half century American architects of commanding original genius but whose talents have been largely confined to composition more than creating, but in the last generation were many who did mighty things in the name of America's creative spirit. Some of them, it is true, have been enthusiasts in following Old World styles or adapting European decorations or details, and plagiarism has been taken from the discard and given a seat of honor, but for all that there was developing an architecture which suited the co-operative activities of the American nation. To all of these the charge cannot be laid, to paraphrase Montaigne, that they merely gathered posies from other men's gardens and that only the garland which bound them was theirs. Men of force and

originality always have imitators, and the crimes committed by worshipping followers cannot be laid at their door. To mention all those noted leaders, who made such able use of American ingenuity and material progress, to advance the cause of a distinctive architecture, would require a volume. And in any country where the citizenry was in large measure acquired ready-made, ready-educated, who all too soon for art's sake became art creators through the medium of American architecture, it is to be expected that a truly national style will be slow in developing. Each new rich man apparently looks at the American architectural creations he finances through a telescope pointed toward the land of his parents or to some other place where he has always imagined beauty existed. This has had marked influence upon the truly stupendous efforts of many of America's most brilliant architectural creators. It is rather beyond these meager words to refer to all of the great men of the recent past, so I shall therefore refer to only a few, and the reader, no doubt, can suggest very many more.

Richard M. Hunt, a worshipper at the shrine of the *Ecole des Beaux-Arts* in Paris, created great homes for the new millionaires of his day, which met all the requirements of a people who wanted convenience, luxury, efficient management of the household—and all in a dignified setting. His buildings on Fifth Avenue in New York were the greatest homes of that time and even now with all the greater facilities and available references, his work in reproducing some of France's best stands as a beacon light in that dull period.

A mediaeval style originating in Southern



HOUSE OF W. K. VANDERBILT, FIFTH AVENUE, NEW YORK

RICHARD MORRIS HUNT, ARCHITECT

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France was the main medium of H. H. Richardson, but with what skill he adapted the Romanesque to the various projects which he was asked to develop! His Trinity Church in Boston was a creation of majesty and power. It was no fault of his, if unthinking and uninspired copyists applied the Romanesque to cheap apartment houses and, worse still, to clumsy and more pretentious monstrosities in brownstone.

That virile and vivid though retiring soul—that archon of American architects, the late Charles F. McKim, of the firm of McKim, Mead & White, apostles of the Italian Renaissance and of the best of Old World architecture, was the author of structures which adapted for distinct requirements of our American life. Great work he did, and as far as quality of effort, exhibition of scholarship, and encouragement of the appreciation of beauty, America never has had and perhaps never will have his equal. His is not the fault, either, if men of less daring, and less grasp of their art, made and furnished museums filled with artistic junk, of which they forced their wealthy clients to become inmates, or who with less taste or discrimination selected poorer details or examples to copy in this new world's buildings.

The trend of the population of the United States to great cities, the building up of vast industries, and the constant evolution of a communal interest both in commercial and social circles, led to that most significant development of American architecture—the tall building, or I may say the mass structure. It became necessary to reuse valuable land not once, but many times—to impose layer upon layer. Hence the American pyramids—the towers of American architecture. There is nothing startlingly original in merely rearing a lofty structure. Babel anticipated that on the Asiatic plain; Italian cities had their heaven-defying strongholds; I have myself seen in old Spain apartment dwellings of eight or nine stories which have stood for centuries. Men erected such structures for defense, for observation, for beacons, but American architecture has led the world in the creation of fabrics looming to the clouds which are of utilitarian value as well as expressions of a daring, inventive spirit. American architecture has triumphed in adapting modern processes, facilities, and materials for building structures to serve the many.

To the versatile talents of the late Daniel Hudson Burnham, designer of the Rookery in Chicago, was due much of the advance which has been made in the development of the high buildings in the last part of the nineteenth century. The homes of great financial institutions, the mammoth department stores, the acre covering industrial plants, the caravansaries we call hotels—all on a tremendous scale, attest the virility of an American arrangement rather than a style in

which he was a factor. It was due to such as he, that the owners of real estate in American cities began to realize the true economies of architecture. A tidal wave of rebuilding swept the country. The Columbian Exposition, held in Chicago in 1893, popularly known as the World's Fair, of which Mr. Burnham was the chief architectural director, enabled us to pass many a milestone on our way to an American understanding of an individual style. Composition only was the main result. Books published in many countries would give the exact proportion of door windows, columns, and entablatures, placed in more or less new arrangement but exact as to form in very many ways. The palaces of white staff and other huge fabrics which sprang up in Chicago started a vogue not only for monumental buildings, but for white or light colored ones. The slogan "Make our City a White City" was taken up by Chambers of Commerce and civic bodies, and by leading merchants and bankers individually. This was more or less of passing phase, but it took away the curse of brownstone, at least, and banished the cast iron front and the other hideous relics of a less imaginative age. Now polychrome detail and ornament are being used on our tall buildings and tapestry brick and eye-resting and eye-soothing treatments of facades help us on our way to the style distinctive.

How the American skyscraper has grown in height and in the favor of man since the days when the first was reared on the shores of Lake Michigan! When I arrived in New York in 1903 the building for the *New York World*, with its gilded dome, topped the urban landscape. Today it is almost buried among the lower stratum of buildings. The present structures in its vicinity have reached such a height that the skyscraper of even twenty years ago looks like a cottage in an Alpine valley.

But, after all, it is not the altitude nor yet the extent of the tall building which makes it so worthy of its place in the American architecture of the future. True American architecture must build from the inside out, from center to perimeter. It concerns itself with use before the overcoat shown to the passerby.

An American skyscraper is like a human being in its organization. Just as the Greeks in making their columns are credited with copying the proportions of the human form divine, so the tall building of the United States is the whole body. It has its skeleton of steel; its arteries through which course heat; its soil pipes for the elimination of its wastes; its veins which supply its water; its tingling electric nerves of sensation and communication, such as its cables for its telephones; its circulatory system; its ventilating plant or lungs for air; its batteries of elevators which make possible the stream of pulsing life. It has in its outer walls of masonry the muscles and last of all,

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its clothes, on which are its details of decoration and adornment.

Every outline of the tall buildings of the states, centers of co-operative activity, is usually controlled absolutely by the purposes for which it is intended. Now that in some two hundred and sixty-one American cities there are zoning laws which regulate the height of the skyscraper, it is acquiring even greater beauties of line and form. The distinguished architect of the London County Council, G. Topham Forrest, whose report on the architecture of urban America has recently been published, says that the terraced or "set-back" formation which now limits altitude, has resulted in a signal improvement in the form of American big buildings. He was kind, for some of those created after the first rush have fittingly been called packing cases with windows. The ingenuity and imagination required to adapt the skyscraper to the new regulations have made for new beauties and for yet more novel nuances of charm. The tall American building, therefore, quite aside from its garments and draperies of stone or terra cotta, or what you will, has a distinctive artistic merit due to its very adaptability to the purpose intended, which obviously is the greatest step toward a distinctive style so far made in the United States of America.

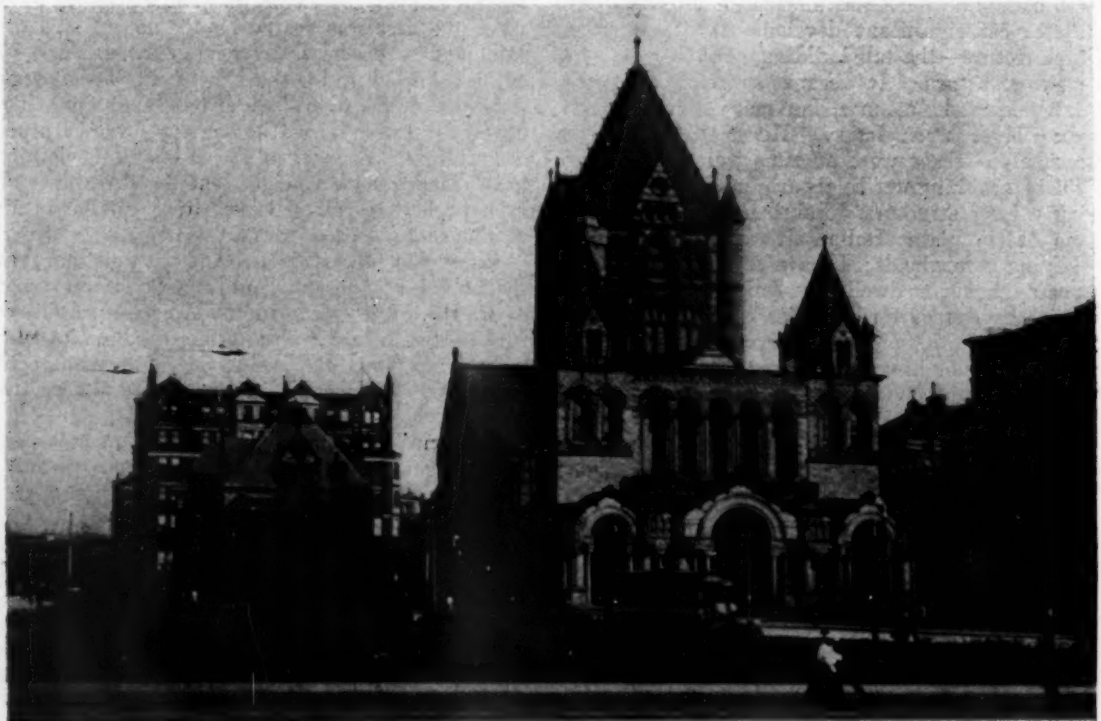
There is scarcely any detail, for instance, on

that splendid fabric, the Shelton Hotel, and yet there is an indwelling and ineffable grace about it which is due to its being planned as a mass, rather than in obedience to the mincing and meticulous demands of a period. It may be said, perhaps, to have something of a North Italian influence, but in every respect I shall call it American of the truest type. Of such structures as these it may well be said that they were conceived in truth; and then designed in beauty.

What, then, shall be the treatment of our American architecture, so bold and so original in its meeting the requirement of a complex civilization? The Woolworth Building, the creation of Cass Gilbert, has a Gothic panoply, and it is a Cathedral of Commerce in name and guise. It is thoroughly American in its utilization of space, its convenience, in its engineering, and certainly it is one of the many monuments to American achievement. It is well ornamented, even lavishly, but still it is American.

The Municipal Building, looking across City Hall Park at the Woolworth, is a combination of Renaissance from Italy and Sir Christopher Wren. An American composition indeed, and possessing great beauty, its detail is all drawn from European motifs.

The Bush Building is another phase of Gothic adapted to American composition and the Mag-



TRINITY CHURCH, BOSTON, MASS.

H. H. RICHARDSON, ARCHITECT

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nolia Building of Dallas is purely American, though its details first saw the light on the shores of the Mediterranean. Many other buildings of American form could be cited but the point in mind is that the steps toward an American style have been along the lines of composition and not through the medium of the trimmings and detail generally.

Before the passage of the regulations restricting height, some most heinous offenses against good taste and the laws of proportion were committed in the name of this nascent American architecture. It was believed that in some way or other the fronts of these new types of buildings should be ornamented. Why this belief nobody professes really to know, but the Grand Architect of the Universe might attribute it to human inertia. The skyscrapers no longer needed marble columns or the support of them. The wonderful maze of pillars in a Gothic cathedral were needed in order to keep the heavy roof from spreading the walls, and the flying buttresses guarded against similar disaster. Even the classic pilasters were not merely ornaments in the old orders of architecture, but they were braces as well. In both these beautiful Old World styles of architecture decoration grew out of the employment of stone as a necessary support. When that need had disappeared and masonry became a mere shell, the architects found it hard to adapt themselves to the new conditions. Just as for many years coaches on the steam railroads had whip sockets, although the iron horse needed no lash—so the ornamentations of the horizontal architecture of Europe are still being applied to our American architecture.

Thus perched high on some cloud-piercing office building, we even now see Grecian temples; and so far above our heads that they can scarcely be made out with the naked eye, appear florid scrolled decorations of the Italian Renaissance. Garlands and pot bellied cupids and sad marble ladies holding up cornices are thrust upon walls where they serve no purpose and can scarcely be seen.

It is desirable, however, that the skyscraper of today should have some attractive outer garments and since this is so, why not have them native American? It is not generally recognized—more is the pity—that there existed in this hemisphere an important architecture long before the coming of Columbus. Along the western coasts were aborigines of a more advanced culture who had vast apartment houses or cliff dwellings. The earliest natives of Mexico lived in houses of tuffa or adobe or stone—which had pointed arched doors and not too many windows—the architecture of which in many ways resembled Gothic. In Mexico City were ornate temples and altars and further south in Central America and along the western base of the Andes were impressive

examples of building. The glory of this American architecture, however, was the Mayan, important examples of which were found by the Spanish Conquistadores and are being daily revealed to us through exploration and research.

Whatever may have been the origin of the Mayas, they of all peoples on the American continents had reached the highest civilization and made the most progress in the arts and sciences. Originating their culture in Central America, they had migrated from Guatemala toward the north, and generally spread into Yucatan, where they were overwhelmed in the course of a great development of their civilization either by plague or warlike enemies.

What better evidence of the architectural skill of the Mayans can be found than the pyramids and temples and monuments they left behind them? They were the just masters of vertical architecture, for they loved to meet and worship on great heights of their own creation. Compare these Mayan pyramids as photographed by Maudslayi, the English explorer, and in models at the Smithsonian Institution, with the present day, set-back American skyscraper. The resemblance is a startling one. These pyramids were terraced three or four times or more, and their summits were reached by a long flight of steps. The American skyscraper of today has elevators and its shell construction permits it to have plenty of room inside. All their ornamentation was in such proportion, that they might well be used as motifs for the larger structures now being erected in our large American cities. In fact, a comparison of a restoration of the Tikal pyramid built by Mayan hands in Guatemala with a combination loft and office building thirty stories in height shows that America is doing by law what originally man in Mexico did by desire.

America is at the cross roads in her architectural development. She has not progressed as regards her domestic work, and the great contribution for better or worse and upon which the American architects for the last fifty years must stand is the tall building. In that new mass composition have been created works original, daring and, I feel, partly accredited as being a successful contribution to the world's artistic growth—but the speed with which these are needed due to the great interest charges and anxiety on the part of owners to start the flow of income into their own pockets, have compelled the architects to use reference books *ad nauseam*. If this is to continue with respect, the chance of a great art arising is slim, but if the natural pride in individuality of the American owner can be aroused, the American architect has demonstrated his desire to use the best there is in him, leaving to posterity a group of buildings which will justly do credit to the great period through which we are passing.

THE AMERICAN ARCHITECT



J. A. DEMPWOLF, F. A. I. A.
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EDITOR OF
J. A. DEMPWOLF
ARCHITECT
1008, PARK AVENUE, N. Y.

Dear Sir,
First
1926.

The American Architect,
243 West 30th Street,
New York City.

Gentlemen:

I notice that the "American Architect" is about to celebrate its Golden Anniversary with a special issue to be published on January 24th, 1926.

I had the pleasure of becoming a subscriber with the first issue of this magazine, dated January 1st, 1876, and I have continued my subscription to date as the enclosed photograph of a corner of my library will illustrate.

Careful reading of the text and studying of the illustrations together with the logical editorials of my since departed friend Prof. Ware, made it possible in the early days of the "American Architect" for an architect, located in the more remote districts of the country, to practice and advance the profession in a manner comparable with the more populated centers of the country.

I wish to emphasize that the American Architect has been of immeasurable value to the public and the profession.

Kindly make whatever use you desire of the photograph in your 50th anniversary edition, and should you desire any further information about this complete file of the American Architect, I will be only too glad to furnish it.

Yours very truly,

J. A. Dempwolf

ONE of the original subscribers to THE AMERICAN ARCHITECT, J. A. Dempwolf, F. A. I. A., has sent the above view taken in his library. The accompanying letter clearly sets forth the high regard in which he holds this journal.

The kindly thought which inspired this testimonial on the part of Mr. Dempwolf is much appreciated by the publishers. It is gratifying to learn from so reliable an authority that THE AMERICAN ARCHITECT has been of such "large value to the public and the profession."

PERSONAL SOURCES of PACIFIC COAST ARCHITECTURAL DEVELOPMENT

BY MYRON HUNT, F. A. I. A.

THE editor's idea of this contribution is that it should "deal appreciatively with the work of the men who are responsible for the upbuilding of the Pacific Coast." The order is too large. It will, however, be a pleasure to give some of my personal contacts during the past twenty years and my appreciations of the men who seem to me to have influenced the thought of the architectural profession on the Coast as the result of their personal touch. In many cases, the volume of their produce has been large, and in others, comparatively small, but to me they represent a group who have helped to open up the eyes of their fellow architects to architectural possibilities under the climatic conditions of the Coast, or who have at some time more or less started a school which has had a vogue, and either lasted in influence or passed.

Before coming to California in 1903, I had read Bertram Goodhue's article and had studied his sketches for the now well known Gillespie Villa at Santa Barbara. He and Mr. Gillespie had taken a trip around the world together after the property had been purchased. Later, I met them both in California. The contact of their two minds and the really distinguished results obtained by Mr. Goodhue, in part through his client's influence, is to me one of the most interesting examples of what we all appreciate, namely, that we cannot produce a good thing for a client whose basic philosophy of life is askew, and that we can hardly fail to do our best, and many of us do something quite out of ourselves, under reverse circumstances.

Except for Goodhue's mythical Villa Fosca, it seems to me he never produced anything that was at all in the character of the Gillespie Villa. It was quite out of his general vein and quite in the vein of his client. Nevertheless, the work is essentially Goodhue's. One of the pleasant features of the result is that we have in Santa Barbara an estate of twenty-five acres, developed by two such men, the owner of which makes of it as much an open park as are the estates of the good and great abroad. Of the pilgrims to this place, twenty years ago and since, architects and laymen, many for the first time saw—shall I call it a Mediterranean or Latin or Greek or just a Romantic production—in an appropriate American setting? You feel transported to a land which is perhaps only a land of your imagination. It is what one dreams of as that setting which the older buildings of the older world must have had, before their Mediterranean Coastal hills were denuded of trees.

This Villa then perhaps first showed Californians that there is something else equally appropriate in the spirit of southern Europe, as are the Spanish originals and the American developments of the building of the Mission fathers, something else that might look at home in California. More than anyone else, it seems to me, Goodhue is to be thanked for this. Since then, he had done many things to expand this suggestion, notably his work at the San Diego Fair, and a number of minor buildings up and down the state. While these others may breathe the mood of the year when he designed them, nevertheless, all carry this same message of the spirit of southern Europe, and even of northern Africa and of Asia Minor, as adaptable to the sunshine and the backgrounds found in California.

There was not a large volume of good architecture in California twenty years ago, not as we measure it today. But there were a number of buildings, particularly churches, in Southern California and in the neighborhood of San Francisco, built by the Coxhead Brothers, which stand comparison with the best things of today.

At about the same time, Bernard Maybeck built his shingle and timber Woman's Building and the Faculty Club at Berkeley. Later, Louis Mullgardt not only developed a new "Greene and Greene" silhouette of his own for the San Francisco Hillside Company, but went much farther with his distinctly individual method in his charming and remarkable buildings and courtyard at the San Francisco Fair.

Charles Whittlesey came to the Coast, perhaps twenty years ago, bringing from Chicago a freshness of point of view which it is interesting today to study. Such buildings as some of the stations along the Santa Fe, which he built at about that time, represent what was a new touch for him, quite different from his larger work which was more related to the influences of Louis Sullivan. These stations and some of his minor work still warrant a careful study. Many buildings by other men which followed show their influence.

It was about 1905 when Elmer Grey made his first appearance on the Coast, where he at once took a leadership, first by reason of his remarkable ability to express himself with pen and brush, and as he began to produce, not less to express himself in actual materials.

In the San Diego district, Louis J. Gill, and, later in that same district and in the Ojai, Richard S. Requa, have produced from time to time in the past decades buildings with simple masses, which under less skilled hands have resulted in some

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of the so-called Aztec or Pueblo efforts of their imitators. Their work reminds me of Richardson's scholarly work of the eighties in that few seem to be able to use their technique and produce anything equally worth while.

The brothers, Charles and Henry Greene, again about twenty years ago, originated a style which for an entire decade was identified with and known as "The California Bungalow." When Charles Greene came from Boston Tech to California, his first half dozen buildings were perfectly good, but not of his later originality. Within five years he was making low-roofed, timbered buildings, principally dwellings, having a touch of Japan, even a touch of Thibet, in their make-up, with something always running through them all that made one think of a Swiss chalet. There was something basic about his method of attack, and something logical in his use of material, with the result that carpenters and builders, not to mention architects, found it possible to emulate him and to do so with remarkable success. This was in the days of cheap, heavy timber and split Redwood shingles, 36" long. It would no longer, on the present market, often be a feasible method for inexpensive building, even though the "Spanish" and the "English" and the "Norman" and all the other imitations and adaptations had not followed one after the other to displace this previous wave, in the crest of which the Greene Brothers led.

Through all the changes from one vogue to another, the Spanish-Latin-Mediterranean-Romantic element was in constant use, and in growing use. The real estate speculators jumped from one fad to another, but the serious designers largely concentrated on that style which some of us think some day may even develop until it is properly called "Californian," a type which, following the suggestions of Goodhue's lead and the lead of the Spanish-Mexican Mission fathers and colonists, actually fits the climate. We had another inspiration when Guy Lowell built his house at Santa Barbara.

Perhaps the leader of the young men, so many of whom have produced notable results along this line which most interests us, is Reginald Johnson, whose gold medal Jefferson House in Santa Barbara a few years ago was recognized by the Institute as the best residence of the season.

In Santa Barbara, three men, two of them originally amateurs, have signally influenced the whole community, and through that community, more or less rejuvenated a whole state. The late James Osborne Craig, in the few years which he spent there, left only a few finished buildings, but, fortunately, he left a series of drawings for his Paseo Group in the hands of a client, Bernard Hoffman, so appreciative that the posthumous buildings of this brilliant young architect are the mecca of everyone who visits Santa Barbara, tourist and architect alike. Before Craig's work was

started, Francis Underhill, an amateur not pretending to be an architect, started to build because he, like Charles Platt, worked from gardening into architecture, produced a dozen or more free, thoroughly Californian houses, some of them scholarly and some of them less so, all of them having a distinct something which influenced his contemporaries. He was followed by another amateur, George Washington Smith, whose touch, which could thinkably have been amateurish, is in reality so scholarly and convincing that he has been made a full-fledged architect by the State Board and has been further recognized by membership in the Institute, because to be without him in our membership would be unthinkable and too great a loss.

In San Francisco, Bruce Porter, as an artist interested not alone in buildings and influencing the character of buildings about the Bay for years, has even more stamped himself upon the architecture of his time through his architectural decorations and his knowledge and sympathy and helpfulness in connection with related work like garden sculpture and planting.

The work of six architects in developing Coast scholastic buildings must also be recognized and mentioned. Ellis F. Lawrence and Carl F. Gould in the North; John J. Donovan and Julia Morgan in the San Francisco District; and the Allison Brothers in the South, have solved problems and set standards and raised the character of even the minor school buildings to an extent that makes, particularly of the grade schools and grammar schools of the Coast, something which we Californians are inclined to take for granted. Not until we get into the country districts in some of the older states, as I recently did, do we realize that they have developed such standards, that even a grade school in a remote California County is almost uniformly well above the average.

Two men in recent years stand out as having stamped their influence upon the work of the southern part of the Coast. They are William L. Woollett and Stiles Oliver Clements. Each is a man of unusual imagination. Each uses reminiscences of Spain—sometimes those of Imperial Rome—in her more luxurious moments. Each seems most at home when he is pushing his fingers through a modeller's clay. Each has imagination and that feeling for plasticity and what might be called "decoration" in architecture, which in an earlier period and in a different style and with entirely different scholarship, has always seemed to me the architectural background of Stanford White.

In the meantime, in Southern California, such men as Robert Farquhar; in Central California, such men as Louis Hobart, Walter Bliss, William Faville, John Bakewell and Arthur Brown, have been producing those distinctly scholarly buildings, which sometimes call attention more to their

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scholarship than to the fact that they are Californian. Many of their buildings can easily be accused of being Californian, yet it is the New York and the Paris training and scholarship which an architect first feels. Afterward, he enjoys the adaptation of this training to local conditions.

Further north, men like Kirkland Cutter, Ellis Lawrence, and Carl Gould, have similarly been showing the results of their scholarly training and have been making architectural history in a Coast climate, less sunny and more like normal Atlantic Coast conditions, and full of big trees.

It is not possible to think of architecture in California during the recent two decades without thinking of John Galen Howard, not only by reason of the work he has produced, but if possible, even more by reason of the young men whom he has influenced, as the responsible head of the architectural school in the University of California. His quiet dignity and uniform courtesy, added to his professional touch, have influenced a whole host of architectural students.

There is one San Francisco Bay man whom I have not yet mentioned, and who may go down into history as more of a real genius than any one else the Coast has produced. This is Willis Polk, whose death is an irreparable loss. He was a native Californian. Two years in Chicago seemed to leave only a mellowing influence upon his western genius.

Willis Polk was a born artist, a natural constructor, the son of a constructor, a scholar without any canned scholarship, erudite without schooling, and as full of the vagaries of genius as any man whom any Boswell ever knew. He used a pen or a brush, but particularly a pen, with an ease and with a stroke that is not imitable. He drew a dome or a colonnade, free hand on a piece of white paper, building the whole thing up out of his imagination with a stroke so sure that it might have been traced over a photograph. I remember a long series of sketches of one building, made on a long strip perhaps four to six inches high and certainly three or four feet long, a dozen or fifteen sketches, each in perspective, each an inimitable pen and ink. The final result is today a reality in the beautiful monument at the headgate of the Spring Valley Water System, the valley which furnishes the water for the City of San Francisco.

The proportions of this building are hard to understand and hard to describe. I once asked Polk where he got his motive and how he got his scale for this monument standing in a great open valley, only here and there relieved by a studding of verdure. We were looking at a photograph of the monument. He pointed off in the distance to the mass of a great live oak tree. He said that after having studied the whole setting for days, he realized that the one perfectly satisfactory thing in the landscape, which was not either moun-

tain or valley, was this oak and its fellows. He measured its height and its width, and the plan of its shadow at noonday, and substantially duplicated it. Today, it vies successfully with the oak. That is something which few mere human beings could produce.

Among the younger men who are making a name, I promised myself to stop with Reginald Johnson and a reference to his gold medal house, but upon reading through the proof, it seems impossible to overcome my inclination at least to mention such names as Dave Allison, Harwood Hewitt, Carleton Winslow, Fitch Haskell, Harold Chambers, Donald Parkinson, David Witmer, John Frederick Murphy, Sumner Spaulding, Ronald Coate, Garrett Van Pelt, Gordon Kaufmann, Pierpont and Walter Davis, Winston Risley, Wallace Neff, Donald Wilkinson, Templeton Johnson, Winsor Soule and Clarence Tantau. To this list ought equally to be added the name of Charles H. Cheney, who though practicing as a city planner, has in his capacity as a trained architect, done much in influencing city Governments, looking toward better building laws, better zoning laws, and better parks, not to mention the general recognition of the value of good architecture.

The business buildings of the Coast are not unlike those of the East. John Parkinson, who has so many to his credit and who is still building, has been producing since the days of Paige Brown and his Crocker Building in San Francisco.

George Kelham, in San Francisco, and Claud Beelman, in Los Angeles, are outstanding in a certain feeling of architectural personality with which they clothe their steel.

It would not be fair to close, speaking only of the men who impress me as having been preeminently influential in what might be called the problems of design. There is something else for which architects stand, and which in each decade has brought out strong characters who concentrated their efforts in their contact with their fellows upon what we think of as the professional attitude of the architect, and upon the dissemination of the Institute's ideals among the younger men, as did Daniel Burnham thirty years ago. George McDougall, as state architect, has most fittingly represented the ideals of the profession. Years ago, in San Francisco, there was the elder Curlett, and, today, Sylvain Schnaittacher and John Galen Howard; farther north, W. R. B. Wilcox and Charles Alden; and in years past, in the South, Octavius Morgan and A. F. Rosenheim, and, later, A. M. Edelman and John C. Austin.

The name of Edwin Bergstrom comes uppermost in this group in the minds of many of us along the Coast. He has not confined himself to bringing back inspirations from the meetings of the Institute Board and from Institute conventions. He has been indefatigable as a member of

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his Chapter and as a citizen in building up a respect for the profession of architecture among laymen, and a respect for the obligations of our profession among its practicing members.

Natural conditions here—the breadth of mountain and foothills, a blue-green sky, usually sunny, the strong massing of trees in the countryside,

tied to an interesting architectural tradition, are probably more responsible for the architectural feeling which is developing than any personality or group of personalities. There is surely growing an ability on the part of the men who are practicing here to absorb these conditions and express them in their work.



WATER TEMPLE FOR SPRING VALLEY WATER COMPANY, SUNOL, CALIF.

WILLIS POLK & COMPANY, ARCHITECTS

Reprinted from the issue of August 7, 1912

GOOD ARCHITECTURE *a* COMMERCIAL ASSET

BY CLARENCE M. WOOLLEY

Chairman of the Board, American Radiator Company

THE theme suggested for this contribution is fraught with great significance. It induces a reflective mood and stimulates the imagination. I am moved to change the sequence of our title by reversing its order.

When one asks the question, "Has good architecture produced great commerce?" one must revert to historical curves for an answer. Great commerce, it would appear, does not follow, it precedes great architecture. Subsidence of the former is associated with decadence in the latter.

As one rambles through Italy, consciously bent upon the inspiring and joy-giving search for noble and beautiful architecture, one is constantly struck by the fact that such beauty can be found in well-nigh every town and city and in many tiny villages throughout that wonderful country. One need not confine his search to Rome, Florence, Milan or Venice. In motoring from Bologna to Rimini, a half day's journey, the numerous small towns visited, which are but a cross section of the country as a whole, possess such architectural riches that several days are inescapably occupied in reaching the objective destination. Forli, Faenze, Cesena, and other towns, each in turn, contain jewels which hold one in delightful contemplation and exalted reverie. The spirit of the architect seems to vibrate in line, form, balance, serenity and majesty. The spirit of "the client," too, becomes articulate. These two elements, whether we look into pictorial or architectural art, seem to be one in sympathy and understanding. The artist, it might be found, has done his best only when conscious that his client appreciates and understands. Herein lies a pregnant subject for elaboration. An understanding and cultured clientele will inevitably aid, if it is not essentially responsible for, the encouragement and growth of the artist. Within reasonably conceivable limits great art may be said to be the expression of great cultural sympathy widely distributed throughout a people.

The architecture referred to in Italy developed through the fifteenth and sixteenth centuries, when commercial activity reached its zenith. Commerce, then, prepared a stage upon which was enacted one of the greatest dramas in the realm of creative art.

The Medici, in the heyday of their commercial prosperity through their cultured and opulent patronage of artists, were veritable incubators of great art. Their contemporaries, too, in great but lesser degree, gave impetus to that wonderful epoch of architectural, sculptural and pictorial

outpouring. Lorenzo dei Medici, the Magnificent, with headquarters in Florence, then employed in his commercial and banking enterprises more than thirty-five thousand clerks, messengers, salesmen, negotiators and departmental heads. Here indeed was a man of big business, perhaps the first of his kind. His patronage of the arts ran parallel with the development of his commercial and financial achievements. He was the Morgan, the Rockefeller, the Field, the Gary, the Schwab, the Ford, *et al*, of his day. Our own great captains of industry and finance, each in his own way, have manifested sympathy, understanding and constructive interest in architecture or in some other department of the fine arts. Each has embodied in worthy examples his interest in, and appreciation of, good architecture. Such practical co-operation has been helpful and contagious.

Let us briefly examine the historical development of commerce and industry in America, that we may detect, if possible, movements corollary to those which produced big business and great architecture in Italy. Here in this little obscure town in eastern Maine—population eight hundred—where these lines are written, can be found the most charming examples of domestic architecture, the relics and vouchers of America's first success in commerce when the Stars and Stripes were found on every sea. The then masters of our ships were also merchants, financiers, and, in a relative sense, great builders. Throughout the entire New England section can be found innumerable examples inspired by the same Greek feeling which animated the architects of Italy during the period in which the larger part of its best creative effort was recorded.

With the advent of steel ships our merchant marine languished and finally disappeared. Then, for reasons respecting which it would be difficult to reach a common agreement, America came into a dark age of architecture, just as Italy did after its Renaissance.

America passed through civil war and its terrible aftermath. Commerce and industry languished with only intermittent and comparatively short-lived revivals. By 1893, however, the country, while not entirely extricated from its backward development—backward when compared with its rich potential—and notwithstanding the panic of that year, was given a stirring exhibition of its creative genius in architecture at the World's Fair in Chicago. There, I venture to assert, were displayed the best examples of architectural excellence the world had seen since the Italian Renais-

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sance. I am persuaded that it was the beginning of our own American Renaissance. Meanwhile, by common consent, America has progressed in architecture as no other country. Those who studiously observe current architecture in Europe each year are gladdened on their return by the ever-increasing superiority of American progress in that field. This improvement continues at a rate seemingly proportioned to the augmentation of its financial, commercial and industrial prosperity. One may, without being charged with boasting or convicted of national vanity, declare that with the continuance of such development America will in due course rise to levels of excellence which will make its architects the worthy successors of the best of all the ages in creative effort. The skyscraper with its wealth of aspiring significance has already become the wonder and marvel of connoisseurs, regardless of nationality. Europeans are coming in greater numbers continuously to observe and study these and other examples of American architects who, in my opinion, have already reached the world's peak of excellent performance.

I think it not fantastic to assert that the so-called early architecture throughout New England, the study of which has played such an important part in elevating architectural taste, was due in large measure to material prosperity maintained and supported by the banking system conceived and advocated by Alexander Hamilton. With the abolishment of the Bank of the United States in 1841 a diminutive but glorious period of national development lapsed to a much lower rate of progress. It was supplanted by a banking system designed, it would seem, to prevent the maintenance of national prosperity. There was no cohesive attraction of the banks of the country; no mobilization of reserves; no solidarity of combined power for serving in the public interest. At the very moment when general business activity reached its logical high level of prosperity, that banking and currency system broke down.

Panics were of regular recurrence, sapping the constructive vitality of the people. Hard times

spread over the land; progress was interrupted. For longer or shorter periods during and after each panic banks and business struggled selfishly for individual financial salvation. Everybody suffered simply because the country had become consistently prosperous.

The adoption of the Federal Reserve Banking System in 1913 gave America for the first time since the abolition of the Bank of the United States an effective instrument for maintaining stability of commerce and financial conditions. It was given birth at the psychological moment of greatest need. Had the United States been called upon to meet the extraordinary situation precipitated by the Great War without the Federal Reserve Banking System it is no exaggeration to declare that our country would have been stricken by terrific financial disaster from which, even now, it would be struggling to recover. If I mistake not, due to its beneficent and sound provisions, this system is directly responsible for the existence of the present era of unprecedented development. With the preservation of the Federal Reserve Banking System as an essential agency for maintaining consistent national prosperity, America will, with only slight variation in the rate and measure of its prosperity, become the wonder of all the ages for cultural, artistic and material progress. No precedent can be found for the present standards of opportunity afforded all of its people, not only in respect to living conditions, but also in educational privileges. Architecture will flourish proportionately with the expansion of commerce and material development.

A great structure, if it is good architecture, attracts the best paying tenants. Good architecture, therefore, is an economic asset, a sound investment. A building representing bad architecture is a sad spectacle and, in the long run, a poor investment. Economic law, as the country continues to develop in wealth and culture, will undoubtedly correct the tendency to proceed with important building enterprises without the directing influence of a competent architect.



FROM THE FRIEZE AT THE HOSPITAL AT PISTOJA, BY GIOVANNI DELLA ROBBIA

Reprinted from the issue of April 18, 1885

CITY and REGIONAL PLANNING SINCE 1876

BY FLAVEL SHURTLEFF, *Secretary of National Conference on City Planning*

AT the exhibit of city and regional planning held during the International Planning Conference last April in New York City, there was shown the Plan of Cincinnati. For the first time in the United States a city had by vote of council adopted as official a plan prepared over a period of three years by its plan commission under technical direction. The plan showed existing streets and indicated desirable widenings and extensions; existing parks, parkways and playgrounds and desirable additions; existing school-house locations, and where, in general, new sites should be acquired; a complete zoning system, dividing the city into areas of residence, of business, of industry. This plan is the guide for the future development of Cincinnati. If changes are proposed they must be submitted first of all to the city plan commission and if the city plan commission does not approve the change, it then goes to the council which can adopt it only after a two-thirds vote. This action of Cincinnati marks the greatest advance in the recent city planning movement.

An architect of the best training and a city engineer of long experience were looking at the Cincinnati plan together. The architect was amazed and frankly said so. The engineer said, "I have been doing that sort of thing for the last thirty years whenever the city council would let me."

Not that the engineering profession is unique in its grasp of the planning idea, or that all city engineers are planners. It just happened that this architect had been busy with other things and had not kept up with the progress in city planning. On the other hand, it was the city engineer's job to live with the problem of city growth, to struggle continually with too many plans because of too many municipal authorities, and to spend himself in making costly adjustments. He, too, may not have known the advance in the technique of city planning, but the theory of the Cincinnati plan was to him plain horse sense.

The engineer had been for thirty years gauging the future of his city, and planning his work to fit in with that future. Other engineers before him have doubtless done the same. Politics or perverseness of one kind or another has usually prevented the working out of an orderly program, but the point is that there has always been city planning, and almost every period in our country's history has its conspicuous examples of planned cities. We, therefore, cannot give city planning a starting date like the telephone or radio. Unfortunately, there are, however, long periods during which planning activity is either at a low ebb or is little talked or written about.

Though the words "city planning" are hard to find in the literature of municipal activities during the last quarter of the nineteenth century, yet plans were being made and were being carried out. The Germans were planning with thoroughness, oftentimes deadly enough. The French were making those liberal uses of space in the capitol, and Haussmann had already cut many of the great avenues which are the wonder of the American travelers. Our architects, trained in French schools, brought these lessons home and as a people we were beginning to get much more neighborly with the European continent. The country had hardly recovered from the Civil War when industrial prosperity and the lure of great opportunities set the tide of population toward the big cities of the Eastern coast. From 1880 to 1900 New York City added 1,500,000, Philadelphia 450,000. Room for these new cities had to be found in the unbuilt-on lands within the city boundaries, or beyond them. There were street planning bureaus long before 1876 in both New York and Philadelphia, but the rush to the city was perhaps the cause of the several street planning boards that came into existence or at least into activity in several cities during the eighties. Their work was hardly more than the cutting of the land into rectangular blocks. It was an engineer's job, not notable for design or variety. But it was an advance in city planning since it looked ahead—and a long way ahead. Even New York City has not yet grown up to the mapped streets that have been projected on the farmlands in the outer boroughs. In 1888 Baltimore added seventeen square miles to its area, and the Topographical Survey Commission, soon after appointed, made a basic street plan for the new addition, and by threat and tact got the subdividers of the land almost universally to follow the plan.

The making of parks is also a consequence of the crowded city. The land speculator uses all his land and walks away with the harvest; the community, in self-defense, taxes itself to provide breathing spaces. The biggest city again took the lead in the planning of park-lands. Long before 1876 Central Park had been acquired by the city and laid out by Frederick Law Olmsted. The example was followed by many cities from the eighties on. In this park planning, the engineer gave way to the landscape designer. Mr. Olmsted and later Mr. Kessler combined many of the principles now used in city planning in their designs for park systems in many cities.

It remained for the architect to design a complete new city and set it down beside Lake Michigan with its streets, its waterways, its open

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spaces, its building groups, all essential parts of one unit. The Chicago World's Fair of 1893 was the opportunity which Daniel Burnham used to the full.

All these influences had their part in starting and shaping the city planning movement of the next decade, and the greatest of them was the White City of the World's Fair.

It is, therefore, natural that the plans of the next period aimed to make a "City Attractive." Streets got comparatively slight attention in the early reports of Charles Mulford Robinson and John Nolen. There is little study of the city's function, or its trends of development, but its people are beckoned out to the green pastures and told to keep them green before it is too late. Unsightliness of any kind is taboo—poles on the street, litter in the alleys. Towns are urged to improve their gateways by sea or by land. Town buildings are to be set in a group on a worthy site. The civic center takes its place in the city plan and the "city beautiful" gets a place in popular writing from which the planners have not yet succeeded in shaking it.

The aesthetic appeal of the early reports failed to take the public by storm; there was no loud demand for a "city beautiful," but the conception of a civic center has never lost its hold. San Francisco rose from the earthquake and fire on its old building lines and few suggestions of Burnham's plan for a finer city were carried out, but a new city hall and an auditorium were grouped in a civic center. Robinson's dream for Denver—a mall crowned by a state capitol building, and flanked by monumental buildings, was the inspiration for the finished work—no matter how changed in detail. Cleveland planned a mall, its vista closed at one end with the Federal Building and at the other end with the railway station. The station site has been moved to the public square, but the civic center is otherwise as planned, and more monumental buildings are located there than in any other civic center in the country. Smaller cities like Springfield, Mass., and even little towns like Weston, Mass., have been stimulated to do the fine thing with their municipal buildings and grounds.

The Chicago city plan of 1909 was by far the most complete of the earlier reports and the most far-reaching in its results. It created, even more than any other plan, a city beautiful, with avenues, vistas, stately buildings, lagoons, and parks. Guerin's drawings are remembered when the text of the plan is forgotten; but Daniel Burnham knew that Chicago's supremacy was in its commerce and industry and these life bases were not neglected in working out the plan. Its novel feature was a legal chapter which considered the ways and means, legal and financial, of carrying out the plan.

The Commercial Club produced the plan under

Burnham's guidance, and then did not leave it on Chicago's doorstep. Such a conception, such radical changes, such an outlay of the city's money, could not be grasped at a sitting. A plan commission was created to be the interpreter of the plan to the public, and with the publication of the report Chicago's planning history started. How well the commission and its executives did their work is well known. Almost every agency making public opinion was enlisted in the campaign. People on the street got to know the Chicago plan and to know it so well that when bond issues had to be passed by popular vote they received great majorities. Chicago has raised over sixty millions by bond issue alone, for carrying out the details of the plan.

The creation of a planning commission is a clear recognition of the continuity of the planning program. The plan itself is but a guide and must be modified as the city develops. The elements of the plan must be carried out in the order of their importance, and this order too may change. The various public authorities that have jurisdiction over physical changes must be induced to work together. The public must be won to generous support.

This new agency must be made welcome in the municipal family, so it is given no duties which conflict with those of existing agencies, and it is not given money enough to do anything very radical. Quite often in the ordinance that creates a plan commission is a section which says, in effect: "Secure a plan," and another: "When you have the plan see to it that future development is in accordance with it." It is hard to secure a plan for \$500, and many yearly appropriations for plan commissions have been less than this. However, as the commission deserved public confidence the council was willing or was forced to increase the appropriation. The plans of the period from 1900 to 1910 were made for improvement agencies, chambers of commerce and other non-official groups. From 1910 on, the plans were more and more made for the official planning commissions.

By 1910 a new and more vital reason for planning was given expression. The first National Planning Conference was called in Washington by the New York Committee on Congestion of Population, a group of social economists and housing reformers who were seeking remedies for the wretched living conditions in the crowded city slums. Building regulations which established a minimum of sunlight and air space for each room and banned dark halls and common passage ways were not enough. The ingenuity of builders produced new "model" law-abiding tenements which were little better than the old. Something must be done to prevent lot crowding, as well as room crowding; city planning might find a way.

Hereafter the human note is never absent from

GOLDEN ANNIVERSARY NUMBER

the planning program. The city exists for man and must be made fit for him to live in. Parks are for leisure time only. Man must be housed before he plays. Sordid and unsanitary conditions, whether in tenements or in shacks, should be cleaned up if possible, or at least they must not be allowed to spread. The city with the worst conditions thought the hardest and brought out in 1915 a radical measure. For a year a devoted group carried their proposals to the people of New York, won the real estate leaders, and in 1916, for the first time in the history of the United States, a city-wide zoning law was passed, which regulated the use of land, the height and bulk of buildings. Only the greatest necessity could justify such a degree of interference with the right of private property and in arriving at the goal many compromises were made. The New York law has always been criticized for not going far enough. Much too great density of living is still possible. The height of buildings was hereafter to have a relation to the width of the street, but the skyscrapers were too strongly entrenched and buildings may still be solidly built too high in New York. Nor could the new law do much for residence districts, which were already blighted. Tenements, too, were essential both for social and economic reasons, and at the most an attempt was made to limit the areas in which they could be placed. Even this could not be done by directly excluding them from single family residence districts. The lawyers said the courts would find this discriminating and therefore unconstitutional. By creating districts in which only a certain percentage of land could be built upon, and in which front, back and side yards must be provided, the building of costly apartment houses was made unprofitable. "E" districts and later the still more restricted "F" districts have worked, and fine old residence sections which would have been overrun with tenements have been preserved. Equally effective were the provisions which excluded business and industry from residence districts. The example of New York was quickly followed. Zoning legislation was passed in many states and today 320 cities and towns are zoned, and 24,000,000 people have some measure of protection for their homes.

Property owners are not accepting these new regulations without a struggle. They feel they are being deprived of valuable property rights without payment. This is true, for zoning is a "police power" act just like health regulations and traffic laws. The welfare of the community is at stake, and for its protection a regulation which causes some individual hardship is justifiable.

That is now the issue in the State courts. Zoning is getting tested for constitutionality and for the most part is weathering the test. State courts of New York, Massachusetts, Kansas,

Wisconsin, Minnesota and California, have been so sweeping in their approval of the principle that other hesitating courts and even those which have been adverse will find a way to fall into line. The Supreme Court of Minnesota said, in July, 1925: "Zoning statutes are becoming common. The police power, in its nature indefinable, and quickly responsive, in the interest of common welfare, to changing conditions, authorizes various restrictions upon the use of private property as social and economic changes come. A restriction, which years ago would have been intolerable, and would have been thought an unconstitutional restriction of the owner's use of his property is accepted now without a thought that it invades a private right. As social relations become more complex restrictions on individual rights become more common. With the crowding of the population in cities there is an active insistence upon the establishment of residential districts from which annoying occupations and buildings undesirable to the community are excluded."

Some cities which have been careless or hasty or radical in their attempts to remedy bad situations, will have their action nullified by the courts. This only means that zoning must be scientifically done and must always find its sanction in community protection.

The best zoning will not prevent the crowding of houses and people on the land. It has been estimated that the New York zoning law will permit a density of 2000 to an acre. The "E" and "F" residence districts will enjoy an openness and decent density, but the other districts may be worse than ever. The choice suburban towns now free from apartment houses will feel the pressure of the rising tide of population and apartments will come in as economic necessities. If they are limited in their locations no great damage will be done, but if they are allowed to spread all over the town and take the best corner sites in residence areas, the quality of the town as a residence place will be cheapened. A speculative apartment builder can afford to pay the highest price for land and even the best citizens feel they cannot afford to resist. Their town no longer means so much to them. They take the price and move on, or they become apartment dwellers.

In another way zoning has been not an unmixed blessing. It is good, if it calls attention to the other elements of the city plan. It is bad, when it is thought of as all there is to city planning. Many cities have rushed into zoning without considering streets or parks, and yet without a well considered street plan, a good zoning plan is hard to make. It cannot be too often said that a comprehensive city plan should have at least chapters on the street system and traffic in the street; zoning; parks, playgrounds and other open spaces; public building sites, all this fitted properly into a whole and all based on the needs of the future.

More and more the emphasis in planning will be not on the old city, not on providing more or wider traffic arteries, not on costly adjustments because of bad planning, but on preparing undeveloped areas for their best use. Less effort and less money are required for this more valuable work of preventing the spread of bad development.

The real city builder is the sub-divider of acreage property. He is dealing in a commodity that is permanent and is making it or marring it forever. He has already done his worst in practically every city in the country, and his best in very few. Never before were the opportunities in land development so great. An automobile for almost every family has brought distant land into the zone of residence. Planners must see more clearly that the sub-divider is in business and is taking the risk. He can do the fine thing and still make a business profit, but he must be shown how. He will be rightly opposed to any control by the community that is impractical or unreasonable. He has no right to saddle on the community a cheap thing that will be an everlasting burden for the community to maintain, but he cannot be expected to make gifts of land whether for parks or playgrounds which benefit the whole city in a greater degree than they benefit the section of the city which he is developing. A regulation which compels a percentage of each sub-division to be set aside for open space for the benefit of the residents of that sub-division is reasonable, if administered by an agency with the right to make exceptions in special cases; but if the reservation is for the benefit of the town as a whole it should be paid for by the town. To bring about a better understanding between the planner and the realtor is a great field of effort. At the last great Conference of the National Association of Real Estate Boards a most promising beginning was made. The Conference itself passed a resolution endorsing city planning and the sub-dividers section appointed a special committee on sub-division planning, to co-operate with a committee appointed by the American City Planning Institute.

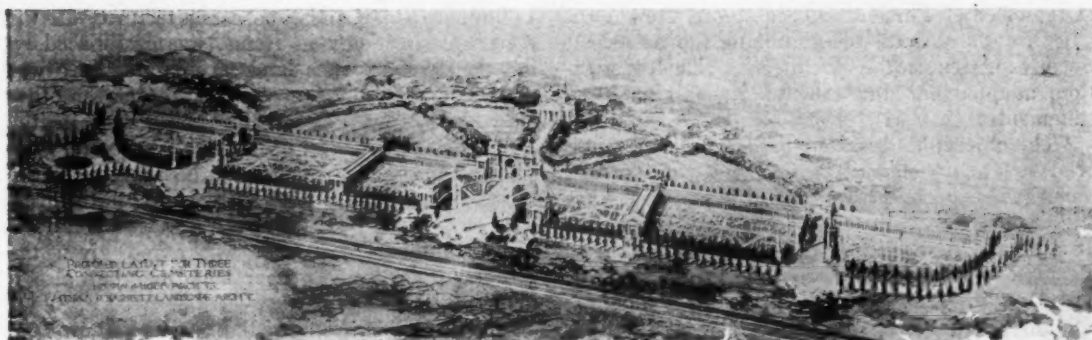
The chapter which is just now being written in the planning movement is "Regional Planning." The concentration of industry has overcrowded the great centers with people. Millions of automobiles that double in number every four years have overcrowded the streets. The day and night stream of workers has crowded the rapid transit lines. This is a big city condition—but twenty-

two millions of the country's population live in big cities. Only planning on a much bigger scale will remedy the situation. Already the planner is looking beyond the city limits to the open country and craving it for the driven city people. He can persuade city dwellers to the suburbs, at least some of them, only by making it easier to get there and providing there some of the pleasant things of the city—certainly schools, certainly entertainment. But this gives no relief to the city's center, and there is no thinning of the traffic stream that daily goes back and forth.

What a relief, all round, if we could only live and work and get some of our fun in the same town, and travel occasionally to the big city for a special celebration! It is the task of regional planning to make this possible. It must first find the industries that can thrive as well or better outside of the crowded centers. There are many that are now needlessly paying big city-prices for everything—rent, labor and raw material. It must discover the best locations for these industries in a given region, and there are many such industrial locations awaiting development. It must bring the opportunity and the industry together, and in this alone is a tremendous field for usefulness. From the successful accomplishment of these things will come towns and cities sufficient in themselves to their citizens.

What kind of person is the planner? He has been a good deal of an engineer, of a landscape architect, of an architect, for they have all made definite contributions to the development of city planning. There may be a city planning profession some day, an art as well as a science, which will require the imagination of the designer as well as the thoroughness of the engineer. As Raymond Unwin has recently said: "In city planning the mass of data becomes so great as to need the fullest exercise of the faculty of trained imagination, to lift the designer clear of it and enable him to see the town, and the life of the town, as a whole, laid out upon the particular site. * * * It is this artistic gift of creative imagination which alone can call forth from the mass of detail a true design in which the various parts will take their place in appropriate relation, one to the other, each having its proper share of emphasis and assuming its due proportion to the whole. * * * It has seemed to me that we might expect to find among architects this faculty of design which we need."





PROPOSED LAYOUT FOR THREE CONNECTING CEMETERIES, MADE IN 1876

NATHAN F. BARRETT, LANDSCAPE ARCHITECT

A HALF CENTURY of LANDSCAPE ARCHITECTURE

BY CHARLES WELLFORD LEAVITT, Fellow, American Society of Landscape Architects

IN 1906, or twenty years ago, Downing Vaux, son of the late Calvert Vaux, of Central Park fame, said, "The history of landscape architecture is more in front of us than behind us, and we must ourselves make history by our genius and work."

In the two decades that have followed there has been accomplished all of the more important effort that constitutes the real advancement of the art during the past fifty years. In the three decades that precede 1906, or dating from our Centennial year and the time that marked the entry of THE AMERICAN ARCHITECT into the field of architecture and the allied arts, all that was done of great moment, or that has survived the test of creative excellence, may be traced to the impetus of the work done at Central Park and the great Exposition, beginning with the Centennial Exposition at Philadelphia. These expositions marked the real point in our progress toward the present development of architecture and landscape architecture, of which latter Central Park and other such naturalistic parks may be said to be the starting point in this country.

A large factor in the bringing about of the present high state of American landscape design and arrangement, is to be found in the world's fairs and expositions held in this country. These fairs gave to the architect and to the landscape architect unsurpassed opportunities to create, for the education and enjoyment of vast assemblages, works of acknowledged beauty of design and execution. That these opportunities were utilized to the utmost is proved not only by the widespread enjoyment of the structures and their surroundings on the ground, but also by the subsequent greater appreciation of landscape art and architecture displayed by the people all over the country. To the architect and the landscape archi-

tect, the great expositions so far held in this country have had untold value in making it possible for them to demonstrate their ability and to educate the people to appreciation and create a demand for the best that professional men had to offer. It is a far cry from the status of the landscape architect of today back to the status he held in 1888, when the letter, quotation from which is given below, appeared in *Garden and Forest*, (Vol. I, page 87) a weekly publication then conducted by Professor C. S. Sargent:

"Much has been written of late with regard to the opening for young men of ability and taste in landscape gardening. While it is true that the need exists for men of artistic taste and skill in this profession, it is not so clear that there is sufficient encouragement for such men to enter it. The greatest need is for the education of public taste in garden matters, so that the demand for men of trained hand and a correct knowledge of beautiful forms and combinations of flower, shrub and tree may be created. So long as the public are satisfied with parks constructed by engineers, and with terraces and embankments like those of railways or fortifications, and are content to have their private grounds filled with meaningless 'serpentine' walks; so long as the denizens of our cities give annual employment to a crowd of peripatetic tree-butchers in lopping off the heads of beautiful trees, just so long will men of taste avoid a profession in which they would starve, while the ignorant pretender and the mathematical park-maker waxed fat. * * * In all our wide and wealthy land the men of true skill in landscape art who meet with encouragement in their profession, can almost be counted on the fingers of one hand. * * *

It was in January, 1899, or eleven years after the above was written, that a meeting was held

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at the office of Parsons and Pentecost, New York City, for the purpose of organizing the American Society of Landscape Architects. The constitution, adopted on March 6, 1899, contains these statements:

"The objects of this society shall be to promote good fellowship among its members and increase the efficiency of the profession.

"The membership shall consist of Fellows, Juniors and Associates.

"Fellows shall be landscape architects or landscape gardeners in good standing. A landscape architect or landscape gardener in good standing is one who practices the art of arranging land

Fellowship in Landscape Architecture, at the American Academy in Rome, was established by the Society, and thus landscape architecture was placed on precisely the same footing as the other older arts represented by Fellowship in the Academy. Also, at this time, the Secretary reported on common names for the profession, the most popular being "landscape architecture." The American Society of Landscape Architects had accomplished a great work, and given the profession not only proper standing, but also a name.

The membership list of the Society is now 165, with five Chapters: New York, Boston, Mississippi Valley, Ohio-Michigan and Pacific Coast. The activities of the organization are many and varied, ranging from purely local questions discussed in the different chapters to questions of national importance and international courtesy.

The foregoing briefly shows the chronological sequence of the development of landscape architecture in the United States, beginning at a period of fifty years ago. It will be of interest to make some inquiries as to the contributing factors to

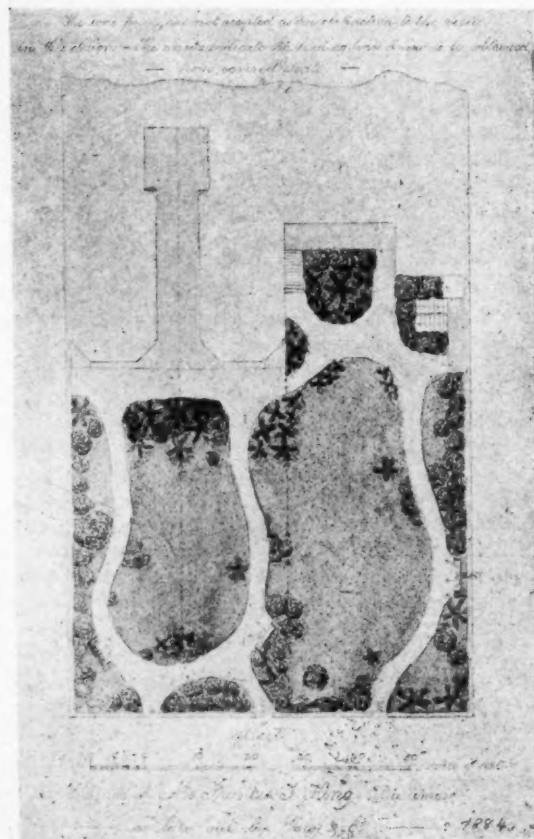


AN ITALIAN GARDEN AT WELLESLEY, MASS. REPRODUCED FROM HARPER'S MAGAZINE ABOUT 1884, ILLUSTRATING A STYLE OF LANDSCAPE GARDENING MUCH IN VOGUE AT THAT PERIOD

and landscape for use and enjoyment, whose compensation is received directly from his client, and not directly or indirectly from labor, plants or other material used in fitting land for use, or from persons supplying the same * * *"

Immediately the Society proceeded to take action and express themselves upon public matters within the domain of their profession. In 1903, at the fourth annual meeting, one of the topics of discussion was the ideal relation between architecture and landscape architecture, and, later in the same year, the offer of The American Institute of Architects to exchange publications was accepted. At the tenth annual meeting of the Society, the speech of the occasion, given by C. Howard Walker, F.A.I.A., of Boston, was entitled "The Relations of the Architect and the Landscape Architect," and at the thirteenth annual meeting, Charles A. Platt, F.A.I.A., a guest of the Society, spoke on "Collaboration between the Architect and Landscape Architect."

In 1913, the Society authorized the formation of Chapters, and in 1915, the Competition for the



SKETCH LAYOUT FOR A GARDEN AT BALTIMORE, MD., REPRODUCED FROM THE ORIGINAL DESIGN MADE IN 1884, BY VAUX & COMPANY, LANDSCAPE ARCHITECTS

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the growth and development of the art.

As the improvement of means of vertical transportation undoubtedly was the one big thing that gave impetus to architectural design in this country, so, in like manner, did the improvement of the electric and gasoline motors extend suburban areas, bring them within comparatively short distances from civic centers, and by supplying cheap and rapid means of communication, serve to educate the city dweller to the finest appreciation of suburban life.

About 1905, the electric passenger elevator came into general use, and following directly, the development of tall buildings for both commercial and residential uses. The architect finds himself and his work to be huge factors in modern civilization, developing his art out of preconceived bounds. Zoning ordinances and building restrictions are framed for the purpose of curbing and guiding this stupendous growth. The more gentle souls among us, whose artistic eyes were trained to soft and quiet scenes, shuddered at the imposing New York skyline and bewailed the poor taste of all who found pleasure and satisfaction in contemplation of the massive piles of masonry, while the more hardy souls rejoiced in the new departure and gloried in its rugged beauty.

The automobile and the trolley car have brought more nearly under human domination two of the great factors of human experience: time and space. It has made it possible for the busy man of affairs and wealth, if he so desires, to use his country house and his town house the year around. It has developed the need and the popularity of the country club with its recreations and sports, accessible after the business day in town. Where formerly only the retired magnate made his home in the country, now we find our most active men commuting from country houses easily reached by means of a few moments' automobile run to a railroad station less than an hour from town. It is not the unusual thing, but the usual.

For the men of lesser means, the suburban dwelling, either mansion, cottage or apartment, is practicable and increasingly considered best, especially if children are in the household. The

small automobile making the quick run to the railroad, and then during the day providing means of transportation and recreation for the family has completely done away with the one unendurable concomitant of country life—isolation.

The very tall buildings are pouring into our narrow city streets a stream of humanity wholly incompatible with street widths. Pedestrian congestion is as great a problem as is vehicular congestion, and the architect finds collaboration with the landscape architect on this subject not only desirable but necessary. Routing, zoning, creation of new thoroughfares and set-back restrictions are subjects as important for the preservation of the health and aesthetic ideals of the city as are the designs of the interior and exterior of buildings.

The past half century has pretty clearly demonstrated that the development of a private estate is best undertaken as a whole, rather than in the old-time fashion of first building a house and later fitting in the landscape to it by embellishing its environs with suitable plantations of evergreens, shrubs and well placed "jets-d'eau." The conference of the client, the architect and the landscape architect on the design of the general landscape plan is now held at the outset before the house

plans are drawn. The architect finds his work much more interesting and the client is a much more satisfied man because of the harmony which results thereby. Also, he is pleased that no expensive alterations are necessary to an already completed residence and outbuildings in order to obtain some landscape feature particularly to his liking. His house site is chosen in conference with both architect and landscape architect, assuring to him the best location for the full enjoyment of home and surroundings. His constant advisors are the two experts who can make of his property the most useful and the most beautiful place possible.

But even more important than the increased accessibility of landed estates and their development is the opening up of large tracts of countryside, compelled by the advent of the automobile, and the consequent quick enlargement of sleepy villages into modern suburbs. City planning,



A PORTION OF CENTRAL PARK, NEW YORK, DATING
ABOUT 1899

SAMUEL PARSONS, LANDSCAPE ARCHITECT

Reproduced through the courtesy of Mabel Parsons

THE AMERICAN ARCHITECT

regional planning, county planning and state planning—all are subjects calling for the specialized art of the landscape architect. The city plan, looking into the far future, gives the alignment of the probable growth of the city's boundaries, streets and highways, with widths of thoroughfares, location and general layout of parks, parkways and recreation fields. By assuring to the residents of the suburb a freedom from haphazard growth, such a plan makes that suburb a desirable one for a class of persons who wish to build proper buildings, satisfying to the common sense of the client and to the artistic and professional sense of the architect.

Subdivision of large tracts for use as building lots is a work in which the architect and the landscape architect collaborate with excellent results. The topography and the natural features of the land are best moulded to the most economical and aesthetic use when the landscape architect knows and consults with the architect in regard to the type of structures to be erected thereon, and fits the land with its buildings into the already created or possible future plan for the city or other community to be served.

Can anyone today question the services of the landscape architect, or the advisability of our youth entering upon this profession, rightly placed among the fine arts? The development of the home grounds—elemental, upon which must rest the inspiration, desires and determination of the past, present and coming generations to live among healthful, pleasant and beautiful surroundings, from which will grow the best moral suburban and urban developments.

Louis C. Mullgardt, in the "Reflection" which serves as preface for his charming book on the San Francisco Exposition, says:

"Architecture and the sister arts are the most reliable barometers in recording human thought. They are the direct exponents of a universal language wherein national progress is clearly read."

If this is true—and who would contradict it?—our nation is indeed on the right path, progressing swiftly, surely and safely, with graceful and glorious stride.

To the architect and to the landscape architect belongs an ever-enlarging field of endeavor, with new problems multiplying in direct ratio to the complexity of the life of man.



BRIDGE IN CEMETERY OF THE GATE OF HEAVEN, MT. PLEASANT, N. Y.

CHARLES WELLFORD LEAVITT, LANDSCAPE ARCHITECT

FIFTY YEARS of INTERIOR ARCHITECTURE in the UNITED STATES

THAT part of interior architecture which in this country was worthy so to be designated, had its beginnings in the Centennial Exhibition at Philadelphia in 1876, so that its entire history, covering the periods of decadence and ascendancy, and the various influences which were exerted to hinder or accelerate its progress, is written in the pages of *THE AMERICAN ARCHITECT* during the fifty years of its existence. To associate with architecture the "trash and rubbish," to use the descriptive terms of writers in the early issues of *THE AMERICAN ARCHITECT*, produced and accepted as decorations and furnishings of interiors previous to that time, would be to libel the Fine Arts. Art throughout the world had been in a "slump." Great Britain had but just emerged from an era of "sham," as Sir Charles F. Eastlake chose to call it, and it was mainly through his efforts that England had been brought to its senses and forced to realize its shortcomings. Eastlake's pleas for a return to the square and solid style of the Gothic, (in which decoration was based on construction) had been heeded, as was plainly to be seen in the British exhibit at Philadelphia. It was noticeable that a revival of eighteenth century motives was already at hand, in England, for modern adaptations of Queen Anne and Free Jacobean designs exhibited evoked favorable comment.

We in this country were not so fortunate. The future looked dark to us. There were occasional examples of decorative work in the American exhibit which showed decided influence of some one of the styles, the Renaissance designs of Marcotte and Pottier & Stymus, the Gothic of Robert Ellin and Daniel Pabst, and the Queen Anne of Christian Herter standing out prominently. But this was in no way parallel to the epoch of "period influence" through which we have been passing these last twenty-five years. In those early days, an architect or decorator chose his one "favorite" style and bent every effort to produce designs and execute the work in strict accordance with the characteristics of that particular style. He became famous for his masterful understanding and interpretation of his chosen style, a procedure prolific of the very best results in days when style and nothing more was demanded.

But these men and their work were exceptions. The American exhibit at Philadelphia was, taken collectively, a collection of monstrosities—they might not be called designs—in which certain evidences of German draftsmanship were strikingly visible. This was readily accounted for by the influx of German architects to this country from 1850 to 1875, who, appreciating the then apparent

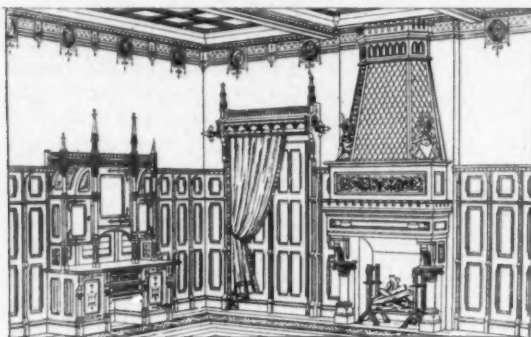
lack of leadership in architectural and decorative art in the United States, recognized the possibilities which might await them here. There was not only a total absence of "style" in those days, but there was evident an ignorance of any art principle. Some years previously we had passed through a period now known as the Greek Revival. It proved to be spasmodic, and unfortunately failed of acceptance, as did the *L'Art Nouveau* and the Mission movement of later years.

Even prior to the Centennial some few American architects and decorators had recognized the pleadings of Eastlake for a return to sanity, but it would be and was an injustice to a man of such high ideals to associate his name with the monstrosities of so-called Gothic inspiration which were produced under the name of "Eastlake" either before or after 1876. Our exhibit at the Centennial, taken as a whole, in spite of certain tendencies for the better of a few of the more elect, might well be said to be representative of the tastes and fashions of the people of this country at that time. It presented an opportunity to compare our work with that of Europe. Along side of that of England and Japan, particularly, in which the skill of the Orientals was demonstrated to an unusual degree, it is putting it mildly to say that ours suffered tremendously in the comparison. A few of the more select of our architects and designers immediately rose up in protest. Such monstrosities as we had been accustomed to would no longer be tolerated. And the closing of the Centennial saw these genuine reformers, these pioneers who set reform in design on foot,—Herter, McKim, Thorp and Atwood—interior architects, in its true meaning—united in an effort to prepare the way for the new era in architectural and decorative art on which their eyes were set, by cultivating the taste of the masses of people which, during the last quarter century, had sunk to such depths.

Following the custom of the times whereby the newer countries lag behind the old ones not only in skill, but in development of style and fashion, and the fashion of European art of yesterday became the fashion of art in this country of today, we entered upon an era only slightly better off than we were before; for it was a long step from the trash of pre-Centennial days to sanity and common sense in design. The Mid-Victorian era, in the United States, as history has recorded it, might be said to date from 1876 to 1896. It might be described as a travesty of Gothic, combined with a burlesque of Renaissance, with a caricature of the Queen Anne thrown in to avoid monotony. Some chose to call this era also "East-

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lake," probably on account of the general respect which the name inspired; not that the designs themselves excited any respect, but rather that they might be received with more respect by the people if associated with such a man, even if only by name. It was, however,



INTERIOR DESIGNED AND EXECUTED BY
A. KIMBEL & J. CABUS

From the issue of September 23, 1876

evident from their works that designers had never read his books, or "else they might better be able to cater to the public demands for better things. An expert has only to make the most casual examination of these articles put forth in the name of 'Eastlake' to see that they are almost all of them as veritable shams as ever were produced before; and some of the architects' work is not free from the same defects."

For twenty years, then, following the realization of our errors and the presentation of an opportunity to "get on the right track," the design of interiors, as well as that of exteriors, (for their history runs parallel) made little progress, content to make preparations so that similar mistakes would not be made again in the future, even if the wrong of the present could not be righted in an instant. The Victorian era, then, continued, with the dawn of a distinctive effort looming in the distance, on which the eyes of the people were unflinchingly set.

To appreciate and understand a description of the work of the architects and decorators of the declining years of the nineteenth century, executed in black walnut, golden oak or bird's-eye maple, one must familiarize oneself with such obsolete terms as lambrequins, whatnots, sofas and parlors, expressions entirely disassociated with interior architecture and decoration of this age and generation.

In writing of upholstery fabrics of those days, THE AMERICAN ARCHITECT in 1876 refers to them as "those monstrosities of upholsterers' ornamentation which appear as if no one could have produced them unless possessed of a depraved taste combined with a disordered brain." Large patterns,

very much out of scale to the size of the rooms, although actually in scale with the details of the woodwork and furniture, were the order of the day, elaborately draped and trailing the floor as window hangings and portieres, generally surmounted by lavishly festooned "lambrequins." Satins were the vogue in the seventies, although they gave way later to haircloth for furniture covering and velvets for draperies. Floors of soft wood were invariably covered entirely with Ingrain carpet, tacked down, the patterns frequently consisting of large medallions with highly colored flowers. The design of lighting fixtures suffered a complete revolution in the change from gas to electric light as a means of artificial lighting. The old cast brass and iron fixtures, limited to a great extent in certain features of design by the inclusion of a gas supply pipe or tube, were completely lacking in any decorative value, and, on account of the dimness of the light which they supplied and the consequent absence of glare, such considerations as the shading and diffusing of light were never even thought of. In the transition period, beginning about 1885 and continuing to the end of the century, when gas had been entirely replaced by electricity as a lighting medium, many old gas fixtures were wired and other new designs combined both gas and electric appliances.

Wallpapers, "as limitless as the changes in the kaleidoscope; in colors from gay to grave, stripes, vines, set patterns, and the 'Japs' run together in hopeless confusion, all 'the latest thing out,' " continued in favor up to the end of the nineteenth century, as "a great advance on the only custom



DINING ROOM IN THE HOUSE OF S. M. NICKERSON,
CHICAGO, ILL.

AUG. FIEDLER, ARCHITECT

From the issue of July 17, 1886

previously in vogue,—that of decorating with the painter's brush, or covering the walls with tapestry."

Probably three-quarters of the woodwork and furniture produced was in American black walnut, the other quarter being in materials as various as the styles of design. Fine ebonized work, a fashion

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imported from Europe, was employed by leading houses, but it was generally used more for ornamentation than in its entirety. "There can be no better evidence of the backward condition of furniture and cabinet makers in this country than by the slight use made of oak. There is perhaps no country in the world more rich in the production of this material, and more ignorant of the proper way to prepare and use it." However, we find oak later becoming more and more popular, supplanting black walnut in the nineties, being stained and finished in a high gloss varnish, known as "golden oak."

The close of the nineteenth century saw interior architecture reach its high water mark to date in the completion of the Congressional Library at Washington, D. C., in 1898, in which we see an original adaptation of classic ideas as the nucleus on which the design of the interior is based. It served, by its national associations, to demonstrate to the American people that the architects of this country were capable of the best in the adaptation of European ideas, and awakened the people generally to appreciate and demand better things. The taste of the masses was elevated immediately. The fashion for the "styles and periods" was given added impetus, and with the realization that the era of "period influence," an era which had been forecast in the foreign exhibits at Philadelphia a generation ago, was at hand, efforts were bent on a study of the styles and periods of the sixteenth, seventeenth and eighteenth centuries, presaging an art movement in this country, amongst both the



THE LOUNGING ROOM OF THE LOTUS CLUB, NEW YORK
DONN BARBER, ARCHITECT

From the issue of March 24, 1909

fine and industrial arts, such as this country had never seen before.

The old-time method, so successfully employed twenty-five years before, of specializing in one style—your "favorite" style—was not applicable now, however, for the popularity accorded one style was eclipsed almost overnight by fashion's decree in favor of another, and a familiarity, at least,

with all the styles was necessary if one were to expect any business. The styles were thus deprived of their greatest value, for the delicacies and fine points which a designer had been able to discover in specializing in one style only, were



DINING ROOM IN THE HOUSE OF W. A. DUPEE,
MILTON, MASS.

JAMES PURDON, ARCHITECT

From the issue of July 24, 1918

lost sight of, and the more modern method of "adapting" ideas of the old styles grew more in favor to meet the new and ever changing demands.

It is not necessary to recall how the French Renaissance, the Louis XVI, the Italian, and the Spanish had their heydays, or how the Adams, the Jacobean and the Queen Anne seemed each to take the lead. We looked to them all for inspiration; we reproduced the old designs intact, or adapted them to suit our needs, although we frequently lost the true spirit of the original or cheapened it beyond all recognition by our modern methods of construction. The twentieth century, then, opened a new era in interior architectural and decorative design. In basing design on the architectural principles on which the historic styles and periods were founded and adapting them to modern requirements, the people had been brought to a realization that poor taste and a lack of discrimination had been responsible for the "trash and rubbish" of earlier days. Their eyes had finally been opened to see the light. In entering upon this era of tutelage, as it has well been called, the people of this country, led by Stanford White,—a decorator as he chose to call himself, although he is better known as an architect,—saw the need for cultivation of better taste. They have, for the last twenty-five years, remained content to adapt and even copy forms of past European art rather than to attempt anything original or creative, understanding better and better, as the days went by, that by analyzing good things one acquires ability to originate things that will be good.

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During this era, when the periods were influential in all fields of architectural and decorative design, interior decorations were more generally considered as the architecture of the interior, a fact brought home to us by an analysis of the old period designs, for they were actually designed by architects and the principles of architectural design are seen to be the basis of their execution.

Other fields of decorative art met the demands of a higher culture which arose with the opening of the twentieth century. Beautiful figured damasks appeared which gave to draperies and upholstery materials generally a new life, and the movement to replace carpets with rugs added tremendously to the decorative value of the interior. It was not until the influence of the periods, with their panelled woodwork and rough plaster walls, became so vital that the popularity of wall-paper began to wane, and now, after twenty years of plain color walls, and the cheapest kind of imitation of wall panelling, the cry for more color has revived the interest in paper, and the character of the designs put forth shows the benefit of the twenty years' preparation for the renewal of its popularity. The added art interest which the inspiration of the periods imparted to decorative art generally in this country and the possibilities of design offered by electrical devices made the light-

ing fixture an important decorative feature of the interior scheme. For twenty-five years, then, this era of so-called "period influence" has held us firmly in its embrace, and it is only recently that it has shown any signs of waning.

And so interior architecture stands today, as does architecture itself, on the verge of a new era in which the talent and ability of American designers in creating and developing new forms, better adapted to the social and living conditions of our times, will be given opportunity for expression, thereby stamping our work as our own. The movement is already on foot. Not a "modern art" movement, as that term implies, but one based on the principles on which architecture itself is founded. An American style is in the making. American ideals are its inspiration. American products are vital to its execution. American methods are necessary to its furtherance. The history of the next fifty years will tell a different story. Instead of lagging behind and following others, we are to take the lead—to set the pace. Our period of tutelage is finished. We have learned our lesson, now we are free to employ our creative ability as we see fit. Confidence, in ourselves and in each other, is all we need. With that and the ability we possess, we are bound to succeed.



THE PARLOR OF THE PONCE DE LEON HOTEL, ST. AUGUSTINE, FLORIDA

CARRERE & HASTINGS, ARCHITECTS

From the issue of June 13, 1896

GREAT AMERICAN ARCHITECTS of the LAST HALF CENTURY

Personal Reminiscences of Outstanding Personalities

BY WILLIAM H. CROCKER, *Editor*

AS the last remaining of a group of men that in 1904 undertook the publishing of *THE AMERICAN ARCHITECT*, supplanting those who for twenty-eight years had conducted that journal, it may result in something of interest to set down in this form reminiscences of the part of the half century just concluded that undoubtedly has been the period of greatest accomplishment.

With few exceptions, the men, practically dilettante, who were perfunctorily practicing architecture in 1876, were not then seriously accepted as a professional body. Men but just from college or the "grande tour" in Europe were endeavoring to evolve from the mass of information they had acquired some practical exemplar of architecture. Some have since risen to the greatest heights of their profession. It is not of those who now survive that these reminiscences will treat, but of those men, great as artists, greater as architects and greatest as the finest developed type of Americans, who have died and whose lives afford the most perfect examples on which the younger men may build their future in the profession of architecture.

Many years before work on this journal was taken up by the writer, he had intimate association with artist painters and artist sculptors. Most of them in this country he knew, many of them intimately. Writers, men like F. Hopkinson Smith whose versatility was marvelous and who combined, each in the highest degree, the arts of engineering, artist painter and author, were much in the public eye. It is recalled that on a certain day, early in Autumn, there was observed Hopkinson Smith, William M. Chase and Stanford White, arm in arm, sauntering down Fifth Avenue, New York. These three men had much physical resemblance, one to the other. In fact, they would singly attract attention anywhere, but grouped they were remarkable. Chase with his conical high hat, horn rimmed spectacles, and a wide black flowing ribbon. Hopkinson Smith whose enormous white moustache received his constant care, and White, as he was always known, the unmistakable artist. Each apparently unconscious of the attention that was given them, all were intimately discussing what was evidently a serious topic. There was none of the poseur about that group. Each man was his own natural self and reflected a personality that had made for him a place at the height of his profession.

Years after, when White had passed, we were at his house in Gramercy Park, waiting in the

studio on the top floor for the photographer who was to make some special views. The day was warm and, seated on the wide couch that fronted the beautiful Caen stone mantel in that room, we must have dropped asleep. A touch on the shoulder aroused us, and looking up we saw Charles Follen McKim and standing with him, J. Pierpont Morgan. McKim then in the zenith of his great life was as always a man of easy approach. Like all great men and artists, his nature was simple, direct and honest. No affectation could be seen in McKim. A truly great man, to have whose acquaintance was a favor and to receive his confidence a mark of distinction.

Flagg had finished his Singer tower, and with true Yankee boasting we were proclaiming to all the world that we had in New York the tallest structure. In the Metropolitan Life Building two men were quietly laboring to produce a structure that would top the Singer tower and soar many feet higher. Pierre and Napoleon LeBrun were among the most cultured men that ever graced the profession. With that refined sense of courtesy that was perhaps traceable to their French ancestry, they were the finest examples of well bred types, gentlemen of the old school.

Writing of the LeBrun suggests to us the personality of Frank Miles Day. We have been in attendance on Institute conventions for many years and it was at these annual gatherings that we met and knew Day. There was a charm to his character, a polish to his method of approach that made one hold him in the most affectionate regard. His passing we felt to be the loss of a fine friend. During the many distracting things that marked the conventions in the early 1900's, Day was never so busily engaged as to make him lose that fine poise and charm of character that endeared him to his wide circle of acquaintances.

When the news was flashed that John M. Carrere had met sudden death on the streets of New York, there was generally a sentiment of profound regret. Stricken in the vigor of manhood, with his greatest work but just completed, his body was borne to the Public Library where it rested for a brief period that all the profession might bid him farewell. Carrere, in some measure like the LeBrun, had that old world charm, a certain polish that marks the cultured gentleman. His death was a grievous loss. The memory of his life and professional achievement will always endure.

No profession of which we have knowledge has

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better shown a paternal aspect toward its younger members than has architecture, and no organization of architects has achieved more lasting results than the Society of Beaux-Arts Architects. For many years Lloyd Warren gave without stint of his brilliant talent and his private fortune to further the cause of architectural education, and his work laid the foundation of the present efficient organization. Lloyd Warren's death not only deeply grieved his fellow members in the profession, but it also took from the student body in architecture in the United States a valued friend. Warren's personality was charming in its fine simplicity, and his attitude toward the task he set himself was one of a lifetime devotion.

There had been a long evening session of the convention of the Institute when held in New Orleans, and we went for a walk and a breath of fresh air before retiring. It was late when we reached the hotel, and the first man to greet us was Evarts Tracy. Clad in the most correct evening dress, it was surprising to note that he carried a shotgun, long wading boots and all a hunter's outer clothing. "Going hunting for duck early in the morning," he told us. It was ever the unexpected one found in Tracy, and it was also ever the expected charm of a delightful personality. When the alarms of war were heard, Tracy was among the first to serve. He brought to that service all the fine skill he possessed as an architect. The Croix de Guerre the French conferred on Tracy was a well earned distinction. He died in his prime.

"The winning of the West" architecturally began coincidentally with the year that marks the opening of the half century this journal is now commemorating. Among the men who felt the lure of an undeveloped country was Willis Polk. He typified in spirit the true Western man and his genius for architecture and an aggressive and progressive personality carried him to the front rank of his profession. He was the first, as far as we know, to place on the front of his tall buildings a huge board setting forth the details of its progress and the ultimate use of the structure. He imbued all who worked with him with that vim and dash that characterized his every effort. He presented, as few men have, that rare combination of shrewd business executive combined with the finest trained artistic mind. His name is enrolled among those of great architectural designers. His civic spirit took him into every effort for the upbuilding of the West; his energy and skill as an architect were marked by many pretentious buildings, and we know by personal contact that he could be a fine friend and that in his death there passed a gentleman and artist.

Every one who has attended each year the meetings of the conventions of the A. I. A., knows that there are times when transaction of routine business makes the meeting dull and uninteresting.

But, some committee report, under consideration, would arouse the interest of Donn Barber. When Barber rose to speak, apathy ceased. His was the true gift of oratory. He had something to say and he knew how to say it. His passing was pathetic. From a bed of pain, he went to a luncheon on one of the days of the last convention. His reception by those assembled, his address in acknowledgment, were outstanding features of the convention's proceedings. No need to set down here a list of his qualifications as an architect. They are known and acknowledged where the language of good architecture is spoken. The friend of the young man just entering on his life-work, the fine associate of his peers, Barber was a man, foresquare.

Once upon a time when I was visiting the principal cities of the Middle West, I called at the office of Eames & Young in St. Louis. I met Eames, or perhaps more correctly Eames met me. In five minutes I felt as if I had known the man for years. I was younger then by many years, and did not know from a personal viewpoint the outlook of a man advanced in years. What Eames said to me on that occasion I shall never forget. He became reminiscent of practice thirty years ago, which dating from now would be a full half century. Impulsive in manner, brusque, with a vocabulary that reminded me of the days I spent at sea, I thoroughly enjoyed that visit. On every subsequent occasion when in St. Louis, I called on Eames, and when I learned of his death, I felt that the profession of architecture had suffered the loss of a personality that was as true and steadfast in its attitude toward the red-blooded things of life, as it was picturesque and forceful.

If the editor of an architectural magazine would keep posted in his work he must needs keep closely in touch with the men in the profession. For this reason and for the more important one for me that I thoroughly enjoyed the personal contact, I made many calls. The artist architect is invariably a fine personality. He has a certain charm, a simplicity of manner and a complexity of knowledge. No man could better combine these fine qualities than Arnold W. Brunner. Many years ago he had travelled and studied in the Far East and among his cherished possessions was a portfolio of beautiful sketches. With a little urging he would get them out and then as one, to him, of special interest would come to hand, he would talk of his youthful days and become so wonderfully reminiscent of his student life and the field of art in which he spent it. Brunner was "the glass of fashion and the mould of form." A man of fine presence that suggested the well bred gentleman. He loved his art, he gave it all he had, and the success that crowned his efforts is witness to his great talent.

S. B. P. Trowbridge, or "Breck" as his intimates called him, was another man in whom the

GOLDEN ANNIVERSARY NUMBER

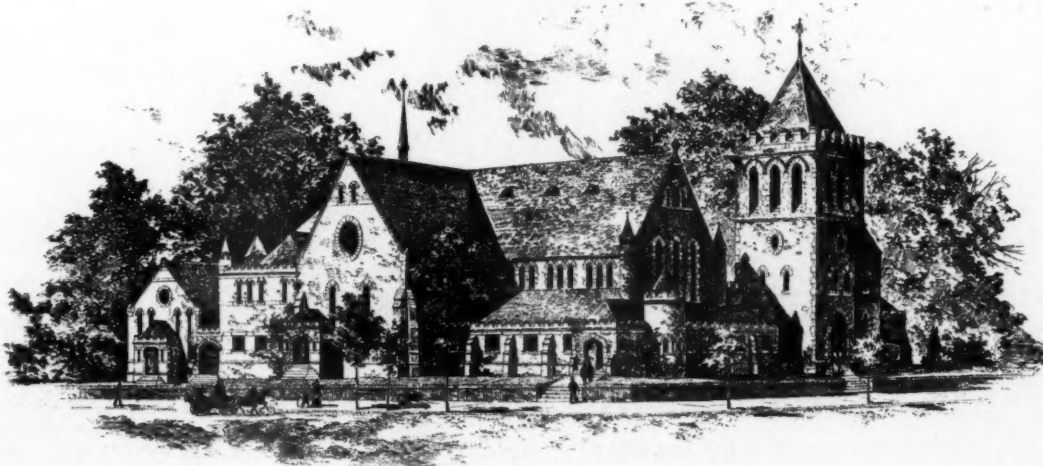
spirit of true art was to be found. He, like many another architect, found recreation in painting. His work as an artist painter was good and he loved it. On the occasion of my last interview with that remarkable man, when I was discussing with him a recently completed example of his firm's work, the talk between us drifted to painting and I sat for a longer time than I intended, deeply interested. His whole attitude toward the men in all of the professions that he intimately knew was one of the most unselfish and appreciative of my experience with men. With small need to devote himself to the insistence of practice, he had achieved a great success in all his undertakings. When he died, there was taken a man who would have succeeded in any walk of life to which he would have given effort.

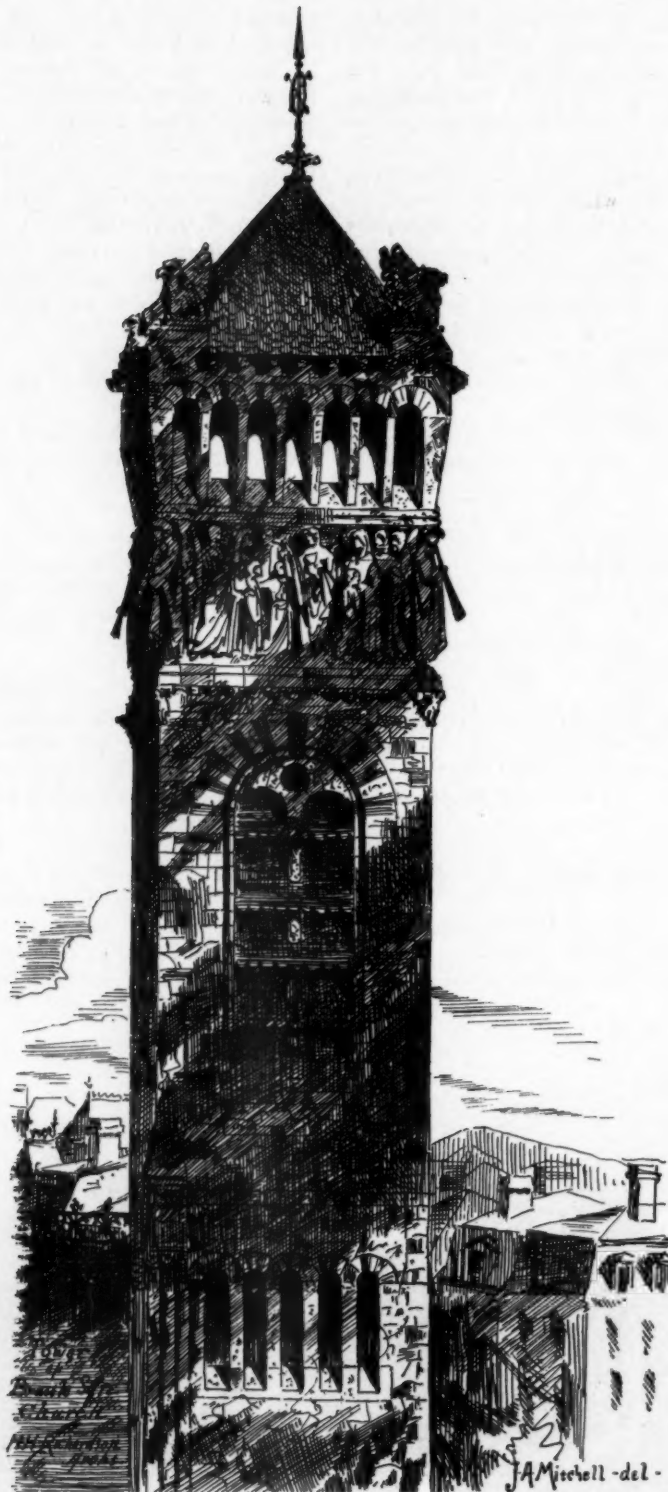
One may never think of the artist architect and fail to remember Louis Sullivan, artist and student of art up to the moment of his death. What he accomplished in his profession is a full page in the history of architecture. His brilliancy of mind was to be seen in the brilliancy of his work. Without pedantry, and with a knowledge of the art he practiced, seldom, if ever, equalled by any man in this country, Sullivan continued up to the time of his death, an unusual personality. The occasions when it was my privilege to meet Sullivan are among the outstanding ones of an almost quarter century of association with architects. His attitude toward me was one that gave me cause for elation. At any time I approached him for help or collaboration in some constructive effort, he met me with a fine show of friendship and a spirit of helpfulness that could not be surpassed.

Many years ago, but not before Bertram Goodhue's great ability was freely recognized, I called at his office to arrange for some material for publication. Too busy to meet me formally, he directed that I come to the drafting room. There

I found him perched high on a stool, crouched over his drawing board. He had but the stub of a pencil, and that he held in his left hand. As he talked to me he worked. The posture was awkward, but the movement of that swiftly flying pencil point was marvelous. We found difficulty in pursuing our topic. Our eyes were glued to the paper, where as if by magic a design of the rarest beauty was unfolding. Men who possess genius are apt to minimize the ease with which they accomplish their purpose. Goodhue's nonchalance was something to study. Dropping his pencil, he took me by the arm and led me back to his office. From that minute there dated an acquaintance that lasted for many years. And during all that time I never felt sure of his attitude toward me. At times I believed I held his regard, at others I was sure he'd rather none of me. But I had a rare opportunity to study the personality of a man whose future was sure. "Those whom the gods love die young." We may not in this generation exactly measure the true breadth of Goodhue's great ability, but it is safe to say that fifty years from now the appreciation of his genius will insure a place high in the annals of the profession he so greatly adorned.

It is doubtful if any profession has ever developed men of finer caliber than has architecture. Burnham's counsel, "Make no small plans," has been strictly followed. What has been achieved in the aesthetic growth of this nation is more largely due to the efforts of men like those we have referred to. Broad of vision, finely educated, polished gentlemen and great artists, they laid the foundation of our present high position in architecture and by an example that may never be excelled, pointed the way to the future. No memory of a life of much activity, no contact with all sorts and conditions of men, could more deeply stir me, or more strongly encourage me in the work I have to do.





TOWER OF BRATTLE SQUARE CHURCH, BOSTON—H. H. RICHARDSON, ARCHITECT

Reprinted from the issue of June 29, 1878

A Half Century of Progress
in the development of
Distinctive Types of Buildings
in the United States

shown pictorially by decades
by reproductions of accepted ex-
amples illustrated during the
past fifty years in various issues of
THE AMERICAN ARCHITECT

THE AMERICAN ARCHITECT

COUNTRY *and* SUBURBAN HOUSES



House in
Chicago, Ill.

1876

From issue of October 7

Burnham & Root,
Architects



House in
New London, Conn.

1891

From issue of February 26

Geo. Warren Cole,
Architect



House in
Worcester, Mass.

1881

From issue of January 1

Stephen C. Earle,
Architect



House in
St. Paul, Minn.

1896

From issue of April 4

L. S. Buffington,
Architect



House in
Philadelphia, Pa.

1886

From issue of October 20

R. G. Kennedy,
Architect



House in
Torresdale, Pa.

1901

From issue of November 23

Wilson Eyre,
Architect

GOLDEN ANNIVERSARY NUMBER

COUNTRY *and* SUBURBAN HOUSES



House in
Readeville, Mass.

1906
From issue of May 12

Winslow & Bigelow,
Architects



House in
Hillsboro, Calif.

1921
From issue of August 3

Sylvain Schnaittacher,
Architect



House in
Lawrence Park, N. Y. *From Issue of April 12*

1911

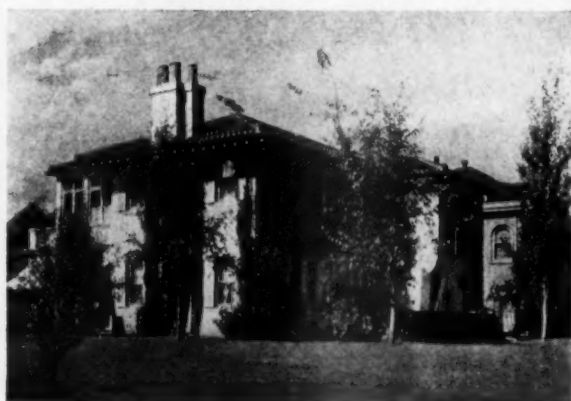
Wm. Allen Bates,
Architect



House in
Riverdale, N. Y.

1925
From issue of April 3

Julius Gregory,
Architect



House in
Denver, Colo.

1916
From issue of January 12

W. E. & A. A. Fisher,
Architects



House in
Los Angeles, Calif.

1925
From issue of May 20

Carleton M. Winslow,
Architect

THE AMERICAN ARCHITECT

APARTMENT HOUSES



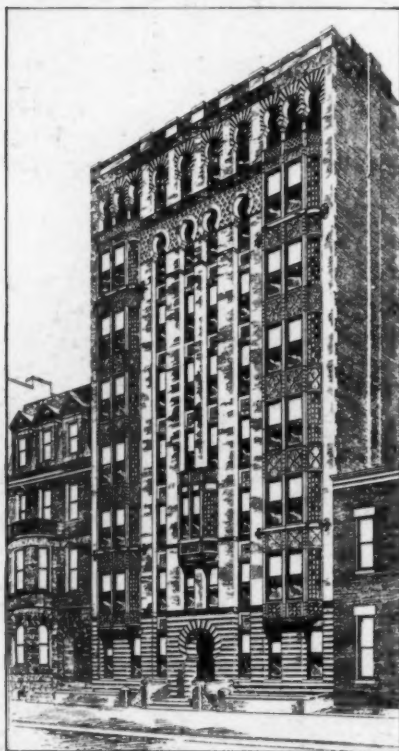
1876

THE ALBANY APARTMENTS, NEW YORK

JOHN C. BABCOCK, ARCHITECT

From issue of December 23, 1876

The first apartment houses, built about 1870, differed from earlier tenements only in the matter of location and slightly better construction. They were of the walk-up type with steep, poorly lighted stairways and long narrow halls. A dumb-waiter used in common by all tenants was one of the first movements toward apartment house service. The lack of proper building codes frequently allowed the construction of buildings that were not fire safe for tenants.



1886

THE RANDOLPH APARTMENTS, NEW YORK

T. M. CLARK, ARCHITECT

From issue of January 23, 1886

The four story apartment occupying an entire block was a common type of early apartment building. As various districts became more crowded and land more valuable the ground area became smaller and to equalize this it was necessary to increase the number of stories. The natural tendency was to construct buildings seven to ten stories high and equip them with passenger elevators which were gradually becoming much improved and perfected.



1896

THE WITHINGTON APARTMENTS,
CHICAGO, ILL.

HENRY J. ROSS, ARCHITECT

From issue of June 18, 1898

A building consisting of ground floor stores or shops, and apartments located in the upper floors, was the usual form of apartment in the 70's. Owners gradually came to realize that the rental value of an apartment was more if no stores were permitted in the lower floor. As a result later apartment house developments tended to locate away from the main or business streets. With the elimination of the commercial aspect and the selection of more desirable sites the demand for this type of residence increased.

GOLDEN ANNIVERSARY NUMBER

APARTMENT HOUSES

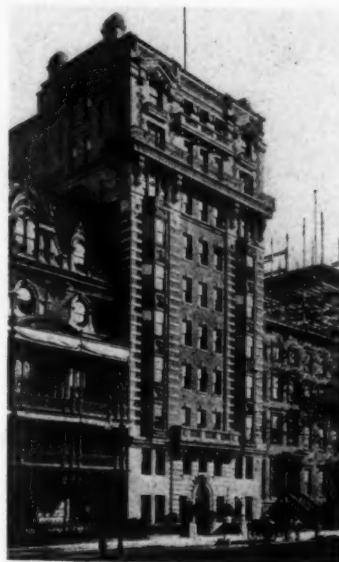
1906

THE MADISON SQUARE APARTMENTS, NEW YORK

HOWELLS & STOKES, ARCHITECTS

From issue of September 1, 1906

With changes in location, increasing rental values, and demands for service and added conveniences, it became necessary to give more study and attention to the planning of apartment buildings. The block plan usually meant that many apartments were located on an interior court almost if not entirely enclosed. To reduce the less desirable and consequently lower rental apartments to a minimum, the H, E, and U shape plans came into use for sites of sufficient size to make them practicable.



1916

THE ASTOR COURT APARTMENTS, NEW YORK

CHARLES A. PLATT, ARCHITECT

From issue of November 29, 1916

With the factors which influenced the size, shape, and location of apartment houses apparently well settled and architects of recognized ability turning their attention to the design of community residences, a strong tendency is observed toward giving a domestic character to the exterior. It is not a simple matter to give a building of large proportions the qualities possessed by smaller residences and obtain a distinctly homelike appearance. Many of our modern apartment houses indicate much thought in this direction. Surely they have developed a character of their own.



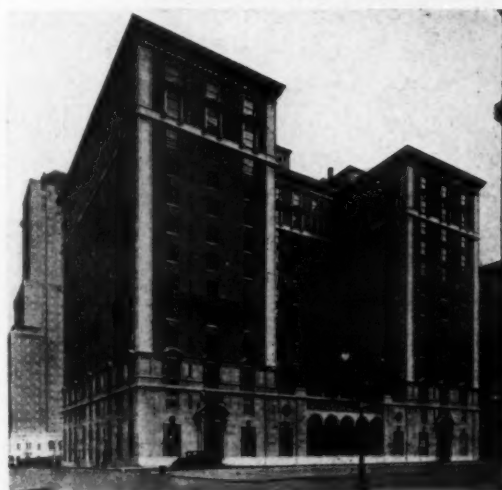
1926

THE PARK LANE, NEW YORK

SCHULTZE & WEAVER, ARCHITECTS

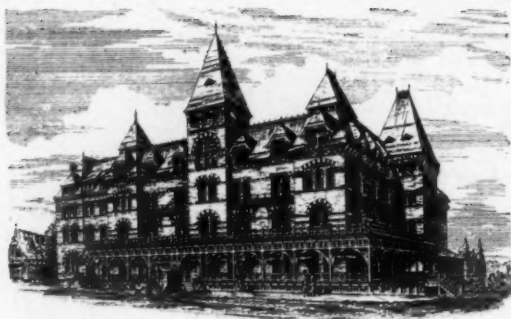
From issue of November 5, 1924

At least two important changes have been made during the past few years. These are the development of the apartment hotel where one has the comfort and roominess of an apartment combined with the luxury and service of the hotel; and the construction of so called "efficiency" apartments. The latter has been brought about because of increased land values and high rentals which made it necessary to obtain more apartment units without increasing the size of the building. This has been accomplished by contracting the area of each apartment and making multi-service rooms by the use of recessed beds, kitchen cabinets, and other space saving devices.



THE AMERICAN ARCHITECT

HOTELS



1876

HOTEL AT PRINCETON, N. J.

POTTER & ROBERTSON, ARCHITECTS

From issue of February 5, 1876

Hotels have closely followed the architectural trend of the times. Fifty years ago the mid-Victorian had about reached its height. Hotels of the 70's without roomy verandas might well be classed with airplanes without wings.



1886

HOTEL AT FOREST GLEN PARK,

WASHINGTON, D. C.

F. SCHNEIDER, ARCHITECT

From issue of March 19, 1887

Hotel verandas were still a permanent part of the architectural scheme in the late 80's. Like other buildings of the time the roof presented numerous dormers, towers, turrets, and gables. Disastrous hotel fires with many casualties were due to inadequate fire protection methods and wooden construction.



1896

THE ALCAZAR, ST. AUGUSTINE, FLA.

CARRERE & HASTINGS, ARCHITECTS

From issue of August 1, 1896

Inspired by the architecture of old Spain, the Alcazar is well fitted to its location in the old Spanish town of St. Augustine, Fla. Hotels of the period were being built more nearly fireproof and many conveniences for their patrons, unknown to those of earlier date, were being added.

GOLDEN ANNIVERSARY NUMBER

HOTELS

1906

U. S. GRANT HOTEL, SAN DIEGO, CALIF.

HARRISON ALBRIGHT, ARCHITECT

From issue of May 4, 1907

The importance of ample light and air for all rooms was fully realized and obtained at this time. Heating and sanitation were well advanced. Hotels were rapidly approaching the luxury and conveniences of the finest homes.



1916

HOTEL PENNSYLVANIA, NEW YORK

McKIM, MEAD & WHITE, ARCHITECTS

From issue of February 26, 1919

Land values have required that hotels follow the precedent set by the office buildings and that they expand vertically. Accompanying this there has been a marked reduction in the sizes of rooms over that of thirty or more years ago. This has been accomplished without inconvenience or annoyance to those who require a temporary convenient residence. Early in the 20th century hotels designed with a bath for every room began to replace the common bath which served several rooms or an entire floor.



1926

ATLANTA-BILTMORE, ATLANTA, GA.

SCHULTZE & WEAVER, ARCHITECTS

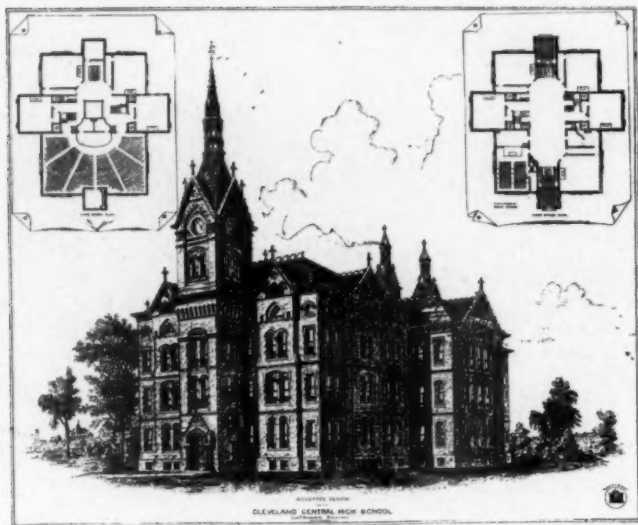
From issue of August 27, 1924

After all, hotels are residences even though they may be such in a most temporary sense only. It is not a simple matter to design a residence of a thousand rooms or more that presents a residential aspect but little less pronounced than an apartment house which is also a residence though of a less temporary nature.



THE AMERICAN ARCHITECT

SCHOOLHOUSES



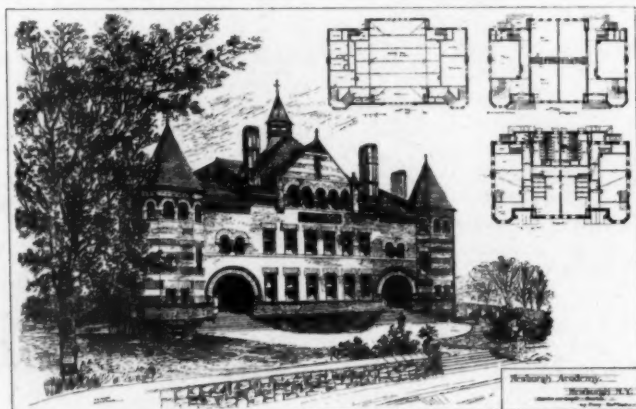
Cleveland Central High School,
Cleveland, Ohio

Levi T. Scofield,
Architect

1876

From issue of April 21, 1877

A typical example of the late Victorian period which has since been outgrown. Classrooms were lighted from both the side and end. Then as now the architect was accused of many things unjustly. Bricklayers received \$2.50 a day and other craftsmen in proportion.



Newburgh Academy,
Newburgh, N. Y.

Rossiter & Wright,
Architects

1886

From issue of April 10, 1886

In ten years both the design and the plan have improved. Classrooms were lighted from one side only, even though from the narrow side and by small windows. The Academy cost \$60,000, contained twelve classrooms and was heated by eight furnaces burning soft coal. The drawing illustrated was hung at a Boston Exhibition in 1886.



H. M. Warren School,
Wakefield, Mass.

Charles E. Park,
Architect

1896

From issue of September 26, 1896

A reasonable conception of the school-house problem in which is observed a tendency toward simplicity in plan, elevation, and choice of materials with a tendency toward classic detail.

GOLDEN ANNIVERSARY NUMBER

SCHOOLHOUSES

1906

From issue of November 16, 1907

The advance in proper lighting, ventilation, equipment, construction and design indicates the careful study given the schoolhouse by American architects. The long U or H shape plan came into favor and in design a leaning toward the Tudor period and larger window openings.



Patrick Henry School,
St. Louis, Mo.

William B. Ittner,
Architect

1916

From issue of September 27, 1916

This school indicates a decided advance in construction through the use of projected steel sash which permit the classrooms to become open air rooms in fact. While light and mechanical ventilation have been previously considered we now realize the importance of fresh air and sunshine on the physical and mental development of the child.



Clawson School,
Oakland, Calif.

John J. Donovan,
Architect

1926

From issue of October 22, 1924

A school built in 1924 upon the H shape plan, with efficient window openings, details of classic origin and simplicity in use of materials. Bricklayers employed at \$12.00 a day.



Kearny High School,
Kearny, N. J.

Guilbert & Betelle,
Architects

THE AMERICAN ARCHITECT

CHURCHES



1876

ST. PAUL'S CHURCH, CLEVELAND, OHIO

WARE & VAN BRUNT, ARCHITECTS

From issue of January 22, 1876

A slate roof with bands of contrasting colors; metal finials and crestings; an intermingling of brick and stone; and Gothic arches make this church a typical example of the time. A period of architectural history in the United States when numerous architectural motives and a lavish use of ornament were the vogue.



1886

ST. PETER'S CHURCH, UNIONTOWN, PA.

CHARLES M. BURNS, JR., ARCHITECT

From issue of January 16, 1886

In the late 80's a reaction to the restless and not always pleasing use of numerous architectural motives had set in. Ecclesiastical architecture was perhaps the first to show this to any marked degree. The numerous churches built throughout the United States at this time show a saner tendency with noticeable simplicity.



1896

FORTY-THIRD STREET M. E. CHURCH,
PHILADELPHIA, PA.

JACOBY & WEISHAMPEL, ARCHITECTS

From issue of February 29, 1896

The influence of European precedent is clearly seen in church architecture of the United States beginning in the 90's. Designers began to work with greater freedom and apparently with a more sympathetic understanding of the requirements of ecclesiastical design. About this time the idea of the church being a community or society center began to be advanced. Separate rooms for the Sunday school began to be incorporated in the design for church buildings or groups.

GOLDEN ANNIVERSARY NUMBER

CHURCHES

1906

CENTRAL PRESBYTERIAN CHURCH,

SUMMIT, N. J.

E. G. W. DIEBRICK, ARCHITECT

From issue of July 15, 1905

Early in the 20th century English Gothic architecture began to be seriously studied by designers in the United States. As a result church authorities began to conform more closely to pure English types in which is seen, as in other structures, simplicity of line and form.



1916

CHAPEL OF THE INTERCESSION, NEW YORK

CRAM, GOODHUE & FERGUSON, ARCHITECTS

From American Churches Published in 1915

A splendid example of the work of an architectural firm which has had a tremendous influence on the ecclesiastical architecture of the United States. Gothic in form, but American in inspiration and character the Chapel of the Intercession will remain for all time a superb architectural monument. Simple in line, pleasing in contour, and of imposingness no one can fail to sense its religious atmosphere and spirit. As a whole, it is strong, bold, yet gently relieved by the delicate tracery of the lofty window and given quiet restfulness by horizontal members.



1926

THIRD CHURCH OF CHRIST, SCIENTIST,

NEW YORK

DELANO & ALDRICH, ARCHITECTS

From issue of February 13, 1924

Since the simplicity of classic architecture is symbolic of the tenets of Christian Scientists, it has been used as a style for many of their churches. Greek and Roman temples may readily become an inspiration for a church whose thought is in harmony with the spirit expressed in these classic temples.

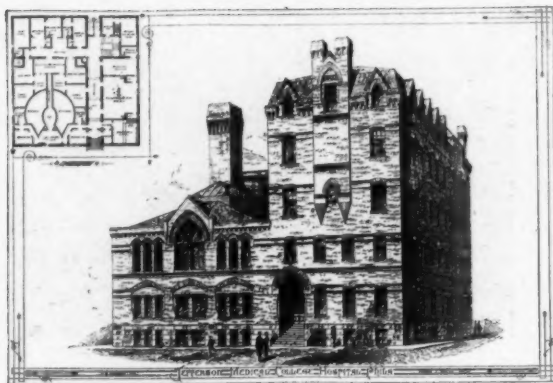


THE AMERICAN ARCHITECT

HOSPITAL BUILDINGS

1876

From issue of September 9, 1876

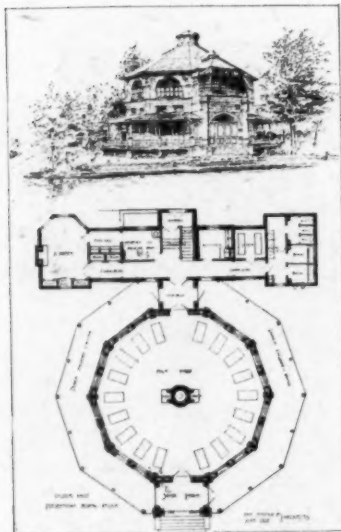


Jefferson Medical College Hospital,
Philadelphia, Pa.

Frank Furness,
Architect

1886

From issue of August 18, 1888



Children's Ward
Presbyterian Hospital,
Philadelphia, Pa.

John McArthur, Jr. &
John Ord,
Architects

Fifty years ago no system of construction had been introduced which satisfactorily prevented the lodgment of infectious effluvia. Old hospital buildings became dangerously infected and showed a greater proportion of deaths than those of temporary buildings. Many well founded arguments were being advanced in favor of the adoption of the "cottage plan." The importance of sunlight, air, and ventilation was thoroughly appreciated.

Circular hospital wards, first built in England and Belgium during the late 70's, found but little favor in America. It was soon demonstrated that any advantages which the circular plan might possess, did not justify their additional cost to build and maintain. A thirty bed ward of this type required an area of 2700 square feet greater than a rectangular ward of the same efficiency. This seems to have been an era of curious planning for in 1887 a hospital for contagious diseases was built with eight octagonal rooms connected by seven small square rooms.

1896

From issue of June 6, 1896



Holmes County Infirmary,
Millersburg, Ohio

Knox & Elliott,
Architects

Thirty years ago there came the realization that hospital planning was a highly specialized problem requiring the most careful study much as the physician diagnoses the ills of his patient. Great scientific progress had by this time been made in the organization of hospital management and the construction of buildings. America was abreast of, if not ahead of, those built abroad. Considerable advance had been made in plumbing, heating and ventilation and electrical inventions were beginning to appear.

GOLDEN ANNIVERSARY NUMBER

HOSPITAL BUILDINGS

1906

From issue of February 2, 1907

Demands of the well-to-do for hospital service began to be seen in the provision made for private rooms. The majority of hospitals had heretofore consisted of general, surgical, and isolation wards accommodating from ten to thirty persons each. The development of fireproof buildings and the advances made in materials and equipment suitable for hospital use, made hospitals three or more stories high both feasible and highly desirable.



General Hospital,
Buffalo, N. Y.

George Cary,
Architect

1916

From issue of March 1, 1916

Dr. Emerson said, "A hospital building is a piece of medical apparatus for use in the treatment of patients." By 1916 it had become a most efficient apparatus, a well patronized institution and the hospitals of twenty-five years previous were indeed antiquated affairs. Wood trim had practically been eliminated and replaced with metal, tile, plaster and concrete. Wooden floors had given way to tile, terrazzo, concrete, and linoleum. Roof wards as completely equipped as those below, ward balconies, and solariums had come into general use for the care of convalescents.



Michael Reese Hospital,
Chicago, Ill.

Schmidt, Garden & Martin,
Architects

1926

From issue of February 14, 1923

Thorough co-operation between the medical and architectural professions has been responsible for the excellent solution of hospital planning as it appears today. Parallel with this in recent years has been the splendid co-operation of the manufacturers of materials and appliances in keeping abreast of and making possible this remarkable development. Restful and safe illumination; silent call systems; glass lined clothes chutes; and electric elevators are but a few of the items which have contributed to the success of the hospital as an institution.

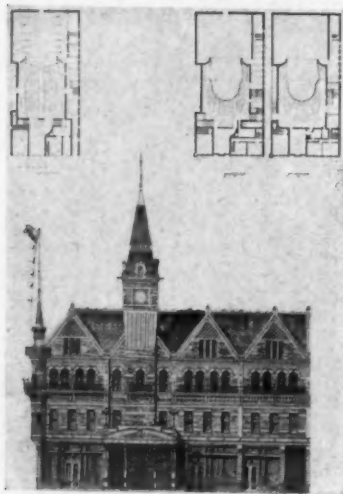


Fifth Avenue Hospital,
New York

York & Sawyer,
Architects

THE AMERICAN ARCHITECT

THEATRE BUILDINGS



1876

LYCEUM THEATRE, ROCHESTER, N. Y.

HARVEY ELLIS, ARCHITECT

From issue of April 12, 1879

The estimated cost of the Lyceum was \$75,000. It occupied a site 96'x186'. The exterior built of brick, stone, and tile follows the style of the period. The plans provided for three stores on the ground floor; an auditorium with two balconies and a stage nearly as large as the auditorium.

Fifty years ago theatre accidents from fires, unsafe floor construction and inadequate exits were not uncommon. Today, we rarely hear of theatre fatalities.



1886

THE CASINO THEATRE, NEW YORK

KIMBALL & WISEDELL, ARCHITECTS

From issue of August 29, 1885

The editorial columns of *THE AMERICAN ARCHITECT* on August 29, 1885, in referring to the Casino said, "In its construction, an unusual amount of terra cotta has been used, which has enabled the architects to secure a richness of effect that could have been obtained in no other way so inexpensively." After forty years, during which time many stage notables have appeared upon its boards, the Casino is still in active service on Broadway.



1896

THE SCHILLER THEATRE, CHICAGO, ILL.

ADLER & SULLIVAN, ARCHITECTS

From issue of January 9, 1897

One instantly recognizes the boldly silhouetted cornice with its vigorous but lacelike pattern moulded in terra cotta, as the work of Louis Sullivan. It was among the first structures to combine the theatre and high office building as one project.

THE AMERICAN ARCHITECT in its pages has always advocated stringent rules for the arrangement; construction, and care of theatres. To its influence can be traced many of the safety precautions found in the theatre codes.

GOLDEN ANNIVERSARY NUMBER

THEATRE BUILDINGS

1906

LYCEUM THEATRE, NEW YORK

HERTS & TALLANT, ARCHITECTS

From issue of July 29, 1905

The influence of the designers of the Lyceum has been seen throughout America. The Lyceum approaches the monumental and shows distinct French influence in its ornamentation.

The Iroquois Theatre fire in Chicago which occurred in 1904 was still before the public eye and the subject of serious investigation in formulating codes for the safeguarding of theatres and their patrons. J. B. McElfatrick, the designer of more than a hundred theatres died in June, 1906.



1916

CORT THEATRE, BOSTON, MASS.

C. H. BLACKALL, ARCHITECT

From issue of March 31, 1915

A theatre built upon a site of unusual shape, having but small frontage on the principal street. The moving picture theatre had not yet exerted any marked change in theatre design and in general arrangement it is much like the amusement houses of earlier date. A reduction in the space allotted to the stage is noticed but a second balcony is still in evidence as well as the proscenium boxes.



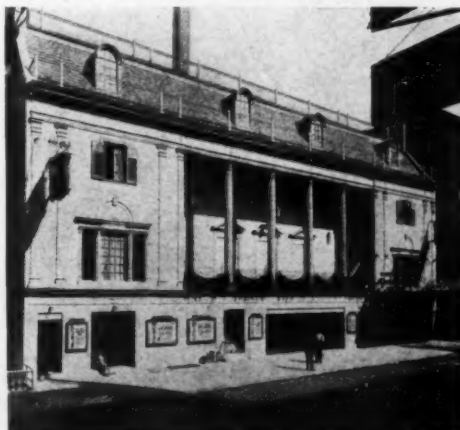
1926

MUSIC BOX THEATRE, NEW YORK

C. HOWARD CRANE, ARCHITECT

From issue of February 1, 1922

A theatre of quiet dignity and simplicity built upon a square lot fronting on a principal street. The stereotyped proscenium box has disappeared from the orchestra floor and has been replaced by a large balcony box of decorative interest. The second balcony has been eliminated. Pleasant dressing rooms have been provided for the artists and comfortable lounging rooms for the patrons. Few better equipped stages are to be found in America.



BANK BUILDINGS



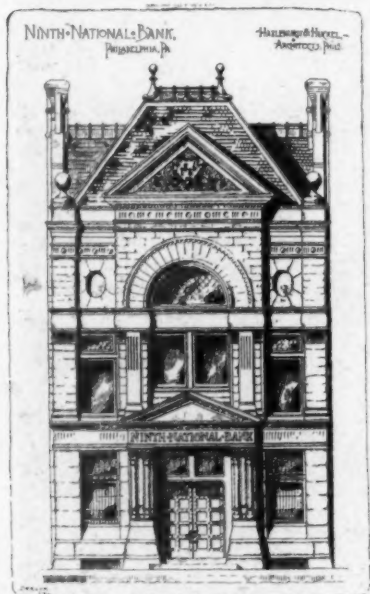
1876

SAFE DEPOSIT CO., BALTIMORE, MD.

E. F. BALDWIN, ARCHITECT

From issue of January 15, 1876

This building of Baltimore pressed brick; Cheat-River stone cornice, door and window trim; polished Quincy granite columns and base, with decorative tile in the cornice and below the main windows, followed the prevailing style of the time. The foundation walls 3' 6" thick were of brick laid and grouted in cement and the walls rested on concrete footings. The roofing slates were laid in cement over hollow tile blocks, and in turn these were supported by iron trusses.



1886

NINTH NATIONAL BANK, PHILADELPHIA, PA.

HAZELHURST & HUCKEL, ARCHITECTS

From issue of December 11, 1886

The banking room, 40 feet high, was lighted by means of a skylight. The floors were of tile and the side walls were tiled to a height of six feet. The interior trim was of cherry, a wood in great favor at the time. The exterior facing was of Indiana limestone. The building was steam heated and ventilated. It was built upon a site 36' x 100'. The construction followed the best known methods of fireproof building at that time and the cost is said to have been forty thousand dollars.



1896

CEDAR RAPIDS SAVINGS BANK BUILDING,

CEDAR RAPIDS, IOWA

JOSSELYN & TAYLOR CO., ARCHITECTS

From issue of January 11, 1896

This was the first fireproof building of any size and the first business building over four stories high to be built in Cedar Rapids. It contained six stories and a basement. Elevator service was an outstanding feature. Sioux Falls purple jasper was used for the exterior facing of the lower stories with polished red granite pilasters at the entrance and terra cotta trim to match the cut jasper. The interior was finished in oak.

GOLDEN ANNIVERSARY NUMBER

BANK BUILDINGS

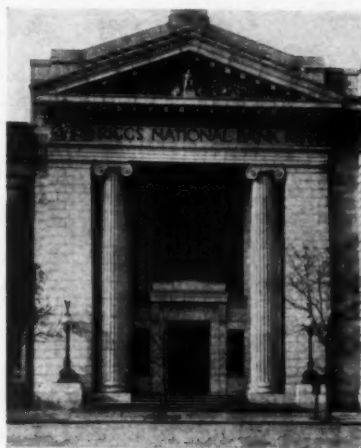
1906

RIGGS NATIONAL BANK, WASHINGTON, D. C.

YORK & SAWYER, ARCHITECTS

From issue of May 12, 1906

With the beginning of the Twentieth Century there came a decided trend toward simplicity in design and the use of materials. Architects were once more returning to the realization of the importance of mass and proportion as a means of securing effects, without the use of contrasting colors and textures. There are now seen few, if any, new buildings combining cut stone, rock faced stone, brick, terra cotta and tile in one facade.



1916

FRANKLIN NATIONAL BANK, PHILADELPHIA, PA.

FURNESS, EVANS & CO., McKIM, MEAD & WHITE,

ASSOCIATED ARCHITECTS

From issue of June 27, 1914

A building which typifies the strength and security of banking institutions. The simplicity and dignity of the exterior add to our confidence in those who have control of the bank's policies. Architects have seriously studied bank building requirements until today they not only facilitate the work of the employees but enable the institutions to render other services to its depositors and clients in addition to the protection of funds and securities. Every facility is offered to make banking easy and convenient.



1926

PONTIAC COMMERCIAL AND SAVINGS BANK, PONTIAC, MICH.

SMITH, HINCHMAN & GRYLLS, ARCHITECTS

From issue of July 30, 1925

A present day tendency is toward the building of revenue producing bank buildings. This has gradually evolved through the increased value of land in locations essential to the conduct of banking business. The combining of the bank and office building has been largely made possible through the successful development of vault construction and protective devices. The lack of these at one time made the isolated building highly desirable to safeguard its contents.



THE AMERICAN ARCHITECT

MUNICIPAL BUILDINGS

1876

BROOKLYN MUNICIPAL BUILDING, BROOKLYN, N. Y.

CORNWALL & MAYNWICKE, ARCHITECTS

From issue of December 2, 1876



The design of public buildings erected during the period immediately following the Civil War shows a marked French influence in the use of superimposed orders and heavy mansard roofs. The roof crestings, round dormer openings and horizontal band courses seen in the Brooklyn Municipal Building are typical details seen in other buildings built fifty years ago.

1886

CITY HALL, ALBANY, N. Y.

H. H. RICHARDSON, ARCHITECT

From issue of September 11, 1886



CITY HALL ALBANY, N.Y.

Early traditions of architectural design were rapidly disappearing forty years ago. Architectural education and travel had received a stimulus, architectural "schools" were in the process of evolution. Richardson's work had a notable effect in the architecture of public buildings in the United States. His followers rarely approached the dignity and excellence of composition which he secured. The movement, however, marked a turning to new lines of thought and architectural character.

1896

CITY HALL, PATERSON, N. J.

CARRERE & HASTINGS, ARCHITECTS

From issue of February 15, 1896



Buildings erected in the 90's exhibit a most academic aspect. Renaissance work in Europe was carefully studied and usually became the inspiration for public and monumental buildings. Leading architects spent much time in traveling abroad, after bringing back to the United States measured drawings of work found in England, France and Italy. College education was receiving more general attention and architectural schools were growing in size and scope.

GOLDEN ANNIVERSARY NUMBER

MUNICIPAL BUILDINGS

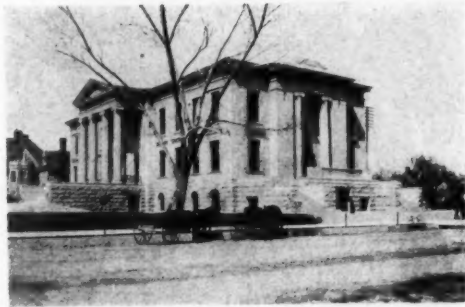
1906

CITY HALL, COLORADO SPRINGS, COLO.

T. MacLAREN, ARCHITECT

From issue of August 19, 1905

The advance in education and recognition of the importance of studying fundamentals produced noticeable results by 1906. Architecture throughout this period usually shows an appreciation of classic forms and their use in a simple and effective manner.



1916

MUNICIPAL BUILDING, WATERBURY, CONN.

CASS GILBERT, ARCHITECT

From issue of December 15, 1915

Modern construction methods were well established and the utilitarian value of buildings was being emphasized ten years ago. This resulted in the beginning of what we look forward to—if it is not already here—an American style of architecture.



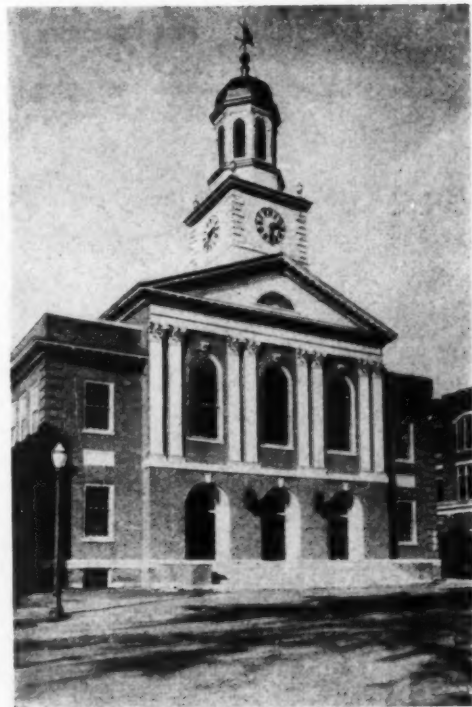
1926

LEBANON TOWN HALL, LEBANON, N. H.

LARSON & WELLS, ARCHITECTS

From issue of February 11, 1925

Pride in civic structures has always been in evidence throughout the history of civilized countries. Dignified buildings have doubtless been inspired by the dignity of government; the regard for those who make and uphold law and order; and respect for local or national bodies. Municipal buildings present in themselves an interesting development from the modest town hall to the monumental structure often rising to the proportion of the high office building in order to meet the demands of the numerous executive and departmental offices of the modern city. Space must be provided for various commissions, committees and bureaus found necessary to meet new conditions of rapidly expanding centers of population. The plan must possess simple direct circulation to meet the convenience of the public.



THE AMERICAN ARCHITECT COMMERCIAL BUILDINGS



1876

THE JOHNSTON BUILDING, CINCINNATI, OHIO

JAS. W. McLAUGHLIN, ARCHITECT

From issue of December 23, 1876

Offices, usually including two windows and very deep in proportion to their width, are typical of the 70's. Corridors were often poorly lighted. The office building with an elevator was the unusual rather than the expected. The exteriors were curiously of brick with stone trimmings or of gray freestone. Windows were generous and often reached nearly to the floor. Stores or banking space usually occupied the ground floor. There were 90 offices in the upper stories of the Johnston Building.

1886

THE STANDARD OIL BUILDING, NEW YORK

E. L. ROBERTS, ARCHITECT

THE WELLES BUILDING, NEW YORK

G. R. AND R. G. SHAW, ARCHITECTS

From issue of February 27, 1886

Bowling Green is seen in the foreground of two buildings but recently demolished and replaced by a much larger structure modern in every sense. Note the absence of automobiles but the congested telephone pole with eight cross arms probably carrying between forty and fifty wires. The problem of placing wires underground was then engaging the attention of electrical engineers.



1896

THE GUARANTY BUILDING, BUFFALO, N. Y.

ADLER & SULLIVAN, ARCHITECTS

From issue of July 11, 1896

One of the earliest of the tall buildings in which the ideas of Louis Sullivan prevail and considered by many to represent the best phase of his work. The ornamentation is characteristic of Sullivan. After thirty-five years the Prudential Building, as it has been renamed, still ranks high among modern office buildings. Few buildings express so well the steel skeleton enclosed by the terra cotta covering used as an exterior facing and may be safely taken as a milestone in the evolution of the modern office building.

GOLDEN ANNIVERSARY NUMBER

COMMERCIAL BUILDINGS

1906

COMMERCIAL NATIONAL BANK BUILDING, CHICAGO, ILL.

D. H. BURNHAM & CO., ARCHITECTS

From issue of June 8, 1907

The steel skeleton frame, fireproofing the elevator, and the telephone have all contributed to making the high office building practical. With these it has been necessary to develop systems of heating and ventilating, plumbing, and electric light and power. Many modern structures are equipped with independent power, light and heating plants and depend only upon outside supply of water and telephone for their operation. Engineers often have been faced with gigantic problems of securing foundations adequate to carry the weight of the superstructure.



1916

BUSH TERMINAL BUILDING, NEW YORK

HELMLE & CORBETT, ARCHITECTS

From issue of October 17, 1917

The designers of modern office buildings are often called upon to solve many unusual and difficult problems. A tall building on a narrow lot may be accepted as unusual in most cities, although a not infrequent problem in New York. Rising to majestic heights the Bush Terminal will doubtless remain a New York landmark for many years. After ten years it remains one of the sights no visitor to the metropolis should miss. The building at night is an excellent example of the value of well studied night illumination and appears to take on new character and individual interest possessed by few other structures.

1926

STANDARD OIL BUILDING, NEW YORK

CARRERE & HASTINGS, SHREVE, LAMB & BLAKE, ARCHITECTS

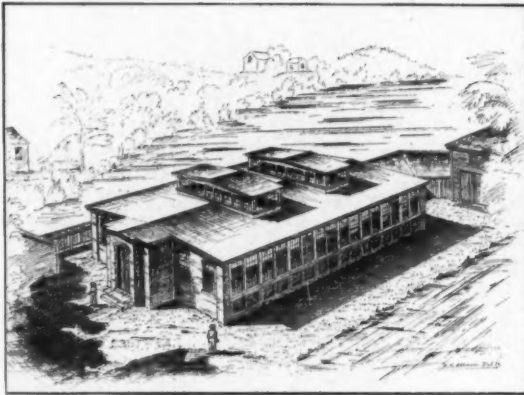
From issue of January 14, 1925

Built upon an irregular plot, the former site of the earlier Standard Oil Building and the Welles Building, an unusual problem confronted the architects. Added to this there was the necessity of completing a portion of the building so that the offices could be utilized before the entire structure was finished. Telephone, telegraph and electric light poles have disappeared and practically all of the horse drawn vehicles are obsolete and replaced by motor driven cars and trucks.



THE AMERICAN ARCHITECT

INDUSTRIAL BUILDINGS



1876

DESIGN FOR A WEAVING MILL

W. H. H. WHITING, ARCHITECT

From issue of August 9, 1879

Mill or slow burning construction as practical fifty years ago was used in the design of this one story textile factory. The mill was 52 ft. x 85 ft., built of brick, with the sides completely filled with windows. It was designed along strictly utilitarian lines with no attempt at architectural embellishment. Note the roof monitors which are typical of this period.



1886

CHADWICK LEAD WORKS, BOSTON, MASS.

WM. G. PRESTON, ARCHITECT

From issue of May 7, 1887

Mid-Victorian ideas in design had practically disappeared. It became common practice to build five and six story buildings and more thought began to be given to the architectural treatment of all buildings, including factories. This was a period of the round arch, repressed brick, sandstone and metal cornices. In the design of the Chadwick Lead Works Building, we see a marked similarity to bank buildings, theatres, apartments, schools and other buildings of the 80's. The interior construction was very likely of heavy timber joists, girders and wooden posts. Fireproof construction had not yet come into general use. Factory fires were frequent; protection facilities were often inadequate, and fire prevention was not given the study it has received during the 20th Century.

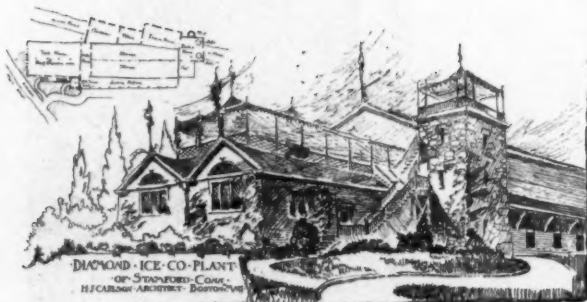
1896

DIAMOND ICE COMPANY PLANT,

STAMFORD, CONN.

H. J. CARLSON, ARCHITECT

From issue of October 17, 1896



While mechanical refrigeration was in use at this time, plants for making ice were not as common as they are today. The architect was to incorporate in his design an old stone tower that stood on the site, and also provide for a roof garden. The result was a picturesque character not often found in buildings of the time.

GOLDEN ANNIVERSARY NUMBER

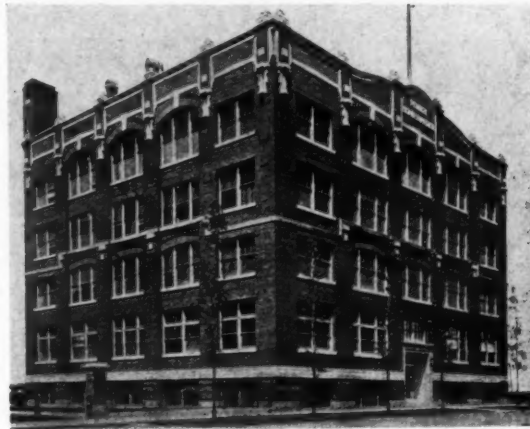
INDUSTRIAL BUILDINGS

1906

PELOUZE SCALE AND MFG. CO.,
CHICAGO, ILL.
HILL & WOLTERS DORF, ARCHITECTS

From issue of November 10, 1909

Fireproof construction came into extensive use about this time, especially in connection with factory buildings. Reinforced concrete joist and girder construction was the type then in vogue for flat slab construction had not yet been invented. A tendency toward simplification in exterior design is seen as a contrast with that of twenty years earlier.



1916

N. Y. CONSOLIDATED CARD CO.,
LONG ISLAND CITY, N. Y.
BALLINGER & PERROT, ARCHITECTS

From issue of March 22, 1916

Following the use of reinforced concrete as a medium of interior construction in factories, it came to be used for the exterior as well. Factory construction became a simple direct expression of the structural elements. Steel sash invented and made commercially available enabled designers to take full advantage of their serviceability to secure a maximum amount of daylight.

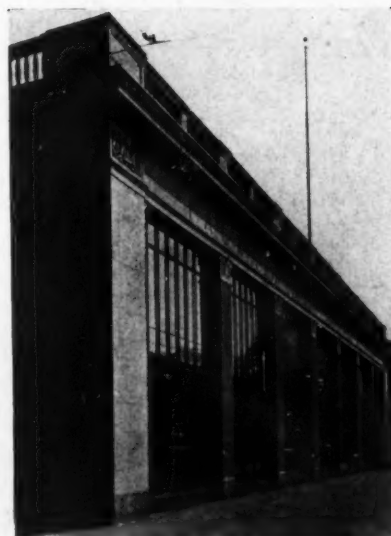


1926

PACKARD MOTOR CAR CO., DETROIT, MICH.
ALBERT KAHN, ARCHITECT

From issue of May 6, 1925

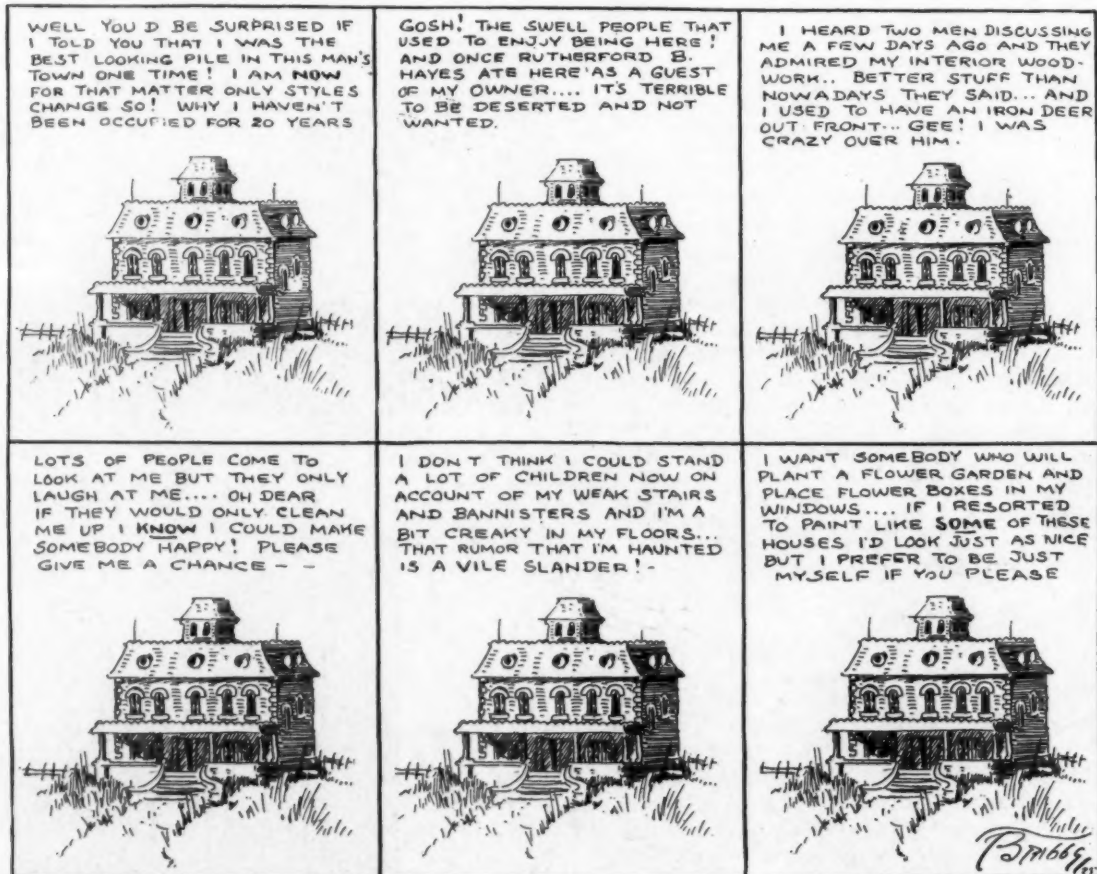
A better understanding of the uses of materials accompanied the advances in fireproof construction and architects began the serious consideration of factories as an architectural problem. Manufacturers have come to realize that good architecture is an asset to industry. The good appearance of individual buildings, a logical grouping of buildings and foresight in providing for future expansion is recognized as being of economic importance. The ability of architects to plan buildings for maximum service is perhaps appreciated by manufacturers now as never before. Through proper planning, manufacturers are often able to reduce production costs, secure volume output and route material through the factory with minimum effort.



"A LITTLE NONSENSE NOW AND THEN—"

"Wonder what an empty house thinks about?" This question is asked and answered by Clare Briggs, well known as the cartoonist of the *Herald-Tribune* of New York, in the cartoon reproduced below by permission of Mr. Briggs and the Herald-Tribune Co.

The architectural reader will appreciate the subtlety of Mr. Briggs' clean humor. The same question could be asked as to every one of the preceding examples of buildings fifty years old. There is a certain pathetic appeal in an old building, and the traditions of occupancy that cluster about it. It is good to feel a respect for dignified old age, and Mr. Briggs in his cartoon has by a few clever pencil strokes and some aptly chosen words, set the appeal of old buildings insistently before the reader.



CONCRETE CONSTRUCTION

Portland Cement which made possible the rapid development of concrete construction during the past fifty years is now but a century old

"AMERICAN INGENUITY"

"IT MAY almost certainly be predicted of any modern mechanical congress that the Americans will carry off the palm for novel and ingenious application of force to practical purposes. *** The mass of invention and practical result from it produced *** especially within the last twenty or thirty years, is so great and so important in results that it presents an important problem in political economy. *** We may say that the most curious feature of American mechanics is its distinctively American feature. As mechanical science progresses, the greater and more important inventions become elaborated by, and the property of, the nation which pushes the science furthest in its experimental studies. ****

"Yet in spite of this the activity and insight of the American inventive genius develops more that is new and practical in mechanism than all Europe combined. The New Englander invents normally; his brain has a bias that way. He mechanizes as an old Greek sculptured, as the Venetian painted, or the modern Italian sang. A school has grown up whose dominant quality, curiously intense, widespread, and daring, is mechanical invention*****"

WHILE this expression of English opinion published in an issue of the *London Times* in 1878, might properly apply to any material or invention selected, it is reflected in no small degree in the development of Portland cement and concrete construction.

Cement was known and used by the early Romans and Egyptians, but the production of cement in Europe dates from the middle of the eighteenth century. These, however, were of the natural or puzzuolana cement variety for Portland cement, credited as an invention of Joseph Aspdin of Leeds, England, in 1824, was apparently unknown.

The construction of the Erie Canal, begun in 1817, marked the beginning of the use of cement in the United States. The manufacture of natural cement was begun by Canvas White, in 1818, near Fayetteville, N. Y. Natural cement production had a steady growth and by 1873, it is said to have reached two million barrels.

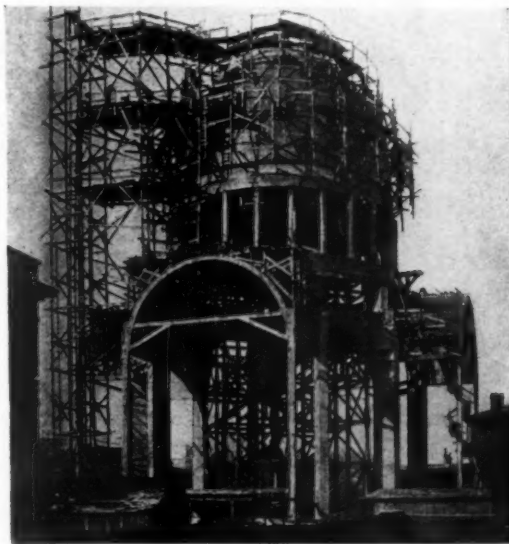
In the early 70's, David O. Saylor of Coplay,

Penn., and John K. Shinn of Wampum, Penn., began experiments to produce a Portland cement similar to that then being imported from England. The product of both received awards at the Centennial Exposition held in Philadelphia in 1876. Importation of Portland cement from abroad, coupled with foreign intensive merchandizing methods and the low cost of transportation afforded by wood sailing ships frequently loading it as ballast, greatly retarded the growth of the industry in America and was largely responsible for early prejudice against the use of the domestic product. The latter, which grew in ten years from a production of less than ten thousand barrels in the early 70's to sixty thousand, still had to contend with imports amounting to over two hundred thousand barrels. American producers by the

beginning of the twentieth century had largely overcome financial, mechanical, and scientific handicaps, and found themselves on an equal footing with foreign brands. By 1905, it was estimated that not over ten per cent of the cement used in the United States came from England, France, and Germany.

Lack of standardization of the product retarded its use for other than pavement foundations, sidewalks, mass foundations and work of similar nature. In 1896 R. W. Lesley compiled ninety-one specifications for Portland cement and found that scarcely any two agreed as to the proportions, fineness, burning or testing methods and

strength to be developed. The first advance came with the adoption of a standard specification for Portland cement in 1904 by the American Society for Testing Materials. In that same year a joint committee consisting of representatives from societies interested in the use of cement as a structural material was formed, gradually expanded to include other organizations, and further developed



From *The American Architect*, August 12, 1905

CONSTRUCTING THE REINFORCED CONCRETE CHAPEL
BUILDING, U. S. NAVAL ACADEMY ANNAPOLIS, MD.
ERNEST FLAGG, ARCHITECT

THE AMERICAN ARCHITECT

the standard specification. As a result, cement today must pass a two hundred mesh sieve, and develop twice as much strength as the product of 1880 which passed a fifty mesh sieve.

A comparatively recent development and an outcome of the World War is that of a cement which acquires a twenty-eight day strength in twenty-four hours.

The producers of natural cement realized about 1900 that their product could no longer compete with Portland cement. Some plants were abandoned, some converted their output to Portland cement, while others set about making a superior form of mortar for use with brick and tile, or stucco and plaster wall coverings.

In fifty years the cement industry has grown from a small beginning to one operating well over one hundred manufacturing plants producing more than one hundred fifty millions of barrels of cement a year. Many individual plants today produce more cement than the combined output of all those operating in the United States thirty-five years ago.

REINFORCED CONCRETE

If the writer who said in a May, 1876, issue of *THE AMERICAN ARCHITECT*,

"Experience is constantly establishing unexpected things, but we should be greatly surprised to see any construction of iron overlaid with concrete prove durable in the Northern United States."

has lived to view reinforced concrete as it is accepted today, he must be greatly surprised.

Concrete construction was not an entirely new idea in 1876 for in 1837, Geo. A. Ward built his residence at New Brighton, Staten Island, N. Y., of concrete moulded on the site. In 1852 Horace Greeley, the editor of the *New York Tribune* built at Chappaqua, N. Y., a three story concrete barn, which has since been altered into a residence, and in 1867 a concrete dwelling was built at Winona, Minn.

The first reinforced concrete building to be built in the United States was the residence of William Ward at Port Chester, N. Y., of which Robert Mook of New York was the architect. The entire house was monolithic in construction,

the walls, floors, and roof being built of concrete, light I-beams and iron rods. The better part of four years was spent in its construction which was begun in 1873.

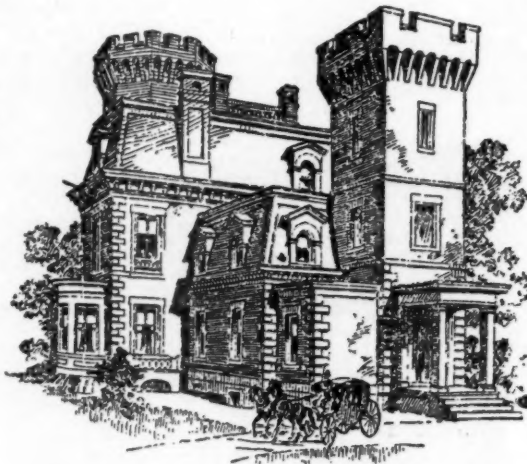
The period from 1875 to 1885 in the history of "armored concrete" might be termed the experimental stage. Supporting the concrete on a framework of iron or wood was the generally accepted theory. One theorist suggested the designing of concrete floor slabs as if made of cast iron. In 1883, another proposed "To bind together masses of concrete by mixing iron wire into the soft material, as hair is added to plastering mortar."

In 1877, Thaddeus Hyatt, a sidewalk light manufacturer of New York, published a series of experiments which he had conducted in England in conjunction with David Kircaldy of London in a pamphlet called, "An Account of Experiments with Portland Cement Concrete Combined with Iron as a Building Material." In the light of later research, Hyatt's experiments and conclusions have considerable significance. He is the first inventor on record to point out that the coefficient of expansion by heat was nearly the same for Portland cement as for wrought iron and to base his experiments upon the employment of iron to resist the tensile strain and concrete to sustain the compressive strain. Hyatt's experiments had been made with flat bars $\frac{1}{4}$ " thick set vertically near the bottom of the slab and tied together with $\frac{1}{4}$ "

wires run through holes punched in the bars.

While P. H. Jackson conducted successful experiments in the United States with this system in 1884, the idea was not generally adapted in either England or the United States, probably due, as a writer in 1888 said, "to the general disinclination to adopt new and novel methods of construction, however meritorious they may be."

E. L. Ransome of San Francisco, experimented, and patented in 1884, a system similar to Hyatt's, but in which he used twisted bars to obtain sufficient bond between the steel and concrete. This was suggested to him through the use of wire cables as a bond in concrete walls. The idea was proven fundamentally sound and used in two



THE WILLIAM WARD HOUSE IN PORT CHESTER, N. Y. WAS BUILT IN 1873-7 AND WAS THE FIRST REINFORCED CONCRETE STRUCTURE TO BE ERECTED IN THE UNITED STATES. THE ABOVE ILLUSTRATION APPEARED IN THE *AMERICAN ARCHITECT* OF SEPTEMBER 1, 1883

GOLDEN ANNIVERSARY NUMBER

warehouses built by Ransome in 1884 and 1885, a factory building for the Pacific Coast Borax Company at Bayonne, N. J. in 1887, the California Academy of Science in 1888-9, various buildings at Leland Stanford, Jr. University at Palo Alto, Calif., and elsewhere. The interest and co-operation of G. W. Percy, architect of many of the early buildings in which the Ransome System was used, was doubtless a factor in hastening the development and use of reinforced concrete in America.

Even in the late 90's, little was known of the possibilities of this form of construction and engineers were skeptical of it. It was not until the early twentieth century that architects and engineers looked upon it as safe construction. During this time, various ideas for reinforcement were advanced, ranging from the use of wire mesh to numerous forms of deformed bars. To further engineering knowledge of the subject, The American Society of Civil Engineers and the American Society for Testing Materials in 1903 appointed committees to investigate concrete and steel construction.

Credit must be given M. Francois Hennebique who in 1900 or 1901 is said to have been the



From The American Architect, October 6, 1888

HYATT'S REINFORCED CONCRETE SLAB. THE VERTICAL BLADES OF IRON WERE PLACED IN THE BOTTOM OF THE CONCRETE AND ANCHORED AT INTERVALS OF A FEW INCHES BY ROUND WIRES THREADED THROUGH HOLES PUNCHED OPPOSITE EACH OTHER IN THE VERTICAL BLADES. THESE FORMED A SKELETON OR GRIDIRON

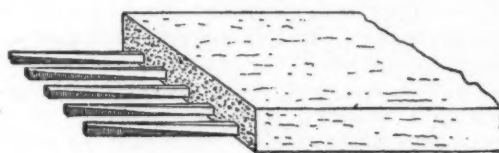
first to recognize the importance of providing for shearing stresses in the concrete through the use of stirrups. Following this French development, American inventions of bars with stirrups and truss attachments and various unit systems of reinforcement appeared almost without end. The resulting condition became a matter of a survival of the fittest until today, the quantity has been reduced to those found flexible and economical.

With a rational method of reinforcement and a more perfect understanding of engineering principles, there has come a logical use of concrete construction. The importance of maintaining safe designing methods, care in the selection of materials and honest workmanship are so generally recognized now that we rarely find conditions such as are recorded forty or fifty years ago and referred to as "scamping."

An important advance in the depositing of concrete was developed early in the twentieth century by Carl E. Akeley, the inventor of the "Cement Gun." This was first used in 1908 for the coating

of the exterior walls of one of the old Columbian Exposition Buildings in Chicago. The mortar used in the "Cement Gun" has been appropriately named "Gunite." It has been successfully used for wall coatings, fireproofing and reinforced structural work.

Hollow walls of concrete and cement moulded into solid blocks were conceptions of fifty years ago. Hollow blocks had been patented in England in 1875 but it was not until 1900 that American ingenuity placed them upon a commercial basis. By 1908 literally hundreds of patents had been

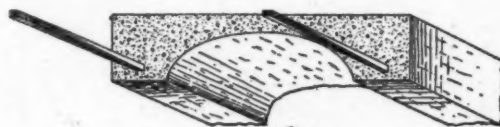


From The American Architect, October 6, 1888

E. L. RANSOME'S CONCRETE SLAB REINFORCED WITH SQUARE TWISTED IRON OR STEEL BARS PATENTED 1885. AN EVIDENT IMPROVEMENT OVER HYATT'S SYSTEM

taken out for various types of blocks and machinery for manufacturing them. Early efforts to mould the blocks in imitation of rock faced stone were unfortunate and prejudiced the architects as to their use. This practice of attempting an impossible imitation has practically disappeared and the blocks today are frankly units of concrete. Solid concrete units in brick sizes have also been developed and extensively used during the past decade.

During the past quarter of a century numerous concrete accessories have been placed upon the market, such as floor hardeners, set accelerators, waterproofing pastes and compounds, acid proofing solutions and anti-freezing compounds. There are



From The American Architect, October 6, 1888

SIDEWALK ARCH AND BEAM REINFORCED BY SQUARE TWISTED BARS. THE SYSTEM OF REINFORCEMENT INVENTED BY E. L. RANSOME. RESULTS OF TESTS WERE PRESENTED AT A MEETING OF THE TECHNICAL SOCIETY OF THE PACIFIC COAST AUGUST 10, 1884

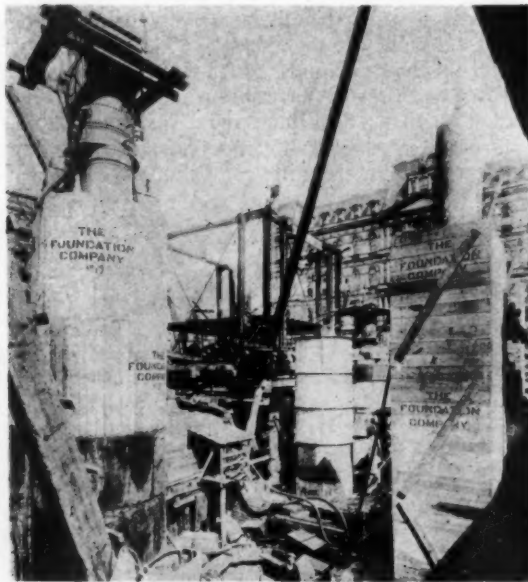
also devices for the securing of floor sleepers, hangers, pipe shafting, etc. The cost and waste attendant to the use of wooden forms created a demand for metal forms which could be removed and used over again. The first removable steel form for concrete joist construction is said to have been invented in 1912 by C. Louis Meyer.

THE AMERICAN ARCHITECT

FOUNDATIONS

For some years, in the United States, heavy planking and timbers were used extensively for foundations. As late as 1893 these were used to support many of the buildings of the World's Fair held in Chicago. Improvements over this type of construction occurred with the use of railroad rails piled in cross tiers and encased in concrete. The development of rolled steel brought another advance and I-beams placed close together and overlaid with iron rails came into use. The Tacoma Building in Chicago, built during the late 80's, of which Holabird and Roche were the architects, was the first construction of note in which only steel beams encased in concrete were used as grillage foundations. One hundred and twenty tons of steel were used in the foundation of this twelve story building.

Open caissons or masonry wells were the early methods used for deep foundations. Pneumatic caissons, which had been in use for bridge construction, were first used, for building foundations in 1893 on the Manhattan Life Insurance Building, designed by Kimball and Thompson, in New York City. Fifteen caissons were sunk, by compressed air to a depth of fifty-five feet below the street level for a distance of thirty-five feet following an open excavation of twenty feet. Concrete was used as a filling. Another notable feature of this building was the use of cantilever girders to support the side wall columns.



MORAN AIR-LOCK PNEUMATIC CAISSONS USED IN CONSTRUCTING THE FOUNDATIONS OF THE WOOLWORTH BUILDING, NEW YORK CITY, ERECTED IN 1911

Up to 1900 the accepted idea of a pile was the wooden type. At that time the possibilities of using Portland cement concrete in a similar way were soon recognized. The reinforced precast pile similar to the wooden form driven by the hammer or waterjet method was naturally the first considered.

Engineers then turned their attention to the development of the moulded in place pile. The Simplex pile, formed by driving a steel pipe or shell having a detachable point, into the ground, filling the shell with concrete and then withdrawing the steel shell, was probably the first type used commercially. The Raymond pile consisting of a tapered permanent casing of light metal placed upon a collapsible mandrel as a driving form which is withdrawn and the casing then filled with concrete, was placed upon the market about 1905. In 1907 the MacArthur Concrete Pile & Foundation Co. introduced a type of concrete pile with an enlarged base, formed in a manner similar to the Simplex pile. Recently this system has been improved by depositing the concrete under high pressure. A casing and close fitting core are driven into the ground, the core removed, and the casing filled with a dry mix of concrete. The load of the core and hammer is then placed on the concrete and the casing is withdrawn. If necessary, a pedestal may be formed at the point of the pile by driving out concrete under the blows of a steam hammer. Steel pipes driven into the ground and later filled with concrete have been used within the past ten years to provide for unusual loads. These pipes are sometimes provided with a point and sometimes open-ended, in the latter case they are later cleaned by compressed air. To secure a solid bearing at depths greater than 40 feet, composite piles, consisting of a concrete pile driven on top of a wooden pile have been developed within the past few years by organizations specializing in this type of work.

The editors desire to acknowledge their indebtedness to the following organizations for their co-operation in furnishing much valuable information which supplemented and often completed the story as recorded in the volumes of THE AMERICAN ARCHITECT: North American Cement Corporation, Alpha Portland Cement Company, Atlas Luminite Cement Company, Cement-Gun Company, Inc., Concrete Engineering Company, Louisville Cement Company, MacArthur Concrete Pile & Foundation Company, Munson Manufacturing Company, Riverside Portland Cement Company, The Carney Company, The Portland Cement Association, The Solvay Process Company, The Truscon Laboratories, History of the Portland Cement Industry in the United States.

CLAY PRODUCTS

Among the oldest materials used in construction, the development of which during the past fifty years exceeds that of preceding centuries

THE origin of the manufacture of burned clay products, for ages one of man's chief building materials, is lost in the misty dawn of civilization. There is evidence that the art was well advanced at the time Babylon and Ur were built. Numerous examples of the early use of brick and terra cotta are found in Egypt, China, Southern Asia, and Italy. Ancients the world over were masters of the art of moulding and sun drying plastic clay which enabled them to rear enduring structures.

Pioneers to this country brought with them traditions of brick made and used in their mother lands. Ships or "wind jammers" as they were called, used brick as ballast, which was traded for commodities to be sold in Europe. Brick making in the United States dates from the middle of the seventeenth century. Virginia, whose remarkable clay, well known to those who have had occasion to journey through that state, was possibly the birthplace of the brick industry although New England and the Hudson River Valley have much to support their claim to this honor.

As land needed to be cleared of timber, lumber was easily and cheaply available during the early history of our country, and brick consumption was not great. Growing cities increased the demand for brick and after the Civil War construction work acquired a new impetus. The fires of 1871 and 1872 in Chicago and Boston emphasized the necessity for more thorough fire protection in all cities. Burned clay products were logical materials to use.

Increasing demands led to improved production methods, and the horses and carts of the late 70's, which were used to draw the clay mined by hand to the moulding yards, were replaced by a track and horse drawn cars. These were followed by the adoption of locomotives to haul the cars and steam shovels for mining the clay.

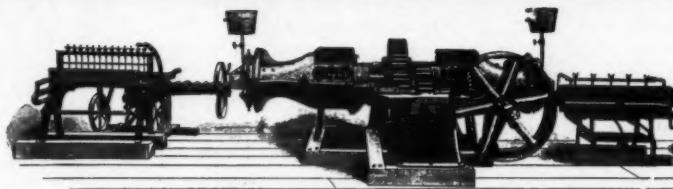
As late as 1890, the soft mud process for the manufacture of brick was much in use. Clay and water was mixed in a pit, about twenty feet in diameter, by large wheels on a sweep operated by horses or steam power. In the late 90's electricity had largely superseded these as motive power. About the same time

a machine was perfected to sprinkle sand, heretofore done by hand, on the brick to prevent their sticking to the moulds.

The stiff mud process and power presses were not extensively used until 1890. Disintegrators and pug mills replaced the tempering pits for preparing the clay for the moulding machine. After being forced through the die of the moulding machine and automatically cut to size brick intended for facing were repressed to true them up before drying.

By 1875 anthracite coal had replaced wood for burning brick. Side wall kilns had largely replaced the old stove kiln and rack drying was used. In 1885 tunnel dryers began to replace rack dryers. About 1888 rectangular and down draft kilns came into use, although the rectangular up draft type continued to be used for certain kinds of brick. In 1895 another improvement was made in kiln construction by locating the firebox below the level of the kiln floor and the substitution of oil or bituminous coal as fuel for general use.

It was not until the nineteenth century that machinery was employed to any great extent in the



The Gray-Shelton Brick Machine.

WHILE THE SWEEP, WHEEL AND TEMPERING PIT MAY BE FOUND IN USE IN ISOLATED CASES, THE BRICK MACHINE SIMILAR TO THAT OF 1890 HAS BEEN AN IMPORTANT FACTOR IN THE ADVANCEMENT OF BRICK PRODUCTION AND HAS LARGELY REPLACED HAND MOULDING



From *The American Architect*, March 12, 1924
A TYPICAL EXAMPLE OF MODERN BRICKWORK. HOUSE
OF CHARLES WILSON, PELHAM, N. Y.
JULIUS GREGORY, ARCHITECT

manufacture of brick. In 1877 Philadelphia brick were being made at the rate of four hundred million a year of which fifty million were machine made. In 1878 Baltimore brick plants were employing steam in the manufacturing processes. Machinery continued to be developed and by 1900 quantity production had been largely perfected and few plants were making hand moulded bricks.

The production of brick had its most rapid growth from 1875 to 1900. The development of steel framed structures in the late 90's followed by the extensive use of reinforced concrete, together with the slowing up of building during the World War seriously handicapped the use of brick. The extent of this condition is realized when we learn that from some 5000 brick yards producing more than nine billion brick annually in 1909, only 1500 yards making about one-third of this quantity were operating in 1918.

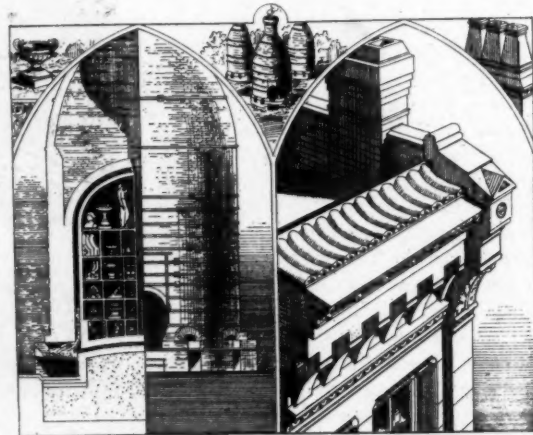
This affected both production and development for no incentive was given the manufacturers of brick making machinery to make improvements in this direction. With a complete realization of conditions the producers set about remedying the situation and once more brick production is on an upward trend. In 1924 production amounted to approximately eight billion bricks.

Lack of standardization in brick sizes was the

subject of unfavorable criticism even in 1877. Each district, and even plants in the same district, continued to produce brick according to their individual standards. In 1918 the Common Brick Manufacturers Association was organized and attempts were made to standardize the product. Complete unity in this respect has not yet been reached although standardization has been urged and approved by the Division of Simplified Practice of the Department of Commerce.

Common brick comprised the bulk of burned clay products a half century ago, although many favored localities were producing fire brick, and buff as well as red face brick. In November 1876, it was stated in *THE AMERICAN ARCHITECT*: "A new building material has lately been introduced in Philadelphia by the Brick Enamelling Company." This concern at that time enamelled daily about 6,000 brick in many shades and colors. Up to that time and even later the general demand for this type of brick lay in those imported from abroad. Foreign competition in enamelled brick has been largely eliminated within the past fifteen or twenty years.

THE AMERICAN ARCHITECT in 1876 commented upon the "mania for queer things" and referred specifically to tessellated brick. Again in 1880, this journal commented upon the revival of red brick for town houses. From 1875 to 1885 there was an increased use of face brick and it was said that no country produced the material in a greater variety of colors, forms and kinds, or used it as well as did the United States. The trend of that time is reflected in a letter published in *THE AMERICAN ARCHITECT* in 1881 in which the correspondent requested advice relative to the painting of brick before laying to obtain uniformity in color. As late as 1890 the demand for repressed



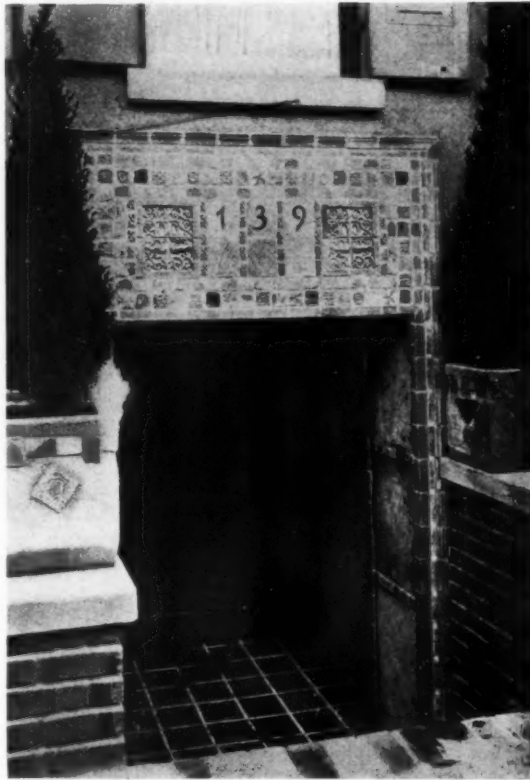
From *The American Architect*, December 30, 1876
SECTION AND ELEVATION OF TERRA COTTA KILN AND
SKETCH OF A TERRA COTTA CORNICE WHICH IS TYPICAL
IN CONSTRUCTION AND DETAIL OF THE LATE 70's

GOLDEN ANNIVERSARY NUMBER

red brick of uniform color, ornamental brick, and painted brickwork were in vogue. The making of gray brick in this year marked the first departure from this custom. A short lived demand in 1885 for white brick reverted to the use of gray.

About 1910 radical departures began to be made in both color and texture of brick. Various shades of red, buff, brown and gold began to appear and whereas brick, smooth surfaced, and uniform in color had been in demand, rough surfaced brick, or smooth mottled brick gradually appeared on the market. The building of the Harvard Gates exerted considerable influence on brick used for facing purposes in this country. Charles F. McKim of the firm of McKim, Mead and White, it is related, drove in a buggy—this was in the days before the automobile—to various brick yards seeking for a suitable brick of rough uneven texture and varying shades. The long sought bricks were finally found in a pile which had been discarded because of the qualities, considered by the maker as imperfections in the brick, which had attracted McKim's attention. Architects readily saw the possibilities of using brick of varying color, shade and texture to obtain new effects. The use of brick to form band courses, panels, frieze decorations and overall wall patterns developed and designers began the serious study of the varied uses of burned clay.

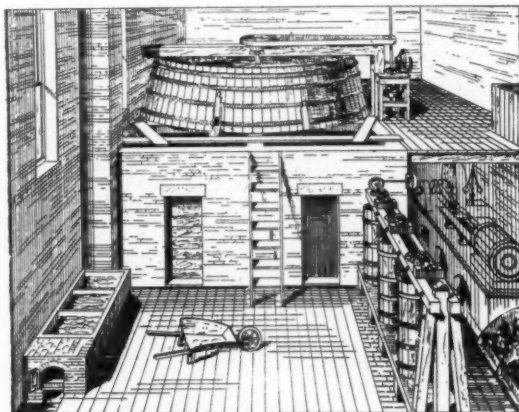
With brick of various colors and textures well advanced and the realization of the effects obtainable, a yet larger field developed through the methods of jointing. Fifty years ago, the joints were made as thin as the consistency of the mortar allowed and by 1885 red mortar color was being widely used, apparently further to efface and disguise the joint. From the butter thin joint a wide joint developed and black mortar color appeared,



From The American Architect, February 24, 1909

TILE AND FAIENCE USED TO FORM A DECORATIVE ENTRANCE WAY TO A HOUSE ON EAST NINETEENTH STREET, NEW YORK CITY

F. J. STERNER, ARCHITECT



From The American Architect, December 30, 1876

MACHINERY FOR WASHING, BOILING AND MIXING CLAY USED IN THE MANUFACTURE OF TERRA COTTA, 1876
MANUFACTURING METHODS HAVE IMPROVED IN 50 YEARS

to be followed in the 90's by the narrow buff joint, either flush or slightly raked out. After a season's use of the beaded joint, custom turned to the slightly recessed joint, one-half inch in width. This was followed by deeply recessed and frequently very wide joints, pointed with coarse mortar or scratched to correspond with the rough surface of the brick. Today, practice is most flexible and the designer freely uses a joint flush or recessed, wide or narrow, smooth or rough, as the exigency of the design requires.

The development of other forms of clay products closely paralleled that of the brick industry as many of the plants were equipped to make pottery, tiles, sewer pipe, drain tile, and terra cotta; and the mechanical processes are much the same for all.

About 1876 a steam press which replaced the earlier potter's wheel and boy screw press, was designed to form the pipe and socket of sewer pipe in one operation and marked an important progressive step. Following years showed decided advances in the manufacture of all forms of clay products. By the late nineteenth century many

THE AMERICAN ARCHITECT

plants were manufacturing large quantities of flue linings, wall copings, chimney tops, and hollow tile building blocks.

The use of clay products such as sewer and drain pipes, flue linings, wall copings and chimney tops has increased to such an extent that the manufacture of these products constitutes a separate branch of the industry. Through the clay products associations, the problems of production, standardization and utilization have been given collective consideration. The trained engineering staffs and research bureaus of these associations have made available much authoritative data, as a

result of careful study and investigation.

Hollow tile building blocks were probably evolved through the manufacture of brick with a round hole through the center to reduce the weight of the unit. It was but a step to increase the size of the units, make thinner walls, and introduce one or more webs to preserve the strength, and to score the outside face to provide a key for stucco, plaster or mortar. This type of clay product found ready and favorable use for partitions, wall backing, floor and roof arches and the fireproofing of steel and cast iron columns. Throughout the nineteenth century patents were obtained for an endless variety of hollow tile blocks of different design. Many of them were developed in conjunction with fireproofing systems paralleling the growth of the steel skeleton frame.

An outstanding development of the year 1890 was the introduction by T. G. Lee of sawdust in the clay mixture which produced a porous, light weight hollow building block. Fifteen years later Wm. E. Wilson patented the "Dennison load-bearing tile" which allowed the use of hollow tile as a structural material. Following this, other inventions occurred along the same line until now we find the material extensively used and obtainable in a variety of types to meet the demands of modern construction. According to the figures of the Department of Commerce, Bureau of Census, the hollow tile industry has grown from a production of 2,216,000 tons in 1913 valued at nearly \$15,000,000 to 3,759,791 tons valued at over \$28,000,000 in 1923.

Within the past fifteen years, further developments in the clay industry have been effected and the product used for septic tanks, silos, chimneys, flashing blocks, and window sills. Hollow tile blocks have also been developed as a facing material. Early attempts to mould the surface in

imitation of rock face stone were found to be unsuccessful and manufacturers wisely returned to a true expression of the material itself and began to study the proportion of the block size or impart to the exposed surface an individual texture.

The names of the late George H. Johnson and

his son, Ernest V. Johnson, pioneers of the industry in Chicago and Henry M. Keasbey and Henry Maurier, pioneers in the East, in addition to the men already mentioned will always be brought to mind by those familiar with the history of the development of the hollow tile industry.

The manufacture of architectural terra

cotta in this country probably began in Kentucky and Illinois in the late 50's or early 60's. By 1875, terra cotta works had been established in New Jersey and California. Sanford E. Loring, a pupil of John M. Van Osdel and an early partner of W. L. B. Jenney, the architect, entered into the manufacture of terra cotta in the late 60's and for twenty years contributed to the development of architectural terra cotta. At this time, the manufacture of terra cotta, book tile, and stock pattern door and window caps went hand in hand. From this beginning there grew the demand for cornices, trimmings, hip rolls, crestings, chimney tops, and moulded work which could not well be secured by the brick making process.

When THE AMERICAN ARCHITECT was founded in 1875, little was known of the structural characteristics of terra cotta. Objections, such as "its smooth surface will not hold the mortar" were advanced against its use, and it was recommended that no piece be made to exceed 400 cubic inches, a very small size indeed, in the light of present day practice and accomplishments. Within the next ten years marked advances had been made and the material was acquiring extensive use by well known architects.

Up to 1886 terra cotta closely followed the tendency developed in brick surfaces. In that year the Northwestern Terra Cotta Company produced the first glazed terra cotta which was used in the construction of the Rookery Building in Chicago, designed by Burnham and Root. This marked a distinct innovation in the industry and further experiments were conducted to produce enamelled terra cotta on a commercial basis. This was accomplished about ten years later when it was used on the Reliance Building in Chicago. The popularity of enamelled terra cotta spread to other parts of the country.



From *The American Architect*, August 11, 1888
ORNAMENTAL AND MOLDED PRESSED BRICKS OF THE LATE 80's. THESE WERE MADE IN RED, BUFF, DRAB, BROWN, GRAY, BLACK, WHITE AND POMPEIAN

GOLDEN ANNIVERSARY NUMBER

In 1895 architectural terra cotta was well established in the building field and manufacturers were developing competent designing forces, and modelers, and maintaining drafting rooms as necessary adjuncts. The advent of the steel framed structure gave added impetus to the use and advanced the development of the material because of its fire-resisting qualities, flexibility in moulding as well as its structural and decorative possibilities. At the present time, there are upwards of forty terra cotta plants operating in the United States producing annually about 140,000 tons of architectural terra cotta.

It was said in 1885 that eighty per cent of all terra cotta used was red in color and that ninety per cent was made in the State of New Jersey. In 1903 centers of production had developed throughout the country and in that year the art of glazing terra cotta in polychrome colors was perfected in the United States. By 1908 less red terra cotta was used than other colors such as the buffs, grays, browns, and "old gold." Advance in the production of colors, tended toward the use of the material in much the same way as stone. So successful has the art become that stone and moulded terra cotta are not infrequently combined in the same facade. The terra cotta industry has for many years constantly sought to better its wares and through the National Terra Cotta Society has maintained a research department since 1911. In 1923, the Society developed a "standard" specification to promote clearer understanding and use of the material as well as to place the industry on a better footing in the field of building construction.

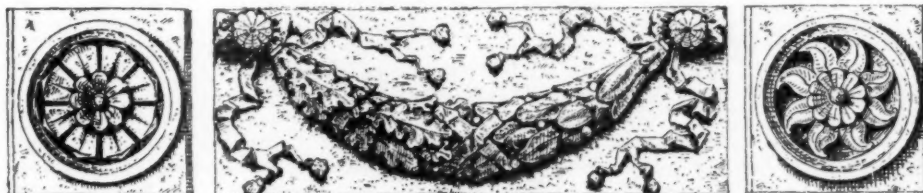
The first ceramic tile factory in the United States was started in 1877, following the Centennial Exposition at Philadelphia, where an elaborate display of European tiles stimulated American ceramists to pioneer efforts in tile production. The kinds of tiles produced by the early factories in this country were quite different in character from those made today. They were unglazed tiles in flat colors and so-called encaustic tiles. The first glazed tiles produced in the United States were made in 1880. This type of material, with a colored glaze on an embossed or

modelled body, were extensively used for fireplace facings. In the early 80's so-called enamels, or bright glazed tiles in color, without modelling began to be made.

By 1890 importations to the United States had largely given way to tile of domestic manufacture. Mechanical improvements, the study of suitable clays and the art of firing, contributed to the steady growth of the tile industry in this country. Developments in the manufacture of ceramic tile largely parallel the advances previously described in the production of terra cotta. The white glazed wall tile, now used was first made in the United States in 1894. A year later an entirely new type of tiles was made and called ceramic mosaic. In 1900 architectural faience was first introduced by producers in this country and since that time, the dull finishes have appeared. Flint tiles have been produced since about 1913.

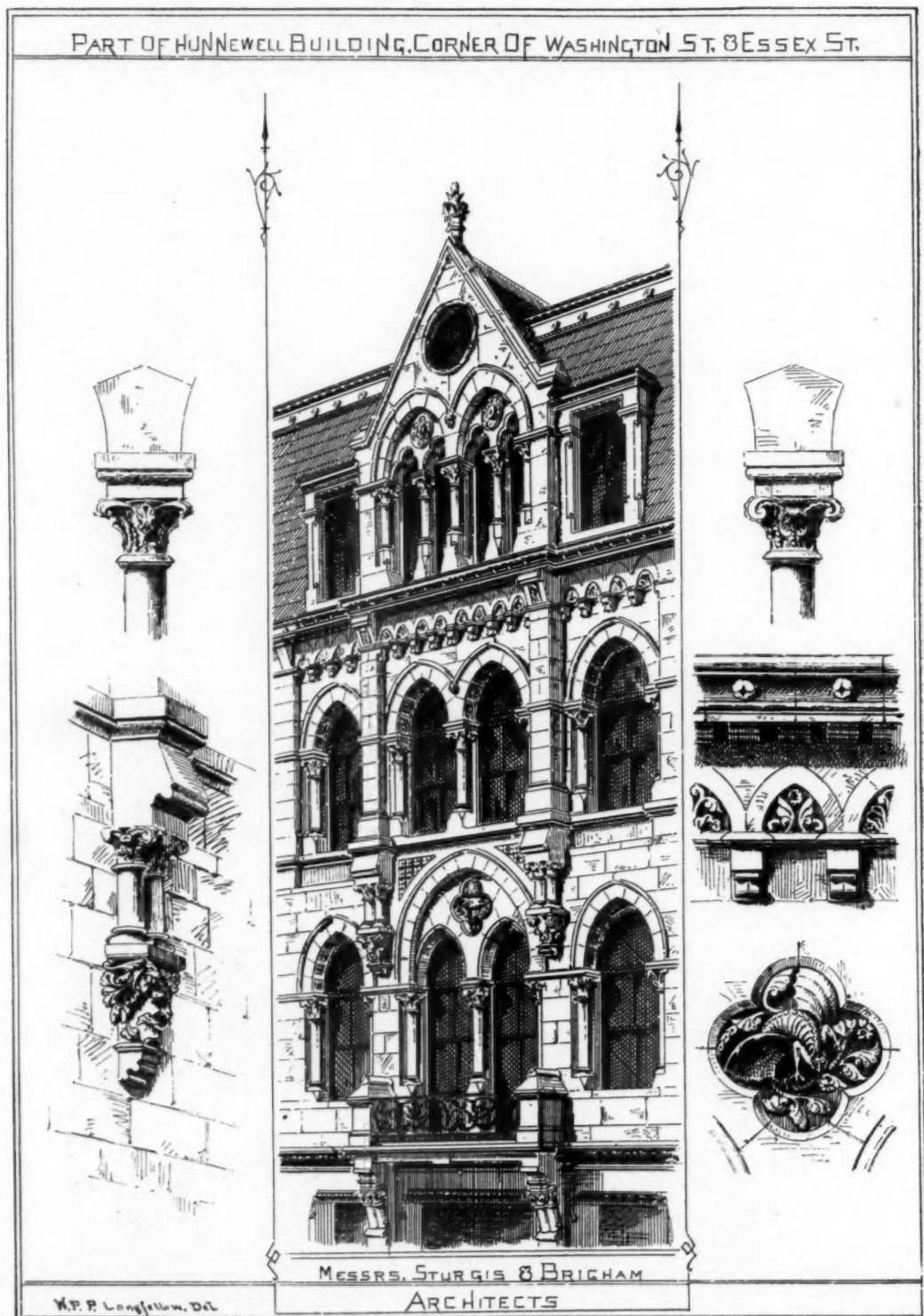
Through the Associated Tile Manufacturers, the industry has had the co-operation of the architectural profession in preparing a series of publications on the manufacture and use of all kinds of tiles. This is important as indicating that the manufacturers have made a serious study of both the artistic and practical use of tiles. Marked results have been obtained in both directions. Tile has a wide range of usefulness in modern buildings because of its decorative effectiveness as well as its utilitarian qualities.

In addition to drawing upon the volumes of THE AMERICAN ARCHITECT for information relative to the development of burned clay products, the editors are indebted to the following authorities for their helpful co-operation in supplying information of an historical nature: Acme Brick Company, The Associated Tile Manufacturers, Common Brick Manufacturers Association, Eastern Clay Products Association, Geo. M. Fiske, Mason City Brick & Tile Company, National Fireproofing Company, National Terra Cotta Society, Northwestern Terra Cotta Company, Ricketson Mineral Paint Works, Rookwood Pottery Company, Sayre & Fisher Company, Structural Service Bureau, Sumter Brick Works, The Batchelder-Wilson Company, W. S. Dickey Clay Mfg. Company.



From The American Architect, February 15, 1879

DETAIL OF TERRA COTTA DESIGNED BY CABOT AND CHANDLER FOR THE JOHNS HOPKINS HOSPITAL AT BALTIMORE, MD.



RENDERING OF UPPER STORIES AND DETAILS OF HUNNEWELL BUILDING, BOSTON, MASS.

STURGIS & BRIGHAM, ARCHITECTS

Reprinted from issue of June 23, 1877

BUILDING STONES

Stone, together with timber and clay products, is an enduring material. Its progressive use in buildings is a record of the artistic advance of the nation

AS stone in its numerous forms has since the early years of man been employed as a material for building, in one form or another, it is difficult to trace the first serious attempt in this country to quarry stone for building purposes. At one place or another throughout the Colonial States, stone in quarries was found and the extent of the industry was in its development, limited to the means for its mining.

We learn that the first marble quarry in successful operation was one in the Berkshire Hills of New England. That quarry was opened in 1790. Marble had also been quarried in a small way in New York, Maryland, and eastern Pennsylvania. It is possible to trace in extant Colonial buildings throughout the original states the presence of marble as used for lintels, trim, stoops and floors, but it is not equally easy to trace its origin.

Quarry methods as late as 1870, and in some districts even later, were primitive and crude. Blocks of this stone dedicated to the gods by ancients, were drilled by hand, wedged out, rough-dressed in the quarry, rolled out by man and team labor, loaded on wagons and hauled to boats or in some instances, considerable distances to railroads.

Handicapped by lack of easy transportation, the development of the marble industry up to about 1875 was slow and uncertain. Few marble plants were equipped with gang and rip saws. Rubbing beds and all finishing work, carving and molded work, were done by hand. Production of marble was practically limited to the states of Vermont,

Georgia and Tennessee, and in order to increase the supply, large quantities of marble were imported from Italy, Belgium, France, Africa and Spain.

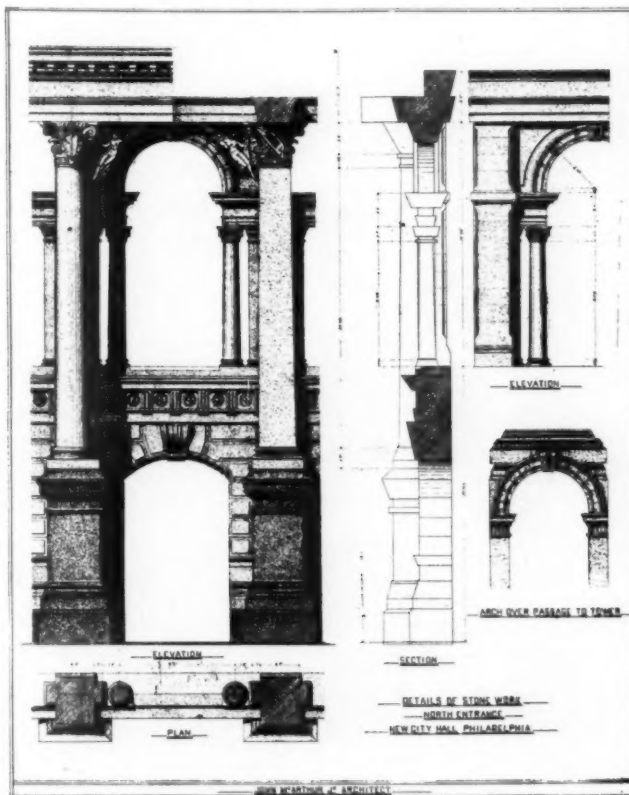
The predecessor of the present channelling machine came into use about 1865. It was an American invention and was followed by the steam drill, and the feather and wedge, which enabled the quarrymen to do with steam, work formerly

done by hand. The use of derricks facilitated the handling of large blocks of stone in the quarry and railroad extensions added a much needed stimulus.

Skilled labor, as compared with today's cost, was cheap, and in some districts was as low as ninety cents for a ten hour day. Buildings were erected more leisurely than they are at present and the demand, limited to monuments, "Shanghai" mantels, wall skirting, steps, stairs, floors, and wash basin slabs, offered no incentive for the invention of labor-saving machinery. It is said that in 1875 the finishing capacity of all the marble working plants in the United States did not equal more

than two plants with modern equipment. Cutters and fitters received for a ten hour day but little more than they now receive per hour. It was not until the late 70's that marble setting was recognized as a trade.

A Tennessee quarry was opened in the 40's to supply marble for the interior of the Capitol at Washington, and from time to time after that, marble was used in various state capitols and other public buildings. The extensive use of marble by



From The American Architect, February 16, 1878

DETAILS OF STONEWORK, PHILADELPHIA CITY HALL

JOHN McARTHUR, JR., ARCHT

THE AMERICAN ARCHITECT

Richard Morris Hunt, McKim, Mead and White, Richardson, and other contemporary architects, together with the development of fireproofed steel framed structures, created a demand for native marble.

The immediate result of this demand was the rapid development of mechanical methods for quarrying and finishing marble. From hand power drills having a maximum capacity of drilling twenty-five lineal feet of holes to the modern hammer capable of drilling over three hundred lineal feet is a big step. Primitive quarrying methods have been superseded by electric-air channellers; derricks with a sweep from eighty to one hundred and fifty feet easily raise fifty ton blocks; batteries of from four to twenty-five gang saws, overhead cranes and automatic hand trucks; carborundum machines, polishing machines, profile and modeling machines and lathes, have replaced manual labor and revolutionized manufacturing in the marble industry during the past thirty-five years.

The rock deposits along the Atlantic seaboard and east of the Alleghany Mountains are mostly of granite or granitoid formations and marble or metamorphosed limestone deposit. The use of these stones by the early settlers and Colonists was, therefore, natural. About 1650, Johnson wrote of the city of Boston, " * * * The buildings are beautiful and large, some fairly set forth with brick, tile, stone and slate."

The old Hancock House in Boston built in 1737 and demolished in 1863, is said to have been "the first in New England, if not in the country, to be built of granite".

Solomon Willard, born in Petersham, Mass. in 1783, has been called the "father of the granite business in the United States". In 1804, he went to Boston and for several years, while working as a carpenter he studied architecture, attended an evening drawing school, and practiced woodcarving. Later on he became interested in stone and

stone carving. In 1825, plans which he had submitted for the Bunker Hill Monument were accepted and he was appointed architect and superintendent. The use of granite in this monument was a great stimulus to the granite industry.

Willard's introduction of large blocks of granite had considerable influence on the use of this stone previously confined to small pieces. Buildings designed in the 20's in the style of the Greek Revival made Doric columns, base courses and trimmings of granite exceedingly popular. After the close of the Civil War, many public buildings, following the lead of French architects, were built with superimposed orders, heavily loaded mansards and lavishly carved ornament. Architects gradually

realized that the most reasonable use of granite, was in leaving the face untooled and without carved ornament, feeling that the decorative aspect of the stone was sufficient in itself.

Early methods of quarrying granite, were primitive and have passed through progressive changes from hand power equipment to the mechanical devices used today. Machinery was used in the late 60's for polishing granite. At that time, sea sand was the abrasive medium for polishing and sawing stone. In 1876, the idea of using iron filings in place of sand was conceived and several years later cast iron shot was found to be advantageous in sawing. Saws which had required a day to cut one and a half to two inches at that time became capable of sawing large stones at the rate of three or four inches per hour. About 1885, pro-

filing machines were introduced; in 1888, the pneumatic hammer; and in 1898, planers were put into use. With mechanical equipment well advanced, the quarrying and cutting of granite were placed upon a commercial basis and volume production was obtained.

The pioneer settlers brought to this country traditions of brick and stone, each as of his mother country. As the architecture of the Colonies de-



DEWEY BUILDING, WASHINGTON, D. C.

GEO. N. RAY, ARCHITECT

A SIMPLE, DIGNIFIED DESIGN WHICH EXHIBITS MODERN TENDENCIES IN THE USE OF STONE FACING

veloped and brick came into more general use, the practice of trimming the brick walls with stone was a natural development which followed the architectural precedent of the homeland.

The more easily worked stones in the East were marble and sandstone. The light colored sandstones in certain localities were among the first selected for cut trim as being more like the stone used abroad. A period beginning in the 40's represented an era of dark colored sandstones, red, brown, and chocolate. Sandstones are of general distribution, easily quarried, and abundant. From use as trim in the form of belt courses and lintels, it came to be used for the fronts of city buildings.

Following this period, and as civilization moved westward, the tide turned to the use of lighter colored stones, for an abundance of gray and buff sandstone was found in Ohio. The real epoch in the sandstone industry occurred about 1865.

To trace the progress in sandstone quarrying would be but a monotonous repetition of the story of marble and granite working, for here again mechanical methods grew out of primitive hand operations; transportation facilities stimulated its distribution and marketing methods improved with the growth of the industry.

Since limestone is not generally found east of the Alleghany Mountains, very little was used previous to about 1870. Quarries in southern Indiana were first opened in a small way in 1833. The first stone was shipped to Chicago about 1853 and there followed an extensive use of the material in that city. In the early 80's, Bedford stone, as it is often called, began to be shipped to eastern cities. It is said that Nathan Hall, a pioneer quarry owner of Bedford, Ind., invented a spring band saw for sawing limestone about 1878 and depended upon ox teams to haul stone a mile to the nearest railroad.

The pleasing color, texture and working qualities of limestone have made it a favorite building stone throughout the United States during the past forty years. From a few thousand cubic feet in the 70's production increased to over ten million cubic feet in 1912.

Quarrying methods have kept abreast of mechanical developments in the use of derricks, cranes, pneumatic hammers, and electrical equipment of various kinds. Twenty or twenty-five years ago, it was thought that all limestone surfaces must be tooled and buildings must be profusely ornamented. Following that, plain surfaces were in demand. Today limestone surfaces are more intelligently handled with a fine sense of the appropriate use of the material in which is seen the use of plain surfaces accented with tooling closely following the practice of sculpture. After all, a stone building is but a piece of sculpture made up of numerous small units fitted into place.

Up to about ten years ago, architects and builders required that stone in any building be

of uniform color and texture. Within the past six or eight years, a marked desire has been seen for variation in both surface color and texture. During this period, economy has been essential and architects designed their buildings to take advantage of machine production methods.

At one time joints, thinner than practical requirements dictated, were in demand. Today it is recognized that a joint of reasonable thickness must be used as an aid to good setting.

Associations representing various kinds of stone have taken an active interest in securing the skilled use of their product. Educational campaigns conducted by these associations have placed valuable information at the disposal of architects. Buildings erected within recent years exhibit a careful attention to well disposed ornament suitable to the kind of stone used, well studied jointing, and stone sizes in scale with the design.

Early accounts indicate that the product known as artificial stone, manufactured from imported cement, was often subject to failure and disintegration of the surface due to hurried manufacture, careless handling and bad setting. In 1876 manufacture had advanced to the point of casting the material in moulds and compressing it by means of a steam hammer. The firms making it, however, had a hard struggle in competing with the cheapness, at that time, of our natural stones.

Ransome's artificial stone was a familiar product in the 80's. Many experiments were carried on in those days for the purpose of developing a formula which would provide a superior product. Improvements in manufacturing methods, quality of both workmanship and material, and a better knowledge of the use of artificial stone have given it extensive use within the past few years for buildings, in marked contrast with its earlier uses for hitching posts and stepping blocks.

Early settlers in America found the native Indians using crude, bowl-like vessels and utensils made of soapstone. This stone, soft enough to be shaped with flint tools, non-staining and high in heat resisting and retaining qualities, was well suited to the uses of the now "Vanishing American." These qualities continued to make soapstone one of the most useful of our native stones for a higher civilization.

Soapstone, a member of a family of rocks, which includes talc, is widely distributed throughout the world. Massive soapstone, geologically known as steatite is found in ample deposits in the United States and can be quarried, sawed into slabs and fabricated for use in large units without further treatment or change in its characteristics.

Early in the nineteenth century several small quarries were opened in Virginia to produce soapstone for making kitchen sinks and laundry tubs. The early fixtures were, compared with today's standards, crudely made but also extremely serviceable. A soapstone tub installed in a New

THE AMERICAN ARCHITECT

York City house in 1836 is said to be still in use. The heat resisting and retaining properties of soapstone were early realized to be of value for the lining of fireplaces and for range hearths.

The easy working and non-staining qualities of soapstone demonstrated its value for toilet partitions, floors, chemical and physical laboratory equipment, hospital equipment and electrical installations. It has also been found highly desirable for use in manufacturing plants where processes require a material possessing these properties.

In 1876 when this journal was first published, the slate industry had been developed in the United States for nearly one hundred and fifty years. Business depression retarded the use of slate from 1876 to 1880 to such an extent that quarrymen often disposed of their slate in England. In 1880 there was a general resumption of business throughout the United States and the slate producers suddenly found themselves in the midst of a demand that far exceeded production.

In the 80's slate was being used, among other purposes, for roofing, table tops, mantels, sinks, school slates, and marbleized slate. Other uses of slate developed as new demands arose, such as blackboards, flooring, stair treads, laboratory tables, hearths and electrical switchboards. At the present time, slate is further used for shower and toilet stall partitions, window stools, chemical vats, septic tanks, and mausoleum crypts. The Department of Commerce, Division of Simplified practice has published a series of books on the

standardization of blackboards, structural and sanitary slate and roofing slate sizes.

Previous to 1919, each producer established his own standards of size, design, and method of fabricating laundry tubs, sinks, and partitions. Roofing was produced in many sizes for some of which there was little demand. Within the past five or six years much has been accomplished in the standardization of slate products, the elimination of wasteful sizes, the investigation of the requisite qualities of slate for electrical purposes and the developing of "standard" specifications.

When one comes to delve into the history of building materials during the past half century, there is found a certain romance and a connection with the growth of this nation. Stone, brick, all the many uses to which electricity is placed and even the lumber and timber, as it stands on end as forest trees, carry with their development the closest intimacy with the economic and sociological progress of the United States.

The editors acknowledge their indebtedness to the following for their co-operation in furnishing information which supplemented the records of THE AMERICAN ARCHITECT: Alberene Stone Company, Granite Manufacturers Association, Inc. of Barre, Vermont, Gray Knox Marble Company, Indiana Limestone Quarrymen's Association, McClymont Marble Company, Arlando Marine, National Slate Association, Geo. Rackle & Sons Company, The Ohio Quarries Company, The Trailtel Marble Co., Vermont Marble Co., Woodbury Granite Co.



From The American Architect, October 30, 1880

THE MUSEUM OF FINE ARTS, BOSTON, MASS.

STURGIS & BRIGHAM, ARCHITECTS

ROOFING MATERIALS

A record of their development and the influence of new demands

IN the United States, as in every country in the world, the history of building begins with a record of the use and adaptation of materials most easily available.

In every early phase of building, the first objective was shelter from the elements and to provide a comfortable habitation. The roof being of first importance, naturally enjoyed the solicitous attention of the early builders in this country. The great forest growths everywhere about and the comparative ease with which wood might be worked, it logically became the earliest type of roof covering.

Lumber split by hand into thin slabs formed a light and convenient material for the pioneers to use on roofs as a protection from the elements. It is further logical to find that the uses of different kinds of wood for shingles became a regional characteristic. In the East, white pine and white cedar were selected. The South made use of cypress and red cedar and in the West red cedar was largely used.

Fortunately transportation facilities for some years advanced more rapidly than the depletion of our forests. As a result, the dwindling supply of lumber in one locality has been easily replaced by rail and water shipments from other sources of plenty.

In early days, only the choicest trees were used and the quality of the timber was for this reason very high. A news item giving an account of the excellent state of preservation after eighty-six years of use, of white pine shingles laid with wooden pins on the Shaker Meeting House in Canterbury, N. H., in 1792 was published in *THE AMERICAN ARCHITECT* in 1878.

Expert labor for splitting lumber grew scarce but the demand increased. Then came hand machines and power machines for performing

the work and eventually it became necessary to use available timber with less choice in its selection.

Many years were spent in experimenting with preservatives to prolong the life of wood and by the late 80's, processes had been perfected. In 1914 a machine was invented for staining shingles by the bundle. Architects were quick to appreciate the more enduring qualities of chemically treated shingles and the color possibilities afforded to make their buildings harmonize with the surroundings.

The first roofs used by man were no doubt stone caves and it is but natural that as the timber was cleaned away man again sought the permanence of stone shelter.

The use of slate for roofing in this country probably began with the opening of a quarry in the Peach Bottom District of Pennsylvania in 1734. In 1787, a quarry was opened in Virginia to supply roofing material for the Virginia State Capitol. By 1876, numerous quarries had been opened and the industry was well established.

Pioneers in slate quarrying were largely of Welsh origin with English traditions as evidenced by the names of the Welsh towns which still survive in the slate districts of the United States. For many years the use of this natural product was more or less limited to districts close to the quarries in Pennsylvania, Vermont, New York, and Georgia. Rapidly growing cities, better transportation facilities and the need for fire-resisting roofs, following the conflagrations in Chicago and Boston about 1872, and later those of Baltimore and Salem provided the stimulus which no doubt accounts for the rapid growth of the industry in the late 80's.

The demand for slate in fancy or unusual shapes, hexagonal, half round, curved, Gothic



From The American Architect, March 11, 1876

THE STATE CAPITOL AT ALBANY, N. Y.

THOMAS FULLER, ARCHITECT

NOTE THE USE OF CONTRASTING BANDS OF SLATE ON THE ROOF OF THE TOWER

THE AMERICAN ARCHITECT

and others, during the nineteenth century is a reminder of the mid-Victorian influence. Many of these roofs in solid colors or with bands, diagonal patterns, or letters of the alphabet in contrasting colors built as late as 1905 are still to be seen throughout the country. These patterns used on roofs of odd shape, cut up with numerous gables, turrets, and towers, came to be locally termed, "crazy roofs".

A natural reaction to roofs of this type occurred in the late 90's when a demand for slates of uniform color and size, and smooth surface became manifest. About 1910, the graduated slate roof, using rough slates varying in size and thickness began to appear. The present indications are that these have influenced in a thoroughly artistic and most satisfactory manner and will continue so to influence the use of roofing slate. There is a gradually growing demand for slates of random width, rough surface and variation of color which can be and is being met with thinner slate than that commonly used for graduated roofs.

Burned clay roofing tiles while made in Lancaster County, Pa., as early as 1769, were not extensively used in the United States until after 1893. The following extracts from a paper by John R. Elder, President of the Clay Shingle Tile Company, read before the National Brickmakers Association of Louisville, Ky., on January 26, 1893, presents a more intimate account of conditions up to that time, than anything which could be said thirty-two years later:

"Architects and others often wonder why more tile has not been used in the United States. This question is easily answered: In the first place, this was a timber country; clapboards and shingles were easily made out of timber, and they formed a cheap, roof that answered the purpose for a time. Then came slate, and tin, and galvanized iron, and felt, and gravel that could be always obtained when wanted, were light and cheap. Tile, as made, was heavy, expensive, hard to get, and in consequence was only used on expensive buildings, that could contract for them in ample time. **** The manufactured tile has not kept pace in advancement with that of any other branch of the clay industry. The idea has been to invent a machine to make tile easily and cheaply, while the fact is, there is plenty of machinery exactly suited for the purpose. *** The application of our improved machinery in preparing clay, and forming tile, is a long step in the direction of increasing the use of tiles, improving their quality, and cheapening their cost. *** So far as I have been able to learn, there are only five tile works in the United States. This fact would indicate that making roofing tile has not been profitable in this country and this is probably true, as we find when any business is successful, competition starts up all around it. *** In our opinion the reason *** is because the old form of tile, and the way of making them in the old country, has been followed in this. No tile factory I know of has been able to keep a stock on hand to supply reasonable demands. It has been necessary to order the tile for the roof before the cellar was dug and then wait weeks and months with the building exposed to the weather before you got them. The consequence of this uncertainty and delay has compelled the architect and owner to substitute other roof covering. They would not be deviled to death by waiting. *** The trouble is not to sell tile but to have them to sell, so that the architects and builders know they can get them when wanted without delay."

Elder certainly had the courage of his convictions, for in spite of the apathy shown by archi-

tecs and builders as to burned clay for roofing up to that time, he opened four factories where there was manufactured a patented clay shingle tile. These factories produced a well made clay tile of reasonable weight and cost and at all times maintained a large available supply. Architects began to have no hesitancy in specifying them and Elder's reasoning was proved to be sound.

Saturated felt for composition or "tar and gravel" roof coverings was first manufactured by the New England Roofing Company in 1852. The felt was saturated with coal tar or pitch and covered with the same material in liquid form when laid on the roof. The specification for flat roofs remains today practically the same as that used nearly seventy-five years ago.

Asphalt, thirty-five years ago was developed into a process for the construction of built-up roofs. In 1895, asphalt prepared roofings began to appear on the market. These were composed of a flexible sheet of several thicknesses of saturated felt cemented together. For convenience in handling, these sheets were rolled up and became known as rolled roofings. A comparatively fine screened gravel was used for surfacing the early roll roofings, and was the prototype of the present slate surfaced prepared roofing. In 1900 the idea of cutting the roll roofing into shingle strips was conceived. During the past twenty years, many mechanical improvements have been made in the manufacturing processes, the form of the shingle, and the development of a wide color range in the finished surface.

Asbestos shingles have been produced in the United States since about 1907. These are made of compressed asbestos fibre and cement, given a color treatment and made in various shapes and sizes.

The roofing and sheet metal trade has had a romantic and most uneven history. One correspondent writes, "The 'old timers' in the business in the old district of Southwark, were most all of them picturesque characters. For example, W—F— (who established our business in 1873) must have been a sight for sore eyes, going to repair a roof with a ladder on one shoulder, some tin under his arm, a firepot in his hand, and dressed up in a silk high hat, 'boiled' shirt 'sans' collar, and custom made French calf boots."

Another correspondent tells of the trials and tribulations of the reconstruction days after the Civil War when "to keep expenses down," he "frequently walked from town to town to call on his trade." Today their goods are trademarked and sold throughout the United States, its possessions, and Canada.

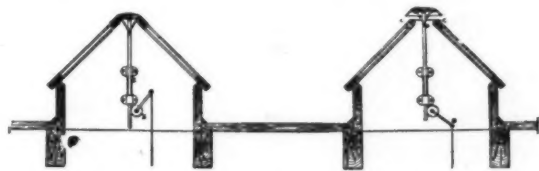
The use of tin for roofing purposes extends back for many years. Composed of thin sheets of rolled iron and dropped in a liquid solution of tin, these "plates" as they were called were easily laid and could be made to as easily conform to any unusual

GOLDEN ANNIVERSARY NUMBER

contours, flat sheets or broken into mouldings.

The early history of the tin roof in this country finds it a somewhat expensive material. In addition to the specially prepared iron sheets tin had to be imported at large cost from Malacca or the Straights Settlement. While tin as ore had been found in certain localities in this country, it was not until the early 80's that it was produced in sufficient quantities to make it a dangerous competitor to the imported product.

The history of the tariff legislation as to tin



From The American Architect, December 18, 1880

VENTILATING SKYLIGHT TO BE USED IN PLACE OF MONITORS ON FLAT ROOFS, SUGGESTED BY A CORRESPONDENT IN 1880. THE IDEA HAS SINCE BEEN FULLY DEVELOPED AND PUT INTO PRACTICAL USE

is really the first of the many arguments that have been held in Congress to establish a protective tariff on commodities generally in this country. With the imposition of a high tariff and the protection of the Government, the tin plate industry in this country was established and has grown until today, the majority of tin roofs in use in this country are made up of rolled sheets and tin ore both entirely produced in the United States.

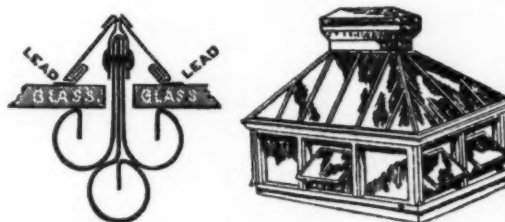
Copper, zinc, and lead have long been used for roofing purposes. Copper has enjoyed a permanent place in the history of the world from the time it was probably first used as a material for axes and arrowheads. We do not know when copper was first used as a roofing material. Many of the remaining historic monuments in the United States dating from the eighteenth century were roofed with copper and the metal was looked upon with favor for its enduring qualities. The first cost of copper has been high in comparison with other metals and economic conditions during the nineteenth and first part of the twentieth centuries greatly retarded its general use as a roof covering or for gutters and conductors except in first class buildings. Within the past few years more attention has been given the economic advantages of this metal and as a result the use of copper and copper alloys has greatly increased.

The discovery of zinc is credited to the Chinese who jealously guarded their secret. Early in the nineteenth century, the invention of the so-called Belgian method developed a commercially successful process whose principle is in use today and resulted in the extensive use of zinc for roofing purposes in Europe. Zinc is a material in which

purity is required to provide sufficient ductility to avoid cracking when manufactured by automatic machines. This was of less importance abroad due to the practice of forming the gutters by the workmen on the job. It has only been within the past fifteen or twenty years that a product of sufficient purity together with proper mechanical methods has been developed in this country to remove objections which greatly retarded the earlier use of zinc.

Manufacturing processes have changed due to mechanical perfections and in recent years metals have been put to many new uses. Skylights at one time made entirely of wood, added metal ribs as reinforcement and now all metal skylights are used to the practical exclusion of all others. Ventilators have been greatly perfected in design and have almost entirely displaced the one time necessary roof monitor.

The numerous roofing accessories which have been developed within the past thirty years seem to leave little to be desired nor can conditions be

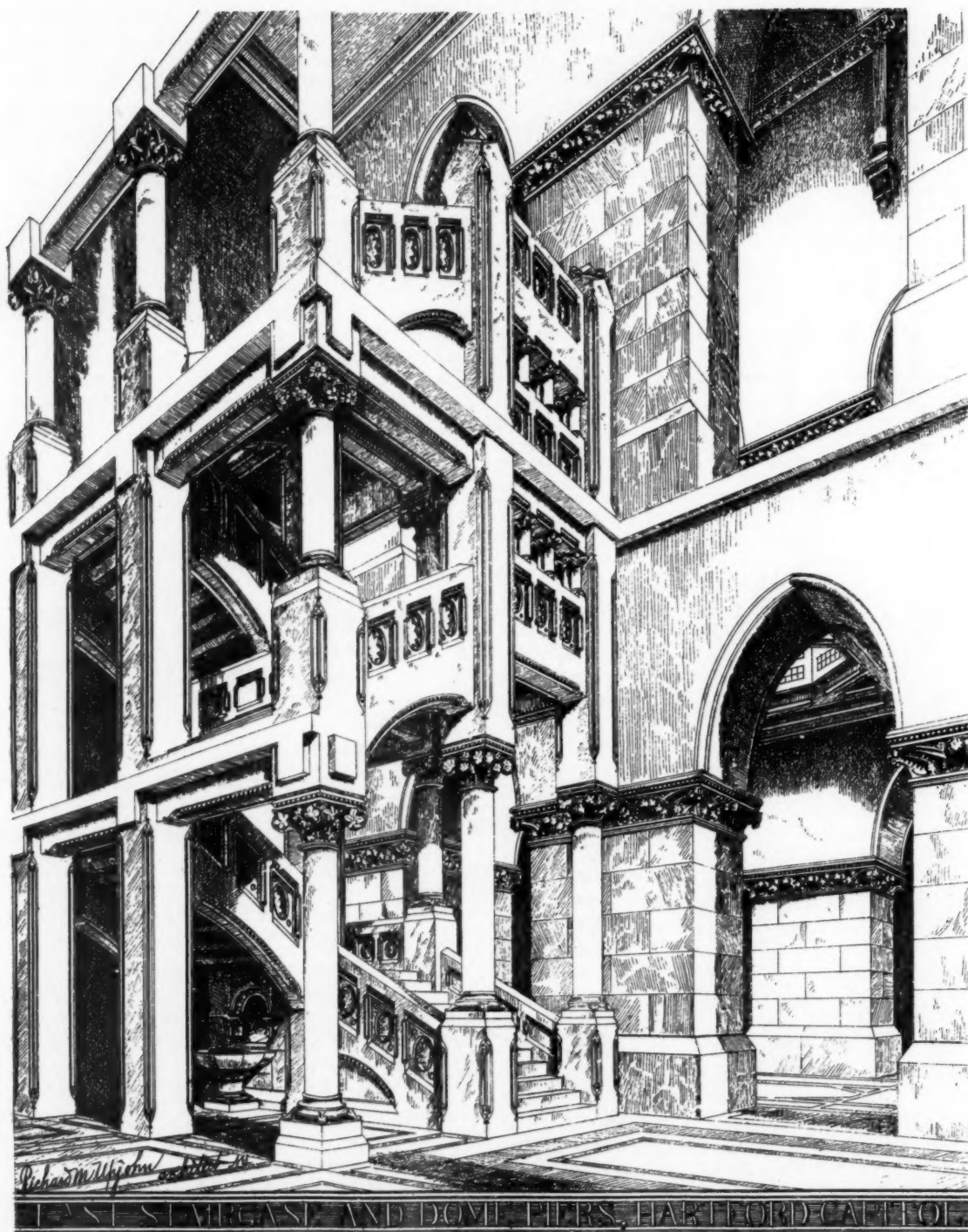


From The American Architect, August 3, 1880

METAL SKYLIGHT CONSTRUCTION OF THE LATE 80'S THE SAME PRINCIPLE IS USED TODAY WITH MODIFICATIONS IN THE DETAILS. METAL SKYLIGHTS HAVE ALMOST ENTIRELY SUPERSEDED THOSE OF WOOD

imagined where there is not some device on hand to meet its need, unusual as it may be.

The editors desire to give proper credit to the following who have ably co-operated with them by furnishing authoritative historical information which has been freely drawn upon in the preparation of this article: Asbestos Shingle, Slate & Sheathing Co., Atlas Roofing Company, Barber Asphalt Company, Bird & Son, Berger Brothers Company, Copper and Brass Research Association, Samuel Cabot, Inc., Francis M. Colbert, Inc., Danzer Metal Works, National Slate Association, New England Felt Roofing Works, Prepared Roofing Association, Red Cedar Shingle Bureau, H. H. Robertson Company, N. & G. Taylor Company, The American Rolling Mill Company, The Burt Manufacturing Company, The New Jersey Zinc Company, The B. F. Nelson Mfg. Company, Vendor Slate Company, Wheeling Corrugating Company.



RENDERING OF EAST STAIRCASE AND DOME PIERS, CONNECTICUT STATE CAPITOL, HARTFORD, CONN.

BY RICHARD M. UPJOHN, ARCHITECT

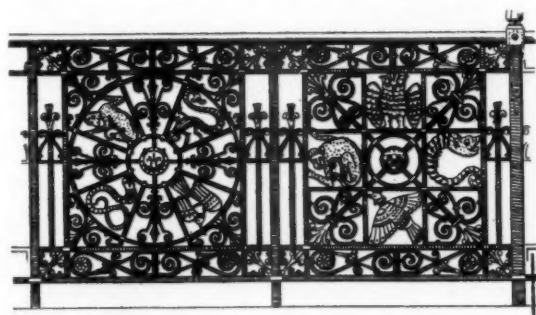
Reprinted from the issue of November 9, 1878

METALS

A few of the vicissitudes through which building metals have passed and their present extended use briefly related

AMERICAN inventive genius can claim little part in the adoption of metal as a means of architectural ornamentation. The principle of the "Waste-wax" process of casting, generally employed in the early nineteenth century, was actually a perfection of the old pre-historic method of making "a mould of clay over a wooden pattern which seems to have been burned out, leaving a cavity to receive the molten bronze. In this we find the first principle of the wax process, namely, the destruction or 'wasting' of the pattern by fire." But American means of employment of the metals, both as ornamentation and as structural elements, have had much to do with their development along these lines in the various uses to which they are put today.

Going back a little more than fifty years ago, one finds the extensive use of "cast iron fronts"—though largely confined to business or commercial buildings built closely together in blocks. It is said that all one had to do to secure such an edifice was to fill out a blank form, giving a few particulars as to size. The building facade was then selected from the foundry yard stock, delivered and bolted together. Mouldings and architectural features were designed in imitation of stone, and when painted, the iron masks passed very well to the popular eye at the proper distance,



From The American Architect, September 20, 1879

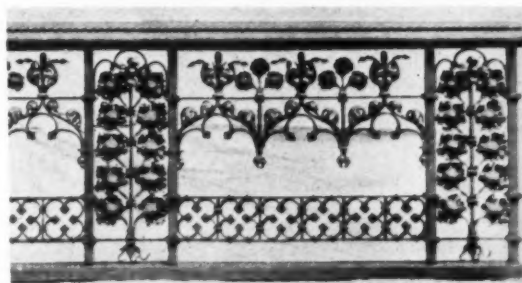
DETAILS OF AN IRON RAILING

THE AMERICAN ARCHITECT GALLERY RAILING COMPETITION FOR A NATIONAL HISTORY MUSEUM

as marble. It was pointed out in an article appearing in *THE AMERICAN ARCHITECT* in 1879 "that the canons of good taste, fixed laws of mechanics, and every rule of architectural decency and honesty were set at naught in their showy, box-like structure. But to the owner of property they offered the advantages of cheapness with great rapidity in construction, while

giving ample floor space and light." The development of steel skeleton construction doubtless aided in the discouraging of further building of these cast iron fronts such as one still occasionally sees in passing through our city streets.

Possibly the one great general development



From The American Architect, June 1, 1889

SECTION OF A WROUGHT IRON ALTAR RAIL MADE BY JOHN WILLIAMS IN THE LATE 80's

which has occurred during the past fifty years and one upon which nearly all must agree is the better, logical and honest use of the materials of construction. Cast iron is still used but confined to those uses for which it is most suitable and designed as cast iron without attempting to imitate masonry or other metals. Today it is used constructively, commonly subordinated to the masonry and there is a marked tendency to return to hand wrought ideals in the design of grills, doors, gates, stair rails and wherever ornamental iron is appropriately used.

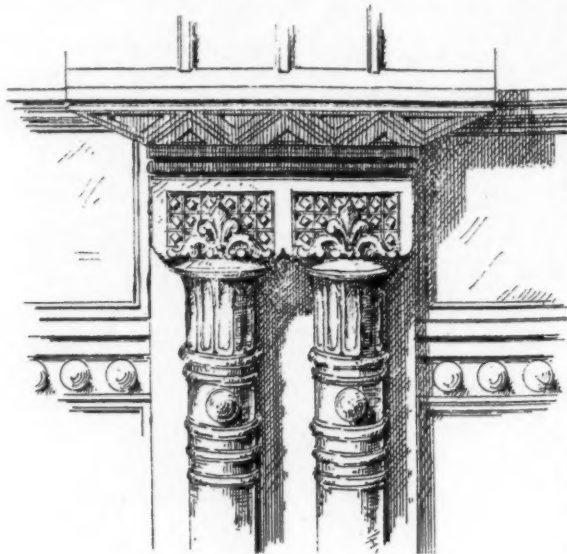
In 1883 a foreign concern opened offices in this country and carried in stock many mouldings of various shapes, sizes and designs for application to architectural surfaces. Much interest was aroused in the decorative possibilities which has continued for more than forty years.

Possibly it was the decline of the iron front which brought cast brass and bronze to the fore again. In any event the methods of casting these metals were perfected by the gelatine process and later by the method originated by M. Le Bourg of France of "adding glycerine and glue to the gelatine—by means of which a statue might be moulded in its entirety" and "producing moulds of remarkable sharpness." *THE AMERICAN ARCHITECT* in 1899 referred to the process and mentions that "the especially original point about this method is that, while affording a considerable number of copies absolutely identical, it is inde-

THE AMERICAN ARCHITECT

pendent alike of the sculptor, the chaser and the bronze mounter."

Castings and forms built up of solid sections were heavy and costly—so much so that their use was largely confined to monumental and palatial



From The American Architect, July 15, 1876

DETAIL OF COLUMN CAPITALS AT SECOND STORY IRON STORE FRONT ON BROADWAY, NEW YORK

R. M. HUNT, ARCHITECT

structures. Stamped sheets were used to some extent for kerosene lamps and hardware. The richly ornamental cast brass and iron gas lighting fixtures were familiar up to twenty years ago. During the transition from gas to electricity for lighting, which occurred between 1885 and 1905 it will be recalled that the gas fixtures were either used for electricity or that new designs combined outlets for gas and electricity and continued to employ cast ornaments and fittings. For many years after electricity generally replaced gas for illumination the influence of the gas fixtures continued to be seen. Today, however, use is made of cast, drawn and hand wrought metals in the design of lighting fixtures more suitable to electric wiring and in harmony with their location.

In 1910 Clarence Fullerton, directing architect of the Gorham Company, invented the means of making extruded shapes in brass and bronze. This process not only produced mouldings with sharper profiles and angles but provided more economical and lighter construction than that formerly afforded by cast work. Extruded shapes were first used in the construction of the window frames of the New York Public Library designed by Carrere and Hastings. This method of forcing the metal through dies stimulated the use of brass and bronze for door and window frames, bank

screens and similar work. Today firms doing ornamental metal work have accumulated an extensive stock of dies and patterns from which practically any design can be fabricated.

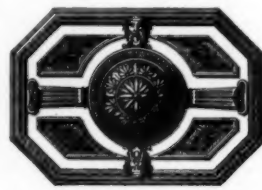
In 1910 the cast bronze doors for the western entrance of the United States Capitol, for the design of which a prize of \$10,000 was awarded by Congress to L. Amatois, were placed on view at the Corcoran Art Gallery in Washington. The combined decorations and structural qualities which they possessed presaged a revival of interest in metal which was exemplified in the doors of St. Bartholomew's Church, New York City, designed by McKim, Mead & White, and the doors of the central portal, main entrance of the Boston Public Library, sculptured by Daniel Chester French.

The results of these inventions and revival of interest in metal working are made evident today in the extensive use of metal throughout the exterior and interior of modern buildings. There is a more general recognition of the appropriate use of metals whose physical characteristics fit them for structural or ornamental use and of others used as adornment where these characteristics are lacking. A tendency to study copper and lead as used centuries ago and to make them serve modern requirements of usage and design, is also evident.

Among the important extended uses of metal which have occurred during the past fifty years is that for windows, doors, and trim, especially in connection with the development of the fire-resisting building.

The origin of metal windows is well-nigh as old as "wind-eye" or "wind door," a term doubtless corrupted from the Icelandic "vindauga." Excavations of the city of Pompeii are said to have disclosed bronze window frames. While it is possible that metal frames and sash were used at an even earlier date, the first fairly well established record of their use is in England during the fourteenth century. These were crude, unglazed and probably little more than hinged heavy gratings intended to exclude intruders by way of ventilation, and peep hole openings left in the walls.

Horn was first used in glazing these openings as a means of admitting light and to keep out the weather. The first glass was in small pieces held together by leads. Many improvements were made from the fourteenth century until the use of metal casements reached a zenith during the Tudor period in the sixteenth century.



From The American Architect, February 16, 1889

A SHEET METAL CEILING CENTER PIECE OF THE LATE 80'S

GOLDEN ANNIVERSARY NUMBER

The frames were flat bar sections set into the masonry or rough hewn timbers. The sash also probably a flat or nearly flat bar section made little pretense at being weathertight rarely exceeded a foot and a half wide and three feet high, and swung upon a crude pivot hinge attached to the iron frame. The panes continued to be made up of small pieces of glass leaded together and supported by saddle bars. One of the most interesting features was the hand forged work of the smith which remains in the form of stays, handles and hand plates.

Following the Tudor period metal windows were largely confined to more imposing buildings and especially ecclesiastical work, due in no small measure to the tax imposed on windows during the reign of William the Third in the seventeenth century. Unless we are mistaken, windows are today subject to a tax in France and it was not until the eighteenth century that this act was repealed in England.

Casements were introduced into the United States by the Puritans from England. From the Netherlands, the Dutch brought the "slide up and down" windows from which developed the familiar and commonly used "double-hung" or "counter balanced" sash. The necessity for screening door and window openings and the ease with which this is accomplished, when double hung windows are used was conducive to the general adoption of the Dutch prototype.

The Chicago fire in 1871 and the Boston conflagration in 1872 were the means of arousing interest in the fire protection of buildings and demonstrated that exposed wall openings were a source of great danger in buildings otherwise well protected from fire occurring in adjacent structures. After these serious fires, Kalamein iron began to be used as a covering for wooden frames, doors, and sash, and by 1885 were in general use for fire-resisting construction. While today other metals are used for covering wooden cores, the term "Kalamein" has been retained and is now accepted as a term applied to this type of construction.

From the Kalamein door and window evolved the hollow metal type which began to be made about 1895. The first windows were of the pivoted or tilting type. American ingenuity, however,



From The American Architect, November 2, 1910

CENTRAL BRONZE DOORS OF THE VANDERBILT MEMORIAL PORTAL, ST. BARTHOLOMEW'S CHURCH, NEW YORK

McKIM, MEAD & WHITE, ARCHITECTS

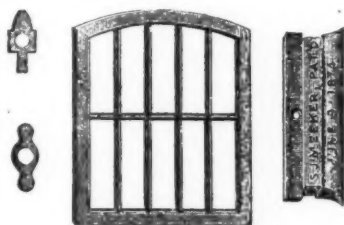
A. O'CONNOR, SCULPTOR

soon adapted it to the counterbalanced window.

Along with the hollow metal and metal covered wooden windows there developed the solid rolled section type. Iron mills began to roll bars in the early 80's which could be readily adapted to the construction of frames and sash. Early forms closely followed the construction of wooden sash, especially in the mitering of muntin bars at the crossings.

Improvements in design and construction followed those of the rolling mills and as steel became commercially available, the use of steel sash increased. The introduction of "factory" sash about 1900 met a commercial demand for metal windows. Solid rolled section sliding windows were introduced in 1914.

In 1910, three organizations began to import in small quantities metal casement sash from England. The cost of the English product precluded its general use except in costly structures. In 1912 metal casements began to be manufactured in the United States. Today there are not less than fifteen manufacturers making windows of this type. After the World War the English Government set about the standardization of metal casement sash to make them available for less costly work. These standard sized English "cot-



From The American Architect, October 21, 1876

MALLEABLE IRON HOLLOW MUNTIN WINDOW SASH. ELEVATION OF SASH, SECTIONS OF MUNTINS FOR GLAZED AND UNGLAZED SASH, PATENTED JUNE 1874 BY S. J. MEEKER

tage" casements have been imported in the United States in large quantities within the past few years. American manufacturers have followed a similar procedure in perfecting standard sized units and sash hardware for this type of work.

In the solid rolled section windows there have been few structural changes within the past twenty-five years. Many refinements have been added, copper bearing steel has been used by at least one manufacturer and electric welding of the corners has become the practice. The use of pressed metal sub-frames has been an American addition often used to replace cast iron for this purpose.

Metal sash and frames have been a valuable contribution to modern building construction due to their fire-resisting qualities, appearance, effectiveness in providing maximum areas of light and ventilation. They have proved their worth especially in the case of large composite windows.

Hollow steel doors were first made about 1895. In 1900 the use of all steel trim in connection with metal doors was introduced. About five years later the combination all steel buck, jamb and trim was introduced and has proved its economic value.

To catalog the many uses to which metal has been put within the past fifty years in addition to those for which it has been used for hundreds of years would fill a large volume. It has been fabricated into casings for concrete piles; made into ties, anchors, plugs and sleeves for use in connection with concrete and other masonry; and used for concrete forms and floor fills. Metal shingles, tiles, and corrugated sheets may be numbered among the forms used during the past five decades.

Galvanized iron cornices thirty or forty years ago were extensively used. Designs were very "fancy" and filled with ornamental finials, brackets, and often made to simulate stone. Not only have these metal cornices been less used but also simplified. With less demand for sheet metal cornices, many manufacturers turned their equipment to the making of pressed steel ceilings.

In the manufacture of fireplace dampers, area gratings, sidewalk doors, coal holes, and door and window fittings, there is little to record except for changes which have bettered their utilitarian

value. The portable and standardized steel building is, we believe, a contribution of the American inventive genius.

A considerable quantity of metal has gone into the manufacture of iron fences which began to be given favorable consideration in 1885 although barbed wire was invented in 1874. For years wooden fences were especially favored because of their low cost. Production methods lowered the cost of wire fences, which combined with the rising cost of lumber, greatly increased the demand for wire fences during the past twenty years.

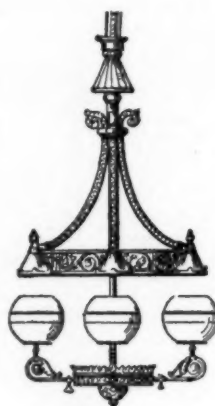
Within the past two decades there has been a noticeable trend toward the use of metal lockers, cabinets and furniture, especially in fire-resisting buildings.

Numerous new devices of metal have been developed in the field of hardware, ranging from medicine cabinets and window screens to weatherstrips.

Within the past fifteen or twenty years many new metal alloys designed to resist corrosion have been developed. Among these may be mentioned the copper bearing metals, monel metal, Ambrac, and similar products.

In contemplating the buildings we live in and work in today, we cannot help but be impressed by the extensive use of metals. Like other things which serve our daily needs, we grow so accustomed to them that we pass them by unnoticed or without observing the material from which they are made. The increased use of metal has occurred so rapidly that we hardly realize its true extent. It is only when we thoughtfully contemplate the things which surround us that we begin to wonder just how "they got along" in 1875 without the use of metal as a material for articles that are today accepted as commonplace.

In addition to drawing upon the volumes of THE AMERICAN ARCHITECT for information, the editors are indebted to the following authorities for their helpful co-operation in supplying information of a historical nature: Anchor Post Iron Works, J. G. Braun, Bridgeport Brass Company, Campbell Metal Window Corporation, Crittall Casement Window Company, Detroit Steel Products Company, Dudfield Manufacturing Company, Gorham Company, Howell, Field & Goddard, Inc., Union Metal Products Company.



From The American Architect, April 3, 1880
A TYPICAL VENTILATED GAS BURNING CHANDELIER OF 1880



BUILDERS' HARDWARE

Its evolution from a hand wrought product to its present mechanical security and artistic interpretation of craftsmanship

IN reviewing the development of hardware during the past fifty years it is difficult to direct attention to any decidedly outstanding feature. This condition is not due to lack of progress, but to the fact that the subject is composed of many items intermingled with improvements and changes. Builders' hardware as made in the United States is not only superior to that found in other countries, but in many branches it is accepted the world over as the standard of excellence.

It has been said that the manufacture of builders' hardware in this country began with the starting of the fire in the first blacksmith's shop. Early hardware consisted of latches, hinges, and bolts, all easily wrought by hand, while the finer grades of hardware were for many years imported. Primitive hand processes were gradually replaced by mechanical power and from 1830 the history of hardware has been one of progress and expansion in production to meet a rapidly growing demand. Since 1850 the importation of hardware has declined until today exclusive styles of ornamental French hardware represent practically the only foreign articles in this field imported into the United States.

In 1875, strap, T hinges and wrought iron butts were commercially made, and soon after that date cold rolled steel came into general use in the manufacture of many hardware items. About 1800, loose

pin butts began to displace the fast pin butts which had been in general use and ten years later

From The American Architect, April 13, 1878



ORNAMENTAL DOOR
HARDWARE OF THE
LATE 70'S

ball bearing butts appeared. The ball bearing butt of today is essentially the same as the first model except for such perfections as case hardened raceways for the bearings, brass dust cups, and washers permanently attached to the joints.

The capped butt was a popular early model. This was made of cast iron and fitted with acorn shaped tips. Ornamental plates of cast bronze, brass, iron or lead were secured to the face of the butt. The acorn tip later became the ball tip and following this the button tip was developed. Ornamental face plates gradually gave way to the plain simple leaves in common use today. The adjustable butt is a recent invention whose future remains to be seen.

Fireproof building construction has occasioned a new development in door hardware in the shape of template butts for metal doors. About 1905

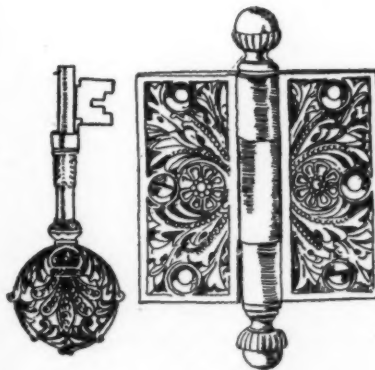
this type of butt in the common full mortise pattern was made for the type of metal doors then in use. The development of Kalmien doors later required the manufacture of half mortise template butts. Following these came the full mortise template butts for use with hollow metal doors built up on channel iron frames.

Fifty years ago, sliding doors operated on bottom sheaves which ran on a track placed on the floor, were used only in the better grade of dwellings. In the late 80's, the development of overhead hangers de-

signed to remove the track from the floor greatly stimulated the use of the sliding door in residences.



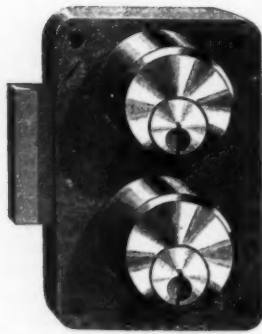
Fig 470.



From The American Architect, August 10, 1889

OXIDIZED-SILVER LOCK, KEY, KNOB AND BUTTS IN A
SEMI-BYZANTINE STYLE, MANUFACTURED IN THE
LATE 80'S

THE AMERICAN ARCHITECT



*From The American Architect
January 4, 1890*

A DUPLEX MASTER-KEY LOCK OF 1890, STATED TO BE "THE ONLY LOCK WHICH CAN BE SET TO A MASTER KEY WITHOUT ITS SECURITY BEING THEREBY IMPAIRED"

The locks of today show many improvements over those of a half century ago. The fronts are heavier, bolts made with a longer "throw" provide greater security, and the interior construction has been greatly perfected. Rim locks formerly used in all but the best buildings are now confined to temporary or lowest priced construction. An exception to this is the limited use of French and Colonial pattern rim locks to

maintain architectural character. A recent development in lock construction is the button lock operated by pressing a button in the center of the knob.

The cylinder lock for years known as the Yale lock was patented by Linus Yale, Jr. in 1861. The use of the flat corrugated key was an improvement introduced in 1882. This type of lock eventually came to be made by other manufacturers, and designated as a "cylinder lock." These have come into such general use that bit key locks are now practically confined to the interior doors of dwellings. A variation of the cylinder lock which has developed since 1900 is the key-in-knob type. The master keying locks of locks has also been an important advance in hardware invention which may be attributed to American ingenuity within the past thirty-five years.

In 1889 automatic door openers or locks operated by electric batteries or compressed air could be purchased. These, like other forms of hardware, have been greatly improved in mechanical operation.

Door knobs have had their "day" too. In the late 70's and early 80's, silver, glass, porcelain, jet, and enamelled knobs were in vogue. A little later hard rubber, Hemacite, and celluloid knobs appeared. In the late 80's, wooden door knobs were much in favor. For the past few years, metal knobs have been in greatest demand and many improvements have been made from time to time in the method of securing the knobs to the spindle.

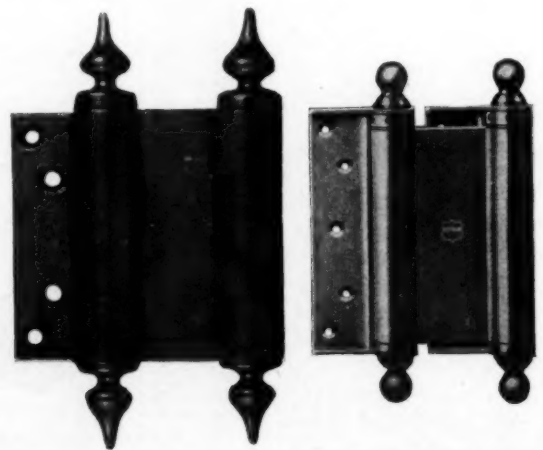
Many disastrous fires, with appalling loss of life, brought recognition of the importance of proper exit protection and about 1905 fire exit bolts and locks were perfected. The high building brought with it the necessity for new types of hardware in the form of window cleaners safety devices, pivoted and reversible windows, elevator

door hardware which meet safety requirements.

The Norton pneumatic door check invented in the late 70's was probably the first device of its kind. Other inventions making use of air or liquid to control the operation of the check followed soon after. Previous to these forms, spring hinges had usually served as a door closing device. While door checks have by no means displaced spring hinges, each serves more needs of utility than that provided by the limitations of fifty years ago.

Double hung or counterbalanced sash were in use many years previous to 1875. But since that time many mechanical improvements have been made. Sash pulleys, are now made larger in diameter, with deeper grooves and often with ball bearings to provide ease in operation. In the 80's sash chain, in demand for the best buildings, was made in the solid link, cable chain, and flat link types. Today the flat link is the only one that has survived. Coiled spring sash cord and spring tape were also used to some extent in the late 80's. Spring sash balances, consisting of an iron housing and coiled steel spring wound to a tension have been in use since 1887. Sash cord has been used from the time counter balanced windows came into use. The practice of manufacturing cheap, short lived cord led manufacturers maintaining a high quality product to weave in an identification mark as a protection to the buyer and to facilitate recognition of the product.

Sash fasteners have been invented and patented in an endless quantity. The Fitch fastener invented a little over twenty-five years ago has come to be universally accepted to the exclusion of hundreds of other inventions.



SPRING HINGES OF 1876 AND 1926. THE FIRST SPRING HINGE OF CAST METAL WAS PATENTED IN JANUARY, 1863, BY LORENZ BOMMER, THE SPRING WITHIN THE BARREL WAS PATENTED NOVEMBER, 1876, THE FIRST ALL STEEL SPRING HINGE ELIMINATING THE USE OF CAST METAL BODY WAS PATENTED AUGUST, 1886. MANY REFINEMENTS HAVE BEEN MADE SINCE THAT TIME

GOLDEN ANNIVERSARY NUMBER

The increased use of casement windows in the United States during the past twenty-five years has brought about the development of many hardware specialties such as special butts or hinges, fasts, and adjustors, for use in this type of window.

Metal sash have in a like manner added many new items in the field of hardware. These have also introduced new problems in window screening which have been studied and ably solved by the American inventive genius.

Changing conditions have required new forms of hardware, the adaption of early forms to new uses, and almost, if not entirely, eliminated others. Today there is little or no demand for hardware to be used on inside blinds so generally used fifty years or less ago. We rarely hear of chandelier hooks, porcelain head picture nails, or bell pulls which were once included in every hardware "set." An outside blind adjustor operated from the inside, brought out in the 80's has in recent years been redesigned for use with casement windows.

Stable fittings such as barn door hinges, harness racks, and stall fittings have practically given way to garage door sets. It was about 1911 that hardware especially designed to meet the requirements of the garage began to be manufactured. These included extra long surface hinges, foot and chain bolts, thumb latches, overhead hangers, and door holders. Hardware, which, through an electric attachment, automatically opens the door upon the approach of an automobile is a most recent development.

Probably the most marked changes have occurred in the ornamentation and finish of hardware. Fifty years ago flat interlacing scrolls, characterized as arabesques, were popular designs and decorated both butts and escutcheons. Then followed the practice of using hardware, the design of which was based upon various architec-

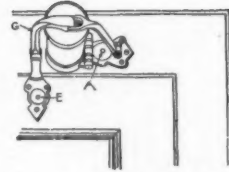
tural periods. Today not only has the number of designs been greatly reduced, largely through co-operation with the Department of Commerce, Committee on Simplified Practice, but probably a more serious consideration is given to its utilitarian value than ever before. Hardware is now designed along simple lines and is most unobtrusive, but thoroughly practical in use and application.

Fifty years ago hardware was made in only three or four finishes. The development of electroplating in the late 70's brought an almost unlimited number of possible finishes by the late 80's. The Bower-Barff process producing a rustless finish on iron while not new was first commercially applied in 1886 to the hardware used in the Rookery Building, Chicago. In a period of thirty-five years the variety of commercial finishes grew to about forty in number, a quantity considerably out of proportion to practical requirements, necessity or economy in manufacture. Hardware manufacturers co-operating with the Department of Commerce, Committee on Simplified Practice and Bureau of Standards have reduced the number of standard finishes to twenty-five.

While a manufacturers catalog may not be a measure of growth of an industry, it is interesting to note that one prominent member in this field states that its first catalog printed in 1857 listed less than 100 items in a sixteen page leaflet. Their catalog today requires 400 pages to describe over 6,000 stock items.

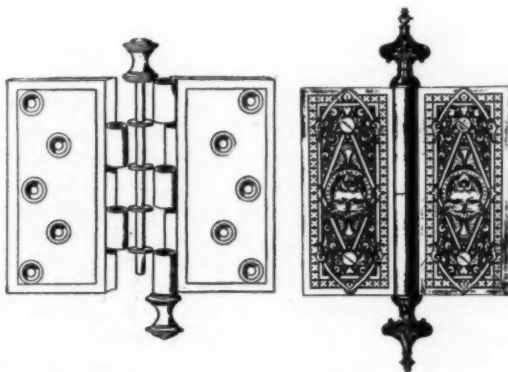
The architects have not been without a part in the development of hardware. Many new types have been made upon the architect's suggestion, or the architect confronted with a new condition for which no stock hardware was yet available, set about the invention of an article which perhaps later came into extensive use.

The editors desire to acknowledge that in addition to material published in *THE AMERICAN ARCHITECT* during the past fifty years, authoritative data furnished by the following have been used in tracing the development of builders' hardware: Bommer Spring Hinge Company, Chicago Spring Hinge Company, P. & F. Corbin Division of The American Hardware Corporation, Pullman Mfg. Company, Inc., Richards-Wilcox Mfg. Company, Samson Cordage Works, Sargent & Greenleaf, Inc., Sargent & Co., Silver Lake Company, Smith & Egge Manufacturing Company, The Berbecker & Rowland Mfg. Company, The Casement Hardware Company, The Stanley Works, Williams Pivot Sash Company.



From *The American Architect*
October 27, 1888

AN EARLY FORM OF
THE NORTON PNEU-
MATIC DOOR CHECK



From *The American Architect* of Oct. 13, 1888 and Nov. 21, 1923

BUTTS OF THE 70'S HAD ELABORATELY CHASED PLATES SCREWED INTO POSITION AFTER THE BUTT HAD BEEN PLACED ON THE DOOR. THE SIMPLER FORM IS OF THE LATE 80'S

STRUCTURAL STEEL *and* FIREPROOFING

The advent of the production of structural steel ushered in the most remarkable advance in building construction since the discovery of the masonry arch

THE two most important events in the entire history of architecture, are the discovery of the masonry arch and the production of structural steel on a commercial basis. The arched opening possessed vast possibilities and relieved architecture of the restrictions of the post and lintel construction. The arch, first applied to wall openings, soon developed into the dome and barrel vaulted ceilings. Restricted to wall openings, its application had no particular effect on construction, but when used for domes its influence was very pronounced because it altered the form of buildings.

The relative importance of the arrangement and shape of the solids and the voids in a facade and of the form of a structure has been debated. No particular engineering ability was required to arch the opening. It did require engineering ability of the best kind to construct the dome, the vaulted ceiling, flying buttresses and other arched parts.

The arch had a pronounced effect on architecture and led to the building of structures of great height, like the cathedrals of France, England and Germany. The Renaissance was but a refinement of architecture in which the arch and dome principle was developed to a fine state of beauty and grandeur.

The construction of the great Gothic and Renaissance works firmly established the structural engineering ability of men. The knowledge of this fact was an influence which has carried on to this day. It opened up an architectural freedom and made possible a creative effort that could never have otherwise been possible.

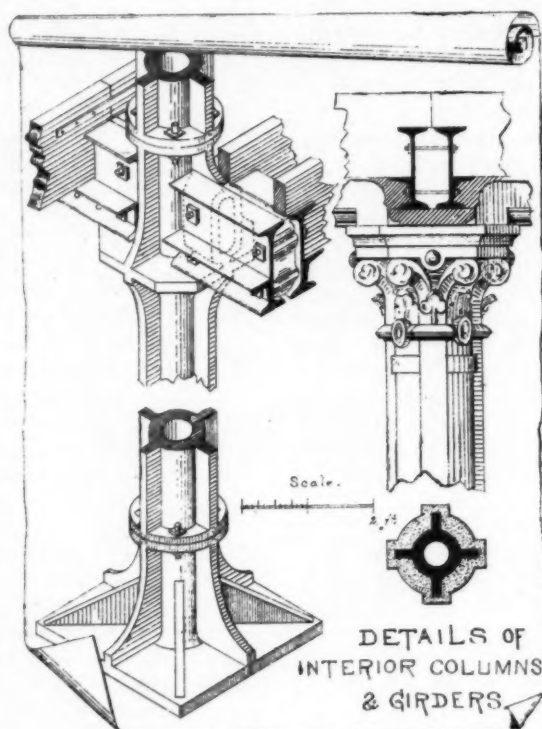
When structural steel became a commodity ma-

terial commercially, architects were quick to grasp its importance. It was at this time that an entirely new element in architecture appeared. For some reason architects delegated the structural design to engineers, resulting in the upbuilding of a distinct profession. Both professions have suffered from the differentiation of the architectural and the structural design. Unfortunately, it led to a separation of the two professions and architects acquired a reputation as artists, and engineers as lacking in artistic ability. Both need some of the other's qualifications.

The effect of the use of structural steel was instantaneous. It was manifested in the steel frame building which revolutionized all previous methods of construction. The new features were the skeleton frame of steel, the isolated foundation, the thin exterior curtain wall of masonry, the fire-resisting floor and roof construction and the fire-resisting partition. Height became the outstanding feature of this new kind of building. The first all steel frame building, the Tacoma

at Chicago, is twelve stories high. It was soon followed by the fourteen and sixteen story structure. Buildings remained at this limit of height for several years, due to building code restrictions. Increased land values brought about by increased density of population was soon indicated by the height limit of buildings being increased.

When the heights exceeded a certain number of stories, the factor of elevators became an important one. Had it not been for the utilization of electricity for power, it is possible that the height of buildings would have remained within the eighteen story limit. Electric power made



From The American Architect October 13, 1877

DETAILS OF CAST IRON CONSTRUCTION USED IN THE
JOHN SHILLITO & CO'S STORE IN 1877

JAS. W. McLAUGHLIN, ARCHITECT

GOLDEN ANNIVERSARY NUMBER

possible the high speed elevator which in turn made usable and profitable the building exceeding eighteen stories in height. All of the other applications of electricity for illumination, for pumping and other power requirements, the steam heating and ventilating apparatus, and the sanitary equipment, are the work of engineers. It is thus apparent that the tremendous advances in these mechanical engineering arts were first initiated in response to the increased height of buildings and that greater heights are profitably possible because of electrical and mechanical devices and apparatus. Although there is a great measure of interdependence between these elements of modern building construction and equipment, it is structural steel alone that made the modern building possible.

Wrought iron structural shapes were first imported and used in this country in 1855. It was not until 1875 that these shapes began to be used to any noticeable extent and their manufacture by American rolling mills became possible in competition with the foreign product. This was brought about largely by the adoption of favorable import duties. The use of structural shapes was retarded to some extent by a lack of knowledge of their mechanical properties. President Hayes, in 1877, requested the Congress to make a small appropriation for continuing the work of a board which had been appointed to investigate the properties and strength of metals. Two years later a 400 ton testing machine was installed at the Watertown Arsenal which was the genesis of the modern physical research laboratory.

The use of cast iron columns was customary for twenty years after the first built-up wrought iron columns were made in 1870. For buildings up to four stories in height the cast iron column is entirely satisfactory, but in tall buildings requiring columns in two story lengths and those that will resist bending stresses, they are not suitable. The 16 story Unity Building in Chicago, 210'-0" high, was built with cast iron columns resting on floating foundations. The wind bracing was made with turn buckled, wrought iron rods, diagonally connecting to bottom and top of the adjacent columns. Although this building settled along one side so as to throw it out of plumb very noticeably, it was jacked back into its original plumb position and the floating foundations replaced with caissons.

The original built-up column, the Phoenix shape, was used for thirty years. Its section was ideal from a mathematical standpoint but it was

extremely difficult to detail for beam and girder connections. It was supplanted by the Z bar and Gray columns which had a vogue until the latticed channel, channel and plate, and the plate and angle columns were invented. The invention of the Z bar column, however, was the most marked event in column design and from it was developed better and more economical types. The most simple steel column in use today is the Bethlehem H shape, which up to certain limits requires no riveting except for the usual connections.

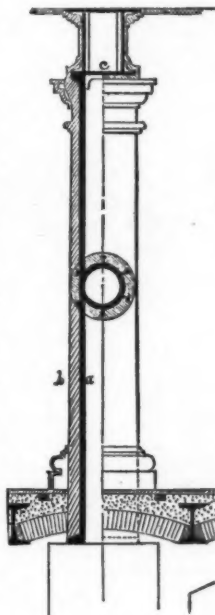
The first handbooks of the early and mid-eighties were based entirely on wrought iron shapes with beams and channels up to 15". The tables of safe loads were based on a 12,000 pound fibre stress. When the Bessemer steel shapes were first commercially manufactured in 1884 the tables of safe loads for them were based on a 16,000 pound fibre stress. Although the cost of steel shapes was greater than that of wrought iron shapes, the differential was offset largely by the increased strength of 33.3 per cent. In 1891 open hearth steel shapes were rolled and today practically all steel shapes are made of that kind of steel. Up to 1894 the rolling mills produced steel and wrought iron shapes, at which time the making of wrought iron shapes was discontinued.

From this time, the greatest development of building construction, in the history of architecture, has taken place and it is attributable to structural steel.

In December, 1884, the late Frederick Bauman, a pioneer architect of Chicago, printed a four page pamphlet entitled "Improvement in the Construction of Tall Buildings." In this, Mr. Bauman described his conception of "concealed iron construction," and from its twenty-one points as a basis, the modern steel frame can be designed. A notation made by Mr. Bauman in October, 1914, on a copy in the possession of Emery Stanford Hall, A.I.A., of Chicago, states that his "first work on the idea was a sketch for a building

50' x 200', s. w. cor. Clark and Jackson in 1883, but it was an idle task: lot was sold and J. W. Root built in 1884 the very neatest building in our city but not of iron construction." The building referred to is the Phoenix Insurance Building now the Western Union Telegraph Building. The J. W. Root referred to was John W. Root of Burnham and Root, now D. H. Burnham & Co. In the pamphlet, Mr. Bauman states that "the design is to erect on foundations a firm and rigid skeleton or hull of iron."

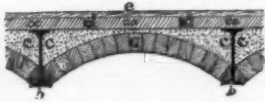
The ten story Home Insurance Building erected



From *The American Architect*,
July 6, 1878

DETAIL OF CAST IRON
CONSTRUCTION USED IN
1878. RIBS ON THE
COLUMNS WERE USED
TO HOLD THE FIRE-
PROOFING IN POSITION.
THE CAPITAL AND BASE
WERE OF CAST OR
SHEET IRON FASTENED
TO LUGS

THE AMERICAN ARCHITECT



From *The American Architect*,
June 20, 1878

FIREPROOFING IN THE 70'S
ABOVE. BRICK ARCHES BE-
TWEEN IRON I-BEAMS.
BELOW: FLAT ARCH OF
HOLLOW TILE WITHOUT
BEAM FLANGE PROTECTION

columns by strap anchors. An exterior column was uncovered on the fifth story of this building in January, 1924, and the spandrel girder, its support and connection were found as shown by the original drawings. The twelve story Tacoma Building erected in Chicago, Holabird and Roche, architects, 1887, was designed along similar lines, as the Home Insurance Building. This was fol-



From *The American Architect*, December 1, 1888

FLAT TERRA COTTA ARCH OF THE LATE 80'S BETWEEN
IRON BEAMS WITH SKEW-BACK PROTECTING LOWER
FLANGE OF BEAMS. EARLIER FORMS DID NOT PROVIDE
FOR THE PROTECTION OF THE BEAM FLANGE

lowed by the erection of the all steel frame first Rand McNally Building in Chicago, the twenty story Masonic Temple and the seventeen story Ashland Block built in Chicago in 1892 and the eleven story Tower Building erected in New York City in 1889. This was the first generation of the modern tall building.

The inception of building construction employing structural shapes, found architects and engineers unprepared. No data for design was available and it was necessary for the producers to prepare handbooks or manuals containing the necessary information. At first these were quite limited, but the successive editions made necessary primarily because of the rolling of new shapes, were rewritten and enlarged. At that time American colleges and universities were not equipped with the splendid experimental laboratories that are now available for the investigation and development of any new material, process or method.

Each rolling mill had its individual product and standards. The larger and more progressive

in Chicago in 1883 was designed by Major W. L. B. Jenney. Several stories were later added to its height. It had interior and exterior columns of cast iron, wrought iron floor beams and girders. The drawings show that the spandrel beams rest on the brackets of the exterior cast iron columns and the ends of the spandrel beams connected across the

fabricating shops had their own standard details. It was a great advance when all of the mills adopted universal standard shapes and connection details. This standardizing of product and design has placed the industry on a true competitive basis. The number of shapes has been reduced to the benefit of the industry. Multiplicity of shapes and weights came about because of a natural reason. A large structure would be designed which required several thousand floor beams which were not stressed sufficiently to require the lightest section rolled of the needed depth. A lighter beam would be rolled and a new section added to the list. Heavier beams were also produced for the same reasons. The standard sizes and weights as now produced are so apportioned that all manner of construction can be made without using excess tonnage of material.

In 1907 the Bethlehem sections were introduced in this country by the Bethlehem Steel Company. The method of rolling is patented and the beams are characterized by wider flanges than those of the standard sections. The Bethlehem H column is made in such sizes that a large percentage of built-up columns can be eliminated from the ordinary building. The introduction of the Bethlehem shapes and the standardizing and refining of the American shapes are the important items of improvement in production. By employing the open hearth method of making steel a more uniform quality of steel is produced and the producers have not only improved the processes of manufacturing but they have maintained a rigid inspection of the chemical and physical properties of the product—resulting in a dependable material.

As a result of experimental tests and research into the field of loads, the resulting stresses and their behavior, designing methods have been improved continuously. The enormous values involved in modern steel frame structures and the responsibility for safety and durability has been



System A—Type 2. Warehouse Construction, with Sleepers

From *The American Architect*, September 3, 1898

THE ROEBLING SYSTEM OF FIREPROOF FLOOR CON-
STRUCTION FOR WAREHOUSES THE DEVELOPMENT OF
WHICH BEGAN IN 1892. CENTERING FOR THE CONCRETE
ARCH CONSISTED OF STEEL RODS WOVEN INTO WIRE
LATHING. FLAT SURFACES REQUIRED HUNG CEILINGS

an unevadable incentive to develop better methods of design. Notwithstanding the almost universal use of open hearth steel for structural shapes, better and more careful inspection of the product

both in the mill and the fabricating shop and the more scientific standard details of construction, the fibre stress of 16,000 pounds per square inch which was adopted when the Bessemer steel shapes were introduced, is still in general use by common custom and as required by building codes. A recent movement, initiated by the American Institute of Steel Construction for the general use of a fibre stress of 18,000 pounds per square inch has led to the adoption, at this time, of this stress and other items comprising a standard code, by about fifty cities. It marks

a distinct progressive step by the industry. Today it can be said that the only limit to the magnitude of a steel frame is the means to pay for it.

In the development of an entirely new industry and type of building construction there were pioneers from whose shops and foundries went forth men who formed the second generation of fabricators, many of whom are still alive. Of these, Post and McCord, New York City; Manley & Cooper, Philadelphia; L. Schreiber and Sons, Cincinnati; the Snead Iron Works, Louisville; Pullis Brothers, St. Louis; the Union Foundry, the Dearborn Foundry, Clark, Raffin & Co., and A. Bolter, Chicago; Gillett, Herzog Co., Minneapolis, were some of the founders of the fabricating industry and from some of their employees who built up the second generation of plants, came the great fabricating industry of today.

Fireproofing and structural steel construction are naturally correlated arts. It is true that the earlier forms of fireproofing were applied to wood joist construction but they served merely as a



From The American Architect October 5, 1910

CONCOURSE PENNSYLVANIA RAILROAD STATION, NEW YORK
MCKIM, MEAD & WHITE, ARCHITECTS
EXPOSED STEEL HAS OCCASIONALLY BEEN USED IN A
DECORATIVE MANNER

retardant without affording any measurable protection to the joists.

The first records of fireproofing are found in England, dating from 1775. The Chicago fire in 1871 gave the first great impetus to fireproofing in this country. In New York, Cooper Hewitt & Co. designed the publishing house of Harper Brothers on Franklin Square in 1872, supposedly fireproof. The earliest forms consisted of brick rowlock arches sprung from the lower flanges of wrought iron I-beams. These were superseded later by hollow tile arches, also supported on the

lower flanges of the beams. The plastering that was sometimes carried over the bottom of the beams was thought to be sufficient protection to the beam.

When the necessity of fully protecting the wrought iron beams was realized the dropped skewback tile and the soffit tiles were invented. Naturally the first arches were segmental in form and were objectionable because of the impossibility then of making the desirable flat ceiling. The flat arch, which consisted of hollow tile voussoirs placed with their walls parallel to the iron beams, then came into use. This type of arch is known as the side construction flat arch. It was superseded by the end construction type in which the cells of the voussoirs run at right angles to the supporting beams. The present type of flat arch construction consists of side construction skewback voussoirs resting on and projecting below the lower flange of the beams, a side construction key with end construction intermediate voussoirs or "inters" whose cells are at right angles to the beam. This provides rigid construction.

Flat hollow tile floor arches are made from 6" to 18" deep according to the span and load. The deepest kind of flat arch tile is the X shaped tile used more extensively in Chicago. In 1890, Thomas E. Lee produced the first porous terra cotta made by mixing a portion of sawdust or fine coal with the clay which was burned out when the tile was fired in the kiln, leaving voids in the ware which not only made the tile less dense and lighter but made it a better insulating material.

The greatest progress made in hollow tile floor construction was during the years from 1883 to 1895. The Chicago district led in the development of this type of construction due largely to the influence of the fire of '71. George H. Johnson and his son, the late Ernest V. Johnson, were pioneers of this industry as was the late Peter B. Wight who was also a well known architect in New York and Chicago. In the New York district, H. M. Keasbey, now President of the National Fireproofing Company, and Henry Maurer, of Henry Maurer & Son, were the pioneers of the industry.

On May 30, 1899, E. V. Johnson patented his wide span floor system consisting of tiles laid end to end in rows separated longitudinally about 1" and laid on a bed of mortar in which was embedded a metal fabric. The longitudinal joints were grouted with mortar and the tops of the tile sometimes covered with 1" to 2" of mortar as needed for the span and load. On February 9, 1904, Julius Kahn patented the combination of hollow tile laid with concrete joists between the rows of tile in which was placed the reinforcing bars having sheared and bent up flanges.

From the inventions of these two pioneers in the wide span type of floor construction have been developed the many types of wide span construction in use today. The Johnson and the Kahn systems of combination tile and concrete construction were followed by a type of floor consisting of concrete joists supporting a thin reinforced concrete slab and a metal lath and plastered ceiling attached to the bottom of the concrete joists. The space between the joists is produced by the use of trough shaped removable forms made of sheet steel or wood. The principal object of this type of floor and the combination tile and concrete floor is to secure depth with the least weight per square foot of floor construction.

Solid concrete slabs are used for short spans Berger Manufacturing Company.

between steel or concrete beams and girders. The flat slab construction was introduced by C. A. P. Turner of Minneapolis and led to the development of several types of such construction, the variation being principally in the manner of placing the reinforcing steel. The flat slab type of floor construction is particularly adapted to large floor panels and where it is desirable to eliminate all projecting beams and girders.

The reinforced concrete construction was introduced in this country about 1889. The Ingalls Building in Cincinnati, twelve stories high, was the first tall building to be built of reinforced concrete in this country. This type of construction was immediately investigated by the leading engineering schools in this country and to them is due the credit for the scientific development of reinforced concrete. The work of the American Society of Civil Engineers, the American Society for Testing Materials, the American Concrete Institute, the Portland Cement Association in its laboratories connected with Lewis Institute in Chicago, and the Bureau of Standards, has been largely instrumental in developing this art.

Fire-resisting partitions were first made of hollow tile and are still extensively used. Solid plaster partitions made of metal lath, plastered on both sides are also used, especially where thinness of the partition is desirable. Steel and cast iron columns were first protected with hollow tile covering and later they were encased in concrete. Partition blocks made of gypsum and gypsum solid plaster partitions and gypsum poured roof construction are applications of gypsum in fireproofing.

In sequence of invention and use in the art of fire-resisting construction we have hollow tile, Portland cement, reinforced concrete and the various forms of gypsum. Each has its distinctive characteristics and each contributes in its particular field to modern fire-resisting construction.

The editors desire to express their appreciation to the following who have assisted, in the preparation of this history of structural steel and fireproofing, by furnishing authentic information upon which we have freely drawn: American Institute of Steel Construction, Carnegie Steel Company, National Fireproofing Company, Porete Manufacturing Company, H. E. Marks Corporation, The



LUMBER and MILLWORK

A summary of the changes in practice, standardization, and usage of our native forest products within the past fifty years

LUMBER, in America, has been, is now, and for an indefinite period will be the most universally used of all building materials. A building satisfying every human need can be constructed entirely of wood. The exception proving this is the fireplace and chimney which must, of necessity, be constructed of non-inflammable materials. Lumber holds this unique position because of its physical and mechanical properties and its wide distribution. While there are marked variations in the different species of wood, the same characteristics, to a large degree, are common to all woods.

The physical properties which distinguish lumber are the ease with which it is prepared for use in an unlimited number of forms and shapes, lightness, durability when protected, and beautiful appearance due to its grain and color. Found above ground, it is prepared for manufacturing with the least expenditure of labor.

The mechanical properties are strength varying with species, insulating quality due to its cellular nature and susceptibility to being finished and decorated.

The manufacturing of lumber has always been coincident with the settlement of the country, crudely perhaps as logs for the pioneer's house, but always wood and lumber, the exception being the sod houses built on the prairies remote from timber and in advance of the railroads. As the railroads spanned the prairies, lumber became

the building commodity most easily available.

With the upbuilding of the country began the depletion of the forests, bringing about strange reversals of conditions. The production of lumber in the New England and eastern states is now totally inadequate for the demands of that territory. The same is true of the central and north central states. Instead of supplying their own needs, these states now secure their lumber from the South Atlantic, Gulf and West Coast States.

Lumber occupies the position that it does because it serves well any of the uses to which it is put. The New England and Pennsylvania forests furnish spruce and white pine lumber; Michigan, Wisconsin and Minnesota principally white pine. These woods are distinguished by the ease with which they are worked and by great durability. Relatively, they are not strong woods. When these sources of supply began to fail, structural timbers of southern yellow pine were furnished by the Gulf States. The several species of southern yellow pine are much stronger than white pine and spruce. Concurrently with the introduction of southern yellow pine a change was noted in the structural design of industrial buildings.

The first step toward designing industrial buildings correctly was taken by the Boston Manufacturers' Mutual Fire Insurance Company through the efforts of William B. Whiting and later Edward Atkinson. To them can be credited what



Courtesy of the Great Southern Lumber Company

REFORESTED AREA OF LONG LEAF YELLOW PINE

is known as mill construction in which all of the parts, except the exterior, stair and elevator walls, are constructed of wood. The first designs made for textile mills had comparatively short spans for which white pine and spruce were suitable. Stresses about two and one-half times as great as those allowed for white pine and spruce, are permissible for yellow pine. This much greater strength with the large sizes obtainable, made it possible to develop a new type of mill construction in which much longer spans are used, adapting it to almost every manufacturing and storage use. At this time the more important buildings of mill construction are built of southern yellow pine or Douglas fir, regardless of their location.

In the first days of lumber making the product was sold at the sawmill largely for local use only. As the consuming territory of each mill became more extended, competition with other mills resulted. The first result of this competition was the establishing of uniform sizes of lumber. At the present time, practically every manufacturer of each kind of lumber produces a material of uniform sizes.

Like all natural products, no two pieces of lumber can be identical and is subject to a considerable range of variation. These variations affect the strength of the timber, the principal ones being the size and location of knots, cross grain and shakes. It became necessary in the marketing of the product to separate the lumber into grades, at first based on the variations above mentioned. Individual producers, retail dealers and in many cases, a group of dealers in a city established their own grades. While the grades all had similar names the specification of the same grade varied greatly. The necessity for standard grades was soon recognized and this was done by associations consisting of the manufacturers of each species of wood. These grades were defective in that they were based entirely on the character of the natural defects found in the material.

When it was realized that timbers had characteristics other than defects which influenced their strength, a new kind of grading was established which recognized what is commonly termed "strength quality." Without discussing this in a technical manner, it can be said that strength is an attribute of density and that the heavier the wood,

the stronger it is. The modern grading rules for structural timbers include the characteristic of density.

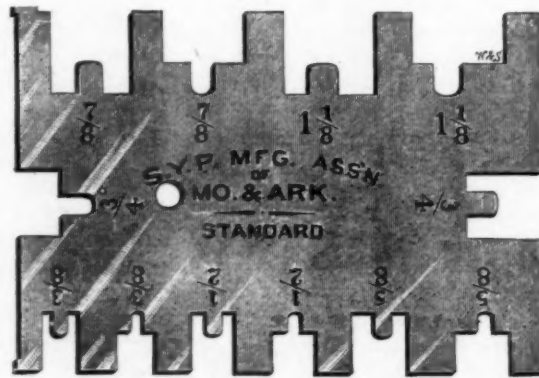
Between the sawmill and the ultimate purchaser is the wholesale and retail dealer and in this exchange the origin and identity of the material were lost. Persons having a preference for material from a certain locality were unable to secure it except by the giving of time and effort to that end. Producers of a superior material then adopted the custom of branding the timbers in order to establish their identity. All of these progressive steps in manufacturing and marketing have led to branding each timber with its grade and a number which identifies the producer. This last step was taken by the Southern Pine Association in 1925 and undoubtedly will ultimately be adopted by other producer associations. This system of a standard, uniform manufacturing, grading and branding of timbers, enables architects and engi-

neers to design more scientifically because they now have available a commercially dependable material whose physical and mechanical properties are known. Architects' and engineers' handbooks containing complete engineering data for the use of southern yellow pine and Douglas fir have been printed by the associated producers of these woods. The placing of lumber on a scientific basis comparable to steel, cement and con-

cretes, is due in a large measure to the work of the Yellow Pine Manufacturers' Association and its successor, the Southern Pine Association, the West Coast Lumbermen's Association, and in co-operation with the former and present Directors, Howard F. Weis and Carlisle P. Winslow, of the Forest Products Laboratory, Madison, Wis.

The amount of hardwood used for structural timbers has been and is negligible. It was necessary to use oak, in some instances, for heavily loaded columns and girders before southern yellow pine became available. None of the hardwoods have the mechanical properties in such balance as to make them comparable to the coniferous woods, southern yellow pine and Douglas fir.

Woodcarving and cabinetwork were well established uses of wood many centuries before the period of time now under consideration. Methods of assembling cabinetwork have changed, owing to the introduction of woodworking machinery.



From The N. O. Nelson Mfg. Company Catalog of 1886-7
STANDARD YELLOW PINE FLOORING AND CEILING
GAUGE OF THE 80'S

GOLDEN ANNIVERSARY NUMBER

Whether the product has been improved or not is a debatable question, but the cost of production has been greatly reduced. The oldtime craftsmanship at the present wage scales is prohibitive and it is machinery alone that makes the use of cabinetwork possible.

Oak has always been the most generally preferred wood for this purpose, especially when carving is employed. It has those peculiar qualities that make possible bold, vigorous modeling in high and full relief, and at the same time is susceptible of being carved in the delicate low reliefs that distinguish the Renaissance styles. In recent years there has been a revival in the use of American walnut for this purpose and it is probably capable of a wider range of treatment than any American wood except oak. The range of finished color is perhaps limited but the beauty of its grain makes it one of the most rich and beautiful of finishing woods. The durability of walnut is not surpassed by any other wood and it is remarkably free from checking, warping or other changes due to climatic conditions.

Of more recent use is gumwood. It has some peculiar characteristics which are now understood and its popularity is increasing. It has a very fine graining and in the natural and stained state presents a very rich and luxurious appearance. Birch is largely used as an imitation of mahogany. It has a similar grain structure and when stained provides a good substitute. It is easily manufactured and is in every way a dependable wood.

The yellow pines, redwood and Douglas fir, are used for cabinet and finished trim, in the natural or stained finish, and their use for this purpose is as yet limited in the field of cabinetwork and fine interior finish.

Mahogany, rosewood, satinwood, teakwood, and other foreign cabinet woods have been imported for many years. Through American production methods, these woods have often been able to compete favorably with some of the woods grown in the United States and used for the same purpose.

The revival of the Colonial style in American architecture has caused a vogue for painted

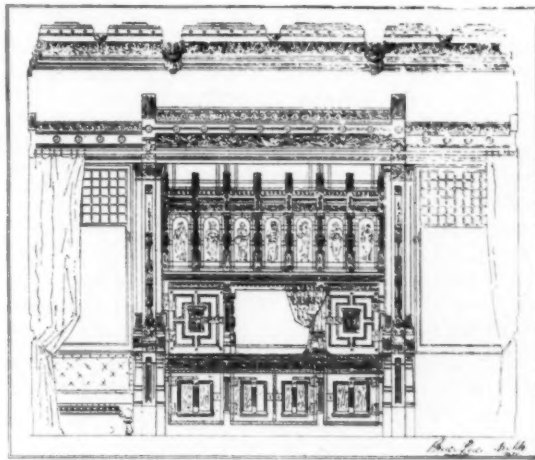
cabinet work and interior finish. For this purpose white pine is highly desirable but owing to its increasing cost whitewood, poplar, birch and other woods receptive to a painted finish are used to a large extent.

Interior finish,—stairwork, doors and windows, and flooring—is included under the general term of millwork. The location of the raw material and availability of suitable labor has had a marked effect on this industry with the result that its production is highly specialized. After hand work gave place to machine work, a planing mill produced all of the wood finish used in construction and this was usually all of one species of wood or those species found within the territory adjacent to the mill. With the introduction of a wider range of woods, the production of certain woods became a specialty. The result is that the manu-

facturing of hardwood veneered doors as a standard commodity is limited almost entirely to the north central states. The softwoods suitable for the built-up cores are readily available, many of the veneer woods are at hand, together with labor and shipping facilities, resulting in the growth of the great door factories in Iowa and Wisconsin whose products are used throughout this country. The most satisfactory hardwood door is one made with a hardwood veneer placed on a softwood built-up core. Solid

doors are limited to those made of white pine and some other coniferous woods. The majority of the doors manufactured are of standard sizes and thicknesses and designs and are known as "stock" doors. The design of these doors has suffered all of the vicissitudes of the current architectures but of late years the manufacturers have recognized the commercial value of good design in their products with the result that in many instances careful attention has been given to this feature. Today a "stock" door can be purchased which is not only well constructed but well designed.

The window frame is a bulky article when assembled and as it is made of merely a good grade of lumber, its manufacture is usually in the neighborhood of its use. Of late, the manufacture of "knock down" frames has been carried on suc-



From *The American Architect*, April 17, 1880

A DINING ROOM INTERIOR BY BRUCE PRICE, ARCHITECT.
TYPICAL OF THE LATE 70'S AND EARLY 80'S

THE AMERICAN ARCHITECT

cessfully. The use of these frames is influenced largely by the labor cost of assembling them and the cost of transportation. Sash, like doors, are largely of standard, stock sizes and thicknesses and are made as a commodity and shipped to wholesale dealers in the large distributing markets. Standardized stock items of interior trim such as base, chairrail, picture moulds, aprons, stools and architraves are now made from designs by competent architects by many of the larger manufacturers and shipped to the wholesale distributing centers. It is a noticeable fact that the manufacturers of stock millwork are becoming increasingly aware of the commercial value of well designed products which better satisfy the aesthetic tastes of the consumer. All of these efforts contribute to the artistic betterment of the average dwelling house.

The cabinetwork and interior trim of the more expensive and important buildings is made from special designs in mills that do not produce stock materials. The product is naturally better fabricated and made from more carefully selected materials. The organizations which produce the finest grade cabinetwork and interior finish are comparatively few in number and are found in every section of this country although for some of the larger hotel and office building projects such work is shipped distances of one thousand miles.

It has become customary in some cities to have the door frames and trim delivered to the building already assembled, ready to be set in place and attached to the rough bucks after the plastering is completed and dried. The changes in the meth-

ods of production and installation have been the results of improved means of manufacturing, transportation of goods, availability of raw materials and mill labor, labor used for installation, better designs by architects, and appreciation by the owners. It has been a commercial and artistic undertaking improving in pace with the general advance in the architecture, building and wealth of this country.

The lumber industry, in all of its multitudinous ramifications has always been the pioneer element of the building industry, satisfying not only the primitive demands for shelter but also those of engineering in construction and architecture in the factors of utility and beauty.

The editors desire to acknowledge their indebtedness to the following who supplied authoritative information which formed the basis of this article on the history of lumber and supplemented the story as revealed in the volumes of THE AMERICAN ARCHITECT from 1876 to 1925: American Walnut Manufacturers Association, Anderson Lumber Company, Curtis Companies, Exchange Sawmills Sales Company, Great Southern Lumber Company, Monite Waterproof Glue Company, Morgan Company, National Lumber Manufacturers Association, Southern Pine Association, The Long Bell Lumber Company, The Wheeler Osgood Company, U. S. Department of Agriculture, Forest Products Laboratory, U. S. Department of Agriculture, Forest Service, West Coast Forest Products Bureau, Western Pine Manufacturers Association, Weyerhaeuser Forest Products Company, Ichabod T. Williams & Sons.

Courtesy of the Great Southern Lumber Company



THE SAWMILL OF THE GREAT SOUTHERN LUMBER COMPANY SAID TO BE THE LARGEST SAWMILL IN THE WORLD WITH A CAPACITY OF ABOUT ONE MILLION FEET PER DAY

PLASTER and PLASTERING

Being an account of a half century's development of plaster and the various structural elements used in plastering

PLASTERING is a term now accepted in the broad sense of including lath or other backing as well as the materials used in plaster and the finished surface. Since 1875 developments in these materials can be briefly stated as a half century of mechanical and scientific progress in manufacture and the expansion necessary to supply the increased volume of building construction. It is true that minor changes have occurred, that many materials are today more extensively used than formerly, and that research has provided a more thorough knowledge of their purpose and use.

Wood lath in its present form was in every day use for both interiors and exteriors in 1875. Its production in the United States that year reached one and one-half billion pieces. In 1906, maximum production was reached with a volume of nearly four billion. The latest figures available are for 1920, when production fell to two billion pieces. At that time the states of Washington and Louisiana were the largest centers of production, and were closely followed by Oregon, Wisconsin, Minnesota, Mississippi, and Maine.

Wire lath nailed to ceiling joists or furring strips had been used some years previous to 1875 in a small way. In 1885 wire lath was improved by the introduction of corrugations or stiffening members designed to effect the results obtained with furring strips, and metal lath began to be extensively used for exterior purposes. Its use for interiors was generally confined to fire-resisting construction as practiced at that time.

During the late 80's perforated and expanded metal lath began to be commercially made. Both Hay's and Laurie's perforated lath was in more or less popular use. This type, used in Madison Square Garden in 1890, was formed by punching the metal sheets so that the metal around the holes was bent back and formed an excellent key for the plaster. Expanded lath was made in shapes

much as we know it today by punching and stretching the sheets to form numerous keys, thoroughly reinforcing the plaster.

In addition to the increased use of metal lath for fire-resisting construction in recent years, the manufacture of light steel channels have made this type of lath particularly useful in the building of thin, solid plaster partitions and suspended ceilings. A variation of the solid partition has been developed in the use of steel studs to which are attached gypsum plaster boards as a backing for the finished plaster surface. Gypsum blocks are also a product of the past quarter century to be used for the same purpose.

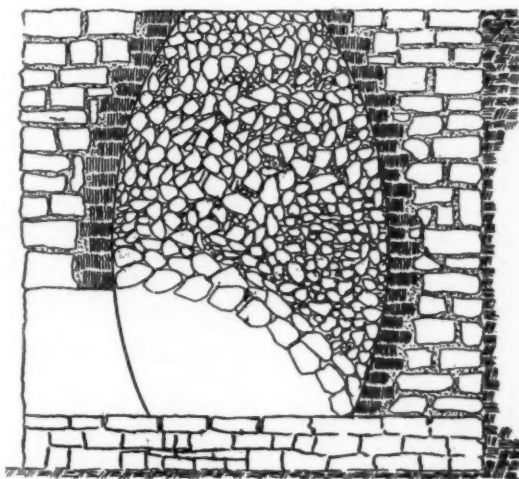
Composite lath of fibre or wooden lath applied to a waterproof fibrous backing or made integral with the backing, in sheets to be nailed to the studding has been made since 1887. The Eureka sheathing lath or lath only in sheets was one of the first manufactured in the United States.

Fifty or more years ago plaster slabs nailed to the joists were made in England. Fibrous plaster boards made by saturating a loosely woven baggy material with plaster of Paris were introduced in Boston and New York about 1875. These were screwed to the joists or furring. A few years later plaster board appeared in the

form of sheets of asbestos cement reinforced with wire netting.

In 1890 the American Plaster Board Co. placed on the market a plaster board made of plaster of Paris, hair or fibre and reeds. These boards, one or two inches thick, were nailed up or held in place by means of mouldings. Later developments within the past quarter of a century have produced a thinner and lighter weight plaster board consisting of a slab of gypsum rock plaster surfaced with sheets of fibrous material.

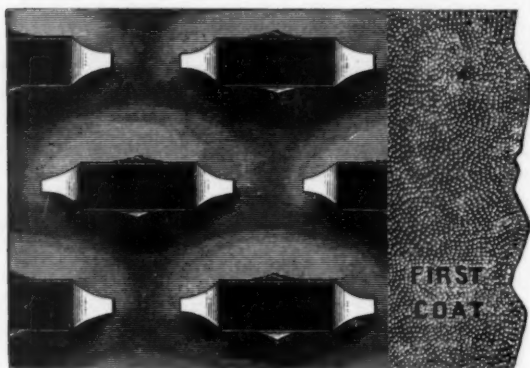
These plaster boards as well as the earlier forms were primarily intended to eliminate the lath and at least one coat of plaster and required one or two coats of plaster to produce the finished sur-



From "Hydrated Lime" by E. W. Lazell, Ph. D.

POT KILN—AN EARLY FORM OF LIME KILN

face. This led to the invention of wood core, wood pulp, fibrous and other boards which could be nailed in place or secured with mouldings and at the same time provide a finished surface for



From *The American Architect* November 3, 1888

THE HAYS FIREPROOF METALLIC LATH OF THE LATE 80'S

paper or paint. Early objections to these have been largely overcome through experiment, experience and improvements in manufacturing processes.

During the period which we are considering, hollow brick and terra cotta backs have had an extensive use as exterior wall backing. These have permitted plastering directly on the inside surface of the wall and eliminated the necessity for lath and other forms of furring. Waterproof paints especially designed for the purpose have also been developed in recent years for painting the inside surfaces of exterior walls and permit the application of plaster directly on the wall without the necessity of furring.

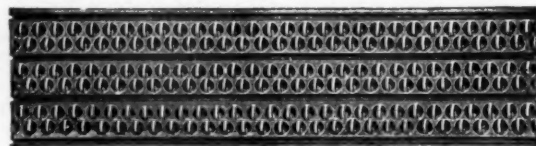
Lime and its use as an ingredient of plaster can be traced back to times of remote antiquity. Lime, which is obtained by heating limestone to its dissociation temperature of about 900° C. was, previous to 1900 in this country, burned in old-fashioned pot kilns which had the appearance of a straw beehive turned upside down. These were fired with wood placed in the bottom of the kiln under alternating layers of limestone and coal. After a week or ten days the lime was drawn out in lump form ready for use, since very few plants were producing ground lime or hydrated lime. The average plant produced four to five tons of lime per day.

Within the past twenty-five years the vertical shaft kiln, consisting of upright cylindrical furnaces fired with wood, coal, gas or oil, and modern cooling bins, grinders, screens, hydrators and separators, have come into general use. The lime industry under technical control has grown in size and importance and plants today produce from 300 to 1000 tons daily.

Mechanical progress in the lime industry as in others, has been an important factor in present day building construction. Before the days of hydrated lime, it was necessary to slake and store quicklime months in advance of its use. Today the same result is more scientifically secured by the use of hydrated lime, which can be made ready for use by soaking over night.

Gypsum, better known to the craft as "plaster of Paris" and recently more specifically termed "calcined gypsum," like lime, is obtained by the burning of native rock. This important product entering into the making of plaster has a history of mechanical and manufacturing progress similar to that of lime. The extensive use of gypsum for many years in the United States is indicated in an item published in *THE AMERICAN ARCHITECT* of May 20, 1876, which stated that three-quarters of all plaster sold and used north and west of the Ohio River came from the gypsum beds at Grand Rapids, Mich.

Until 1885 when fibrous plaster mixtures began to appear on the market, ordinary plaster usually consisted of lime, hair, and sand. A plaster pit for slaking the lime at the building was a part of every building operation. In those days lime plaster was termed "coarse stuff," "fine stuff," or "plasterer's putty" according to its relative coarseness. Plaster of Paris was principally used for gauged work.



From *The American Architect* February 23, 1895

"PIQUA" OR CORRUGATED STEEL LATH

The time, labor and space required for the slaking of lime, mixing of plaster and its storage far in advance of its application were always sources of annoyance and improvements in plastering methods were both urged and favorably received. Merritt's Asbestine plaster was one of the first, if not the first, ready mixed patent plaster to appear in 1885. It was shipped as a semi-fluid paste for mixing with sand but required no addition of hair or fibre. The first important buildings in which it was used were the Boston Safe Deposit and Trust Co., and an addition to that famous hostelry, the Parker House in Boston.

Thereafter numerous patent plasters were produced until the lime pit has practically, if not entirely, disappeared. Today much of our plaster, accurately mixed and proportioned at the mill, is shipped to the buildings in bags with only water as the lacking ingredient.

In certain localities it is not infrequent to find

GOLDEN ANNIVERSARY NUMBER

manufacturers who deliver ready mixed lime plaster to the building operation in trucks ready for the plasterer's board, float and trowel, so that even the mortar box and water are not required.

A calcined gypsum which has been burned at a higher temperature than is customary for ordinary gypsum plaster and then partially hydrated with an alum solution and again calcined and known as Keene's cement was imported from England in 1876. This was first used in the New England Mutual Life Insurance Company's Building in Boston, and the Equitable Life Assurance Company's Building in New York. In 1886 Sturgis and Brigham, architects for the Boston Museum of Fine Arts employed it, for architraves and baseboards. The hardness, durability, and surfacing qualities of Keene's cement has especially fitted it for various uses in modern buildings.

Portland cement in recent years has been used to some extent for plastering work but more particularly for exterior stucco, a purpose for which it is especially suited. In 1885, *THE AMERICAN ARCHITECT* noted that rough cast work which had formerly been done with haired lime mortar over wooden lath was being done over wire lath with cement substituted for lime. Magnesite, discovered in France in 1866 and first used in the United States as a flooring material at the World's Fair in Chicago, has been extensively used for exterior stucco during the past fifteen or twenty years.

The finishing plaster coat which was formerly made exclusively of fine slaked lime known as "plasterer's putty," gradually came to include gypsum or plaster of Paris worked to a hard smooth surface. While this is in general use today there has been a tendency toward the more extensive use of sand and coarse plaster finish in various textures and the use of coloring pigment with the plaster to obtain decorative effects with or without further treatment.

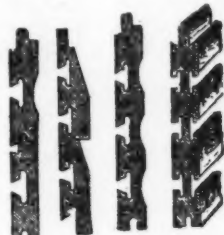
Material manufacturers have accomplished much toward the improvements of materials and

their application as well as surface finishes during the past fifty years. These organizations have co-operated with the architectural profession, and standard specifications for plastering and stucco are now available for direct incorporation in a set of master specifications. This knowledge has been widely circulated and today there is greater latitude in meeting requirements of individual taste and design, and more satisfactory and enduring work than at any time during the history of building construction.

Decorative or ornamental plaster work up to the late 90's was almost entirely a matter of hand modeling or castings of individual design. About 1895 the practice of casting designs in staff whether ornaments, mouldings or decorative panels and beams appeared. Much creditable work has been done in the matter of stock plaster ornament and its low cost permits of its general use. Hand modeling is frequently costly and as a result must be confined to a work of high order.

During the nineteenth century, plaster work took on a most commercial aspect and the art greatly degenerated. In the past few years there have been revivals of antique methods of decorative plaster in design, materials and craftsmanship. With the general renewed consideration being given the subject of artist and artisan, and methods and materials ornamental plastering has much to look forward to in the future, and may point with pride to the work of the twentieth century.

Acknowledgment is made to the following for authoritative information, on the history of plastering from 1875 to 1925, in addition to that found in the volumes of THE AMERICAN ARCHITECT: Jacobson and Company, National Lime Association, Simplex Steel Products Company, Storm King Stucco Company, The Beaver Products Co., Inc., The Consolidated Expanded Metal Companies, The Gilbert and Bennett Mfg. Company, The New Jersey Wire Cloth Company, The Ohio Hydrate & Supply Company, The Upson Company.



EUREKA COMBINED
SHEATHING AND LATH-
ING ILLUSTRATED IN
THE AMERICAN ARCHI-
TECT, JULY 7, 1888



PAINT, VARNISH and GLASS

A chronicle of important achievements during the last quarter of the nineteenth and first of the twentieth centuries.

A RADICAL change in the making of paints has taken place during the past half century. The original materials and methods of their production are still in use and they adequately fulfill their purpose. The changes in paint making are but the natural result of the introduction of new building materials which demand protective coatings specially made for them. New paint making materials have been discovered and their characteristics definitely established. The knowledge of these things is such that a paint for a specified use can be compounded by the competent chemist.

The raw materials originally employed in paint were white lead, zinc oxide, linseed oil, drier and turpentine. The demands of the consumer for a quick drying paint, for a paint suitable for a special surface and other factors have resulted in a study of every kind of surface and the production of a coating particularly suitable for it.

For the ordinary dwelling house, manufacturers make a special paint for concrete and cement work; exterior house paint; interior wall and woodwork paint in gloss, semi-gloss and flat finishes; exterior and interior floor paints; oil stains, shingle and varnish stains and metal protective paints. The list can be extended to include radiator paints and stove pipe enamels.

Concrete and cement require a paint that will be more resistive to alkali and more weather resisting than one made of linseed oil. A paint made of properly prepared China wood oil is used for this purpose. This is but one example of a paint made for a special purpose.

White lead is the oldest white pigment used in paint and was originally, and is yet, produced by the old Dutch process of corroding in earthenware pots in combination with acetic acid and tanbark which results in a hydrated carbonate of lead. It is a ninety day process. A quick process has been developed for producing this form of lead. It is very heavy and is readily mixed with oil.

Sublimed white lead is another form of white pigment. It is a smelting furnace product resulting from the sublimation of Galena ore. It is readily mixed, covers well and spreads easily.

Zinc oxide is a white pigment made in this country by the sublimation of the metal. This pigment is more bulky than white lead and requires more oil in mixing. It is used extensively for enamels.

Leaded zinc is a pigment made up of various proportions of zinc oxide and sulphate of lead. The proportion of zinc oxide is usually the greater. It is not as white as zinc oxide and has but slight

chalking quality. It is made of "complex ore" volatilized at a high temperature.

Lithopone is a precipitate pigment made up of zinc sulphate and barium sulphide. The precipitate, washed and dried, must receive heating and cooling treatment to produce an opaque pigment. Lithopone has fine covering qualities but is less easily worked under the brush than white lead. It is not used extensively for exterior work but its greatest use is in making flat wall paints. It can be mixed with China wood oil, rosin and varnishes without danger of thickening. It is also used in enamels.

These white pigments have definite characteristics; each has its faults under certain conditions of work. This has led to the admixture of two or more pigments to produce a paint that will satisfy certain demands for drying and durability performance.

All pigments have a definite structure and the manufacturer aims to produce a paint film which has a minimum of voids so that the film will be equally strong throughout. A study of the various pigments and their performance under exposure has resulted in the discovery of the need, under certain conditions, of the use of inert pigments or extenders to fill the voids in the basic pigment. These inerts when mixed in oil are not opaque and when used are merely reinforcing agents. They also maintain a liquid paint in suspension and prevent caking in the containers. Among the inerts used is crystalline silica made of ground and washed mineral quartz. This pigment, as well as asbestine, furnishes what is known as "tooth" which makes it especially valuable for repainting.

Barytes (barium sulphate) is a crystalline structure known as "mineral heavy spa." It is ground, treated and washed. It is a heavy white powder; when mixed with oil is not opaque and is an inert in practically all liquids. It is sometimes used as a substitute for white lead in cheap paints. Other inerts are whiting (calcium carbonate), gypsum (calcium sulphate), China clay (aluminum silicate) and asbestine (powdered asbestos). Each one had its particular structure and is practically without covering properties when mixed alone with oil.

Of the red pigments, oxide of iron is one of the earliest used. It is in the form of a natural iron ore or is made by treating copperas or sulphate of iron. Red lead is also an old pigment which is made by the corrosion process producing the oxide rather than the carbonate which is the form of white lead.

The red oxides are red powders of shades vary-

ing from pale red to dark violet. When properly prepared they have good covering and staining qualities. They mix perfectly with all pigments and have no appreciable effect on the drying. If properly made and used they wear well on exterior work when applied either to iron or other metals.

The umbers, ochres and siennas are earth pigments, treated, and mix readily with all other pigments. They come in varying shades produced by oxidation by burning. The vermillions consist principally of orange and red lead.

The blacks are essentially carbons known as lamp black, vegetable black and carbon black. Animal black, bone black, ivory and drop black are prepared from both animal and vegetable matters and have other constituents beside carbon.

Lamp black is essentially a soot. When oil, fat or grease is burnt under conditions of imperfect combustion, the smoke deposits a black soot on a cold surface which is a form of lamp black. These blacks have exceptional tinting and covering properties, retard drying and are perfectly permanent as a pigment.

Bone black is prepared from bones by charring in a closed vessel. The organic matter volatilizes and the carbon is left with the mineral matter contained in the bone. It does not have the depth or brilliancy of lamp black, is permanent and dries slowly. It does not remain in suspension in paint as well as lamp black.

Graphite is a mineral quite common in this country. It is unusually bulky and has great spreading qualities. It has a flake structure and produces a thin film and is often reinforced with an inert or with red lead, red oxide or other pigment.

Among other pigments used by paint manufacturers are the chrome yellows, chrome greens, blues, umbers, siennas, Para reds, tolindene and lakes. The increase in the number of pigments has not been the only advance in paint making. The liquid mediums are quite numerous and complicated in composition.

The basic liquid medium was linseed oil, either boiled or raw. The demand for better water-resisting qualities, fast drying and high gloss has made it necessary to discover and use other materials. Chinese wood oil or Tung oil, is obtained by the cold pressure of the seed pods of the Tung tree found in China. It requires considerable skill to prepare this oil properly. It produces a film far more impervious to moisture than linseed oil—it dries faster, harder and glossier. Perilla oil is extracted from the seeds of *perilla ocyroides*, a plant found in Manchuria and the East Indies. It is similar to linseed oil in appearance and odor. It is used considerably for interior paints. Soya bean oil is extracted from the seeds of *soya hispida* grown in China and Indo-China. It is not as fast drying as linseed oil. It is, with driers, sometimes used as a substitute for linseed oil. Menhaden

or fish oil is obtained from the Menhaden fish, which are plentiful in the North Atlantic. It has a peculiar odor and dries extremely slowly unless treated with driers. It has great elasticity, even under high temperatures and is often used in stove enamels.

There are many combinations of these oils with rosins, gums and various drying salts such as manganese, cobalt, litharge or red lead used in paint and enamel formulating. In some of their combinations they are later described as varnishes.

Whitewash is one of the most ancient of the class of paints in which water is the chief element. In its simplest form, whitewash is prepared by mixing slaked lime with water. The product obtained from this formula possesses disadvantages under certain conditions. Many formulae to perfect aqueous paints have been prepared and used. Hydrated lime with glue, casein, salt and alum and various other substances are used to increase the hardness or wearing qualities of the films. Gypsum and zinc, lithopone, clay, silica, or asbestine in small quantities are sometimes used. A binder of casein with small amounts of hydrated lime or an alkali salt is often used as a solvent. Zinc oxide is also used in aqueous paint. Within the past twenty years the usage of this type of paint has been greatly extended and perfected to obtain finishes and surfaces of considerable interest and merit.

The selection of a satisfactory paint for a specific use is properly within the province of an expert paint maker. The making of paints for the many surfaces with varying conditions of exposure is a highly scientific art. A large number of manufacturers produce paints which are developed to a high state of perfection and their responsibility and reliability are such that their technical recommendations are trustworthy and satisfactory.

The application of paint has been and will probably continue to be largely done by brushes and manual labor. This journal on September 23, 1876, published a foreign note under the heading, "Painting by Machinery" in which it stated that a Miss Paget, an English lady, had invented a machine worked by a treadle or by hand for painting large surfaces. At that time it was being tested by a large ship building firm on the Thames. About 1910 a machine for spray painting with varnish and paint was introduced in the United States. Since that time portable spray painting machines have been made and extensively used. The equipment consists of a spray gun and hose; paint tank, air compressor, gas engine or electric motor, air receiver, and regulating devices. Certain economies and advantages are effected through the use of machine spray painting, and may be considered among the contributions of this industry to building during the past fifty years.

The manufacturing of varnish has been practically revolutionized in the past fifty years. The old-time varnish was made of linseed oil, fossil gum and turpentine, and aged. Various things have conspired to make the production of varnish with other constituents desirable.

The painter and the consumer have demanded varnishes that dry more quickly and harder, that are more resistant to water and more durable. These demands are entirely reasonable and the important time element of modern building construction makes quick drying and hardening materials very desirable.

The varnish manufacturer set about to satisfy these demands. He turned to China wood oil as the only way of doing so. One of the characteristic properties of China wood oil is that it dries more quickly than linseed oil, thus permitting a shorter drying schedule. The hard drying of this oil makes it superior to linseed oil for varnishes that must resist wear. Waterproofness is another characteristic of China wood oil and every waterproof varnish is a China wood oil product. More durable varnishes are made of China wood oil, not because it is inherently durable, but because with given drying requirements a larger proportion of oil can be used. The high grade architectural enamels continued to be made of linseed oil, with a possible small amount of other oils.

The use of fossil gums has been largely displaced by ester gum and rosin. Ester gum is a synthetic resin made by treating rosin, a fatty acid, with glycerine, which forms the glyceride of the fatty acid. Ester gum or rosin ester has the advantage over rosin of producing a varnish that is more elastic, more durable, more waterproof and less subject to thickening when mixed with basic pigments. The strong prejudice against the use of rosin in varnishes arose in the days when, practically speaking, all varnishes were of the linseed oil-fossil gum type, before it was thought of using China wood oil. In varnishes of this kind, the rosin reduces the quality and is used solely to cheapen the product. With China wood oil varnishes the ester gum and rosin are not cheap substitutes for gum, but they serve a distinct function and have real merit. The highest grade waterproof spar varnishes are made with ester gum or rosin or a mixture of the two. Floor varnishes of the modern, relatively quick drying type often contain some fossil gum in combination with the ester gum or rosin, and rubbing varnishes contain a large proportion of fossil gum. Ester gum and rosin are almost essential to the use of China wood oil because they impart to the varnish great durability and they act to reduce its tendency to form a jell during the process of cooking.

The third important constituent of varnish is the solvent or thinner. The original thinner was turpentine but modern varnishes can be made

almost entirely with straight mineral spirits. The primary function of the thinner is to reduce the heavy varnish base to the proper consistency for application. The thinner should evaporate at such a rate as to impart good working and levelling qualities and not leave any residue in the film that will injure its appearance or serviceability. It should also have sufficient solvent strength and an odor that is not objectionable. Mineral spirits fulfill these requirements in modern varnishes as well as turpentine. Since both evaporate and have no appreciable effect on the properties of the film, they have no effect on the quality of the varnish. It is the oils, gums, driers and their treatment that determine the quality of the varnish.

Modern varnish does not require aging because of the chemical properties of its constituent parts.

A new type of liquid wood fillers have been developed which have none of the objectionable features of the older type. The newer fillers are elastic and make a durable foundation for a finish; they have desirable filling and sealing properties and are quick drying.

It is due to the new demands made on varnishes, that chemists have made an almost entirely new product insofar as the chemical constituents are concerned, and a better and more durable article. The product has not been cheapened by the use of the newer oil, gum and solvent but rather the cost of production has been increased. The art of making varnishes has been developed to the extent that the competent manufacturer can produce a varnish which will have any reasonable predetermined physical and chemical properties.

* * *

Glass making is one of the oldest of the arts. At times the method employed in making certain kinds of glass was lost and its production ceased. At this time, these lost phases of glass making have been revived and the production of glass of all kinds equals and often exceeds the quality of that produced in former times.

Glass is divided generally into two kinds: sheet glass and plate glass. Sheet glass is blown in the form of cylinders and afterwards cut and straightened into flat sheets. Plate glass is made by pouring the melted material on a large smooth metal surface, where it is rolled to a certain thickness. Both kinds of glass are cooled and annealed, after which plate glass is ground to a specified thickness and polished.

In the fourth century St. Jerome writes of glass that was poured out in a molten condition onto a flat stone and rolled. That process, with refinements, of course, is in use today. The first settlers in Virginia established glassworks and later other works were established throughout the eastern states. In 1787 Albert Gallatin established the first glassworks in western Pennsyl-

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vania and manufactured window glass. The making of plate glass was first placed on a quantity production basis with sufficient capital shortly after 1880. Today the manufacturing of plate glass has become a great industry. The production has doubled since 1921 to over 100,000,000 square feet, due largely to its more general use in buildings, and to its use in automobiles. Today the American glass manufacturers surpass in quantity and quality those of France and Belgium.

Figured or obscured glass is made by casting the melted glass on a metal plate on the face of which are engraved the figure and design. This is rolled in the same manner as plate glass. This type of glass has almost entirely displaced the use of ground glass which was the only type of obscured glass in use fifty years ago.

The first wire glass was made at Tacony, Penn., in 1892. The invention and production of this kind of glass have had a very marked influence on some phases of building construction. Wire glass is distinguished by its ability to resist the breaking effect of intense heat. The only protection to exterior window openings from fire, before the invention of wire glass and metal window frames and sash, consisted of fire-resisting shutters of various types. Wire glass is also a valuable addition to all skylights. Its fire-resisting qualities are supplemented by its resistance to the impact of bodies that often fall on skylights.

The material used in stained glass windows was imported up to fifty years ago. The designers and mechanics employed in this work were trained in European studios. As the production of stained glasswork increased, mechanics were trained in this country.

Colored glass is now made in this country of a quality equal to the foreign product. The most important improvement in the art was made with the invention of opalescent glass in this country. This kind of glass is distinguished by the character of its surface and the variety of its coloring. One type of opalescent glass is especially adapted to the representation of drapery with which beautiful and striking results are obtained. The development of a distinctive American art glass with the use of this material was initiated by John LaFarge, George Payne and Louis B. Tiffany.

The making of the comes by machinery and the solder in the form of wire, by the lead producing companies, are mechanical improvements in the production of leaded glass. The steel cutting wheel is used in place of the diamond cutter and the double bladed knife and double bladed shears are used in cutting the patterns from the artist's cartoon.

To the primary purpose of using glass in buildings—that of light transmission—has been added that of refracting and diffusing of light rays. This is accomplished by scientifically de-

signed sheets of glass which deflect the light rays to any desired angle and also by glass prisms placed in sidewalks and other horizontal planes for the purpose of lighting places that depend on overhead light sources.

About fifty years ago, plate glass was just coming into use outside of the large cities. Wooden members had been used to hold the small panes of glass used for show windows. Plate glass permitted the use of large panes but wooden sash were generally found to be unsatisfactory for its installation. For some time cast iron strips as a covering for wooden frames were used. These were bulky and to overcome the objections of merchants that they too greatly reduced the glass area, the use of wooden mouldings covered with sheet copper were tried but found to lack the desired strength. In 1904 the prototype of store front sash was invented by Francis J. Plym, an architect of Kansas City. Plym received a commission to design a department store at Holdredge, Nebraska. Since the market afforded no device suitable to frame the large plates of glass, Plym set about the designing of hollow copper mouldings for this purpose. Other architects had similar problems to meet, called upon Plym for assistance and he eventually entered into the manufacturing of store front construction. Later developments retain the fundamental principles used in those first made, but many refinements have occurred.

It may not be amiss to here mention the development of the revolving door for stores and public buildings. In 1890 Theophilus Van Kannel invented the revolving door as an improvement over storm doors and temporary winter vestibules. Revolving doors as first made were much the same in general appearance to the type now used. Ball bearing carriages, weatherstripping, governing devices, electric control and automatic burglar locks are among the improvements and refinements which have occurred in the design of revolving doors within the past three decades.

In addition to drawing upon the volumes of THE AMERICAN ARCHITECT, the editors are indebted to the following authorities for their helpful co-operation in supplying information: Breinig Bros., Inc., Samuel Cabot, Inc., Craftex Company, Detroit Show Case Company, Devoe & Reynolds Company, Inc., Kawneer Company, Keystone Varnish Company, Macbeth-Evans Glass Company, Murphy Varnish Company, National Lead Company, National Lime Association, Plate Glass Manufacturers of America, Paint Manufacturers Association of the United States, Pratt & Lambert, Edward Smith & Company, The DeVilbiss Co., The New Jersey Zinc Co., The George Hardy Payne Studios, The Sherwin-Williams Co., The Standard Textile Products Co., The Sterling Products Co., Toch Bros., U. S. Gutta Percha Paint Co., Van Kannel Revolving Door Co.

MAKING BUILDINGS SAFE

Developments which have increased the security of buildings, the safety of their contents, and the safeguarding of occupants from destructive elements

BUILDINGS and their occupants are subject to ills which destroy them in time and their occupants are also subject to the assaults of society. The elements that are destructive are fire, water, frost and wind. The force of wind is resisted by an element of construction designed for that purpose. Fire, water and frost are resisted by the selection and arrangement of certain materials.

Fire attacks a building either from the exterior or in the interior. The window and door, in masonry walls and with fire-resisting roofs, are the vulnerable points of attack by exterior fire. The function of a window is to admit light to the interior of the building and glass is notoriously a very inefficient barrier to fire or high temperatures. Wire glass, however, when installed in hollow or solid metal sash and frames, offers a definite measure of fire resistance. This type of window was developed to supplant the sheet metal or tin-clad fire shutter and door. The tin-clad door or shutter is the most efficient fire barrier that has been produced but as a window protection it has objectionable features. The wire glass and metal sash and frame are sometimes reinforced by an automatic, interior or exterior, rolling steel shutter which is actuated by the melting of a fusible link and operated by gravity. This combination provides the maximum window protection. A perforated pipe line is sometimes installed on the outside of the building above the top story windows. In case of severe exterior exposure, water is pumped into the pipe line, providing a water curtain which protects the building.

Interior fire hazard is offset by fire-resisting construction, fire doors in interior walls, and the automatic sprinkler system. This system consists of a series of distributing water pipes placed about 12" to 18" below the ceiling in which, at regular intervals, are placed the sprinkler heads. When a sufficient temperature has been developed by a fire, a fusible connection is melted, the head

opened, and a spray-like discharge of water is made which extinguishes the fire. The pipes are either filled with water at all times in a warm building or are empty in a cold building where freezing is possible. These are known as wet and dry systems and both are satisfactory in operation. The experience of the automatic sprinkler system shows it to be a dependable and efficient means of fire prevention.

Automatic fire alarms are operated by the opening of a sprinkler head or by devices made solely for that purpose. The latter are thermostatic in character, operated at a predetermined temperature or by an increase of temperature attained at a certain rate of speed. Automatic fire alarms are connected with the headquarters of the industrial plant fire department as well as with the city fire department. They also serve to alarm the occupants of the building.

Interior fire protection is also provided by standpipes located at regular intervals in the building. These standpipes are filled with water supplied from a water tank placed on the roof of the building. On each floor is a valve which opens a connection to a hose of sufficient size and length. The hose is coiled on, or suspended from, a bracket made for that particular purpose.

In the better finished class of buildings these standpipes, hose racks and hose are concealed in a closet or pipe shaft. The system of standpipes also extends on the basement ceiling to a point outside of the building just above the sidewalk level. At this point is installed a siamese valve to which the fire department engines can make a connection. A check valve set against the house tank pressure prevents the escape of the water but it is reversed by the water pressure generated by the fire engines.

Small hand chemical fire extinguishers and hand grenades are placed at advantageous points for use in extinguishing incipient fires. Hose connected to stand pipe is also ready for an emergency.



From The N. O. Nelson Mfg. Company Catalog of 1886-87

THE REMINGTON HORSE-POWER FIRE ENGINE MADE TO FILL THE GAP BETWEEN HAND AND STEAM FIRE ENGINES. THIS ONE CONTAINED THREE DOUBLE-ACTING PUMPS HAVING A CAPACITY OF 200 GAL. PER MINUTE. A STREAM COULD BE FORCED THROUGH A 1 3/16 INCH NOZZLE 125 FEET HORIZONTALLY OR 60 FEET IN HEIGHT WHEN THE PUMPS WERE OPERATED BY ONE TEAM

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Waterproofing is secured by a proper selection of materials, details of construction and the correct use of suitable mortars. Materials that are permeable by water are subject to damage. They are rendered impermeable by the use of some type of waterproofing. Waterproofing, of a definite and scientific character, is of rather recent origin. It is divided into several types. One type is to cover the surface to be protected with a coat of water-resisting material over which is placed one or more plies of a waterproof felt which, in turn, is coated with an application of asphalt or other waterproofing medium. This is known as the membrane type of waterproofing; or the surface to be protected is covered with one or more coats of water-resisting compound. Another method is to incorporate in the structural material, such as concrete, a substance which expands and fills thoroughly the minute interstices which are naturally common to such a material. This is known as the integral system of waterproofing. A special method is required for each condition and the art of waterproofing has been so developed that every problem of protection can be successfully solved.

Water is perhaps the most insidious enemy to the permanence of the building. Fire proclaims itself by light, smoke or odor, but water may enter a wall in sufficient amount to corrode metal parts and its presence not be apparent, even by stains or obvious dampness. Water enters a structure in some measure in every exposed place and it requires the utmost vigilance to provide a sufficient constructional resistance. When frozen, the water expands and exerts a tremendous force which quickly disintegrates the material.

The field of waterproofing embraces a great range of applications and although the art has been developed to a fine state of perfection, there are still many refinements to be produced through investigation and research.

* * *

Safety to the occupant involves several means of protection. One of the most important is a treatment of floors and stair treads in such a manner that a person will not slip thereon. This condition has been secured by the use of non-slip materials in which are incorporated high resisting abrasives, such as carborundum, or by a combination of soft lead with the harder iron or bronze. Sufficient natural or artificial illumination is also a very important feature in the prevention of accidents.

The value of adequate illumination as an element of protection to the person is shown in the use of specially designed and placed lights. These illuminate the passageways and are placed sometimes in a stair riser so as to light platforms and winders; in the ends of seats to light the aisles of

theatres; at the doors of elevators to light the floor, and in sleeping cars to illuminate the floor of the car when the regular lighting system is not in use. The use of similar lights can be extended to many places not yet made safe to the occupants of buildings.

Adequate means of exit from buildings under fire or panic conditions are essential to safety. The number and plan of these are regulated largely by ordinance. The enclosed fire tower having its entrances and exit outside of the building is a very desirable form of exit. It displaces valuable floor space and for that reason other means of exit are often provided. This is provided by the exterior fire escape which consists of metal stairs, platforms and balustrades built according to standards set up by ordinance. The exterior fire escape is useless unless the windows and doors back of and adjacent to it are made of metal and wire glass. Without such windows and doors, the flames and smoke can escape through them and destroy the persons using the fire escape. This was demonstrated in the well remembered Binghamton fire. Some building codes require these precautions. Another form of exterior fire escape is one which consists of a large vertical sheet steel cylinder in which is placed a spiral metal floor extending from the center to the outer wall of the cylinder. The person simply slides down to the bottom by gravity. Ingress to the fire escape is made through doors at each floor. Once inside of this, the person is safe from injury. This type of fire escape is especially adapted to schools, institutions and industrial plants.

Exit doors in public places, such as schools and theatres are provided with special hardware in the form of latches which are released by means of a pressure applied to a horizontal bar extending across the door at the regular door lock height. Usually these doors have no hardware on the outside and ingress is prevented, while egress is always possible.

Smoke and heated gasses are greater sources of destruction to life than the actual fire. The prevention of the spread of these is accomplished by the installation of fire resisting partitions with self closing doors placed at strategic points in corridors, and inclosing all stair and elevator halls. Several types of these smoke partitions are used and all should be glazed with wire glass.

Fire curtains are now installed in all well constructed theatres, which prevent the escape of fire and smoke from the stage to the auditorium. In addition to these curtains, ventilators are placed over the stage which automatically open and permit the smoke to escape from the building. Automatic sprinklers are also installed over the stage to extinguish the fire. Building codes regulating theatre construction, exits, aisle space, etc., have greatly improved the safety of places of amusement.

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The protection of the occupants and contents of buildings against the acts of anti-social persons is an important and later kind of building equipment. With the first introduction of electricity, crude systems of burglar alarms were installed. They were largely undependable and quite easily circumvented. With the perfection of electrical installations and the surety of the source, burglar alarms have become dependable apparatus. They are so arranged that the occupants of the building are alarmed but also so that the alarm is turned in to the police.

The designing of bank and safety deposit vaults to resist fire has included the element of resistance to burglary. It is in recent years that combinations of steel shapes with concrete have resulted in vaults practically secure from entrance. With the improvement of the vault structure has come the perfection of the vault door, the operation of which is controlled by a time clock. In addition to the structural security provided, systems of alarm have been perfected which indicate any undesirable contact with the structure.

Alarms operated by banking officials and employees have been devised which are actuated in various ways not readily seen. Additional protection to employees handling cash is provided by a bulletproof glass used in the work space en-

closure. The use of these alarm systems is growing and will undoubtedly be extended to other places which are subject to the attacks of bandits.

Fire protection has been studied and standard construction and methods recommended by the National Fire Protection Association and fire insurance companies. The standardization of fire-resisting materials, construction and devices is established by the Underwriters' Laboratories, Inc., insofar as insurance premium rates are involved. Knowledge of protection against other destructive elements, such as water, has been developed largely by those interested in the material or device invented for the purpose. Safety to life is of recent consideration and the means of attaining it are being studied by the National Safety Council. While the motives of the manufacturers of protective materials and devices may be primarily selfish, much credit for better modern building is due to them.

The editors acknowledge their indebtedness to the following for their co-operation in furnishing information which often completed the records of THE AMERICAN ARCHITECT: Detex Watchclock Corp., Duplex Electric Co., Foamite-Childs Corp., Grinnell Co., Sargent & Greenleaf, Inc., The Philip Carey Co., The Safe Cabinet Co., The General Fire Extinguisher Co., The H. J. M. Howard Mfg. Co.

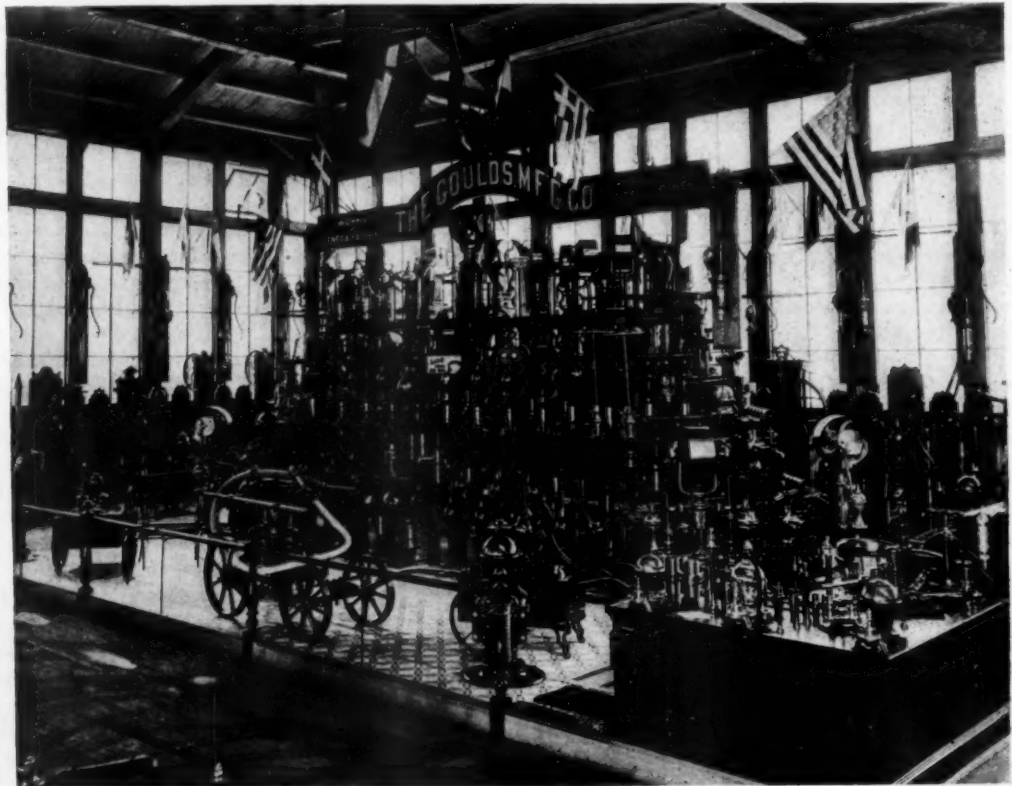


EXHIBIT OF GOULD'S PUMPS AT THE PHILADELPHIA CENTENNIAL EXPOSITION IN 1876

FLOORING MATERIALS

A discussion of the various types used and perfected during a half century

SPRUCE has ever been a favorite flooring material in New England. As the supply gradually grew less it was often replaced by white and Norway pine. Pine continued to be a favored wood for floors throughout the United States. In recent years, yellow pine for general use has largely replaced other species, though fir and redwood have been extensively used in the West. Maple has a record of many years for floors where exposed to severe service. White oak was at one time considered especially desirable, but in recent years both white and red oak, birch and other woods have been employed for interior floors.

In the late 70's, oak finished floors, especially the pattern or parquet floors, were regarded as costly and rarely used beyond the homes of the wealthy or the larger public buildings. Floors were in general of square edge pine boards, surface nailed and covered with carpets. In 1885, the "sanitation craze," as it was called, was at its height and carpeted floors were viewed as being unsanitary. As a result, the closing years of the nineteenth century saw a marked change in floor surfaces, and hardwood

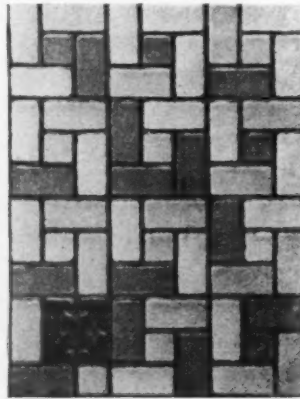
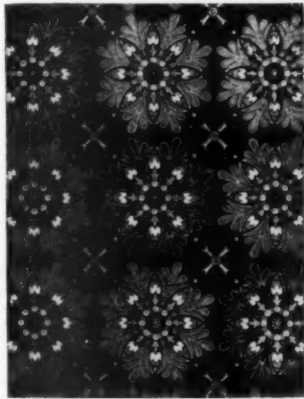
floors covered, or partly covered with rugs came into vogue. So completely was the idea accepted that it was not unusual to find in residences of moderate cost a floor having a pine center surrounded by a wide border of hardwood. Carpet manufacturers soon found that their plants must turn to the making of rugs or go out of business. With the advent of hardwood floors, it became customary to use tongue and grooved or matched boards. At that time no home was considered thoroughly modern unless it could exhibit one or more rooms finished with a parquet floor. Gradually the vogue subsided and while parquet floors are used today where a pattern floor is desired, the plain strip floor has come into more general use. Perhaps modern labor saving and cleaning methods

are largely responsible for the return of the carpet, for in recent years its increased use has been noticed.

About 1895, foreign woods, teak especially, began to be imported. Stanford White is said to have been responsible for the first importations of teakwood which he selected for the floors in the Winthrop residence at Westbury, N. Y. Within the past five years, there has been a "reversion to type" in the demand for random width board floors of the sixteenth and seventeenth centuries, even to the wooden plugs covering the screws to simulate the wooden pins of three centuries ago.

In the early 80's, clay tiles used in the United States were chiefly those imported from abroad.

Their cost at that time precluded their extensive use in any but the finest and most costly buildings. For general use, tile as a floor material was restricted to the small areas of vestibules and halls. Banks, churches and similar public buildings commonly used plain, encaustic, or any of the numerous forms of tiles made of fire clay for floors and they may be seen in such buildings of this period as still



MANY CHANGES IN FLOORING MATERIALS HAVE BEEN MADE DURING THE PAST FIFTY YEARS AS ILLUSTRATED BY THESE TWO EXAMPLES OF LINOLEUM. THE ILLUSTRATION AT THE LEFT IS A PRINTED PATTERN EXHIBITED AT THE CENTENNIAL EXPOSITION IN 1876 WHILE AT THE RIGHT IS AN EMBOSSED INLAID DESIGN INTRODUCED IN JANUARY, 1926 WHICH HAS ALL THE APPEARANCE OF TILE

remain. A favorite floor of the late 80's was a mosaic of marble in random color or laid out in pattern. These were the forerunner of the familiar ceramic mosaic which has been so extensively used since the early 80's.

On page 70 of Volume XI of *THE AMERICAN ARCHITECT* for 1882 two methods for laying encaustic tile floors over wood joist construction are described. One consisted of boards cut in between the joists to support bricks set on edge in cement mortar. The boards were set about three inches below the top of the joists and the brick surface projected about an inch above the joists and was covered with one or two inches of concrete as a foundation for the tile.

The other method consisted of a concrete bed

for the tile over brick laid flatwise over a wooden floor of rough boards. Either method made very heavy floor construction. In recent years, the substitution of cinder concrete for the bricks has provided a light weight floor and overcome early prejudice to the use of tile because of the heavier floor construction required.

With the development of the tile industry in the United States in the late 80's and early 90's, the native product began to compete favorably with the imported. Progress in sanitation and the attention given the bathroom added a new demand for tile in residences as well as hospitals and public buildings. White was considered for years to be essential to sanitary conditions and equipment. Within the past fifteen years tile has been recognized as a sanitary material irrespective of color and there has been a most gratifying tendency toward the use of agreeable color combinations.

It has only been within the past fifteen years that great advance has been made in color as applied to tile. The decorative value of the material, its sanitary feature and durability immediately commend it to architects for use wherever a material having these qualifications is desired.

Depending upon the point of view, stair treads may or may not be considered a flooring material. In the broad sense, at least, they are "floors," and because of certain developments in stair treads within the past thirty-five years, which have had a bearing on flooring materials, they may properly be referred to in connection with this subject.

Prior to 1890, in England, a workman going down a stair stepped on a scrap of lead, noted a singular feel, and mentioned the fact to his employer, Jonathan Mason, who pondered it, made some experiments and in 1891 patented "Unwearable" non-slipping stair treads under the name of "Safety Tread Syndicate, Ltd." of London.

The introduction of this device in the United States came about 1893 when W. S. Lawson, a retired dry goods merchant of Lowell, Mass., while on a business trip in England, noted some of Mason's treads, and arranged with him for the manufacturing rights in the United States. Upon Lawson's return to this country a company was organized and began manufacturing safety treads in 1894. These were of the steel rib type with

alternate grooves filled with lead. In 1904, C. J. Marius conceived the idea of using carborundum crystals and a chemical binder to replace the lead. A further development occurred about 1910 when Charles B. Jacobs, an electro-chemical engineer patented a process of combining granular aluminum oxide, an electric furnace product with iron or steel at the time of casting. Later aluminum and bronze also were developed with the abrasive element in the surface. About 1912, C. J. Marius was successful in incorporating the abrasive element in lead with a tinned steel reinforcing plate on the underside.

Following the successful combining of abrasives and metal for safety treads, the same material was adopted as an aggregate for use in terrazzo, granolithic and tile floor surfaces. Anti-slip walkway surfaces have been developed to meet a real need in modern building. Under the joint sponsorship of The American Institute of Architects and the American Society of Safety Engineers a national walkway safety code committee is formulating a code for walkway surfaces.

Slate floors abroad have been popular for centuries, but it is only within the present century that this material has been used for interior floors to any extent in the United States. In the 70's and 80's slate was often used for walks and flagging. In general, its use was largely

limited to towns and cities relatively near the quarry districts. The advance in transportation facilities which occurred during the nineteenth century made slate available to all parts of the country and partly accounts for its more extended use.

Twenty-five or thirty years ago slate having an absolutely smooth surface finish was demanded. In recent years, a better understanding of the material has led to advantage being taken of the natural or split surface to secure more interesting effects. Slate, being a stone, is a logical flooring material to use in many places. Its color and texture are often of value in contributing to the spirit of an architectural design as well as providing an excellent wearing surface.

Marble has always been and will doubtless continue to be a valuable material for floors. Excellent in wearing qualities and obtainable in a wide range of colors, marble was, early in



From The American Architect, February 27, 1924

A MODERN OAK FLOOR IN RANDOM WIDTHS, ROUGH HEWN, WHICH SIMULATES A FLOOR OF THE SIXTEENTH OR SEVENTEENTH CENTURY

GOLDEN ANNIVERSARY NUMBER

the history of building, used for this purpose. Stone was a favorite flooring material extensively used by the designers of early buildings in the United States. Marble has continued to find its place in all types of structures from residences to public buildings.

Within the period we are considering, marble mosaic, or as it is often called "Roman Mosaic," floors have been extensively used. About 1885, marbleolithic floors composed of marble-chips and a cementing mixture came into use. Granite has been used in a similar way and called granolithic. These floors properly come under the general term



From The American Architect, May 20, 1925

A THOROUGHLY MODERN USE OF TILE FOR FLOOR, BASE, WAINSCOT AND WINDOW TRIM

of terrazzo. One advance noted in the construction of these floor surfaces which is of comparatively recent date is the introduction of metal dividing strips. While often used in a decorative manner, they serve a most useful purpose in preventing cracking due to slight settlement of the building or other causes.

The increasing use of concrete as a structural material demonstrated the value of cement for various purposes. Artificial stone has been made many years previous to this, but the important ingredient cement being almost entirely an imported commodity and costly, its use was greatly re-



From The American Architect, March 11, 1925



From The American Architect, March 11, 1925

AT THE LEFT—THE SLATE FLOOR OF THE "PIAZZETTA" RESTAURANT IN NEW YORK, DESIGNED BY BAKER AND CROMWELL, ARCHITECTS MAINTAINS THE ARCHITECTURAL ATMOSPHERE OF THE SETTING IN ADDITION TO BEING PRACTICAL AND SERVICEABLE. AT THE RIGHT: THE RUBBER TILE FLOOR SURFACE OF THE BANKING ROOM OF THE MADISON AVENUE BRANCH OF THE FARMERS LOAN AND TRUST COMPANY, NEW YORK, DESIGNED BY WILLIAM F. DOMINICK, ARCHITECT, IS BOTH DECORATIVE AND UTILITARIAN. MANY TYPES OF FLOOR SURFACES WHICH MEET THE REQUIREMENTS OF THE MODERN BUILDING ARE AVAILABLE

stricted. The rapid development of the cement industry in the late years of the nineteenth century reversed conditions and cement soon came to be used for finished floors or as a suitable base upon which to lay other surfacing materials.

Magnesite had been developed in Germany and France in the 60's and attempts were made to introduce it into the United States. We understand that its first use as a flooring material was at the Chicago World's Fair in 1893. For the next six or seven years, "composition flooring," passed through a period of experiment and demonstration. Since 1900, it has been extensively used wherever the advantages of a plastic floor were desired. For years, magnesium chloride, the basic material of composition flooring, was imported from abroad. About ten years ago, the domestic product, said to be superior to the imported, began to be manufactured in the United States.

Rubber was introduced as a floor surfacing material about 1895. The early product was costly and made up of a compound which had a tendency to become hard and brittle. Small interlocking units three-eighths of an inch thick made in plain colors were first used. Manufacturers continued to experiment with the curing of rubber until they perfected a compound which will retain its natural resiliency indefinitely, and at the same time processes were perfected which provide an endless variety of color treatments.

During the period of perfecting rubber flooring from 1895 to 1905 units of other sizes, and thicknesses of one-quarter and three-eighth inches began to be made. Since that time, the various manufacturers have added other thicknesses and now make units up to twenty-seven inches square. In 1921, a further development of this type of floor was the introduction of cotton fibre as a binding element or reinforcement. Manufacturers have also supplemented rubber flooring material with cove base, wainscot, wainscot cap, and stair treads of the same material.

Cork tile made of cork curlings compressed and baked in moulds have been manufactured since 1895. Composition cork tile, an outgrowth of this type of flooring and the linoleum process, was introduced in 1913. These are made of cork flour, oxidized linseed oil, gums and pigments. When cork board was first made, a binder of asphalt or pitch was considered necessary. Later on it was discovered that cork itself contains a natural gum which, when liquified by heating the cork, makes a better binder than asphalt.

About 1860, a floor covering known as "Kamptulicon" was used in England and exported to the United States. This was made of India rubber, gutta percha, boiled oil and ground cork, all thoroughly mixed together and rolled into sheets without canvas or burlap backing. Frederick Walton, an Englishman, became interested in find-

ing a substitute for Kamptulicon. One day, it is said, he chanced upon an abandoned paint can and found that the encrusted dry paint could be easily kneaded. He began to experiment and eventually produced a product consisting of oxidized linseed oil, ground cork, wood flour, Kauri gum, rosin and coloring pigment, rolled on burlap which he patented in December, 1863, and called "linoleum." In 1872, Walton sold the American rights to manufacture linoleum to Joseph Wild and his associates who formed the American Linoleum Manufacturing Company in 1873.

People were skeptical of the merits of the product and the pioneers were faced with the problem of convincing both merchants and the public of the desirable qualities of linoleum as a floor. The first shipments of American made linoleum were begun in 1875. The first year's production amounted to 94,000 square yards, a little less than perhaps twice the amount required in a large office building. Linoleum was exhibited at the Centennial Exposition in Philadelphia in 1876, and created considerable interest.

In the Autumn of '89, the process of making "straight line" inlaid linoleum was patented. Previous attempts to make inlaid linoleum had been unsuccessful owing to the colors and patterns running together, or when made of separate units cemented to the backing, the units did not permanently adhere. Previous to this time, linoleum designs had been printed on the surface but due to wear were not permanent.

Battleship linoleum was introduced in 1899 just after the Spanish American War to meet the demands of the Navy for a floor surfacing material which would not splinter or take fire.

Today linoleum is composed of the same materials and made by the same process as that invented by Walton sixty-two years ago. Advance in color and design are improvements of the past decade and an embossed inlaid linoleum has recently introduced texture to the surface.

No part of the interior of a building is subjected to greater or more constant wear than the floors. Stone, slate, marble and wood were the earliest selections as to durability, but the inventive minds and persistent efforts of American manufacturers have produced a number of materials where the surfaces and color retain their original characteristics to the point of complete destruction.

The editors acknowledge their indebtedness to the following who supplied authoritative information on the history of flooring materials: American Abrasive Metals Co., Armstrong Cork Co., Asbestolith Mfg. Co., Associated Tile Mfgs., Batchelder-Wilson Co., Goodyear Tire & Rubber Co., Indiana Flooring Co., National Slate Association, Rookwood Pottery Co., Stedman Products Co., The Safety Stair Tread Co., United States Rubber Co., Joseph Wild & Co.

PLUMBING and SANITATION

In which is narrated how water supply and drainage systems have advanced with and protected the health of rapidly growing communities

WHEN it is recalled that the first American bathtub was installed in Cincinnati in December, 1840, and that eminent physicians predicted dire results from frequent bathing and some cities proposed to prohibit their use by health ordinances, it is realized that sanitary plumbing is essentially a modern art. The element of drainage, however, is of ancient origin and some remains of such systems are still in existence. Like many other common things with which we now have contacts, modern plumbing systems and fixtures have been almost entirely developed within the last half century.

Plumbing consists of drainage, water supply, fixtures, and accessories. Drainage consists of a system of pipes which conduct from a building the wastes from the sanitary and other fixtures, and rainfall. The system is divided into horizontal and vertical pipes. The horizontal pipes are made of burned clay and cast iron, the former used outside and the latter within the building. The vertical pipes are used for disposing of rainfall collected on roofs and the wastes from the sinks, baths, lavatories, urinals, water closets and other water wastes. Usually these waste pipes are made of cast iron soil pipe. Another system of vertical piping is used in connection with sanitary plumbing fixtures which serve to ventilate the traps of the fixtures and extend upward and enter into the main soil pipes just above the topmost fixture, the soil pipe extending through the roof. In high buildings where the weight of the waste system is considerable, steel or wrought iron pipe, lighter and stronger, is often used for practical considerations.

Accessory to waste systems of a drainage kind, such as downspouts for roof rainwater, drainage from shower baths, swimming pool gutters and borders and places where the floors are flushed with water, special types of drain heads have been invented which provide for the absolute prevention of leaking. This kind of water leakage is one of the most difficult to prevent and the means for doing so represent a high quality of designing. These drainage fixtures are made in cast iron, brass, bronze and white noncorrosive metals.

Where wastes contain waters which are impregnated with corrosive chemicals it has been found desirable to use a special type of drainage pipe. Burned clay pipe was one of the earliest materials used and is still sometimes employed. Lead lined pipe has also been employed for this service. Quite recently, however, there has been developed a corrosion-resisting alloy cast pipe of excellent acid resisting properties which has come into extended use where special waste systems are necessary such as for chemical laboratories and in plants whose processes produce wastes that are destructive of wrought iron and steel pipe.

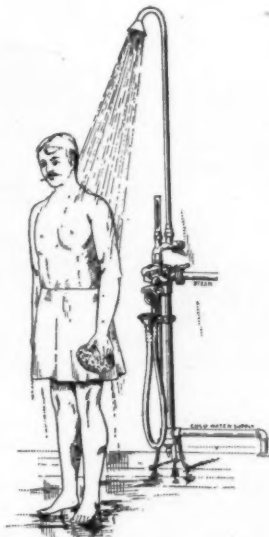
Sanitary plumbing would be impossible without the use of water and for that reason the water supply service to the various fixtures is of the utmost importance. The water service originally consisted of cold water which satisfies all of the essential needs, but physical comfort and convenience demands the use of hot water in certain fixtures. The action of cold and hot water on the service pipes varies and to compensate for this pipes made of different materials are ordinarily used.

The making of pipe was a matter of rather slow development but the ingenuity of American inventors led to the development of machinery which made the production of pipe a commercial possibility. The first pipes were made of wrought iron prior to the production of steel as a comparatively cheap commodity. This was followed by the manufacturing of steel pipe. Brass pipe was made with the beginning of pipe making in this country.

Wrought iron and steel pipe are marketed black or galvanized for the different uses to which they are put. Hot water service pipes are subject to damage much more than cold water service pipes, caused by the more rapid oxidation that takes place when in contact with hot water.

Brass pipe has had a long use, especially for hot water service, due to its resistance to corrosion and while its cost exceeds that of both wrought iron and steel pipe, its use is increasing very rapidly due to its ultimate economy.

The use of lead pipe was coincident with the first installations of water service and it was universally used until wrought iron pipe became avail-



From *The American Architect*
April 6, 1895

"HUBER'S RAIN BATH"
"FOR INSTANT PRODUCTION
OF WARM AND HOT WATER
BY MEANS OF STEAM"

able. Owing to its ductility, lead pipe, unless properly supported, loses its alignment with a corresponding effect on the service. Its softness renders it also subject to puncture.

A very important feature in water service is the correct proportioning of pipe sizes to the demands of the service. The general tendency is to use pipes too small in size, thereby materially affecting the satisfactory operation of the plumbing fixtures. The designing of water service systems has been standardized on a scientific basis and the resulting action is satisfactory and effective.

The early sanitary fixtures were very crude in design and workmanship. It was customary to enclose the bathtubs, water closets and lavatories with wood cabinetwork to conceal the fixture. With a better class of fixtures came the desire to expose them for reasons of cleanly maintenance, and the unsanitary, ugly woodwork was discarded. Sanitary fixtures are made principally of two materials: vitreous porcelain and enameled iron. Certain utility fixtures are also made of slate, soapstone and various composition materials.

Vitreous porcelain for this purpose was first produced at Trenton, N. J., and that city is now the largest producer of this kind of ware. Although porcelain has been produced in foreign countries for centuries, its application to sanitary plumbing fixtures is of recent origin. The mechanical difficulties of production are probably greater than those encountered in making any other class of porcelain ware. Another difficulty was the developing of the shape and size of the article itself; therefore the design and the method of making had to be evolved concurrently. It is but natural that the new industry grew slowly as experience had to be gained, there being no precedents whatever for such work. Great credit is due to those pioneer potters at Trenton for their courage and persistence in establishing the industry. Today, vitreous porcelain is employed in making all of the sanitary plumbing fixtures.

The making of fixtures of cast iron was not so difficult a problem because stove foundries had been brought to such a condition that their production of cast iron articles was an important industry. The

making of a satisfactory enamel was the principal difficulty. The use of enamel paint was never satisfactory and the bare iron was both unsightly and insanitary. Today, pure white enamels of a perfect texture and durability are produced. Colored enamels have never been employed for sanitary ware, either of porcelain or cast iron. Perhaps the next step in improving the appearance of sanitary plumbing fixtures will be the use of colors to harmonize with the wall and floor tiling used in toilet and bath rooms.

Enameled cast iron is used in all fixtures except the water closet which presents mechanical difficulties in founding. Enameled ironware has many desirable characteristics and its popu-

larity has grown steadily. The selection of either vitreous porcelain or enameled iron ware is purely a matter of personal preference, influenced possibly by the cost.

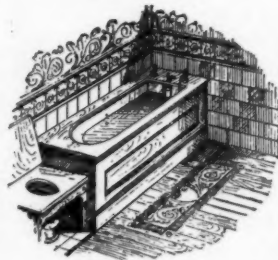
The first water closets were largely mechanical devices consisting of a metal or earthenware hopper with a movable dumping pan or a plunger. It was impossible to ventilate or maintain them in a clean condition. The first great step in their improvement was to make the one piece earthenware water closet which

depended on water only for its operation by washing out the contents of the bowl through a water sealed trap. The early patterns were of the washout type which were not positive in operation and often uncleanly. At present, the siphon jet and the washdown types of bowls are in general use and in many instances required by sanitary codes.

The problem of providing water closet facilities for large numbers of persons under control as in factories, schools, prisons and institutions, was first solved by the use of a long trough, called a latrine, which was automatically, periodically flushed by admitting the water at one end. This means of emptying the trough was improved with a rim flush along the edge of the latrine. This type of closet is objectionable owing to the impossibility of keeping it in a clean and sanitary condition. The only argument in its favor was the low cost of installation.

THE "SANITAS" BATH TUB OF 1886. THE STANDPIPE OVERFLOW RECESSED AND THE OUTLET OPERATED BY A "SINGLE MOTION OF THE HAND. THE NECESSITY OF REMOVING THE STANDPIPE FROM THE BATHTUB, AND FINDING A PLACE FOR IT TO REST UPON EVERY TIME THE TUB IS EMPTIED, AND THE RISK OF DROPPING IT INTO THE TUB AND DENTING OR PERFORATING THE COPPER IS AVOIDED" NOTE WOODEN FLOOR AND TILED WALLS

From The N. O. Nelson Mfg. Co. Catalog of 1886-87



AND DENTING OR PERFORATING THE COPPER IS AVOIDED" NOTE WOODEN FLOOR AND TILED WALLS

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With a finer sense of the fitness of things, industrial plants and other places where latrines were used, are now equipped with more sanitary individual closets designed particularly for the special use as demanded by the characteristics of the persons using them and service requirements.

Attempts have been made to produce a silent water closet but complete success has not been attained as the necessary volume of water acting with sufficient force to empty the bowl, must of necessity create some noise. Many styles and types of water closets have been designed by the various manufacturers. Standard designs, limited in number, are being adopted by the manufacturers. Some architects who control the purchase of large numbers of water closets, specify them to be of a siphon jet type, to be made of vitreous china in one piece, to weigh not less than a stated number of pounds, and to pass a 2" ball through the trap without obstruction. In this specification, quality of material and performance are the two factors of importance. All first-class manufacturers can comply with such a specification.

Accessories of the water closet are the flanges connecting it to the soil pipe, the seat, the flush tank or the flush valve. The securing of the seat to the bowl was a difficult matter after the disuse of the old enclosing wood cabinet and seat combined. This attachment of seat to bowl has been accomplished and the seats are so made that they do not warp, split or break. Much attention has been given to the sanitary phase of seat design and finish and it has resulted in the making of the two piece, open front and back, seat which, with the extended lip bowl, and easily cleaned seat finish satisfies the most rigid sanitary requirements.

The flush tank was originally placed well above the floor in order to secure a sufficient head of water to flush the bowl. The tanks were made of wood, copper lined, and operated with a pull chain. Later a low-down tank was devised which had a larger pipe connecting it with the bowl to reduce the retarding of flow because of friction. A hand manipulated valve operates the tank. Tanks are now made of vitreous porcelain as well as of wood, the low-down tanks having a movable

cover. There has been little change in the float-closing inlet valve into the tank, the changes being for simplicity and durability.

A flush valve is one through which a direct connection is made between the water service and the bowl. The valve is so constructed that it will close automatically when a predetermined

volume of water, sufficient to flush the bowl, has passed through it. The use of this valve dispenses with the flush tank and permits of a close regulation of the water consumed and better appearance.

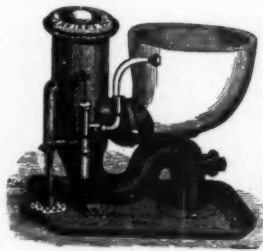
The bidet, as a bathroom fixture, is quite common in England and on the continent. It is a comparatively unknown fixture in America. Through the efforts of certain manufacturers knowledge of this type of fixture is becoming more general and the indications are that the bidet will soon become recognized as an es-

sential feature in the bathroom. The foot bath and the sitz bath are also not commonly found in American bathrooms. There is a probability that they will eventually be found in at least the better class residence.

The American characteristic of being influenced by fashion applies to plumbing fixtures as well as to other things. That influence has caused a rapid growth of the use of some of our modern fixtures of a certain style and type. It leads to the belief that these now infrequently used fixtures may suddenly come into a popular vogue and be found exceedingly valuable.

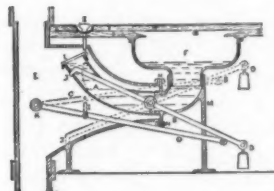
The first lavatories were made of earthenware bowls attached to marble slabs in which an opening was cut for the bowl. The joint between these two parts was difficult to make tight and maintain in a sanitary condition. To overcome this objection a one piece top and bowl made of vitreous porcelain was invented, to which was later added the attached back. When the making of enameled cast iron was perfected, lavatories made of this material were introduced. They possess the merit of strength and freedom from damage by breaking. The quality of enameled iron bathtubs and lavatories has been developed to a high state of perfection.

The early type of lavatory was supported on the wall at the back and by legs. Later it was sup-



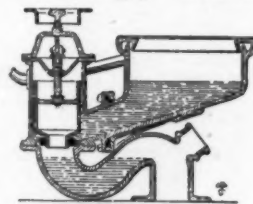
From *The American Architect*
October 14, 1876

JENNINGS' IRON TRAP SAFE
PAN CLOSET OF 1876



From *The American Architect*
February 9, 1878

A TYPE OF WATER CLOSET
USED IN 1878



From *The American Architect*
October 20, 1883

PLUNGER-CLOSET OF THE
EARLY 80'S

THE AMERICAN ARCHITECT

ported on wall brackets. The pedestal type of lavatory has a large central leg which supports the bowl and top. It has the advantage of being entirely separated from the wall and is usually made so large that a wall-back is not required. It occupies more space than the bracket supported types and is used in buildings where space allotted for toilet rooms is not reduced to the minimum.

Special lavatories in groups or batteries are installed in industrial plants, prisons and other places where large numbers of persons wash at the same time. The design of these fixtures has improved vastly over the primitive trough which was first used. In many of these, the water is supplied to all of them at the same temperature by employing a mixing chamber in which the hot and cold water is proportioned as desired. These fixtures are often arranged to be used only under running water conditions for sanitary reasons.

The original bathtub was a cabinet enclosed tub made of sheet copper with soldered joints. This type of tub was succeeded by those made of vitreous porcelain. The early cast iron tubs were enameled only on the inside and on top of the rim. The outside of the tub was covered with enamel paint. The art of founding and enameling has developed to such a state that cast iron tubs are now enameled on all exposed surfaces.

The shower bath consists of a waterproof enclosing wall and floor pan and curtains to close the

overcome by making the perforated face of the spray of vitreous porcelain. The selection of the mixing device is very important because of the possibility of scalding the bather. Group showers are provided in factories, gymnasiums and prisons which consist of a row of spray heads with a continuous central controlled water supply.

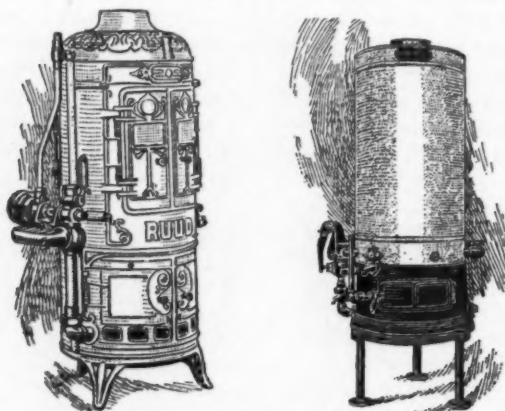


From The American Architect December 8, 1894

A PORCELAIN ROLL-RIM BATHTUB ON LEGS MADE BY THE J. L. MOTT IRON WORKS IN 1893

The early types of urinals consisted of individual bowls attached to a wall, back of which was the waste, or of walls of slate or marble down which flowed a thin, constant sheet of water, or a trough which was continuously flushed or automatically and periodically flushed at the end or along the rim. The later type consists of individual unit stalls made of one piece of vitreous porcelain or enameled iron. These units are also assembled in batteries in public places. Probably no fixture requires more constant attention to keep it in a sanitary condition and the improvements have all been made with that end in view. The drainage connection at the bottom of the unit is of great importance. Urinal batteries are often automatically flushed at predetermined periods or each unit is flushed by a manual or foot control valve.

The sink is not usually classed as a sanitary fixture but rather as a utility fixture. Its general use is confined to domestic purposes. The kitchen sink is arranged with a drainboard made either of wood or of the same material as the sink. The style and quality of sinks vary greatly. The plain rectangular cast iron sink is used more commonly in factories where it is subjected to rough treatment and appearance is not considered. The better types are made of vitreous porcelain and enameled iron. The backs and drainboards are either separate or attached to the sink. There is a wide range in the sizes of the sink and the drainboard. Special sinks for glassware and silverware are also made for butlers' pantries. Hotel and restaurant kitchens also require some special sinks used in the preparation of food and the cleansing of dishes and utensils. The slop sink is not made in many sizes and the style is quite uniform. Special purpose laboratory and industrial sinks are made in quite a large variety.



Courtesy of the Ruud Mfg. Company

INSTANTANEOUS AUTOMATIC WATER HEATER, 1896 AT RIGHT, 1922 AT LEFT. VARIOUS MECHANICAL PERFECTIONS HAVE BEEN MADE DURING THE PAST THIRTY YEARS IN THE WATER SUPPLY SYSTEM

entrance. A later type has a plate glass door with a brass frame to close the entrance. The most important features of the shower bath are the spray head and the valve control (which mixes the hot and cold water to the desired temperature) and the floor drain. Metal spray heads sometimes corrode and the perforations become closed due to the chemicals contained in some waters. This is

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The laundry tub naturally is classed with the sink, being a utility rather than a sanitary fixture. These are made in single units or in a group of units. The principal requirements are durability and the ability to resist rather rough treatment.

Sinks and laundry tubs are made of cast iron, plain or enameled; vitreous porcelain, slate and stone. The wide range of use in this class of fixtures requires an equally wide range of material in their making.

The enclosing of the sanitary fixtures when used in groups for reasons of privacy was accomplished by using a low partition and wainscoting made of wood. These were undesirable and unsanitary for obvious reasons. This type of enclosure was superseded by those of marble, slate, enameled sheet metal and structural glass slabs.

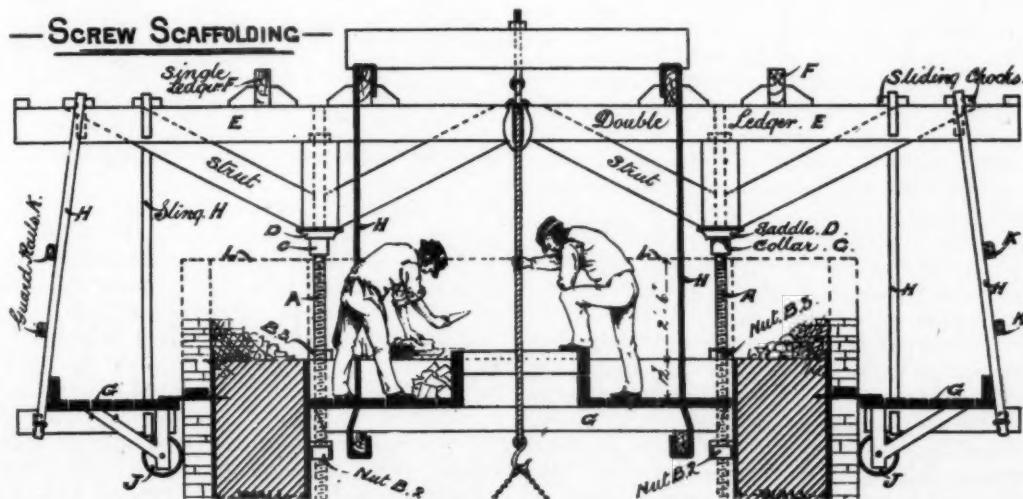
The water supply to bathtubs, showers, lavatories, urinals, laundry tubs and sinks is controlled by faucets of various kinds and shapes. These are usually made of brass and are left in their natural color or are nickel plated. A recent development is the making of the exposed parts of faucets of vitreous enamel, especially for the toilet room fixtures. White metal is also coming into more common use. A large number of designs and styles of faucets have been produced by the many manufacturers but the present tendency is to standardize them and eliminate those that do not comply with the standards. Special purpose faucets, knee or foot operated, are made for surgeon's wash rooms and for other places that require special consideration.

Toilet room accessories have been developed on a very comprehensive scale. These include the wall cabinet, the tumbler holder, tooth brush and

soap holders, towel racks, toilet paper holders, hand holds at bathtubs and other things. These are made of vitreous porcelain or enameled steel. Wherever possible they have been made in the recessed wall type, in sizes to conform with the usual glazed wall tile used for wainscoting. Glass is also used for some fixtures such as towel racks. The main object in designing these fixtures has been to make them of the utmost simplicity in order that they may be easily maintained in a clean condition.

Modern plumbing includes a wide range of things, apparently innumerable, all devised to promote sanitary and convenient conditions.

In addition to drawing upon the volumes of *THE AMERICAN ARCHITECT* for information, the editors are indebted to the following authorities for their helpful co-operation in supplying information: A. P. W. Paper Company, A. M. Byers Company, C. F. Church Manufacturing Company, Griscom-Russell Company, Groeniger Manufacturing Company, Humphrey Company, Jenkins Bros., Thomas Maddock's Sons Company, J. L. Mott Company, N. O. Nelson Manufacturing Company, Never Split Seat Company, Reading Iron Company, Ruud Manufacturing Company, Thomas Savill's Sons, Sloan Valve Company, Standard Sanitary Manufacturing Company, The American Pin Company, The Bridgeport Brass Company, The Chicago Faucet Company, The Duriron Company, Inc., The Fairfacts Company, The Stack Heater Company, The Youngstown Sheet and Tube Company, United States Cast Iron Pipe and Foundry Company, Wheeler Condenser and Engineering Co., Whitlock Coil Pipe Company.



SCREW SCAFFOLDING USED IN BUILDING TOWERS, ILLUSTRATED IN AN ENGLISH PUBLICATION AND REPRODUCED IN THE AMERICAN ARCHITECT JULY 12, 1879

ELECTRICITY in the MODERN BUILDING

A force harnessed and made useful to man during the past half century

ELECTRICAL progress is preeminently the achievement of the past fifty years. While the science of electricity is not new, its practical development and application in the form of mechanical energy may be said to have been accomplished during these past five decades.

PROGRESS BEFORE 1876

Philosophers and inventors from 600 B. C. to the early years of the eighteenth century were familiar with the phenomena of electricity as a medium of philosophical diversion but no practical applications of this science were made.

Proof that man-made frictional electricity and electricity out of the heavens were identical and capable of storage in Leyden jars was obtained by Benjamin Franklin in 1752, and was an event of no little importance in furthering later progress in electricity.

Discoveries covering a period of over 2000 years had but little practical value for a steady flow of electric energy or current was not obtained. While Luigi Galvani has been called the father of modern electricity, it was Alessandro Volta, who in 1800 demonstrated with his Voltaic pile that a steady flow of electric current could be generated by chemical means. Important as are the machines and discoveries of Faraday and Oersted, Volta discovered the link between electricity and magnetism. About twenty-five years later, Ampere founded the science of electro dynamics and George Ohm discovered the relation between voltage, amperage, and resistance in an electric current.

In 1808 Sir Humphrey Davy publicly demonstrated his arc light, operated by current from a battery of cells. Thomas Wright obtained in 1845 the first patent on an arc lamp, and J. W. Starr in the same year invented an incandescent lamp. In 1866, Sir Charles Wheatstone invented the dynamo, the principle of which is in universal use at the present time. Z. T. Gramme, a Belgian, produced in Paris about 1870, the first practical generator of direct current. The invention of the electric motor is said to have resulted from an error in "hooking up" Gramme's dynamo at a Vienna Exhibition in 1873. Jablockkoff's "Electric Candle" of 1876, a crude arc lamp, used for lighting the boulevards in Paris fifty years ago can

perhaps be remembered by many of our readers.

By 1876 the telegraph was well advanced in the United States; the telephone just conceived as practical; progress had been made in the dynamo and Edison had established his laboratory at Menlo Park, N. J., a center from which so much history in electrical developments has been made. The situation in the field of electricity at the time *THE AMERICAN ARCHITECT* began publication is briefly conveyed by this condensed review. The scene was then set for one of the most remarkable periods of progress in a particular field that the world has ever seen. So closely do these developments touch our daily lives that we now accept as commonplace, things considered as miraculous or impossible forty or fifty years ago.

ILLUMINATION

In 1876 the principal sources of illumination were gas and kerosene oil. American rights to manufacture German mantels for gas light burners were obtained in 1888 and the mantels given the name of Welsbach. Acetylene gas did not become a commercial fact until the early 90's. During this period of about twenty-five years, important progress had been made in the field of electric lighting. About 1877 the arc light had been perfected and was commercially established. The nature of the arc lamp made it unsuitable for use except in commercial buildings and for street illumination. This

spurred Edison on with his experiments to find a suitable filament with which to "subdivide" the arc lamp and produce an incandescent lamp more suitable for general use. In 1879, he invented the high resistance carbon filament operating in a high vacuum, maintained in a one piece all glass globe. His crude central lighting system established at Menlo Park in that year laid the foundation of the central electric lighting systems in general use today.

The first commercial installation of the incandescent lamp was on the Steamship Columbia in 1880. The first commercial central lighting plant was that built by Edison in New York City in 1881 and used for many years.

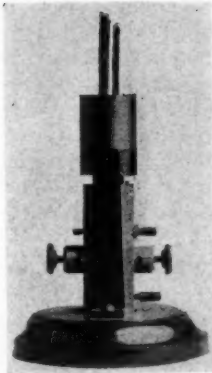
While many minor changes were made in Edison's incandescent lamp, the next most important invention was that of the Gem incandes-



Courtesy Edison Lamp Works

VOLTA DEMONSTRATED THE FIRST BATTERY CALLED THE "VOLTAIC PILE" IN 1800

GOLDEN ANNIVERSARY NUMBER



Smithsonian Inst. Pub. 2717

JABLOCHKOFF'S "CANDLE" 1876. SEVERAL "CANDLES" WERE PLACED IN ONE FIXTURE TO PERMIT ALL NIGHT SERVICE. WHEN ONE "CANDLE" WENT OUT ANOTHER WAS AUTOMATICALLY SWITCHED ON

the market, in 1911 for use on automobiles.

Two years later, or in 1913, Dr. Irving Langmuir perfected the gas-filled Tungsten filament incandescent lamp, which was a notable improvement in lamp efficiency. Since 1913 improvements have perfected the filament, appearance and general construction of the lamp.



Smithsonian Inst.
Publication 2717

ENCLOSED ARC LAMP, 1893. UP TO THIS TIME ARC LAMP CARBONS WERE SHORT LIVED DUE TO THEIR OPERATION IN THE OPEN AIR

electric workers and the many details which go to make an invention of this magnitude commercially practical had to be developed and marketed.

The past twenty-five years may be correctly

cent lamp by Dr. W. R. Whitney in 1905. This lamp contained a carbon filament which was subjected to a very high temperature in the process of manufacture and increased by 25% the efficiency of the carbon lamp. A year later, a Russian, Dr. Werner Von Bolton, invented the Tantalum filament lamp which was 20% more efficient than the Gem.

In 1907 Just and Hanaman, two Austrians, invented a lamp using Tungsten wire as a filament which had three times the efficiency of the carbon lamp. This lamp was later perfected in the United States by Dr. W. D. Coolidge, through the use of a drawn Tungsten filament. It was placed upon

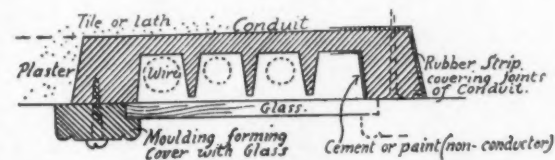
the progress made in electric lamp design covering a period of less than fifty years has tended toward greater efficiency in the life of the lamp, economy in current consumption for comparable results and consequent reduction in lamp cost and maintenance. In spite of advancing manufacturing and other costs, we now obtain more artificial light at less cost than at any time during our history.

One can but marvel at the tremendous progress made in electricity in the twenty years following Edison's discovery of the incandescent lamp. Sources of energy, generators, wire, distributing systems, electric

said to be a period of perfection and the extension to practical use of the many devices crudely begun in the earlier period. The product itself had to be so perfected that volume sales at a price within the reach of all justified the installation of expensive plants and equipment. During this phase of the history of electricity the name and work of Steinmetz became one of world-wide recognition.

While the purchase price of electric current had to be reasonable in order that it might compete with other sources of energy produced at moderate cost, it was also essential that this current should be made convenient and safe for general use, and overcome ignorant prejudice always present when new things are introduced. Wire for conveying this unseen force had to be insulated properly. Early installations were run exposed. As methods of insulation improved and electricity came into more general use, exposed wiring was recognized as both unsightly and unnecessary and it became general practice to conceal the wires. This necessitated many new inventions to meet new conditions.

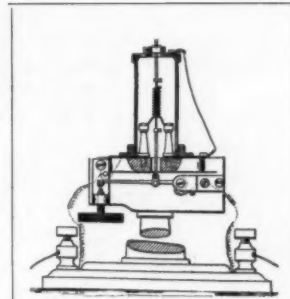
Switches of various types for various duties were required readily to control the current, outlets with equipment by means of which others than mechanics could tap the electric flow and obtain light or power with convenience and safety had to be developed. Protective safety devices and meters had to be perfected.



The American Architect, June 29, 1895

SUGGESTIONS MADE IN 1895 FOR THE CONCEALING OF ELECTRIC WIRES. AT THIS TIME ELECTRIC WIRES WERE RUN EXPOSED ON WALLS AND CEILING

With practical appliances largely solved, attention was directed toward making equipment better in appearance. The invention of the great variety of labor saving devices which the market affords today developed within the space of a



Courtesy Edison Lamp Works

EDISON RECEIVED HIS FIRST LAMP PATENT ON THE PLATINUM LAMP APRIL 22, 1879

THE AMERICAN ARCHITECT

few years and came into almost instant use.

It has been told that Benjamin Franklin in 1747 proposed an "electrical dinner" where the turkey would be killed by an electric current and all the food cooked by heat supplied by electricity. It was 150 years later that W. S. Hadway perfected and installed the first electric range, since highly developed and extensively used. The perfection of the application of electric energy as a source of heat has resulted in the production of many appliances from the household toaster to the electric furnace of commerce. The general use of heating and other mechanical appliances has in a large measure affected wiring practice, so that today installations are made with numerous separate circuits run from the panel board to prevent overloading and its attendant fire hazard.

THE ELECTRIC MOTOR

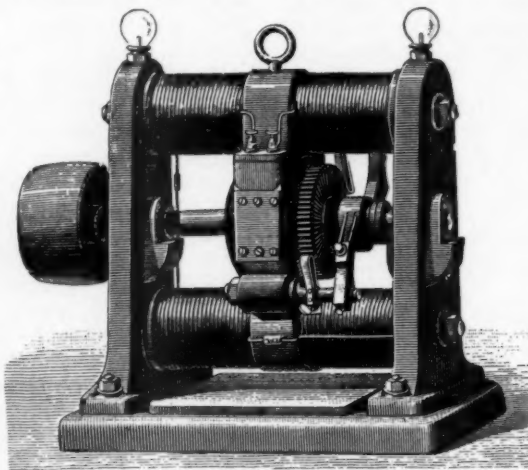
Closely following the development of the electric lamp was that of the electric motor, the progenitor, so to speak, of the now highly developed gasoline engine. The conversion of electric current to mechanical power has been universally felt and applied in all industries. An early use of the motor was for the operation of pumps. In the late 80's, it began to be used for direct drive worm-gear elevators, and for driving the fans of ventilating systems. While the fundamental

principle underlying the electric motor has remained unchanged, its physical aspect has not remained stationary. The development of the motor has tended toward much higher efficiency with a reduction in size. With the perfection of small motor units its range of influence was extended to the home. Today the use of the electric motor may be found from the vacuum cleaner and washing machine to that furnishing power for building equipment, and driving the wheels of commerce.

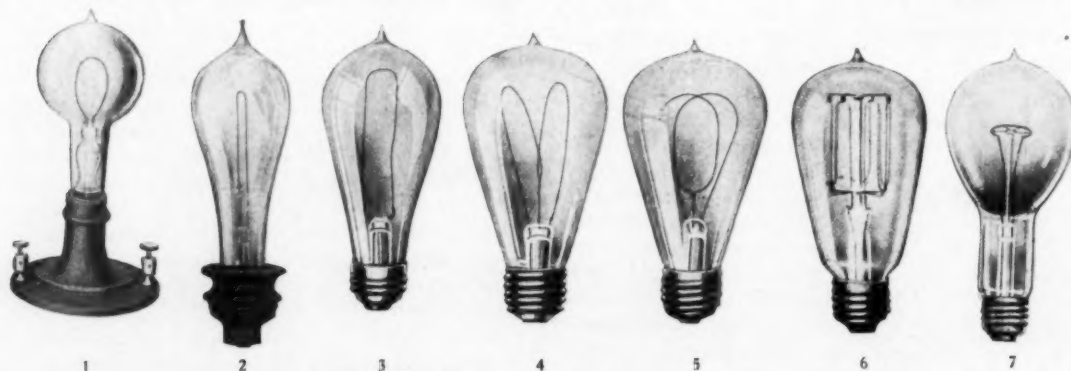
THE TELEPHONE

Speech was first transmitted over a wire by Alexander Graham Bell on March 10, 1876. While many have made claim to the invention of the telephone, Bell's claims have been well substantiated and it was he at least who perfected and carried the idea through to a workable conclusion. The story of Bell's achievement reads like romance or a page of fiction. Bell had discovered the principle of the telephone in 1875 and a year later, in October, two sets of telephones were connected to a telegraph wire between Boston and Cambridge, two miles apart, and long distance speech was established.

Progress was rapid and in May, 1877, the first telephone circuit switchboard was installed in Boston to serve five telephones. In 1878 the first commercial telephone exchange was established at New Haven, Conn. Within a year, switchboards



Smithsonian Institute Publication 2717
GRAMME'S DYNAMO, 1871



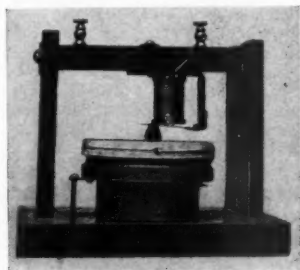
THE EVOLUTION OF THE INCANDESCENT LAMP

1. EDISON'S FIRST SUCCESSFUL LAMP—1879. 2. ORIGINAL SCREW BASE—1880. 3. PROGRESS IN 1886. 4. LAMP OF 1900. 5. GEM LAMP IN 1909. 6. DRAWN TUNGSTEN WIRE LAMP OF 1911. 7. GAS-FILLED LAMP OF 1922.

Illustrations reproduced through the courtesy of the Edison Lamp Works

GOLDEN ANNIVERSARY NUMBER

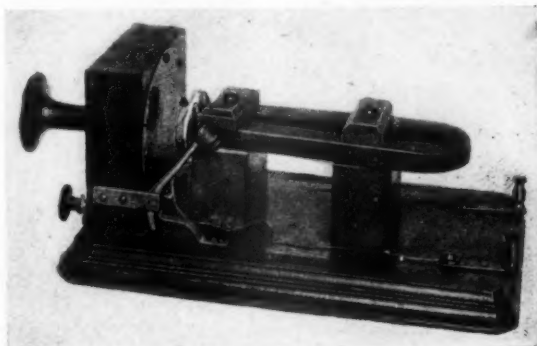
had been installed at Bridgeport, New York, Philadelphia, and Chicago. In 1882, a telephone line forty-five miles in length was opened between Boston and Providence and two years later telephone communication was established between New York and Boston, a distance of 235 miles. A line was put in service in 1892 between New York and Chicago. Long distance service was completed between New York and Denver in 1911



Courtesy A. T. & T. Co.
ALEXANDER GRAHAM BELL'S
FIRST TELEPHONE, 1876

and in 1915, the transcontinental telephone line was opened between New York and San Francisco. The telephone as commercially developed was originally two instruments at either end of the wire carrying the electric current and was confined to a connection between an owner's place of business and his residence. The first telephone "call system" consisted of tapping the transmitter with a lead pencil. Under ideal conditions this served the purpose, but was improved by the use of a button attached to a small hammer to hit the diaphragm. Since this did not prove entirely satisfactory, the inventors worked out the magneto-electric bell. In spite of the general use of the modern desk type of telephone which automatically signals the central switchboard upon removing the transmitter from its hook, the general use of the wall type box and crank is a familiar memory in our own time.

The discovery that several telephones could be operated at the same time on one wire by variation in the frequency of the carrier current greatly simplified the wiring problem. In the late 90's, the telephone had come into such general use that



Courtesy American Tel. & Tel. Co.
BOX TELEPHONE WITH WATSON HAMMER SIGNAL, 1877.
THE FIRST CALLING DEVICE OF WHICH SEVERAL WERE
USED PREVIOUS TO THE MAGNETO CALL

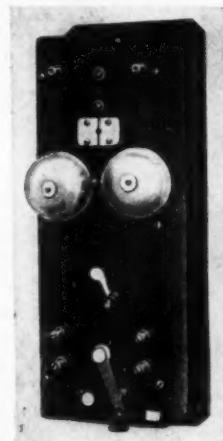
intercommunicating systems began to be installed in buildings. Then followed the development of local switchboards, numerous improvements in the design and construction of instruments, underground conduit, machine switching, and other equipment until today every desk has its telephone and every business several trunk lines to handle the volume of incoming and outgoing calls with dispatch.

The nature of telephonic communication is such that the perfect coordination of organization, apparatus and methods has been necessary and the development of "service" has become of paramount importance. This has been a gigantic task and required constant research and progress to keep abreast of public demands. The able way in which this has been accomplished in a comparatively brief space of time and will no doubt continue, speaks well for the foresight and ability of those who have had and now have this work in charge.

In no branch of electrical development has the use of electricity been more widely extended and its commercial and time-saving properties better developed. We learn from a reliable source that there is at present installed in the United States a total of approximately 16,000,000 telephones and that the number of conversations held during twenty-four hours may safely be stated in excess of 50,000,000. The messenger boy of fifty years ago, whose lagging footsteps were the subject of many humorous comments, as compared with the telephone of today is as the passenger canal boat is to the aeroplane that has recently demonstrated a speed of approximately 250 miles an hour.

THE RADIO

One may not hazard a guess that the hidden forces of nature have all been discovered. Since time was, the currents of the air have throbbed with the vibrations, which harnessed and correlated, have resulted in the perfection—we were tempted to write—invention of the radio. It is but a few years ago that radio communication and broadcasting were established, and within the year we have witnessed the transmission of photographs over the telephone wire and through the currents of the air. So rapidly has the radio been accepted

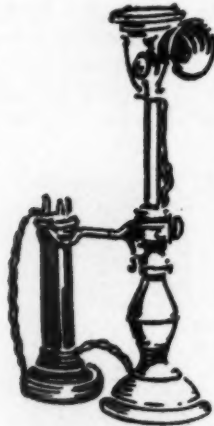


Courtesy A. T. & T. Co.
THE FIRST MAGNETO
CALL WALL TELE-
PHONES DUE TO SHAPE
WERE CHRISTENED
"WILLIAMS COFFINS"

THE AMERICAN ARCHITECT

that most modern apartment houses, hospitals, hotels, and clubs, are now provided with the necessary wiring and outlets. This reflects the evolution of wiring for illumination from exposed installations to the concealed, except that it has occurred within a shorter space of time.

By 1915 radio telephone apparatus had been developed and successful demonstrations had been made over great distances. Wireless communication was established between Arlington, Va., and the Pacific Coast and the first transatlantic communication by wireless telephone from Arlington, Va. to the Eiffel Tower, Paris, France, was effected. On July 2, 1917, telephone communication was established at Langley Field, Hampton, Va., between an aeroplane in flight and the ground. Successful communication between planes in the air was also found possible.



Courtesy A. T. & T. Co.
A DESK TELEPHONE
OF 1886

In less than four years the radio was highly perfected and came into popular use and demand. Like a new toy, it sprang into being almost over night. Its first fascination has almost worn off and like

many other modern developments we cease to wonder but accept it as an every day commonplace.

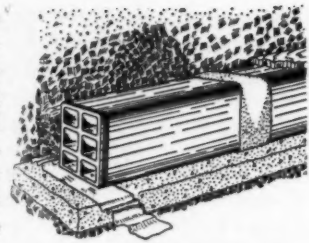
The scope of the application of electricity to modern buildings seems to be unlimited. The cleaning of buildings is greatly simplified through the use of electrical apparatus. Banks and other buildings are made more secure through protective alarm systems. Electric fire alarms make known the beginning of a fire almost the instant it starts. Farm buildings are no longer dependent upon candles and kerosene oil for illumination and hand or horses for power but now have their own individual electric plants. Houses, hotels, and other institutions manufacture their own ice through large or small refrigerating units operated by electricity and even the linen is washed by the same source of energy.

Swift moving elevators, electrically controlled and operated make four or more floors feasible where but one was formerly possible. Factories drive their machines with direct connected individual motors instead of line shafting and even ores and metals are reduced to a molten mass by means of the electric furnace.

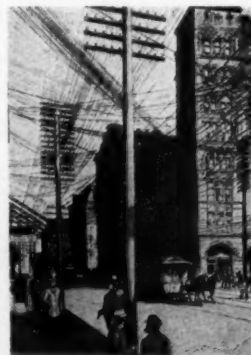
In this brief, and necessarily condensed reference to what may be considered among those of greatest importance in this issue, nothing has been set down as to the artistic

development in the use of and application of the electric current. That must be deferred for future discussion, but it may not be out of place to state that the various uses that the electric lamp has been put to in ornamental lighting, stage lighting, and the flood lighting of tall buildings at night represent a record that is as mysterious and awe-inspiring as the tale of the genii in an "Arabian Nights Tale."

The editors desire to express their appreciation to the following who have assisted, in the preparation of this history of electrical developments, by furnishing authentic information upon which we have freely drawn: American Telephone & Telegraph Company, Appleton Electric Company, Bakelite Corporation, Curtis Lighting, Inc., Edison Lamp Works, I. P. Frink, Inc., General Electric Company, Gisholt Machine Company, Hart & Hegeman Mfg. Company, Hart Manufacturing Company, Hydro-Electric Manufacturing Company, Pyle-National Company, Stromberg-Carlson Telephone Mfg. Company, The Arrow Electric Company, The Bryant Electric Company, U. S. Radium Corporation, Ward Leonard Electric Company, Waterbury Metal Wares Company, Western Electric Company, Westinghouse Electric & Mfg. Company.



IN THE LATE 80'S ZINC TUBES, CEMENT PIPE, IRON PIPE AND CREOSOTED WOODEN TUBES WERE USED FOR UNDERGROUND TELEPHONE CABLES. IN THE EARLY 90'S VITRIFIED CLAY IN THE FORM OF TILE OR HOLLOW BRICKS BEGAN TO BE USED. THE MULTIPLE CLAY TILE DUCTS ARE THOSE NOW GENERALLY EMPLOYED FOR THIS PURPOSE



Courtesy American Telephone & Telegraph Co.

BROADWAY AND JOHN STREET IN 1890 WITH ABOUT 500 OVERHEAD CIRCUITS AND IN 1923 WITH NEARLY 17,000 PAIRS OF CONDUCTORS IN UNDERGROUND CABLES

VERTICAL TRANSPORTATION

Setting forth its remarkable progress since 1875, due to the result of American inventive research

REVIEWING progress in the construction and equipment of buildings, one is impressed to discern that evolution has been gradual, and a natural growth, without developments particularly marked or outstanding in themselves. The elevator is in a measure an exception. We find a natural sequence as relating to motive power in definite stages.

THE FIRST ELEVATOR

Vitruvius in 40 B. C. described a device used in 250 B. C. consisting of a windlass, rope, and pulley arrangement operated by manpower, evidently used for hoisting material, freight or persons to high levels. For want of earlier records, we may assume that this was the first elevator. Apparently the next development in manpower elevators made use of the screw and nut principle. Man has always sought to make his work easy in execution and we are not surprised to find in the seventeenth century that the principle of a geared winding drum or spindle placed over the elevator shaft was introduced with hand motive power.

HAND POWER ELEVATORS

While many mechanical improvements have been made, the principle in use two centuries ago is still employed in the design of hand power elevators. The first elevators used in the United States consisted of a platform and yoke suspended by ropes from a geared windlass operated by a hand rope. A variation of the latter substituted as a

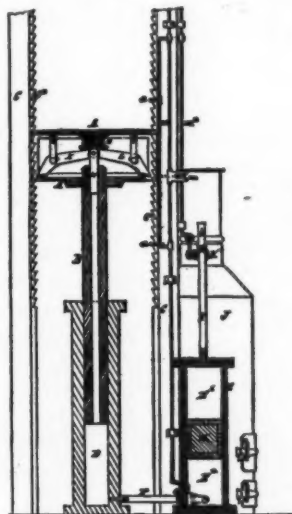
suspending member, log chain which was operated by cast iron sprockets attached to the overhead shaft. This type is manufactured today except that flat leaf steel chain, similar to that used on the bicycle, has been a notable improvement over the earlier log chain for more quiet operation.

Hand power elevators have a wide range of usefulness, but certain demands so outstripped the practical usefulness of this type of elevator that mechanical energy became recognized as a necessity as well as a labor-saving element. The water wheel drive was the first step in this direction and the use of the steam engine may be accepted as the second phase in this type of elevator progress.

STEAM POWER ELEVATORS

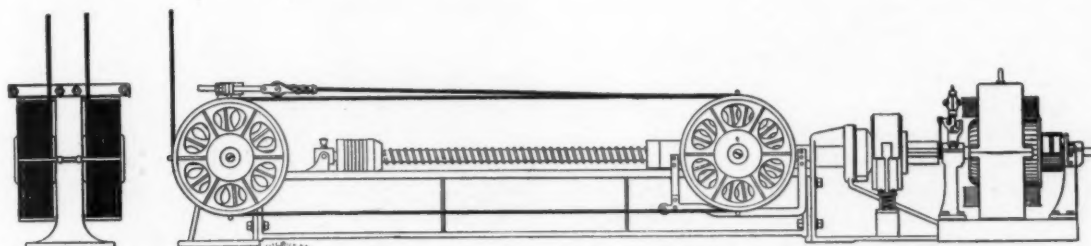
In 1850, the first platform freight elevator was invented by Henry Waterman. A winding drum was rotated by a series of gears driven by two belts from line shafting. The belts were shifted from idler pulleys to driving pulleys by a rack attached to a hand rope operated from the car by the attendant.

"The vertical screw railway" invented by Otis Tufts was, it is believed, the first passenger elevator driven by steam power, and was installed in the old six story Fifth Avenue Hotel, New York City, in 1859. A cast iron screw extended through the height of the building. The car was built around a large nut on this screw and movement



From *The American Architect*, May 18, 1878

A HYDRAULIC ELEVATOR INVENTED BY CHAS. H. MORGAN IN 1878. THE RACKET GUIDES WERE PART OF THE SAFETY DEVICE TO STOP FALLING CAR BY ENGAGING BRAKE SHOES



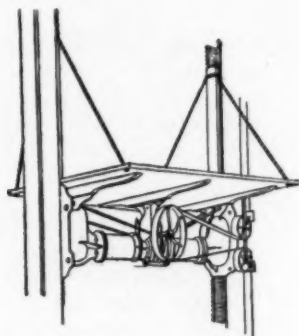
From *The American Architect*, October 27, 1894

THE SPRAGUE ELECTRIC ELEVATOR MACHINE

THE FIRST MACHINE WAS INSTALLED UNDER A HEAVY DAILY PENALTY AND AN AGREEMENT TO REPLACE THE PLANT BY ANY SELECTED HYDRAULIC-ELEVATOR SYSTEM IN CASE THE ELECTRIC RESULTS WERE NOT SATISFACTORY. THE SYSTEM PROVED TO BE ONE OF THE BEST DEvised UP TO 1894

THE AMERICAN ARCHITECT

up or down depended upon the direction in which the screw was rotated. The rotating of the screw was accomplished through a beveled gear driven by a line shaft belt.



From The American Architect, June 5, 1880

MILLER'S SAFETY SCREW ELEVATOR OF 1880 USED THE SAME PRINCIPLE AS THAT OF THE EARLIER "VERTICAL RAILWAYS" AN ENDLESS BELT EXTENDING FROM TOP TO BOTTOM OF THE SHAFT OPERATED BEVEL GEARS ENMESHED WITH THE VERTICAL SCREW

Elisha Graves Otis of Yonkers, New York, in 1854 invented the first hydraulic elevator, which consisted of a platform supported by a ram, worked up and down by water pressure in a closed cylinder. In 1861 Otis Brothers developed the first geared hydraulic elevator which was a modification of the earlier hydraulic type.

Otis Tufts in 1866 is also said to have designed a steam elevator, installed in The American House, Boston, Mass., which was operated by a belt driven hoisting drum connected by worm and gear to a winding drum. The engine was found to lack sufficient power to lift the car, and the counterweight, the principle of which is in general use at the present time, was added.

About 1870, the water balance elevator came into use. This consisted of a lifting cable, idler pulley and a bucket which traveled up and down in an open cylinder. The bucket was filled with water to raise the car, and emptied to lower the car. Those who know, say that this elevator was not built for pleasure riding. A water balance elevator was in operation as late as 1892, and was the type in vogue when New York's first skyscraper was built.

The vertical hydraulic elevator invented by Cyrus W. Baldwin in 1873 had a marked effect upon the hydraulic elevator which was rapidly perfected between 1876 and 1893, and as is generally well known, influenced to no small extent, the development of the high building.

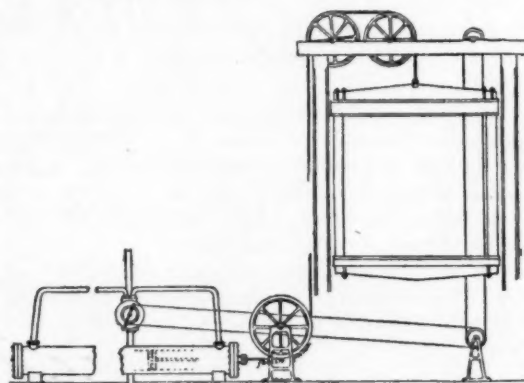
From 1890 to 1905, the plunger or direct lift hydraulic elevator, because of its adaptability to high speeds and the sense of security lent by its appearance, was the type generally adopted in the United States for high struc-

tures in spite of certain disadvantages known and recognized.

ELECTRIC ELEVATORS

It was only logical that the electric elevator should pass through the phases of first copying or adapting the hydraulic elevator and then the winding drum. The application of electricity as a source of energy had been in process of development for many years and in 1887, William Baxter installed in Baltimore, the first electric drum type machine. This could be called successful in a small way but needed certain perfections which were developed by others so that the date of the first successful electric elevator is placed as 1889. A hand rope operated from the car was connected to a shifting arrangement which reversed the direction of the current in the armature of the motor. The motor was direct connected to a worm shaft. This type of elevator was perfected for speeds up to 400 feet per minute and gradually the mechanical hand rope was replaced by a car switch magnetic control for passenger service.

The Sprague electric screw type elevator from 1895 to 1898 is a phase of elevator development which cannot pass unmentioned. About 1898 the duplex motor type, permitting a car speed of 450 feet per minute, came into prominence, but had marked disadvantages in the space required for sheaves and hatchway, a large number of bearings and hard wear on the cables.



From The American Architect, July 3, 1880

THE STEBINS HYDRAULIC ELEVATOR, WITH FLEXIBLE PISTON OF THE LATE 70'S AND EARLY 80'S

The demand for higher buildings, in the larger centers of population, was limited by the speed with which elevator traffic could be handled, and about 1900, the gearless traction motor was developed, which, with its modern refinements and rheostatic control, allowed car speeds up to about 600 feet per minute.

With high elevator car speeds, and this type of control, it became a very serious problem to pro-

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vide smoothness of operation with rapid speed changes. About 1919, the multi-voltage system was brought into use. This control supplied power to each elevator motor, in four definite steps, such as 60—120—180 and 240 volts. Since this type of control still necessitated the use of armature resistance and stepping from one voltage to another, smoothness of operation with rapid speed change was still a problem, although this control was a marked improvement over the old rheostatic type and made a more simple apparatus possible.

In 1921, the variable voltage elevator control was successfully introduced. This type of control, consists of an individual generator for each elevator motor. The elevator motor is controlled by changing the value and direction of the voltage of the generator, by adjusting its field strength. With this control, it is possible to successfully obtain car speeds of 1000 feet per minute, and car speeds as high as 800 feet per minute are in successful operation today.

Progress in elevator development made the height of buildings limited only by physical and practical limitations of materials and building laws. They have also had an influence on the planning of buildings. The high speed elevator today probably performs more than double the duty of the comparatively slow moving affair of forty or fifty years ago. Our high buildings with

their banks of local and express elevators house and transport daily the population of a moderate size city. Many years ago the elevator was looked upon with distrust and one can still hear tales of that time when people refused to use them. Today we use the elevator without fear and complain if one is stopped for needed or precautionary repairs.

ELEVATOR SAFETY

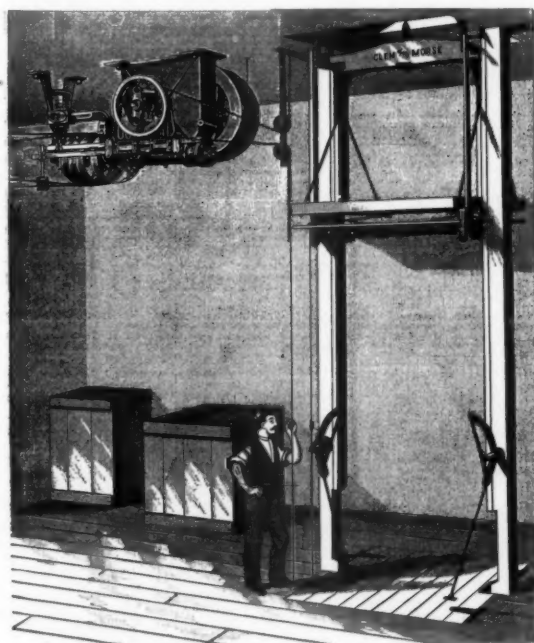
The lack of safety devices on Waterman's platform elevator of 1850 was responsible for numerous accidents. A few years later, a ratchet guide safety device was added. This was operated by the breaking of the hoisting cables. It was soon learned that it was useless when any other part of the mechanism failed and a centrifugal governor was added which caused the device to operate after the car exceeded a predetermined speed.

The vertical screw railway of 1859 was equipped with terminal stopping devices and a friction brake. Difficulty in controlling the descent of the car was instrumental in developing a retarding device which consisted of a piston working in a cylinder filled with oil and operated by a crank secured to the bottom of the car.

The water balance elevator car of the early 70's was controlled by brakes which gripped the car guide rails. In 1878 the safety governor, a principle in use today was invented by the Otis Brothers and the mechanical brakes of early electric elevators were soon displaced by electrical mechanical brakes. In 1881, A. C. Ellithorpe invented the toggle clamp safety device. At that time, guide rails were made of maple. In the course of five or ten years steel guides came into general use and a new type of safety device was required. The first of this type was used for speeds up to 150 feet per minute and was designed to cause two heavy cast iron shoes to grip the rails when the car attained a speed in excess of that normally used.

These devices originating more than forty years ago have formed the basis for elevator safety apparatus which today perform their functions well and make reports of falling elevator accidents a rarity at the present time.

THE AMERICAN ARCHITECT has always taken active interest in elevator safety. On September 29, 1877, it reported an elevator accident in which the packing of the second tube of the hydraulic elevator in the New York Post Office became loosened and allowed the water to pour out into the lower story of the building. The fall of the car was prevented by the safety apparatus. The issue of February 23, 1878, contained an account of an accident in Cincinnati in which five persons were very seriously injured and stated "This reminds us that it would be well that these conveniences of modern life should be subject to the periodic inspection of a properly qualified officer." Dur-



From The American Architect, November 3, 1883

CLEM & MORSE'S SAFETY ELEVATOR ATTACHMENTS TO "GUARD AGAINST ALL ACCIDENTS ARISING FROM THE TOO SUDDEN DROPPING OF THE CAR, EITHER BY THE RUNNING AWAY OF THE MACHINERY, BREAKING OF THE ROPE, OR OTHER SIMILAR ACCIDENTS." THE ILLUSTRATION ALSO SHOWS AUTOMATIC HATCH-WAY DOORS

ing the same year, following an elevator accident in Chicago, this journal stated "This shows how good a thing it would be if each elevator were marked plainly with the weight it could carry safely. Had the elevator in question been so marked, it would have saved ten men a drop through 85 feet, and a shock which left only one unhurt."

And today, as every architect knows, these recommendations have become laws and are a part of the ordinances of every city in the country. The small white card giving the date of the last inspection, the inspector's name, the load and number of persons which may be safely carried are familiar to those who have occasion to avail themselves of this type of vertical transportation. This is constructive effort and exactly within the limits of journalism in any of the technical fields.

Since the late 70's, the adequate protection of elevator shafts as a fire hazard has been discussed, urged, and given wide publicity by this journal. Today, elevator shafts are practically without exception required to be enclosed in fire-resisting materials and the openings in such enclosures protected from fire.

SIGNAL SYSTEMS

The prototype of the modern method of elevator signal systems was the placing of electric lamps in the hatchway. These were turned on by means of a knob which passed through the enclosing wall. The car operator turned them off. This system was used in the sixteen story Auditorium Hotel in Chicago in 1889. An automatic signal system having lights in the hatchway and on each floor was used in the Administration Building of the Chicago World's Fair in 1893. A year later, the system installed in the Stock Exchange Building in Chicago provided for a light in the car instead of those in the hatchway and a button enabled the car operator to transfer the signal to a following car if desired.

About 1895, mechanical indicators were designed which automatically showed the position of the car in the shaft as respects the various floors. By this time the importance of effective signal systems in providing efficient service was thoroughly understood. As a result of these systems, and the use of high speed equipment, our elevators of today are equivalent to several of those of fifty years ago.

A development which grew out of the electric signal system is the illuminated threshold. This has played an important part in reducing elevator accidents through preventing passengers from tripping at this point.

Elevator doors were formerly made of wood or a light metal grille and operated by hand. The increased use, and today required use, of metal doors together with the numerous stops served by elevators developed the need for their mechanical



From The American Architect, May 7, 1924

ELEVATOR MACHINE ROOM OF JOSEPH HORNE CO. STORE, PITTSBURGH, PA., AT LEFT THREE MOTOR GENERATOR SETS; AT RIGHT VARIABLE VOLTAGE CONTROL PANELS AND WINDING MACHINES

operation. These operators in the early 90's depended upon spring power, or liquid and compressed air. These evolved into the air chamber compressed air closers, pneumatic interlocks and eventually interlocks operated both mechanically and electrically.

With other safety devices there came the emergency release switch and the sequence relay. The latter prevents the moving of the car from any floor unless the operator has followed the proper sequence of closing the hatchway door, car door, and then applying the starting switch.

THE DUMB WAITER

That efficient labor saver, the dumb-waiter is so closely related to the elevator that a word as to its history may not be amiss. An important patent under which manufacture was begun in 1855 by A. Murtaugh is said to be the basis for all hand power dumb-waiters made in the United States. R. W. Lawrence, in 1866, placed a wheel on the car and counterweight and patented the idea.

At that time the wheels of sheaves required in the operation of this equipment were made of wood glued up in sections and the cars were of black walnut.

In 1869, Cannon invented a new type of dumb-waiter machine, using both large and small wheels without brakes. A clamp was placed on the hand rope to hold the car at any desired level. The year 1890 saw an improvement made in the Cannon "rig" in the form of an automatic brake which held the car at any point in the shaft upon releasing the hand rope, but the car had to be heavier than the counterweight. Several years later, a new automatic brake was developed which permitted a heavier counterweight to be used. At this time iron wheels had replaced the earlier wooden forms but heavy wood frames

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were still used for at least ten or more years.

In 1900 the wooden frames began to be replaced by iron frames and geared machines were coming into prominence, and one manufacturer had patented the use of the full diameter wheel. In 1915, an expanding inner brake was patented.

During this period the manufacturers carried on many experiments in car designing and hanging. Rope was frequently short lived and sprocket chains were tried and found too noisy. Wire cable was tried with questionable success and eventually marlin covered cable was adapted as the most satisfactory type of lifting rope.

About fifteen years ago electric dumbwaiters began to be manufactured following the principles of the electric elevators. Today, both hand power and electric dumbwaiters fulfill many useful purposes and perform an efficient service in many ways. The principle upon which they are made has been extended to provide equipment meeting new needs such as ash hoists, sidewalk lifts, and material conveyors.

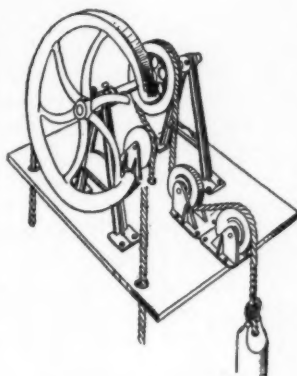
In this review of the evolution of the elevator, space has not permitted the mention of equipment employed in handling particular industrial problems which might be classed with this subject, as well as elevators used in commercial garages. Many of these requirements have all developed within the past fifty years, at least the solution has been found and the situation met during this period.

Through constant association with any utility, we are led to overlook its importance as relating to the big things in our daily lives. The total number of passengers carried in one day by elevators in New York, for example, approximates in number those carried by the transit lines.

We point with much satisfaction to our tall buildings and fail to realize that their progress skyward has only been made possible as the passenger elevators were improved. We measure the value of time in a rate of dollars and cents. The time saving afforded by elevators if reduced to money would represent millions of dollars daily and this great advancement, this forceful solution of a great problem is but one of the many that have been brought to fruition by the constant and tireless energy of manufacturers in every major line of industry that marks our progress as a nation.

The editors desire to acknowledge their indebtedness to the following for authoritative information which has been freely

drawn upon in the preparation of the above article: Chelsea Elevator Company, Elevator Supplies Co., Inc., General Electric Company, Kimball Bros. Company, Otis Elevator Company, Sedgwick Machine Works, Standard Conveyor Company, The Houghton Elevator & Machine Company, The H. J. Reedy Company, Westinghouse Electric and Mfg. Company, Early History of the Elevator, by W. J. Hamilton.



*From The American Architect,
August 8, 1889*

THE CAMERON DUMBWAITER
MACHINE



Courtesy The George Hardy Payne Studios, Inc.

CENTER—MEDALLION CHANCEL WINDOW OF ST. JOHN'S EPISCOPAL CHURCH, JACKSONVILLE, FLA., SHOWING "THE ENTHRONED CHRIST". RIGHT AND LEFT—SMALL GRISAILLE WINDOWS OF THE COYNERS LUTHERAN CHURCH, WAYNESBORO, VA. MODERN STAINED GLASS WINDOWS SHOW A RETURN TO TRUE CRAFTSMANSHIP

HEATING and VENTILATION

Recording a remarkable progress achieved since the crude beginning of five decades ago

HEATING and ventilation serve two primary purposes: to make living conditions indoors pleasant, endurable and sanitary; and to create such atmospheric conditions that certain productive processes are made possible. Their application can be classified broadly as either social or economical. They have to do with air. Perhaps nothing has contributed more to physical comfort than the art of heating and ventilation, making it possible to offset, by artificial means, the characteristics of climates.

At the beginning of the period of time under consideration the art of heating and ventilation was in a very crude state. It had advanced but little beyond the primitive open fireplace, the stove and the rudimentary warm-air furnace of some years ago.

The principal improvements in the fireplace consist of a better design in their shape and the introduction of the use of dampers and other appliances which regulate fuel combustion and the radiation of heat.

The artistic appearance of heating stoves has been the most important improvement made in this appliance.

There has been a marked improvement in the warm-air furnace. In principle this furnace remains as first manufactured, consisting of an enclosed combustion chamber surrounded by a metal jacket, the air being warmed by passing between the jacket and the combustion chamber and then conducted through ducts to the place where the warm air is desired.

The principal improvements have been made in changing the shape of the combustion chamber in such a way that it has a greater surface contact with the cold air and thereby increases the volume of warm air in proportion to the amount of fuel consumed.

The efficiency of the warm-air furnace has for many years been of a high degree. The principal problem which has been encountered in its use has been the distribution of the warm air. For many years the distributing system of ducts was designed from knowledge gained by observing furnace performance. These observations and experiences were not measured or definitely established in a scientific manner. Individual methods

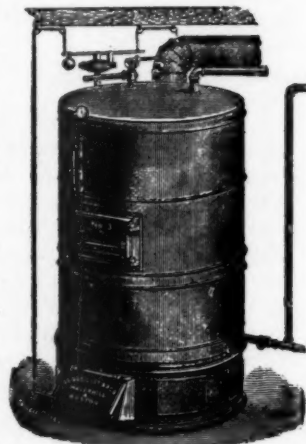
of designing and installing warm-air heating apparatus resulted in a lack of uniform practice. The necessity for definite scientific information led to the formation of the National Warm-Air Heating and Ventilating Association which includes the more prominent and progressive furnace manufacturers in this country. This association made an agreement with the University of Illinois to conduct an investigation in August, 1918, and this became operative on October 1 of that year. Investigations and experiments are still under way at this time and will probably continue for some years to come. Sufficient data has been developed quite materially to modify the design methods for the distributing system which have been in use and at this time it can be said that the design and installation of the warm-air furnace have been removed from the field of conjecture to that of definite knowledge.

The investigations at the University of Illinois comprehended every factor which might influence the effectiveness of a warm-air distributing system. The principal elements of such a system consist of the size, shape and installation of the ducts, their inclination and position, the form of bends where a change of duct direction occurs, the insulation of ducts and their approach to registers and the design of the register faces.

The necessity for heating a large number of rooms without individual fireplaces or stoves led eventually to the introduction of an entirely new method wherein

hot water was produced in a central boiler and distributed to heating units located where desired. The first installations of apparatus of this kind were made in Boston and New York about eighty-five years ago. These installations were confined entirely to a crude heating system in which the radiators were made of wrought iron pipe more generally assembled in coils attached to the walls. The high cost of the large pipe used in this apparatus led to the introduction of steam, making possible the use of smaller and less costly pipe.

The first high pressure, hot water apparatus was known as the "Perkins System" sold by J. Perkins & Co., of London. Joseph Nason of



*From The American Architect,
June 17, 1876*

LE BOSQUET'S STEAM HEATING
PORTABLE BOILER OF 1876

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the firm of Walworth and Nason, Boston and New York, became familiar with this system of heating and introduced it into this country. The first installation was made in the office of the Middlesex Company at Lowell, Mass., in 1842.



From The N. O. Nelson Mfg. Company Catalog of 1886-87

HAXTUN'S VERTICAL WROUGHT IRON TUBE RADIATOR OF 1886 MADE WITH 6 TO 32 TUBES, 34 INCHES HIGH. ONE TO FOUR ROWS OF TUBES. CIRCULAR RADIATORS WERE ALSO IN VOGUE. FEW CAST IRON RADIATORS WERE BEING MADE AT THIS TIME

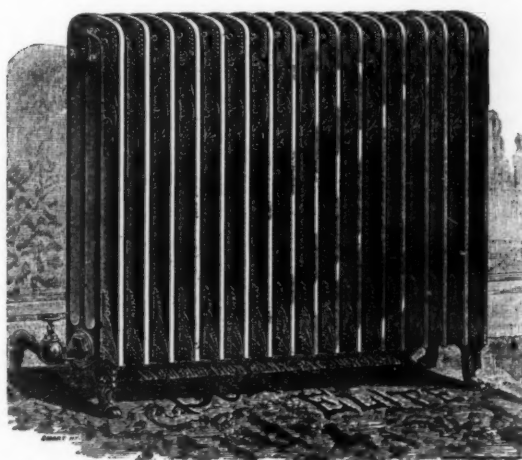
About 1845 Mr. Nason conceived the idea that very small pipes might be used to convey steam in place of the large pipes which were necessary for circulating water. In March, 1845, Walworth and Nason contracted to install in the Eastern Exchange Hotel, near the East Boston Ferry, the first steam heating apparatus in which was used small wrought iron pipes strung in parallel lines on the walls, for radiation. A few months afterward the Burlington Mills, at Burlington, Vt., were heated in this same manner, and afterwards many large mills in rapid succession.

One of the greatest problems that this firm encountered was to develop suitable pipe fittings and valves. The first pipe fittings were made of cast iron, and malleable iron fittings were introduced a year later. In 1845 globe and angle valves were designed and put in use. Mr. Nason apparently had the inventive genius and Mr. Walworth the resourcefulness to make these commodities a commercial success.

The development of hot water and steam heating apparatus presented great difficulties to the

pioneers in this art because of the lack of scientific knowledge. When all is considered, too much credit cannot be given to them for the results which they achieved. It was not until research engineers definitely established the physical and mechanical properties of water, steam and air that it was possible to design hot water and steam heating apparatus in a truly scientific manner.

The general principle of the boiler has remained the same from its first invention. The process is to vaporize water by heating it by the combustion of fuel. As better facilities were provided in the form of machinery and foundry equipment, boilers of a more satisfactory form and quality were made. The principle object in improving boilers was to make them more efficient in evaporating water. This increase in efficiency was effected by providing a greater area of con-



From The American Architect, March 2, 1889

THE BUNDY "ELITE" CAST IRON RADIATOR OF MOORISH "ARABESQUE DESIGN AS MADE IN 1889

tact surface of the parts of the boiler containing the water to the heat generated by combustion, and also by improved combustion chambers and grates which made it possible better to consume the fuel.

Smoke is a source of annoyance, is unsanitary and causes serious financial loss from damage to merchandise. Many cities have provided means for its prevention. In response to the demand for smoke prevention, boilers have been designed to accomplish this. Smoke is caused by the incomplete combustion of fuel. The smokeless boiler is that one which is so designed that perfect combustion is accomplished. This is done by correctly shaping and proportioning the combustion chamber, the design of the grate, the down draft principle of combustion, the correct introduction of fresh air, the shape and placement of the bridge wall, the size, shape and length of the smoke channels between the fire box and the smoke stack and

THE AMERICAN ARCHITECT

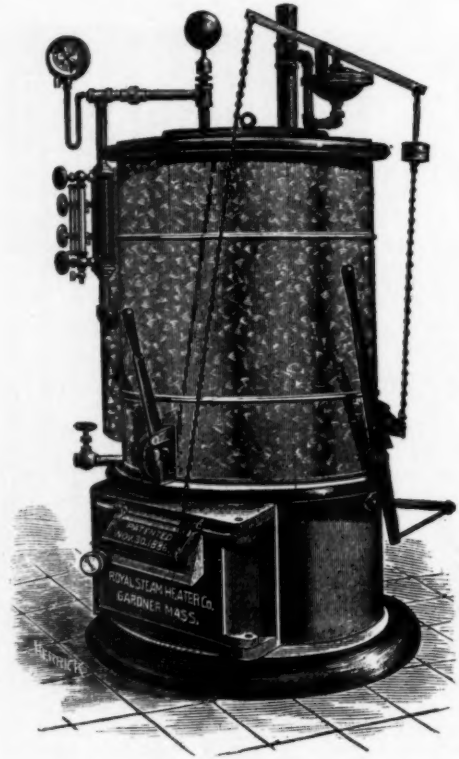
other details. Several kinds of satisfactory smokeless boilers are now manufactured which are the result of scientific research and experimentation and incorporate some of the essentials noted.

The art of heating was in a very crude state at the time of the founding of *THE AMERICAN ARCHITECT*. Steam heating systems were all of what is known as the two-pipe system, consisting of steam supplies and water returns. The radiators at that time were made of wrought iron pipe. About 1885, A. A. Smith & Co., manufacturers of the Bundy Heater, made the first cast iron radiator, which was called the "Elite."

In these early heating systems the circulation of steam was effected by high pressure which forced the air out of the apparatus through hand-operated pet cocks placed on the radiators. On each radiator there were placed a supply valve which admitted the steam and also a return valve which controlled the flow of the condensed water from the radiator to the boiler. At a later period a one-pipe system was devised which consisted of a single line of pipe in which the steam supply to the radiator and the water of condensation from the radiator both flowed. In this case but one valve was used for each radiator. In order to permit the escape of the air in the radiator, air valves were placed on the end opposite to the steam inlet valve. The principal objection to the one-pipe system is that the flow of steam and water of condensation is in opposite directions. Unless the piping is of sufficient size and very carefully installed, it is possible for water pockets to occur, with the resulting water hammer noise.

When exhaust steam was first utilized for heating purposes, it was found that in order to circulate it throughout the heating system it was necessary to do so with a back pressure on the cylinder of the engine. This added engine load of back

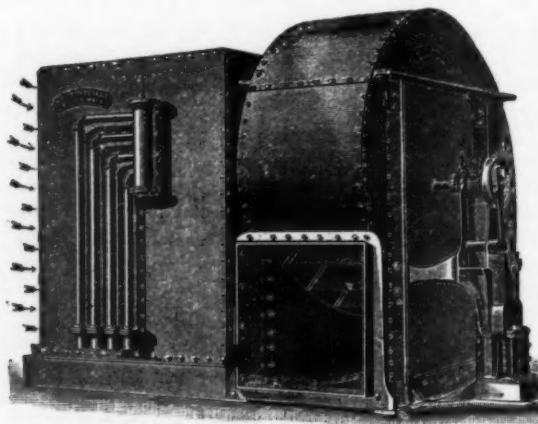
pressure was wasteful in fuel. The problem then was to devise a system of heating which would permit the free and complete circulation of steam throughout the apparatus without back pressure.



THE ROYAL STEAM HEATER FUEL MAGAZINE ILLUSTRATED AND DESCRIBED IN THE AMERICAN ARCHITECT OF SEPTEMBER 7, 1889

This was accomplished, about fifty-five years ago, by N. Y. Williams, of Philadelphia. His method was to attach a pump to the main steam return by means of which the air, as well as the water of condensation, was withdrawn from the heating system. While this was an improvement upon the ordinary, poorly constructed plant in use at that time, it permitted the wasteful flow of steam through the radiator into the returns. The great step accomplished was to secure complete circulation of steam throughout the apparatus.

The patents for this method of circulating steam were purchased by the Warren Webster Co. who immediately introduced improvements which corrected the faults of these installations. The principal improvement made was in placing a trap on the return end of the radiator which would prevent the passage of steam through the radiator into the return lines after the water of condensation and air had been removed. This was done by an application of the thermostatic principle which is still used very largely in modern work.



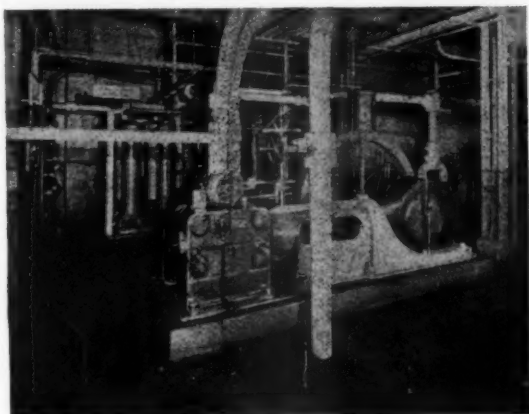
From *The American Architect*, August 25, 1888
STEAM HOT-BLAST HEATING AND VENTILATING APPARATUS MADE BY B. F. STURTEVANT IN THE LATE 80'S

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Other traps are in use in which a float is operated by the water of condensation.

It is possible by these systems to produce a vacuum of varying degree and for this reason they are called vacuum systems. The Warren Webster Co. was the pioneer in developing the vacuum system of heating to a complete success. Different types of steam traps were invented by others and at this time several efficient and satisfactory systems are in use.

One other method of circulating steam without pressure was introduced under the name of the Paul System which operates on an entirely different principle from that described. The Paul System is applied to an ordinary one-pipe heating apparatus and consists of a thermostatic air valve placed on the end of the radiator opposite



From *The American Architect*, January 30, 1924
FIFTY TON REFRIGERATING PLANT USING CARBONIC ACID GAS, GENERAL MOTORS BUILDING, DETROIT, MICH.

the inlet valve. To this air valve is attached a small air line system connecting all of the radiators to a steam ejector which withdraws the air from the heating system. When the air is withdrawn from the radiator the steam actuates the thermostatic air valve and closes it, thus preventing the passage of steam into the air line. As air accumulates in the radiator and reduces its temperature, the thermostatic valve opens and the air is removed through the air line by the ejector. At the present time vacuum systems of this type are not in use and the universal practice is to use the vacuum pump attached to the return mains.

With added experience in the installation and operation of vacuum systems it was but natural that great improvements were made in the return traps, vacuum pumps, condensers and other accessories which go to make up a perfect operating vacuum system.

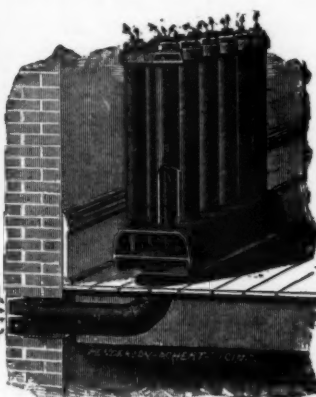
One of the principal advantages of a hot water system consisted in the possibility of modulating the temperature of the radiator due to the fact

that hot water could be circulated at any desired temperature. The temperature in a steam radiator is that of 212° F. or more as the pressure increases. The desirability of a heating system which could be controlled so that the radiator could have different temperatures, similar to that in a hot water system, led to the development of the Vapor System. This term refers to a two-pipe gravity return system of steam circulation in which provision is made to retard, or prevent escape of steam from the radiator into the return main, and in which the air from the system, as well as the water of condensation, is carried back to a central point. The air is liberated at this point and provision is made for returning the water of condensation to the boiler. The steam is first circulated under a slight pressure which forces the air out of the heating system and completely fills it with steam. As the steam condenses and no air is permitted to return to the radiator, there is formed a vacuum within it. Under conditions of vacuum, water is vaporized at temperatures below 212° F. and it is in this way that vapor of lower temperatures is circulated within the radiator, effecting a true heat modulation.

The vapor system has been developed to a point of commercial practicality and is a distinct advance in the refinement of the art of steam heating.

The vacuum system and the vapor system of heating have their particular uses and for each of which they are perfectly adapted.

Perhaps the earliest installation of a combined heating and venti-



From *The American Architect*, July 7, 1888
ASKINS VENTILATING RADIATOR
MADE BY THE KANSAS CITY
RADIATOR CO. IN THE 80'S

lating system was that installed by Walworth and Nason in the Boston Custom House in 1846. It is described as a new style of apparatus in which the radiating surface is placed in one stack, and a revolving fan, operated by a steam engine, blows the warmed air through the building. This apparatus provided systematic, controllable ventilation in warm or cold weather. It was completed and was a perfect success, remaining in operation for many years.

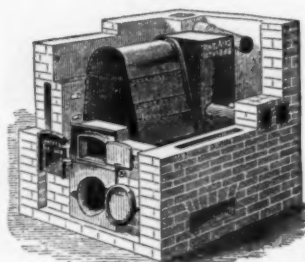
The beginnings of the modern systems of mechanical ventilation were made by B. F. Sturtevant. He invented an apparatus consisting of a fan and blow pipes for the purpose of removing dust from machines which manufactured wooden

shoe pegs. In making this machine he invented the centrifugal fan which is used in practically the same form today. The use of such an apparatus for removing dust was extended to many other kinds of manufacturing plants. A natural development of the use of fans was to apply it to ventilating, which reversed the operation. The removal of dust is accomplished by suction, and ventilating is accomplished by forcing air into the place which is to be ventilated. A large number of types of exhaust and ventilating fans have been invented which fulfill every requirement of moving air.

The ventilating fan is installed with steam heating coils made of either cast iron or steel pipe, from which the heated air is conducted, through a system of ducts to the place where it is used. A modern plant of this kind will automatically deliver any desired volume of air at a predetermined temperature and humidity.

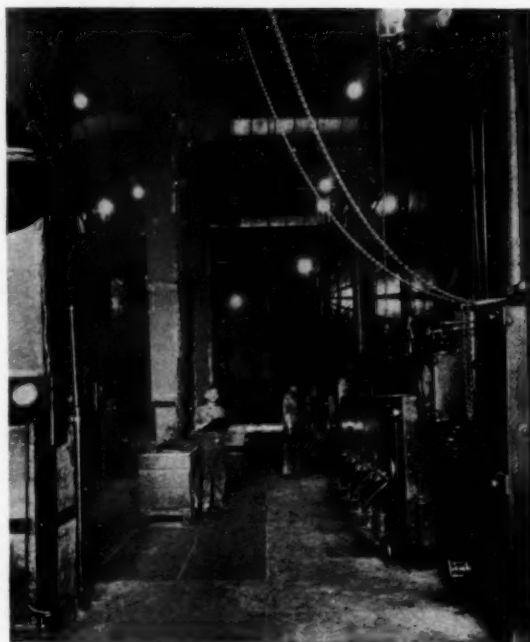
The effectiveness of modern heating and ventilating plants is based on what might be termed accessories to the basic elements which are the boiler, the hot water and steam heating system of piping and radiators and fans for the movement of air. In the perfecting of the vacuum and vapor systems of heating the integral parts such as pumps, valves and traps, which differentiate these systems from the standard types, were invented and improved to a high state of perfection. The accessories are more factors of refinement than simple operation.

It is sometimes desirable to maintain a constant temperature or different constant temperatures in various parts of a building. In order to do this without continuous attention, it has been accomplished by the use of an automatic temperature regulating device. This device is set for any desired temperature and when the temperature of the room rises or lowers, the radiator valve is either automatically closed or opened. These same devices are applied to heating coils used in connection with blowers and to steam coils in hot water heaters. Thermostatic control is also used in connection with hot air furnaces and heating boilers installed in residences for the purpose of regulating the draft and to control the combus-



*From the American Architect,
January 24, 1880*

THE REYNOLDS WROUGHT IRON FURNACE. IN 1880 IT WAS SAID TO BE ONE OF THE MOST PERFECT HOT AIR FURNACES MADE AND USED AT THAT TIME



OIL BURNERS IN THE BOILER ROOM OF THE JOHN WANAMAKER STORE, PHILADELPHIA, PA.

tion of fuel in order to maintain a constant steam pressure in the boiler or a constant temperature of air in the warm-air heating furnace. The thermostat may be located in any room desired.

When mechanical ventilation came into use, it was found desirable to remove dust from the air. The first method was to place a screen made of some fabric (commonly cheesecloth) over the fresh air inlet. This fabric served as a strainer which would separate the larger particles of dirt from the air but it would not retain the finer dust. Another disadvantage of a fabric screen is that the dirt accumulates very rapidly and clogs up the pores so that the passage of air is greatly reduced. To overcome this difficulty and entirely to remove dust from the air, an air washing device was invented which consisted of a fine spray of water through which the air was passed. The dust became attached to the minute particles of water and were thus removed from the air. Washed air naturally absorbs a certain amount of humidity and in places where clean, dry air was required this excess moisture had to be removed. The latest air washing device consists of a metallic filter of considerable thickness, the operating principle of which is that of baffle impingement. This involves a breaking up of the air stream into innumerable sub-currents by the proper arrangement of the filter medium and the collection of dust by causing these dust-carrying sub-currents of air to impinge against the surfaces of the filter medium. These surfaces are coated with a special

viscous, non-flammable fluid having a high vapor tension to which the particles of dust become attached. When the screen becomes coated with dust it is easily cleaned and recoated.

The use of oil as a fuel has no influence on the design and operation of any part of a heating plant except the boiler. The supply and combustion of fuel oil can be automatically controlled. By its use it is possible to have a heating and ventilating plant which is entirely automatic in its operation.

Probably no part of the equipment of buildings has been improved more than the heating and ventilating apparatus. The variety of their applications and design is apparently endless. Primarily they comprehend the warming of air and the movement of air. The warming of air is elemental. With the varying temperatures is correlated the factor of the relative humidity which is controlled by natural laws. Industry, sanitation or comfort may require a predetermined temperature and relative humidity. Regardless of the natural conditions, the heating and ventilating engineers design and install apparatus that produce a predetermined temperature and humidity. They further take the air as found and wash it and wring the moisture out of it to any degree of dryness that may be needed. This manipulation of air to make it conform to a specification of stated qualities has developed the science of air conditioning.

Conditioned air is a very important factor in many manufacturing processes. Formerly the operation of some processes was dependent on the natural atmospheric condition but with artificially conditioned air, such processes can be operated continuously. As a corollary of artificially conditioned air, new processes and new products have been developed which otherwise would have been impossible.

Simultaneously with the development of heating, the antithetic science of refrigeration has been investigated, studied and its applications perfected. Contrary to heating, refrigeration is based on the use of power, but its automatic control is effected by the same devices that regulate the temperatures produced by a heating plant. The apparatus employed in a heating and a refrigerating plant are similar in having radiators and coils. In the heating plant the radiator emits the heat units contained in the steam as it condenses. These heat units warm the surrounding air. In the refrigerating plant, the radiator absorbs the heat units from the surrounding air because of its colder liquid or gaseous contents.

The movement of air is the purpose of ventilation. This is done in two ways, either by propelling it under pressure or by exhausting it by suction.

Very often both methods are employed in the air changing of a certain enclosed space. The movement of air is produced by revolving fans of various kinds and types which have been invented to satisfy different demands. These fans have been standardized to a certain extent and their capacity is established. The air is delivered to a designated place through ducts and the volume delivered to each place is regulated by dampers, air diffusers or other devices and if desired, automatically controlled. The removal of air is done by fans that are connected to ducts and which discharge it generally to the outside atmosphere. Air washing, tempering, heating and drying are done by accessory apparatus connected to and forming a part of the ventilating system.

Air is moved for purposes other than ventilation which is designed primarily for sanitation and comfort. Air movement is employed for drying or humidifying, warming or cooling a material, as required by some process of manufacturing or preservation. Its applications are being constantly extended and when the demand is made, the ventilating engineer satisfies it.

The importance of professional and production organization is becoming more apparent as time passes. The advances in the science of heating and ventilating are due very largely to the American Society of Heating and Ventilating Engineers, a national organization founded in 1895. The Research Department of this organization is constantly engaged in investigations and studies of a wide range of subjects, which result in valuable, definite and exact knowledge.

The editors desire to give proper credit to the following who have ably cooperated with them by furnishing authoritative historical information: American Blower Company, American District Steam Company, American Nokol Company, B. F. Sturtevant Company, Burnham Boiler Corporation, Clarage Fan Company, Combustion Engineering Company, Frick Co., Inc., Gorton & Lidgerwood Company, International Heater Company, Johnson Service Company, Knowles Mushroom Ventilator Company, Kewanee Boiler Company, Minneapolis Heat Regulator Company, Midwest Air Filters, Inc., N. O. Nelson Company, National Warm Air Heating & Ventilating Association, O. E. Specialty Manufacturing Company, Richardson & Boynton Company, Socony Burner Corporation, The Thatcher Company, The Brownell Company, The Dole Valve Company, United States Radiator Corporation, Warren Webster & Company, Williams Institute of Heat Research, W. H. Johnson & Son Company, Walworth Manufacturing Company, Williams Radiator Company.

BUILDING EQUIPMENT

The results of American ingenuity made available to architects in designing more habitable and useful structures

THE building of fifty years ago, even of the better class, was a primitive affair. It had the essentials of enclosing walls, roof, floors, partitions, windows and doors. The ornamental features, both exterior and interior, were developed to a very artistic state and can be considered as a part of the construction. The equipment of a building consists of those things which make it habitable as to sanitation, and which promote the comfort and convenience of the occupants. At the time mentioned, the equipment of a building was very limited and crude. Its scope has been enlarged by invention and by the use of some forces then unknown or commercially undeveloped, notably in the domain of electricity. The range of equipment extends from the most simple dwelling to the most complex structure. The general characteristics of each class of equipment are the same and the variations in each class are the result of the needs and demands of the users.

REFRIGERATION

Refrigeration is now quite generally produced mechanically in all places requiring it, except in the dwelling and the smaller places of business and even here small mechanical plants are rapidly coming into use. The modern refrigerator has been developed to a high degree of efficiency by making the interior air circulation and the insulation of the enclosing walls positive and efficient. The sanitary phase of refrigerators has received attention which has resulted in lining the storage spaces with glazed tiles or enameled steel. Sanitary conditions, positive temperatures, insulation with resulting conservation of refrigerant, are the characteristics of modern refrigerators.

Mechanical refrigeration is employed in industrial plants where low temperatures are needed, in ice making plants, storage houses for perishable food products and furs. It is also employed in hotels, hospitals and apartment houses. This type of refrigerating equipment requires the use of power to operate the compressors and circulating pumps. The refrigerating medium is either a low temperature brine solution or compressed ammonia, carbonic acid gas or other gas, which is circulated through a system of pipes and coils. Small mechanical refrigerating units are made suitable for domestic and small commercial refrigerators and they can be attached to the standard ice-cooled box. These small units are operated by electric power and are automatically controlled by a thermostat.

HEAT AND SOUND INSULATION

Insulation in construction is receiving increasing attention. While it may not be considered strictly as equipment it is still an added rather than a customary feature of construction. With increased study, both from the economical as well as the comfort aspect, the indications are that insulation will be considered as necessary in all good construction. Insulation serves a dual purpose—to prevent the transmission of heat through walls and to prevent the transmission of sound. The characteristics of heat and sound insulators vary somewhat. Heat insulation is primarily an economical problem involving the conservation of fuel with the secondary consideration of physical comfort. Heat insulators are distinguished by cellular characteristics which provide a multitude of enclosed air cells. The more dense the material, the greater the heat transmitting ability. Insulators are made of vegetable and mineral materials. Some vegetable insulators are used in the natural state, being merely pulverized and formed into blocks or sheets, others are made of processed material. Mineral substances like asbestos or mineral wool are manufactured from raw materials which in that state would not be commercially usable.

Heat insulation is also an important factor in conserving steam when circulating through steam pipes, by means of which the condensation of the steam is retarded. This type of insulation is made of magnesia, asbestos, wool felt and other media. The selection of the type depends largely on the temperatures of the steam. The insulation used on high pressure steam lines for power plants is of a different character from that used for low pressure or vacuum steam lines in heating plants. The insulation of steam and hot water pipe lines is a very important factor in their successful operation.

Sound insulation is secured principally by using sound absorbing materials which are non-sound reflecting but rather absorb the sound waves which impinge on the enclosing walls, floor or ceiling of the room. The theory is that the sound should be confined without echo to the room in which it originates.

The art of insulation, although initiated about fifty years ago, has received a great impetus in recent years. Of the two phases, sound insulation is the later development and the determination of the laws which control it can only be completely established when the laws of acoustics are

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fully understood. It is only within recent years, due to the great increase in the sources of noise, that sound transmission and noise prevention have received the serious consideration of scientists. Acoustics is the last of the known elements of building construction to have received the attention of research engineers.



MANY TYPES OF KITCHEN CABINETS HAVE BEEN DEVELOPED WITHIN RECENT YEARS. THESE MEET VARIOUS REQUIREMENTS OF MODERN CONDITIONS

WEATHERSTRIPS AND SCREENS

Closely allied to heat insulation is the weatherstrip applied to windows and doors. The making of the first metal weatherstrips, some thirty years ago, inaugurated a new kind of building equipment. The first makers of metal weatherstrips have kept themselves in the forefront in improving them in accordance with the results of experience and of scientific research. The function of the weatherstrip is to prevent the passage of air and dust through the cracks about the doors and windows. The weatherstrip is purely a mechanical device and its effectiveness depends largely upon its correct installation. Metal weatherstrips are an important factor in fuel economy and in affording greater comfort to the occupants of buildings. So firmly established is the metal weatherstrip that it is a part of all first-class structures and it is rapidly becoming recognized as a necessity in minor structures as well, especially those of a residential character.

The window and door screen might appropriately be classed as an insulating medium—against the transmission of insects. From the old-time cotton window-screen fabric, either tacked on the

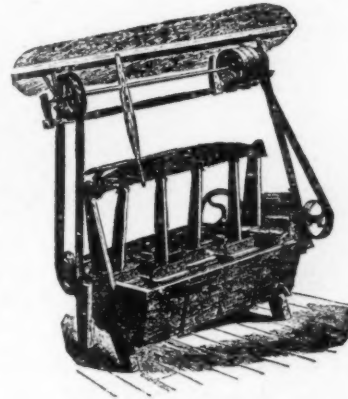
window frame or on a crude wooden removable frame to the modern metal-frame screen operating in metal guides is an indication of the vast improvement in screens. Screen material was first made of iron or steel wire. To secure greater durability by resistance to corrosion, copper or bronze wire was used. The latest development of screen material is the use of nickel-bearing copper wire used to secure greater resistance to corrosion.

The frame of the screen has been mechanically improved to secure the requisite rigidity, durability, ease of replacing damaged screen material, ease of operating the screen and retaining the requisite tightness. For every type of window a corresponding type of screen has been made which is a satisfactory and essential feature of building equipment. The door screen is of the same standard of excellence.

THE MAIL CHUTE

The mail chute is a convenience. The first installation of a mail chute was made in September, 1884, by the Cutler Mail Chute Company in the ten story Calumet Building then standing on South La Salle

Street, Chicago. The contract was made with W. E. Hale, then president of the Hale Elevator Company, which had a lease on the entire building. This was followed by the installation in the New York Produce Exchange made in May, 1885. Mail chutes have been improved in construction, making them more easily installed and more easily cleared of obstructions. Their use is universal in commercial buildings, office buildings and hotels. Mail chutes are under the control of the U. S. Post Office Department.



From *The American Architect*,
August 31, 1889

A LAUNDRY MACHINE OF THE
TYPE MADE IN THE LATE 80'S

WATER TREATMENT

Water filters are required in some localities to remove suspended mineral, vegetable or animal matter from water. These are made in small units for domestic service and in larger units for large buildings, manufacturing plants, and mechanical filters are even built for smaller cities. The prin-

ciple of the filter has not been materially changed from that first employed. The water is passed, either under pressure or that pressure due to gravity, through a porous medium, which collects the solids that are suspended in the water. These solids are sometimes removed by attaching themselves to a precipitate of alum or sulphate of iron which is collected on the filtering medium. Another form of filter has a bed of crushed quartz, sand and charcoal through which the water passes by gravity or mechanical pressure. Filters are scientifically and accurately designed for all conditions of water and operated to secure the predetermined result.

Analogous to filtering is water softening—both remove something from water. Water softening consists of removing those soluble salts from water that produce some degree of hardness. This is accomplished by precipitating these salts by some chemical reagent and filtering them out of the water, which is a mechanical process. These soluble salts are removed in another manner by passing the water through a mineral filtering substance which acts as a precipitating reagent and also a filtering medium. The current of water is

reversed at proper intervals in order to cleanse the mineral substance of the collected solids and it is regenerated to its original potency by chemical treatment.

Large water softening units are employed in industrial plants, hotels and laundries. They are becoming quite



"THE DETROIT" FOR "HARD OR SOFT COAL, COKE OR WOOD" REPRODUCED FROM THE MICHIGAN STOVE COMPANY'S CATALOG OF 1876 FEW OF THIS TYPE REMAIN

common in the better class of dwellings for which service small units are made. Soft water is desirable for use in steam boilers as it prevents the accumulation of scale when evaporated as steam. This is essentially an economical problem. It also effects economies in the laundry in saving soap and by reducing the wear and tear on the linens. Soft water is also conducive to the physical well being and comfort of human beings. Water sterilization by electrical means which produce bacteria killing agents has also been introduced, particularly in connection with swimming pools. Here filtration and treatment accomplish both purification and economy in the use of water.

KITCHEN EQUIPMENT

The essential equipment of the domestic kitchen consists of a limited number of articles which in later years has been vastly increased in number. The primary article in kitchen equipment is that

one used for the cooking of food—the cooking range. The first cast iron ranges and cook stoves were quite heavy and crude. By use of metal patterns, moulding machines, carefully selected mixtures of pig iron, foundry sand and other factors of the founding art, a perfect, smooth, thin and durable cast iron range is made. A later type of range is made of sheet iron riveted to a structural frame, insulated, and with cast iron top and lids.

The shape and style of ranges and stoves have been steadily improved to make them more easily used and operated. When sources of heat other than the combustion of coal and wood became available, the gasoline, kerosene, gas and electric ranges were invented. These newer types of ranges have been perfected with the intent to make their operation safe, reliable and economical in fuel consumption.

Other features of kitchen equipment are dish-washing and drying machines, bread mixers, combination kitchen cabinets made of wood or sheet metal, enameled or painted. Kitchen machinery is either hand or electrically operated with a very rapid increase in the latter type of equipment.

The preparation of food in hotels, clubs, restaurants and institutions involves many things not found in the domestic kitchen operation. Taking the hotel as expressing typical conditions, it is found that the plan and equipment of the kitchen are controlled by the volume and variety of the food prepared, the speed required in the preparation of the food, the storage of the food supply, and the necessity for economy in the cost of operat-



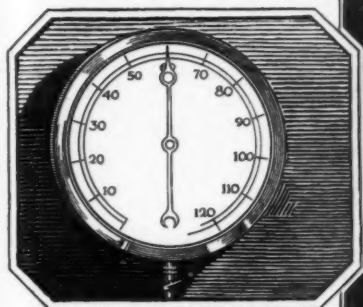
From The American Architect March 4, 1882

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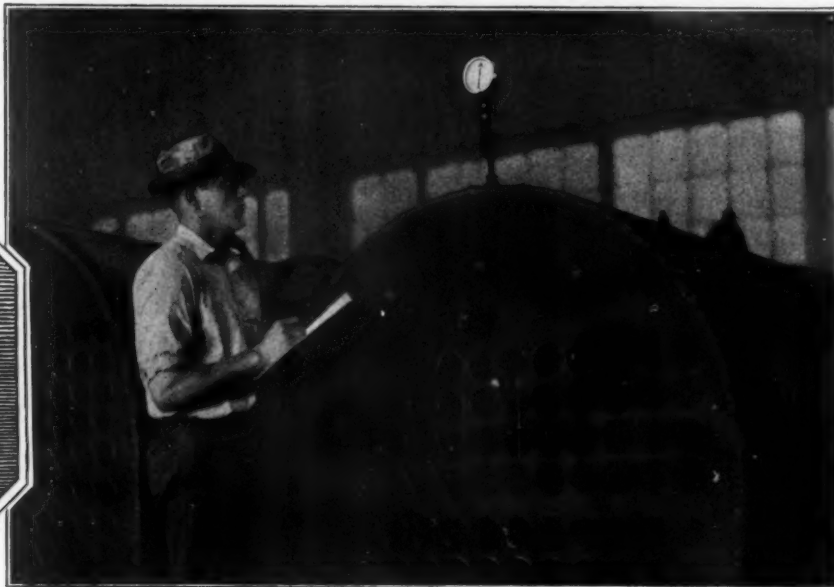
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4. A single, unimpeded, freely circulating body of water.

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THE AMERICAN ARCHITECT

ing help. The operation of the large kitchen is a production process of the highest type, the success of which is controlled to a large extent by the plan and equipment.

Ranges are made of many types for special purposes, heated by gas or electricity, as the use of coal or wood fuel is practically eliminated. Sinks used in the preparation of foods and mechanical dishwashers and driers are designed for the special conditions of each kitchen. In addition, mechanical conveyors are installed to automatically transport soiled and clean dishes to and from the dishwashers. Refrigerators are designed for the various classes of food and are used for the storage of food supplies and for the prepared food, conveniently placed to accommodate distribution. The ventilating equipment is an important factor in kitchen operation.

LAUNDRY EQUIPMENT

The domestic laundry is based on the laundry tub, used singly or in groups of two or three. The electrically driven washing machines are usually movable fixtures and while the form of them varies, they are all made on the same principle. Only in the larger domestic installations is the steam clothes drier used. Electric irons and built-in ironing boards are in general use.

The laundry for hotels, clubs, restaurants and institutions is equipped with a line of fixtures, each of which has a definite purpose in the cleansing and preparation of linens and garments. In the modern machine wooden parts are displaced by those made of non-corrosive metal, the soaps being destructive to the ferrous metals which were first employed for this purpose. The wringing of the linen is done in a revolving receptacle which drives out the water by centrifugal force. From this machine the linen is placed in a drying tumbler which consists of a revolving metal-screen which is enclosed. Below the tumbler is a steam heating coil and above it is an exhaust duct. The warm air dries the damp cloth, after which it is cooled and loosened up ready for the ironer. This ironer consists of a revolving heated metal drum which has a contact with a cloth covered roller between which the linen is passed and smoothed.

The washer, extractor, drying tumbler and ironer constitute the main items of equipment. For special purposes there are made pressers, ironing boards, lace curtain finishers, collar, cuff and neckband ironers, starchers, and many other accessories. Like the kitchen, the planning of a laundry and the selection of the equipment is a highly specialized service.

CLEANING EQUIPMENT

The maintenance of a building in a cleanly and sanitary condition requires the removal of dust which is accomplished by the use of vacuum

cleaners. These machines operate on the principle of a suction produced by an exhaust fan. In the larger plants the exhausting apparatus is located in the basement or other place and connected to each floor by a system of pipes which have outlets placed at convenient locations.

Portable vacuum cleaners in which are contained the exhausting apparatus and the dust containers, are used for domestic and large buildings. Portable units are connected to any electric outlet.

GARBAGE DISPOSAL

The disposal of garbage and other wastes is accomplished by burning it in specially designed incinerators made for the purpose.

A wide range of other equipment is also used in completing a building for occupancy. Among these are the electrically operated musical organ; the radio system with loud speaker connections distributed where desired; steel clothes lockers, space-saving equipment such as disappearing beds, built-in cabinets, tables, and seats.

The development of these latter articles is in response to a demand for those things which make for the comfort, convenience and amusement of the occupant.

The editors desire to acknowledge their indebtedness to the following organizations for their co-operation in furnishing much valuable information which supplemented and often completed the story as recorded in the volumes of THE AMERICAN ARCHITECT: American Stove Company, Josiah Anstice & Company, Inc., Armstrong Cork and Insulation Company, S. F. Bowser & Company, Inc., Brunswick-Kroschell Company, Samuel Cabot, Inc., Cabranette Corporation, Chamberlin Metal Weatherstrip Company, Chambers Mfg. Company, Colt's Patent Fire Arms Mfg. Company, Conveyors Corporation of America, Cutler Mail Chute Company, Delco-Light Company, Dexter Metal Mfg. Company, Flax-li-num Insulating Company, Frick Company, Inc., Goulds Mfg. Company, Grand Rapids Refrigerator Company, Johns-Manville Company, Kelvinator Corporation, A. J. Lindemann & Hoverson Company, McCray Refrigerator Company, Rathbone, Sard & Company, Dr. Paul E. Sabine, Skinner Organ Company, Soper Sanitary Kitchen Company, The American Laundry Machinery Company, The Canton Clothes Drier Company, The Philip Carey Company, The Diamond Metal Weather Strip Company, The Hoosier Mfg. Company, The Michigan Stove Company, The Permutit Company, The Standard Electric Time Co., The United Electric Company, United Iron Works, Inc., United States Mineral Wool Company, Waldorf Paper Products Company, Watson Manufacturing Company, Wayne Tank and Pump Company, Weyerhaeuser Forest Products, Worthington Pump and Machinery Corporation.



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*—doubles the usefulness of
parks and playgrounds*

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As this photograph shows, Pyle-O-Lytes give an evenly distributed, brilliant light over the entire park. One of the distinctive features of this type of installation is the large spread of light without any spotty effect to detract from the beauty of the park and the lighting.

Pyle-National floodlighting equipment can be arranged to meet almost any requirements of lighting large outdoor areas, or of lighting striking architectural details in buildings. Our engineers are available for consultation on floodlighting problems.

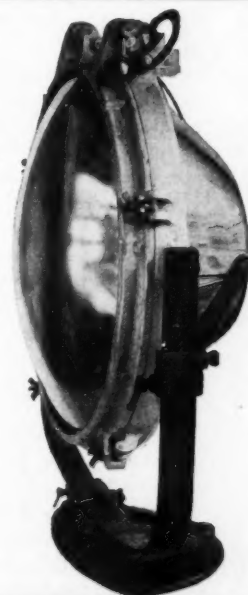
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ASSOCIATIONS and BUREAUS

The adaptation of the guild spirit beginning in the middle ages to meet modern conditions in the building industries

E. H. NAYLOR, writing in *Trade Association Activities*, one of the "Elimination of Waste" series issued by the Department of Commerce, in 1923, stated, "If one were to write fully of the history of trade associations in America, the treatise would doubtless fill a good sized book, half of which would be devoted to legal decisions and their effect on the organizations and activities of these associations, and the other half would be a repetitious cataloging of when they were founded and what they have done, especially in the last decade. The tome might well be as erudite as uninteresting. To deal with this subject briefly necessitates merely the sketching of the picture, giving a background and then the principal groups."

Upon realizing that there are in the United States well over two hundred associations, societies and bureaus, not including labor organizations, intimately connected with the building industry, we shall not even attempt to sketch the picture. The part played by these organizations in the development of building in the United States, however, should not pass unnoticed even though we are able only to lay in the ground color of the background.

Trade associations have so many accomplishments to look forward to and back upon that it would be impossible to make any general statement as to the relative importance of their activities. In general, these organizations have properly first entered upon the solution of problems closely affecting their particular industry as a major duty.

Within the industries themselves many trade associations have attempted to better the relations between employers and employees, and trade disputes have often been settled within the industry without outside interference. Barriers of ignorance and prejudice which led to misunderstandings between producers in the same industry, many of them of long standing, have been broken down and harmony established to a marked degree. Members of these organizations have come to realize the necessity and advantages of closer co-operation both among themselves and with those in related industries. A closer bond of trade relationship is replacing the wrangling, fear of disclosing trade secrets, "cut-throat" methods of competition and deceit prevalent some years ago. The industries are being placed upon higher planes of ethical standards; promoting better business relations; establishing proper and safe credit standards; fair, uniform contracts and contracting methods, and products, wherever possible, are being improved and standardized.

Trade associations have often been instrumental in establishing better contact and co-operation with the general public as well as with those immediately connected with the building industry. Through the printed word some associations have carried on educational campaigns tending toward a better understanding of their product, its use, and also the importance and ultimate economy of good construction and equipment. A few associations have and do maintain technical service and research departments where authoritative information of great value can be obtained. These have fully realized that satisfactory, dependable service and the proper use of their products in a large measure lead to the ultimate success of their members.

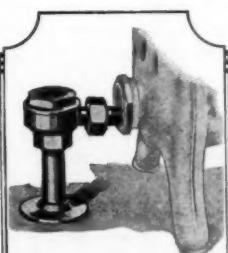
In constructive efforts to raise the standards of manufacture and use of their products, many associations have sought and secured the co-operation of members of the architectural profession. An organization quite familiar to architects, both because of the work accomplished, and also because a fellow architect, D. Knickerbacker Boyd, acts as its consulting architect, is the Structural Service Bureau of Philadelphia. Boyd recognized some years ago the need for the dissemination of better coordinated information on the materials used in building construction. Architects are generally well acquainted with the "Structural Slate Chapters," "Basic Information" and "Basic specifications for Tile Work," "Architecture and Anthracite," "Flues and Flue Linings," and other volumes which thoroughly and ably cover their subjects.

While Mr. Naylor, whom we quoted at the outset, remarked that a statement of the work of the various associations would fill a large volume and become an uninteresting repetition, we cannot forbear at least mentioning the work of the National Board of Fire Underwriters, the Underwriters' Laboratories, and the National Fire Protection Association in furthering safe electrical installations and adopting standards to reduce the fire hazards in buildings and communities; The American Society for Testing Materials in adding to our technical knowledge of materials and furthering the adoption of standard specifications; The American Society of Heating and Ventilating Engineers, and The American Engineering Standards Committee in developing various building construction data, codes, and standards. We would like, if space permitted, to outline the work and accomplishment of the brick, cement, gypsum, lime, lumber, roofing, steel, stone, terra cotta, and tile associations together with other organizations



SILENCE

Noise in a heating system is as much out of place as is unreliability, and there is no good reason why either should be present. The Dunham System is as silent as the countryside in winter, at midnight.

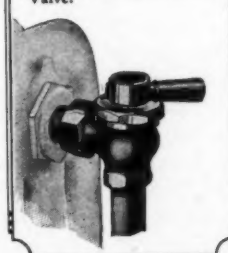


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In the **silent** Dunham System the steam is allowed a free entry at one end of the radiator, while the water and air are released from the other through the automatic thermostatic trap.

Silence, in the Dunham System, is the by-product of free and unrestricted circulation of steam. There is nothing to impede either the flow of steam from the boiler to the radiator or the return of the condensate to the boiler, nor the release of the imprisoned air to the atmosphere. Consequently, in a Dunham System the radiators are efficiently heated, they are never noisy, they are not disfigured with air valves.

Silence in a heating system is not always expected, but it is always welcome. It is a vital and important part of Dunham Heating and is an index of the carefulness of Dunham design.

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generally well known to all in the building industry.

The United States Government through the Department of Commerce has for many years taken an active interest in building construction. The Bureau of Standards, established in 1901, has made thorough investigation and research on the properties of various materials. The Division of Building and Housing, established in 1922, has also accomplished a large measure of good results toward securing more uniform and better building codes, zoning laws, better home building, along with its statistical information on building work. The Division of Simplified Practice has been instrumental in simplifying both manufacturing and usage practices, eliminating many complexities and has proved as Secretary Hoover said, "a total asset" and one "that has no liabilities."

The American Construction Council has taken up in a national way for special attention through investment, manufacturing, surety insurance, building and other similar interests, the serious situation caused by the large percentage of housing and other building construction of inferior quality and unsound financing. Marked results have also been obtained through courses of instruction in the training of apprentices and the furtherance of craftsmanship in various building trades.

One of the chief activities of the American Construction Council is the promotion and organization of local building congresses. Wherever these congresses exist and function, there is a notable feeling of better co-operation and good fellowship throughout the building industry. The Building Congress forms a logical meeting ground for all in any way connected with construction work.

In 1921 the American Institute of Architects initiated a movement to provide for better and proper contact between architects and producers. A meeting called in Indianapolis that year was attended by members of the Institute and manufacturers' representatives. The problem of securing through the co-operation of the architectural profession and the producers, the information on materials and products that the architects would like to obtain in order to produce the results required in daily practice was discussed. Two years later, the Producers' Research Council affiliated with The American Institute of Architects was organized. The council is at present working upon the complex problems which affect both the architectural profession and the manufacturers; informative advertising; salesman contacts, and educational work through the architectural schools.

The architect's problem, a complex one at its simplest, is gradually being reduced to its lowest terms and simplified insofar as it ever can be. Many of the results in this direction can be traced to the willingness and desire of these numerous organizations and bureaus to co-operate with the architect's own organization, The American Institute of Architects*.

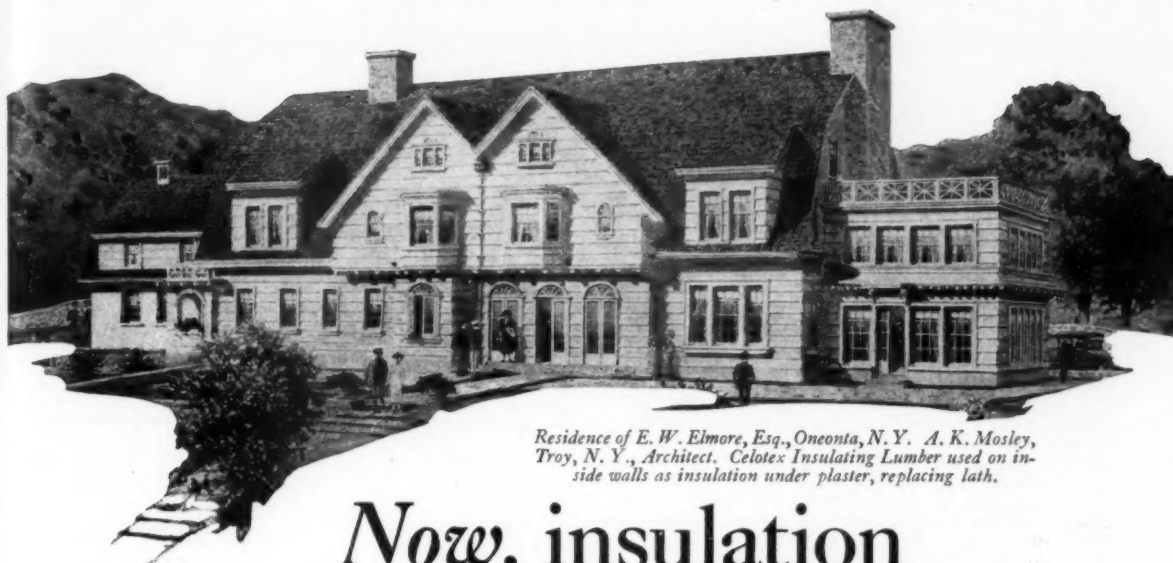
No one group of men in the industry should realize more keenly than do the members of the architectural profession the results which have been produced through group co-operation. There has been achieved that which would have been impossible of accomplishment if attempted through individual effort.

It has been inevitable that many trade associations should be frequently misunderstood, looked upon with suspicion and frowned upon by both the public and the Government. Their survival in the face of prejudice and suspicion that their motives were entirely selfish, can but indicate that many of them have been earnest and sincere, and that they are needed by the industry. It should be recalled, however, that in many cases they have been reorganized upon a basis of service and no longer have any connection with trade practices which at one time or another, either rightly or wrongly, were responsible for much unfavorable opinion.

Trade associations in the building field are not new. They are as old as the building industry itself and have existed since time immemorial in one form or another. There was a time in Europe when the few trades, simple in their operation and in their relation to building were each governed by a guild. These guilds are in many instances still in existence and exercise toward their respective members similar supervision as that carried on in this country by Trade Organizations.

However, the simple conditions of building as they existed from one to two centuries ago, bear so small a proportion to the activities that now engage the attention of the building interests that guild methods have been outgrown. The present forms of trade associations are the natural evolution of the guild idea, and usually function in a better and more efficient manner. It should not be omitted to state that the trade organizations while conferring lasting benefit on the members engaged can be equally of great advantage to that element so often lost sight of—the ultimate consumer.

*The history of The American Institute of Architects is covered elsewhere in this issue by Glenn Brown, F. A. I. A.



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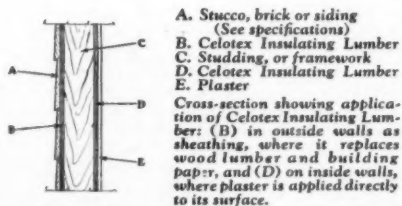
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GROWTH and DEVELOPMENT of the ARCHITECTURAL PROFESSION

Facts as Revealed by Nation Wide Survey

IN DEVELOPING this Golden Anniversary Number of THE AMERICAN ARCHITECT, it was believed that a definite effort should be made to determine certain facts about the profession as a whole. Therefore, during the past year this journal has been taking a mail census of the profession. Questionnaires were sent to every known architectural office. While the results are not 100% complete the large percentage of returns makes the compilation of the information received sufficient to indicate clearly conditions of professional practice. Growth has occurred in large measure during the past fifty years, for prior to 1875 there were comparatively few architectural offices in this country.

The accompanying chart shows, by five year periods, the relative number of offices now in existence that were established during each period. Of the total number reporting, nine were established prior to 1860.

The oldest office is that of Hobart Upjohn of New York City, established by Richard Upjohn in 1835.

The second oldest is that of Smith, Hinchman & Grylls of Detroit, Michigan. This office, originally known as Mortimer L. Smith and Son, was opened in 1850.

In 1853, D. A. Bohnen and Son established an office in Indianapolis which has been in continuous practice through three generations.

The appointment of the first superintendent of school buildings in New York City in 1854, marked the beginning of the Bureau of Construction and Maintenance, Board of Education of New York. The staff of architects, administrative force, draftsmen, inspectors and mechanics attached to this bureau make it one of the largest in the country doing architectural work.

The office of F. J. Mystre was established in 1855 in Hoboken, N. J.

Cyrus K. Porter and Sons opened an office in Canada in 1855 and ten years later removed to Buffalo, N. Y. to practice their profession.

In 1856, Augustus Bauer began the practice of architecture in Chicago. In 1881, the firm became Bauer and Hill and in 1894, it was changed to Hill and Woltersdorf. This office is still conducted by Arthur Woltersdorf under his own name.

The office of Samuel Hannaford and Sons is the oldest Ohio office and is still under that name. It was opened in 1857 at Cincinnati, Ohio.

In 1859, Henry M. Congdon began practice at Arlington. The firm became Henry M. Congdon and Son in 1900. This office is now conducted by Herbert Wheaton Congdon.

About 70 per cent of the architectural offices in the United States are conducted by individuals. Partnerships of two represent about 22%; firms having three members, 6%; those of four members a little over 1%, and those of more than four members less than 1% of all offices now operating. Based upon the figures submitted, for every office there are 1.4 persons sharing in its ownership.

The total number of graduates of architectural schools or those licensed to practice show an average of 1.5 persons per office. Thirty three per cent of the offices employ no graduates of architectural schools or others licensed to practice, while 50% employ one or two persons who are so

qualified. Offices employing from three to five graduates or licensed persons represent 13% of the total. Those employing six to ten make up 3%. About four-tenths of 1% employ from eleven to twenty; two-tenths of 1% employ twenty to thirty, and one-tenth of 1% from forty to fifty graduates of architectural schools or persons licensed to practice.

Total number of persons connected with office	Percentage of offices reporting
1 or 2	25.0
3 — 5	43.0
6 — 10	20.3
11 — 15	6.0
16 — 25	4.0
26 — 40	1.0
41 — 80	0.6
OVER 80	0.1

An estimate of the total number of persons actively connected with the architectural offices in this country would be placed at about 35,000. These are distributed in individual offices, approximately as above.

One office reports 96 employees, one 130, one 135, another 155, and the Bureau of Construction and Maintenance, Board of Education, New York City, reports 576 persons.

As was to be expected, all reports showed that design and specifications were handled in the office. Design is executed by members of the firm in 85% of the offices and by employees in the other 15%. Specifications are written by members of the firm in 92% of the offices.

Engineering work, both structural and mechanical, is done within the offices of 90% of those who answered this question, and by outside consultants in 10%. In those offices doing their own engineering work, 70% of these report this done by members of the firm and 30% by employees.

Interior decoration is included in the service rendered by 88% of all the offices reporting on this subject, while 12% delegate this to outside agencies or exert no influence upon it. Interior decoration is under the control of members of the firm in 87% of the offices reporting that they include this work, and 13% by employees.

Of all the offices answering the question as to their specialty, if any, 18% confine their work to one type of building, 14% to two types, and 8% to three or more types. General practice is the common rule and is followed by 60% of the offices. The above percentages have been compiled in accordance with the replies received. In many cases, specialization no doubt represents the major portion of office practice and accompanies practice of a general nature, so that the office might be included with those doing general practice and make this total more nearly 80% than 60%.

Specialization or preference as indicated by various architectural offices, and arranged in the order of number of times mentioned, is as follows: Residences, schools, commercial and industrial buildings, churches, apartment houses, public buildings, hotels, banks, theatres, hospitals and institutions, office buildings, and club and fraternal buildings.

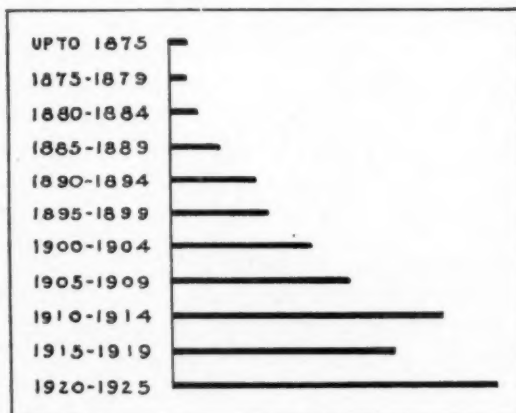


CHART SHOWING BY FIVE YEAR PERIODS THE RELATIVE NUMBER OF OFFICES NOW IN EXISTENCE WHICH WERE ESTABLISHED DURING EACH PERIOD

The PUBLISHERS' PAGE

IN THE preparation of this Golden Anniversary Number of THE AMERICAN ARCHITECT, the publishers have felt it to be a duty as well as a privilege to mirror to its present readers the remarkable architectural development that has occurred in this country during the past half century—the time during which this journal has been serving the architectural profession. No expenditure of time, effort or money has been spared to make this as valuable historically as could be conceived. The Golden Anniversary number was not and is not now intended to be in any sense a "special issue" the chief purpose of which generally appears to be the publication of as much advertising as can possibly be secured. The publishers of this journal are not believers in the claimed value or usefulness of such special issues. This number represents the contribution on the part of publishers to its readers in properly presenting and preserving the record of this "Golden Age of Architecture."

In the articles by special contributors, all of them well known to members of the architectural profession, the aim has been to call attention to the changes and advancement that have taken place in architectural design and practice. Those who have been in practice for a considerable time are undoubtedly conscious of these changes but their importance and extent has possibly been overlooked because of the close personal contact with them. To the younger men in the profession, familiar with conditions during the past few years only, these accounts hold much of a historical background for present day practice.

Possibly the section of this issue devoted to the presentation of structures by decades will visualize more vividly than the word pictures the radical changes in design which have occurred during this period. These illustrations are taken from the illustrations appearing in THE AMERICAN ARCHITECT from 1876 to 1925 and show the general trend of development in eleven major types of buildings. Many others of equal interest might have been selected but these present the general picture.

As comparisons are drawn between buildings of fifty years ago and today there is forcefully brought out the great advancement that has been made in materials of construction and equipment of buildings. The architect now has a much wider range of selection in which to express his ideas than his fellow practitioner of fifty years ago, whether for structure, equipment or decoration. There is practically no limitation placed upon him as to materials but only those limitations of his own making and his client's purse. The advance upon the part of producers and the improvement in craftsmanship is brought out in the pages dealing with materials in which the high lights of this half century of development are presented.

Advertising of commodities in the architectural press has undergone as radical a change as has architectural design itself. Fifty years ago advertisements were little more than business cards giving the name of the producer and the product presented. Today many of the advertisements in the architectural press are as carefully studied as to composition and effect as an architect would study a presentation drawing. Also quite generally an endeavor is made by the producer to bring helpful ideas to the architect.

Many of the advertisements in the following pages are planned to supplement the information contained in the text pages with historical data regarding the particular contribution of the company to the general architectural advancement during the past fifty years. Reading of these will bring out many facts not possible of mention in the articles.

In this, as in other issues of THE AMERICAN ARCHITECT, endeavor has been made to secure a proper balance in volume between text and advertising pages so that no feeling can arise that the profession of architecture is being exploited.

To all who have contributed to the interest and success of this issue among both architects and producers, the publishers express their grateful acknowledgment.

THE BUILDING of a GREAT BANKING BUSINESS

FORTY-FOUR years ago the investment banking business of S. W. Straus & Co. was founded.

Today the Eastern and Western headquarters of this nation-wide organization are housed in buildings on Fifth Avenue, New York City and Michigan Avenue, Chicago, which stand out as landmarks in their communities and are regarded as distinguished architectural achievements, as well as buildings of high efficiency from the business standpoint.

When the business was young, it was conducted on a purely personal basis with a staff consisting of one bookkeeper and one office boy. One room in the old Sherman House, Chicago, was all that was necessary for the transaction of business. Frederick W. Straus, father of the present head of the business, negotiated all mortgage loans personally, inspected them himself and himself sold them to investors. The volume of business was small and the capital invested, as compared with present day standards, insignificant.

From that humble beginning has grown the nation-wide organization of S. W. Straus & Co., admittedly the first in its field of underwriting bond issues upon improved city real estate—first in financial strength, first in knowledge and experience, first in volume of business and first in the wide scope of its operations. It has offices in all principal cities and its organization, both in the purchase and distribution of securities, is unique in the investment banking field. It has financed thousands of buildings, aggregating in value upwards of a billion dollars, and its clients numbered by the scores of thousands are found throughout the United States and in practically every civilized foreign land.

Many factors have contributed to the growth of this great business institution. Most important of all of these is the fact that it was founded on the sound principles of working in good faith for the protection of the investor, for the good of the borrower and the good of the people of the community itself.

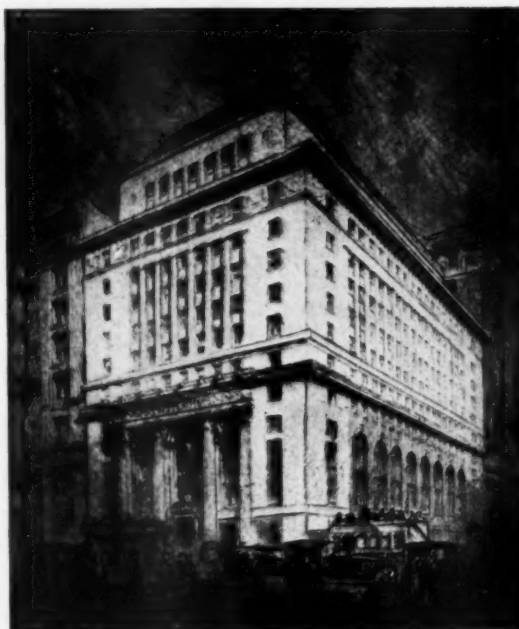
Frederick W. Straus opened his office in Chicago in 1882 after a residence of about 30 years in Ligonier, Indiana. Originally Mr. Straus conducted a small mercantile business; then he opened a private bank

and finally came his decision to leave the narrow restrictions of business proscribed by a rural community and test his mettle in the wider field offered by Chicago. His new undertakings were successful from the start and in 1886 S. W. Straus, now and for many years past head of the organization, entered the business.

The mortgage loan business of the 80's was very different in both its character and its extent than that carried on today. Then loans were made on single residences, often of brick or even frame construction. Floors were of pine; lighting fixtures for gas, and plumbing was of the most primitive type. These, however, were good loans because the margin of safety was large enough to protect the lender against adversity, and these individual mortgages found a ready sale.

At a later date there was developed the plan of making a larger mortgage available for a number of investors by requiring a series of notes payable over a period of years, and in this process may be seen the beginnings of the real estate mortgage bond as we know it today. As the business grew other innovations took place, until in the 90's money was loaned in large sums by dividing up mortgages into issues of bonds, which being of convenient denominations could be purchased by all classes of investors.

The history of S. W. Straus & Co. is in many respects a history of the first mortgage bond business, so numerous have been the features originated and developed through this organization and now in common use in the first mortgage field. Among these was the requirement that the principal be amortized and paid down year by year, and that these yearly payments be divided into twelve equal parts and deposited with the underwriting organization month by month. The benefits, both to borrower and lender alike, are obvious, for it results in a steady reduction in the amount of the obligation directly from the earnings of the property, so that no undue burden in meeting a large obligation faces the borrower at any time during the life of the loan, and the lender—the investor—constantly sees his security enhance



S. W. STRAUS CO. BUILDING, NEW YORK
WARREN & WETMORE
ARCHITECTS

through the steady reduction of the obligation.

This Company has contributed greatly to the upbuilding and rebuilding of American cities, to the replacement of old obsolescent structures with new, modern, fireproof buildings. Some of the most noted building operations of the past two decades were financed by S. W. Straus & Co. A few out of the many include, in New York, the Allerton Houses at 57th, 38th and 22nd Sts., the Ambassador Hotel, the Fiske Rubber Co. Building, 575 West End Avenue Apartment Building, 610 Park Avenue Apartment Building, 580 Park Avenue Building, the Murray Hill Office Building, the One Park Avenue Building, National Association Office Building, Pershing Square Office Building, the New St. George Hotel, the Westinghouse Building, and the Court and Remsen Building; in Chicago, the Burnham Building, the Allerton House, the Drake Hotel, the Lincoln Belmont Building, the Windermere, and the Chicago Produce District; in Atlantic City, the Ambassador and Ritz-Carlton Hotels; in Detroit, the Book-Cadillac Properties and the Book Building and Addition, the General Motors Building, and the 1700 Jefferson Ave. E. Apartment Building; in Los Angeles, the Ambassador Hotel, and the Gaylord Apartments; the Statler Hotels in various cities; in Pittsburgh, the Schenley Apartments; in Seattle, the New Washington Hotel and the Dexter Horton Building; in Dallas, the Cary-Schneider Building; in Louisville, Ky., the Brown Hotel; and in Philadelphia, the 19th and Walnut Sts. Apartment Building.

So far as is known S. W. Straus & Co. were the first lending organization in the city real estate field to establish Engineering and Architectural Departments, working both to the advantage of the borrower and the bond buyer. These departments have been developed to a point where they are of inestimable service to the architect or builder who brings a construction proposition to S. W. Straus & Co. for discussion. Every month there pass through the Straus organization more sets of plans and specifications than the individual architect or engineer could see in the course of a year. Knowledge and experience thus gained are at the disposal of those who come to S. W. Straus & Co. for their financing. While there is no disposition unduly to urge suggestions as to changes of plans or specifications, there have been many instances where modifications resulting from consultation with the Straus engineers and architects have worked for the benefit of all concerned.

Another development in the lending field for which S. W. Straus & Co. is responsible is the activities of the

Survey Department, which monthly collects building and construction statistics from a very large number of cities throughout the United States. Information thus secured is of the greatest value in determining what communities are in need of certain types of building, or what communities or sections of cities have reached the saturation point in certain lines of construction. S. W. Straus & Co. often have advised that a construction project be deferred or abandoned altogether, because building needs of the particular character suggested have been met. On the other hand, S. W. Straus & Co. naturally have been able to advise as to needed construction projects and such advice has been responsible for many of the most successful operations.

The essence of the Straus Plan, as the methods and policies laid down by S. W. Straus & Co. have come to be known, is that bond issues are underwritten only upon successful and profitable properties, with the result that to be a Straus financed undertaking is practically synonymous with being a successful proposition. In the long history of S. W. Straus & Co. no investor in Straus bonds ever has had to wait even a day for the payment in full of the principal and interest due him, and this is the logical result of the lending policies pursued by the organization. In another way the policy of S. W. Straus & Co. may be summed up by saying that unless a loan is good for the borrower it cannot be good for the investor. If the proposition is such as to yield the borrower a good return upon his investment, it necessarily follows that the individual bond buyer has a safe investment. If the undertaking is not profitable to the borrower, it is not likely to be so to the purchaser of the bonds.

Thus has the business of S. W. Straus & Co. developed over the

four decades and more it has been in successful operation.

For many years S. W. Straus & Co. have been advertisers in *The American Architect*, in order that they constantly may keep in touch with the architectural profession and keep before it the message of S. W. Straus & Co. The constant flow of inquiries from the profession demonstrates both the interest of the architect in his publication and his desire to keep abreast of the times in that particular branch of his profession which relates to financing. More and more he is called upon to advise in matters of finance. It is natural that he should come to such an established institution as S. W. Straus & Co. for information, and through him S. W. Straus & Co. well are able to serve his client, the public.



S. W. STRAUS CO. BUILDING, CHICAGO
GRAHAM, ANDERSON, PROBST & WHITE,
ARCHITECTS

THE HISTORY OF VERTICAL TRANSPORTATION

For nearly three-quarters of a century the vision and inventive genius of the Otis Elevator Company have been making possible the development of the skyscraper

IF the elevator had never been invented architects would, in all probability, never have planned buildings which were over four or five stories in height; structural steel would not have been needed, cities would not have been so densely populated, and land values would not have risen to such staggering levels.

When Henry Waterman conceived the idea of the platform elevator operating between two floors, which he completed in 1850, he, and no one else for that matter, dreamed of the vast influence it was destined to exert on building construction and property values.

Elisha G. Otis was the first man to have the real vision of the future importance of the elevator. Inspired by what he foresaw he began to manufacture elevators in Yonkers, in 1852. The full force of his extraordinary inventive genius was applied to the problem of elevation throughout the remainder of his lifetime.

Practically every important advance in elevator technique can be directly traced to the members of the wonderful organization built up by Mr. Otis and his sons.

Safety was their first consideration. It was of but little value to be taken up on an elevator, they felt, unless a safe descent could be assured, and this even though some of the machine parts were broken. With this principle in mind, Mr. Otis worked on the original safety device which he produced in 1853. It attracted great attention when a few months later it was exhibited at the Crystal Palace Exposition, in New York.

A decided sensation was created the following year, 1854, by the hydraulic elevator, which was also a product of Elisha G. Otis' mechanical genius. Although it was a crude affair, as compared with our present day standards, it marked a long step forward in the progress of the industry. Mr. Otis never relaxed in his efforts to improve upon his models. Four years later he made a wood frame belt machine. A machine of this class made a good record for itself, having been installed in the Bible House, New York City, in 1862, where it remained in constant service until the need of modern equipment caused it to be removed in 1922.

Mr. Otis gave free rein to his fertile mind and kept at his work until his last days. One year before his death, which occurred in 1861, he produced the oscillating cylinder steam engine.

After his death, the business was taken over by his two sons, Norton P. and Charles R., under the firm name of N. P. Otis & Brother. With their father's business they inherited his standards of safety. Their policy that every car bearing the stamp of Otis manufacture must be safe has been maintained by the Company to this very day.

In spite of the death of Elisha G. Otis the industry did not lose, for both of his sons were endowed with inventive powers that equalled his. That very year the geared hydraulic elevator was designed by Charles R. Otis, who was later (in 1866) to produce, jointly with his brother, the stationary cylinder steam elevator engine.

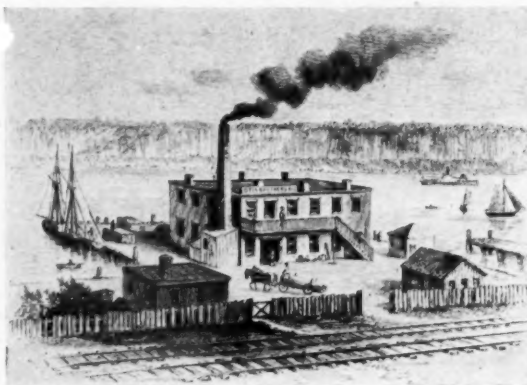
At about this time the first factory building was erected on the site of the present Otis plant at Yonkers, of which the old red brick building still forms an important unit.

We now come to a radical change in the elevator industry—the introduction of the vertical hydraulic elevator, the first of which was patented by Cyrus W. Baldwin, in 1872. Not long after that the inventor joined the Otis organization. The hydraulic elevator gained in popularity as time progressed, for, owing to the rate of speed it was able to attain, architects found it possible to increase the height of buildings.

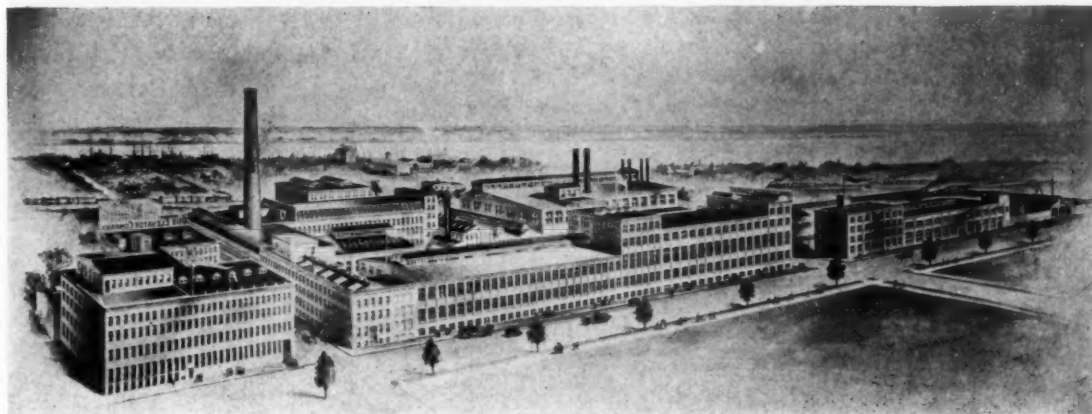
Almost half a century ago, in 1880, Mr. C. R. Otis invented that impor-

tant feature of the safety device known as the governor, which is still an integral part of the mechanism of every elevator. In 1883 the iron frame spur geared belt machine was produced.

The age of the electric elevator dawned in 1889. Here again the Otis Company was in the lead—the first successful electric elevator was the product of its factory. All honor must be paid to this ancestor of the present day high speed cars, which continued on its cheerful journey up and down its hatchway for nearly thirty years. The rapid development of electricity and its application to the elevator industry



FIRST FACTORY OF E. G. OTIS AT
YONKERS, N. Y.—1854



YONKERS WORKS, 1925—OTIS ELEVATOR COMPANY

wrought marvelous changes in the character of elevator service. They claimed attention and were in general favor in the early nineties. Hydraulic elevators were forced to yield to these new and more popular rivals, except in the highest buildings where they were capable of greater car speeds than the drum type electric machine which was in use at the time.

In 1898 the firm of Otis Brother & Company was incorporated under its present title, taking in a large number of smaller elevator companies.

The first important installation of the modern gearless traction machine was made in 1904, in the Majestic Theatre Building, at Chicago. It was destined to be the forerunner of a type universally used for the highest class of elevator.

For a very brief period, about the year 1905, the high rise plunger elevator came into vogue. Its advertisement "I hold thee safe" appealed to the public fancy. However, it was inefficient and clumsy as contrasted with the rapidly improving electrically operated car. Its popularity soon waned.

By 1909 the Otis gearless electric elevator had come into general use for all high speed service; hydraulic elevators were becoming obsolete. The changes in the industry followed each other in quick succession. As we approach the year of 1916, the old style slower speed drum type electric elevator had fallen into practical disuse, its place being taken by the single wrap traction geared type, which had inherent advantages over the drum machines.

The World War, productive of so many inventions, did not fail to have its effect upon the elevator. The Micro-Drive, or Self-Leveling Electric Elevator, was the direct outgrowth of some machines designed by the Otis Elevator Company at the request of the Government for use on the mine laying ships and for freight service in the large Army and Navy Base Ware-

houses located in New York, Boston and other cities. After the War the Company developed the Micro-Drive feature for passenger and freight service of all kinds. It is now being universally employed.

No invention of the Otis Elevator Company has aroused greater interest and commendation than the Signal Control Elevators. The first of these, of which it has been said that they were "almost human," was introduced in New York City, in 1924. In addition to being of the gearless traction type it is automatically controlled and is run without the interference of the operator. Combined with the Micro-Drive Operation and the Multi-Voltage Control, this car provides the finest class of service for high buildings. Its speed at the present time is 800 feet a minute. It can, however, be augmented should the increased height of the skyscrapers demand it.

In its new production the Company is more than living up to the reputation established by its founder. This year it will place the Collective Automatic Control Elevator on the market. This type, built for use in residences, apartment houses and smaller commercial buildings, is an adaptation of the Signal Control. It has a lower rate of speed, and its mechanism is so simple that it can be run without the aid of an operator. The Collective Automatic Control is a vast improvement on the old push button system.

Another outgrowth of the Signal Control is the Department Store Control, to be employed, as its name implies, in those shops so largely frequented by women and children. The elevator is automatically controlled, leaving the operator free to devote his entire attention to his passengers. It is furthermore provided with the self-leveling feature, which enables the occupants to get on and off without danger of stumbling.

OTIS ELEVATOR COMPANY

Offices in All Principal Cities of the World

THE STORY of BATCHELDER TILES

BY ERNEST A. BATCHELDER

THE history of an industry is often more entertaining to those who have nursed it through the troubles of its infancy than to the casual reader. A recital of early vicissitudes is akin to bringing out the family photograph album for the edification of a social caller.



THE "BIRTHPLACE"

These early stories of industries have points of striking similarity. They generally center about personalities—men who had dreams and who persisted in pushing their dreams along a single track road, up hill and down, in season and out. Retrospection means merely to rest for a moment by the wayside to look back along the track littered with debris commonly called experience. This is written in one of those moments.

Twelve years ago Batchelder Tiles were made in a Pasadena garden under the shade of the olive trees. The clay was brought home from a brick yard wrapped in gunny sacks, all mixed, ready for use. This raw material delivered at the back door was painfully plebian. Its antecedents were humble; but it possessed two characteristics not vouchsafed to common earth—plasticity under the hands of fertile invention, and permanence when subjected to the searching heat of the fire. It had potential beauty when brought into contact with adequate ideas. We had ideas and sought to give them expression.

Our first tiles were made one at a time with deliberate satisfaction,—each patted and watched through the critical steps of its career. The first quantity production involved the making of twelve six inch tiles at a single process—a commendable enterprise. Our kiln permitted us to hazard forty six of these tiles at one firing. It took three firings to com-

plete our first mantel. This mantel was laid out on the kitchen floor and personally delivered at the job because we doubted the trustworthiness of expressmen,—and incidentally, feared the owner of the house might change his mind for these tiles were different from those in vogue.

The olive trees still weave sunlight and shadow over the roof of the little shop but its activities remain only as a pleasant memory. The kiln soon sputtered itself into premature old age,—it tried hard to keep the pace; the neighbors objected to the soot and so withal we established ourselves down among the gas tanks in a galvanized iron shed in regions remote from neighborly solicitude.

Our second kiln appalled us by its yawning cavity. It required nearly five hundred six inch tiles to appease its demands. We exulted in the roar of its fires but worked day and night to keep it going. Dawn often caught us on the way home to last night's supper. The tiles were sun dried in a yard at the rear of the shed where cats and chickens frequently walked over them offering a "pleasing variation of texture." We watched them—the tiles—as a cook watches a pancake on the griddle. As fast as the tiles were dry they were whisked away to the insatiable kiln. But even California sunshine refuses to work nights. Artificial drying appeared as a logical helpmate. Our first drying room was built with the aid of tarpaulins and a gas stove. It rendered valiant service in a good cause.

Expansion became an early forced habit. For some reason or other people liked our work, in fact have continued to like it. We hope they will always like it. When kilns Number 3 and 4 were built—they came as twins—Number 2 lost its power to overwhelm us. The day came when it was even referred to as the



THE "NURSERY"



MAIN ENTRANCE TO OFFICES

"pup". The shed which sheltered our infant industry grew in size and dignity until it filled the narrow limits of the property. To expand further meant that we must dig in or climb over. We did the latter.

A portion of our present location was secured in 1920. Building was started on a comparatively modest acquisition of an acre of ground. The expansion habit remained. Our plant now occupies a seven acre tract. Kilns 5-6-7-8-9-10 followed each other in rapid succession—each bigger than its predecessor. And now Number 11 is with us, a tunnel kiln through which a train of loaded cars moves day and night throughout the year with firing controls unheard of a decade ago.

* * * * *

Any industry making a product of artistic merit in which the personal element enters as a dominant factor faces a serious problem in expanding its facilities. It is difficult to retain the elusive quality which comes in part from simple methods of production.

Batchelder Tiles are still made by hand by just the same processes as they were twelve years ago. But modern progress has pointed many devices for the saving of unessential labor. To mix clay in a mortar tub with a hoe adds nothing to the beauty of a clay product; machinery does this work much more satisfactorily. To carry burdens from one point to another is a primitive method which contributes nothing to the charm of the finished work; overhead trolleys can whisk a ton of material to its destination more expeditiously than a man can carry an armful. The laborious task of spreading tiles out in the sun to dry has given place to drying rooms, through which the material moves automatically, fitted with

every device which engineering skill can make use of to guard the product through this critical period of its progress. And so in our plant today we have all the facilities necessary for the rapid movement of materials at points where personality is unaffected, but maintain with scrupulous care all the hand processes which bring unique distinction to our product.

We have a reasonable pride in our plant. It is a wholesome place in which to work. Our employees have increased from four in nineteen fourteen to one hundred seventy-five in nineteen twenty-five. The responsible positions in our organization from the drafting room to the kilns are held by men who have grown up with the business, who are trained to methods of production peculiar to our plant and who are jealous of any innovations which would rob the material of its unique character.

In addition to the home office and works in Los Angeles, the Batchelder Wilson Company maintains an office and display room at 101 Park Ave. as well as a warehouse in New York City to which our product is shipped in bulk through the Panama Canal for distribution to eastern points. Expressed in terms of freight rates this means that Los Angeles is closer to New York than is Cleveland. Expressed in time it means three weeks from the kilns to our eastern warehouse.

* * * * *

Time was—in Persia, Syria, Italy, Spain, Mexico, the Orient—when the clay worker turned his art to an infinite number of purposes to enoble and enrich

the architecture of his day. From the walls of Babylon to the churches of Mexico his enduring art enhanced architecture with plastic ornament and glorified it with color. Only fragments remain to tell us of the painted marbles of Greece; but the potters art is as beautiful as the day it left the kiln. Unhappily the fires burned out, at different times in different places until the last flicker of beauty disappeared in the chaos of plate-glass, pressed brick and mill turned wood work.

In the youthful days of the "American Architect" the word tiles connoted a thin slab of machine pressed clay covered with shiny glaze bespattered with spots of pink, blue and green, varied to your taste. In our vocabulary TILE means the adaptation of a clay product to architectural purposes when



MAIN ENTRANCE TO FACTORY

plastic design, form and color enter into the scheme as desirable factors. Long before the next anniversary of this magazine we know that clay is destined to regain a large measure of the prestige and beauty which the potters of old gave to it.

STEDMANIZING the RUBBER FLOORING INDUSTRY

And the important part which cotton fibre plays in floors of this type

THE history and development of rubber flooring is a record of the history and progress of the Stedman Products Company of South Braintree, Massachusetts. It would be practically impossible to separate the two.

Reinforced multi-colored rubber flooring came into existence only a comparatively few years ago and while the discovery of the process for impregnating color into the rubber was, like so many other inventions accidental, the reinforcing of rubber to its present perfection as a durable floor material was not.

The reinforcement phase of the rubber flooring industry links closely with the tire industry,—for the backbone of both is cotton fabric. Nearly all rubber articles owe their strength and usefulness to cotton fabric—belting, rubber hose, packing, clothing and rubber footwear.

THE IMPORTANCE OF COTTON FIBRE

Cotton fabric remained almost stationary in its relation to rubber until the development of the cord tire, in which the individual cord or strand of cotton treated with rubber was shown to impart a greater strength, resilience and length of life to the tire than woven fabric. In other words, here was the beginning of the reinforced idea where the individual cord or thread was coming to be considered as against the woven sheeting or canvas.

In working out this principle the Stedman Products Company, under the direction of its president and founder, J. H. Stedman, whose business career has been closely associated with the field of rubber for over a quarter of a century, perfected the process whereby the cotton and rubber are so entirely a unit as to make it impossible to say where one begins and the other ends.

The first use made of this knowledge was in the

making of the reinforced rubber or fibre shoe sole which gives far greater wear than the compounded sole and is tougher where the stitches penetrate. The success of the rubber sole naturally suggested the adaptation of the cotton reinforcement principle to other rubber goods.



A STEDMAN FLOOR IN THE "CRADLE OF LIBERTY"
FANEUIL HALL, BOSTON

RESILIENT FLOORS ALWAYS NEEDED

The need for rubber floors has always been present. It required no devising of means to find an outlet or use for a new product when the first Stedman flooring was produced. There were no established habits to overcome. Just as the car spring helped to eliminate the jolt of pre-Pullman days, so the solid tire rendered a buggy ride a treat, the rubber heel made life's walk easier, and a pneumatic tire became a help not alone to comfort but to speed. The natural sequence of ideas from the contemplation of these things where individuals are rubber shod is obviously to cover the underlying surfaces—floors and roads.

The idea of a softer floor than marble, wood or cement, was the first appeal for reinforced rubber, but as Stedman floors were laid and greater knowledge of them grew, other and much stronger factors in their favor came to light.

The architect, for instance, was impressed by the fact that in wear, nothing he could specify in almost any other department of building had greater endurance. The roof, the walls, the ceiling would last no longer than a Stedman floor—and when comparisons were made between Stedman flooring and other flooring material, facts were even more startling and convincing.

In public buildings, such as theatres, and in banks, hotels, offices, stores and churches, demanding good looks with endurance, the adaptability of this new flooring was instantly recognized.

WHY HOSPITALS SPECIFY STEDMAN

Hospitals were and are today, the largest single users of Stedman flooring. It was at the convention of the American Hospital Association at West Baden, Indiana in 1921 that a floor of this type was first shown. Many hospital administrators and superintendents were attracted by this new multi-colored, reinforced rubber flooring material. Up to that time, only one other manufacturer was advertising a rubber flooring, this being of the inter-locking and square type. The reinforced rubber type as shown by the Stedman Products Company at West Baden was the only other and it was the original reinforced rubber flooring.

Since then, hospitals in many parts of the United States have installed the Stedman flooring and in doing so are largely aided by the recommendations of the American Hospital Association.

This recommendation came from the report of the committee on flooring of the American Hospital Association made at the Convention held in Atlantic City in October of 1922. It is now a matter of history and showed that in 56 types of flooring submitted by 45 manufacturers, Stedman products Company's Naturalized Reinforced Rubber was awarded the very highest recognition in nine separate instances above all other types of floors, and in each succeeding year, this recommendation has been sustained.

Stedman is making and installing today the same type of multi-colored reinforced rubber flooring which it originated in 1920.

On February 5, 1924, The Stedman patent No. 1,482,952 was granted, covering the use of multi-colored cotton or like fibre reinforced rubber and the Stedman Company is the only lawful producer of this type in the United States. In Canada, Australia and New Zealand the Gutta Percha & Rubber Ltd. of Toronto manufacture Stedman Floor, under license. The English patent has also been granted, and the British market will shortly be covered. Installations have already been made on the Continent; one of the notable examples is that in the Appeldoorn Hospital in Holland.

OVER A MILLION FEET INSTALLED

Last year considerably over one million feet of

rubber flooring was made and installed by the Stedman Company. The company does all of the installing and accepts all responsibility for the floor. This applies to installations of all kinds, in residences, or in large buildings.

The use of this type of flooring in residences is growing very rapidly, both because of its wonderful durability, its practicability in harmonizing with interior decorative color schemes, its quietness, cleanliness and the ease with which it can be taken care of.

The vitally interesting features characteristic of reinforced rubber, making it more desirable than a similar product without the cotton fibre reinforcements are briefly these:

"The introduction of fibre entails with it further mixing and milling than would be necessary in a non-fibre type, and also a far greater hydraulic pressure during vulcanization, both of these steps tending to densify the material and to make it a far more wear resistant product than the non-fibre type.

"Secondly, the introduction of the fibre tends to act as a retardative interflow medium, so that in the blending of various batches of different colors, we get a definite striation, as against the appearance of spilled paint, which comes in the non-fibre type where the stock, being softer, more readily flows and smoothes together. With this attribute it is possible to make definite inlays comprised like a mosaic of many pieces, which when subject to the heat of vulcanization do not interflow or overflow."

PLEASINGLY DIFFERENT WITH INLAYS

The inlays used in Stedman flooring for nurseries, hospital rooms for children, special designs for banks, theatres and various types of business buildings, typifies the service which Stedman gives. Two special examples of this are in the Masonic Temple, Lawrence, Massachusetts,

and the Columbus Hospital, Columbus, Ohio.

Stedman Products Co., So. Braintree, Massachusetts. Direct Branches: 101 Park Ave., New York; 4 Park St., Boston; 1524 Chestnut St., Phila.; 343 So. Dearborn St., Chicago; 1217 Book Building, Detroit; 216 Union Building, Cleveland; News Tower Bldg., Miami—Agencies in principal cities. Manufactured and sold in Canada by the Gutta Percha and Rubber, Ltd. Toronto.



EXHIBIT OF STEDMAN FLOORING
SHOWING INLAYS

THE AIMS and IDEALS of the RISING & NELSON SLATE CO.

THE Rising & Nelson Slate Company, for three generations quarrymen and producers of roofing slate, are the fortunate owners of a chain of quarries producing a rock having a most exceptional range of colors.

In some of these quarries the strata of the rock does not run straight or smooth. Therefore the slate is more difficult to split and, when split, the surface is rough and irregular. From the designer's viewpoint this is a distinct advantage. The splitting of this rock is so carefully and artfully done that it retains all the natural sculps, seam edges, etc., thus producing a slate which closely simulates the old hand-wrought European slate.

The Rising & Nelson Slate Company realized, after having the matter brought to their attention by cer-

artificial means are resorted to in its production.

The different types and colors were classified and grouped, and quarrying proceeded in accordance with a definite plan. The material was marketed, roofs built, and the results, even at that stage, justified all the preparation. Since then further study has been devoted to the subject and new combinations and effects are being developed from time to time.

Age improves "Tudor Stone." Certain colors being weathering colors, the material taking on various tones of brownish green, brown buff and tan on exposure to the elements, although the quality of the stone does not in any way deteriorate. Other colors are unchanging—deep purples and beautiful harmonious blendings of green and purples, grays and dapple grays, sandy gray blacks, shiny blacks and



tain architects, that they had a material which if properly handled was far superior to ordinary slate for effective roofing.

Architects and designers were consulted and invited to the quarries to inspect the rock. Upon their advice an Architects' Service Department was organized under the direction of a consulting architect.

Close study was made of existing examples of European roofs, experiments were undertaken in the mixing of the different thicknesses, treatment of butt lines, combination of sizes and thicknesses, and graduation of colors. At the quarries new holes were sunk and new materials were developed. In short, an organization was built up especially to develop and handle this, then new effective roofing material.

To this rock was given the name of "Tudor Stone"—nature's product—hard, non-absorbent, quarried from deep beds, retaining all the original texture; imparting to the finished product an exceptional range of colors and providing the architect with a medium which for many purposes cannot be excelled. No

dead blacks, orange and bronze blacks. Nature herself has imparted through the years this wonderful coloring which cannot be imitated by artificial means.

Tudor Stone is never sold in bulk. It is quarried to order for each contract and material for each roof sold for a lump sum delivered to the nearest freight station to the job. Each roof is designed by their Architects' Service Department, under the personal direction of Mr. Walter McQuade, Architect.

To all architects is extended a cordial invitation to visit the quarries, where they may see craftsmen, especially trained in their work, producing this exceptional roofing material.

Their Architects' Service Department is located at 101 Park Avenue, New York. They also maintain branch offices at 2554 West Harrison St., Chicago, Ill., 112 South 16th St., Philadelphia, Pa., and 46 Cornhill, Boston, Mass.

Quarries and main office of the Rising & Nelson Slate Company are at West Pawlet, Vermont.

The DEVELOPMENT of PENCIL QUALITY THROUGH HALF a CENTURY

THE VENUS PENCIL was not created in a day or a year; nor did it "just grow"—like Topsy—to its present inimitable perfection.

It is the result of more than half a century's constant striving after an IDEAL; a determination, adhered to throughout the years, to make the very BEST lead pencil that broad technical knowledge, exhaustive experimentation, long experience and ample facilities could possibly produce.

In 1900, after a quarter of a century's experience in the manufacture of pencils of continually improved quality, the American Lead Pencil Company brought out the first VENUS PENCIL; the first drawing pencil made in various definite, uniform degrees of hardness and softness ever produced in this country.

With a determination to make the new pencil known throughout the world as a purely American product—not an imitation of any foreign article—the present distinctive green watermark was chosen for it. It was placed upon the market as an American pencil, made in an American factory by American craftsmen. It won its way, through sheer merit, first into the studios and architects' offices of the United States, then into those of Europe, and finally into every important center in the world.

Architects, artists, engineers and others requiring pencils of precision, everywhere recognize that the lead of any one of the 17 Venus Pencil degrees, whenever and wherever the pencil may be bought, can be depended on to be smooth, firm, gritless, non-crumbling and absolutely uniform.

The artist or architect wishing a very soft lead for bold, heavy mass effects and rendering will find his ideal pencil in Venus 6B, 5B, 4B or 3B. For sketching, writing and general office use, Venus 2B, B, HB, F & H offer a smoothness that speeds the transfer of thought from brain to paper. For general drafting room use, architects and engineers select Venus 2H, 3H, 4H, 5H and 6H;

while 7H, 8H and 9H are used for work of the utmost precision, requiring delicate, thin lines.

The Ideal which led to the production of the Venus Perfect Pencil has been kept steadfastly in mind in the creation of each other article in the long line of VENUS products. In its pencil service to the various professions and to business, whatever the American Lead Pencil Company has manufactured, is either the best that can be made or the very best of its particular class.

With the continual development of business and professional life, new pencil needs arise from time to time. As each demand became apparent the Company has met it with an article that exactly filled the bill. The Venus Copying Pencil, Venus Stenographers' Pencil and Venus Erasers are noted examples of success in these lines.

Now, after another quarter of a century's experience, the UNIQUE Colored Pencil with *thin leads* has been developed. Made in blue, red, green and yellow, they supply a need of professional and business men long-felt, but seldom voiced for the reason that such pencils never before had been heard of.

These new Unique Thin Lead Colored Pencils have leads no larger in diameter than that in a No. 1 black writing pencil; and, immediately upon their introduction, became a necessity in every drafting room, studio and office. Neat colored checks, figures, lines, underscoring and other notations on manuscripts, specifications, blueprints, tracings, etc., are now for the first time made possible by the Unique—in constant use by architects, artists, draftsmen, executives, auditors, estimators, surveyors, instructors and students.

Whatever new pencil needs may arise in the future, the American Lead Pencil Company, 220 Fifth Avenue will continue to supply them, with the same thought, care and attention to detail that made the Venus Pencils "*The largest selling QUALITY pencil in the world.*"



THE STORY of the BEGINNING of a NATIONWIDE SERVICE

BY MELVIN SPENCER OF I. P. FRINK, Inc.
24th St. and 10th Ave. New York, N. Y.

SIXTY-EIGHT years ago I. P. Frink lived in the country. Someone had smashed the glass in one of his tiny cellar windows. To keep out the cold, and perhaps wild animals he tacked a piece of white cardboard over the window.

That night the wind blew a gale.

The next day was a beautiful sunshiny one. When he went into the cellar, he found the place flooded with light. The ceiling, white-washed, stood in bold relief—the fruit glasses on the shelf almost glistening in sunlight.

Frink was amazed. The usually dark cellar was transposed into a sunlight room. He could see everything in the room more clearly than he ever had in his life before—except the source of the light.

Suddenly it dawned on him. The gale in the night had blown in the white piece of cardboard, so that it hung, fastened at the bottom but slanting inward from the top. A ray of sunlight striking the white surface, reflected the light against the white cellar ceiling and diffused it over the cellar.

From this beginning has grown the great national service of Frink reflectors. First came the manufacture of daylight reflectors for stores and offices. Untold thousands were in use for years.

When the use of gas became common, came the first Frink Reflector per se, the great grand-daddy of all reflectors in use today. From the reflection of gas light to electric light was a natural sequence and marked the birth of Frink Service.

For many years Frink had been known as the pioneer and leader in the study of reflected light. Quite naturally, difficult and novel work of all kinds was offered us for solution and execution. So heavy did this demand become that eventually practically all stock lines were abandoned and Frink Lighting Engineering Service became the large part of our business.

As a result of these years of intensive study of reflected light it is but natural that many important inventions should stand to the credit of our engineers. The following tabulation furnishes an interesting commentary on the ever increasing scope of our efforts.

1857—Daylight Reflectors—In 1857 Mr. Frink originated and developed the system of lighting dark rooms by reflected daylight.

1866—Oil Lamp Clusters—It was in 1866 that Mr. Frink originated the idea of using a cluster of oil lamps under a reflector which could be installed high enough to spread



the light over a large area.

1869—Gas Light Reflectors

—When gas began to replace the oil lamp the reflector gained in importance. The principles evolved for oil

lamps were now put into use for gas.

1888—Transition from Gas to Electricity—A study of old records reveals the fact that at this time, at the very birth of electric illumination, we began to study methods of adopting our system of reflectors to its use.

1890—Show Window Lighting—The present system of show window lighting, both overhead and floor lights, was originated by Frink. The first installation was designed and installed by us in the windows of Palais Royal Dept. Store, Washington, D. C. in 1890.

1898—Concealed or Indirect Lighting—The first installation of this method of illumination was designed and installed by us in the ball room of Sherry's, New York City, for Stanford White, under the direction of C. O. Mailloux, Electrical Engineer.

1909—Bank Screen Reflectors—In 1909 one of our engineers conceived the idea of installing a continuous reflector on the inside of the cornice of a banking screen for lighting the counters. The first installation of this description was made by us under the direction of J. H. Freedlander, in the Importers and Traders Bank, Murray Street & Broadway, in 1909.

1912—Combination Bank Screen Reflectors—Three years after we produced the first bank screen reflector for desk illumination, we improved it by combining upward as well as downward reflection.

The first combination reflector for both the lighting of counters and indirect illumination of the room was installed by us in the Bankers Trust, 15 Wall Street, under the direction of Mr. Bassett Jones, Electrical Engineer, and Trowbridge and Livingston, Architects, in 1912.

1924—Silverlight All Metal Reflectors—In the spring of 1924 after over a year of exhaustive study and tests we offered to the electrical industry Silverlite—the all metal unbreakable unit window reflector, eliminating the use of glass—producing a lighter and more efficient reflector.

PILOTING the PILOT FLUSH VALVE



AMID the turmoil of the Civil War, months before the turning point at Gettysburg, the firm of Hedges and Brother was organized and began the manufacture of plumbing goods. As we look back upon 64 years of continuous existence, we feel that we may greet *THE AMERICAN ARCHITECT* upon its Fiftieth Anniversary with some slight show of patronizing condescension—one old boy to another 14 years its junior!

We maintain, with all due modesty, that any concern which can live and grow and prosper through 64 years in the plumbing supply manufacturing business is entitled to its special niche in the Hall of Fame for its record of endurance and patience if for no other qualification.

We began in the days when plumbing, as we know it now, was in swaddling clothes, just starting to show the signs of life which were eventually to make America the most sanitary country in the world because it was to become the best "plumbed" country on the footstool.

The original capital was \$800.—not a munificent sum even in those days of cheap commodities, but sufficient to meet the payroll which was neither long nor large. Like most other firms whose beginnings date back so far, we have gone through

fat years and lean, have met the wolf face-to-face over the threshold and have lived to learn the lines of his rear elevation.

As we go back in retrospect we are just a bit proud of the

fact that through all those years, despite the temptations offered by expediency, we have held fast to the ideals promulgated by the founders to make honest

goods of honest materials and to back them in both word and deed. We are proud, too, of the confidence which architects repose in us and our products, a confidence no doubt inspired by the policy which we have maintained for 64 years. We are frank to say that whatever success we have had is due to the fact that we have never under-estimated

the influence of the architect nor abused his trust.

Over fifteen years ago we readily saw where many improvements could be made in flush valves and proceeded to make them. When we had perfected a valve in design and manufacture, we named it the Pilot Flush Valve and placed it on the market. Improvement succeeded improvement. Today's Pilot Flush Valve represents the accumulated experience of years combined with extensive study and research. Today, hundreds of the country's finest buildings are equipped with Pilots and hundreds of thousands have been successfully installed and operated.

While practically all flush valves are built on the same basic principle known as the equilibrium of pressure, we claim for the Pilot three outstanding features which, in our estimation, make it the superior device. First, the "snifter" which rids the

valve of air. Second, the ability to make a positive regulation of the flush length. Third, the removable seat which when worn can be renewed in position and thus obviates an enormous amount of labor, cost and lost time.

Further information regarding the Pilot Flush Valve and installations is now ready and will be forwarded upon request to any architect addressing Hedges and Brother, Hedges Building, Newark, N. J.



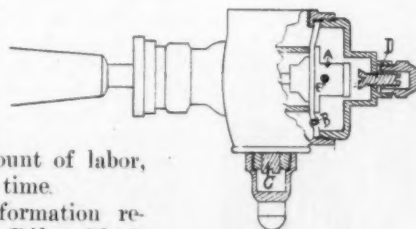
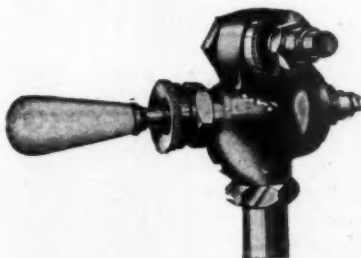
ELK'S CLUB, BROAD STREET, NEWARK, N. J.

WARREN & WETMORE, ARCHITECTS

NIEL L. COVELY, ASSOCIATE ARCHITECT

W. G. CORNELL, PLUMBING CONTRACTOR

EQUIPPED WITH PILOT FLUSH VALVES THROUGHOUT

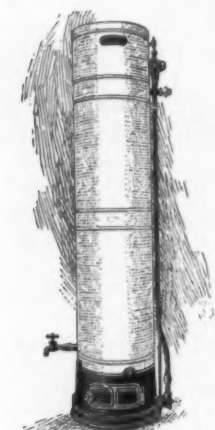


THE DEVELOPMENT OF THE AUTOMATIC WATER HEATER

BY RUUD

EDWIN RUUD invented in 1889 the first successful Automatic Gas Water Heater. Since then the name RUUD has been as closely linked with the development of the Automatic Gas Water Heater as the names Edison and Steinmetz are with the advancement of Electricity.

Edwin Ruud stands out from the crowd as one with the inventive genius to create a much-needed appliance, with the foresight to see the commercial possibilities of his invention, with the sagacity to develop both his product and organization to such a state that thirty-seven years from the time of invention his product, the Ruud Automatic Gas Water Heater, is the leader to which all other water heaters are compared.



THE RUUD
AUTOMATIC STORAGE
SYSTEM
IN 1889

It is not dramatizing the man, as those who have come in contact with him will verify, to say that the greatest satisfaction he receives from his invention is not fame nor success, but the knowledge that he has contributed generously towards making hundreds of thousands of homes better places in which to live. For what greater comfort can a home, a factory, a building of any type have than an unfailing supply of steaming hot water ready instantly at the turn of the faucet for the myriad of hot water needs?

As President of the Ruud Manufacturing Company, Edwin Ruud has constantly improved the Ruud Automatic Water Heater. So sound were the basic engineering principles of the original Ruud Automatic Water Heater that they have defied change, but in order to adapt the Ruud to varying gas and water conditions certain alterations and refinements were necessary.

Ruud Automatic Gas Water Heaters are made in two types—Instantaneous Automatic and Automatic Storage. The Instantaneous Automatic type heats water instantly as it flows and burns gas only when the faucet is open. It is made in six sizes. This type has no tank. The Automatic Storage Type, made in three sizes, burns gas at a comparatively slower rate, storing the heated water in a tank ready for use when needed.

Features that contribute to the "Quality Only" construction of Ruud Automatic Water Heaters are:

Instantaneous Automatic Type—

A copper coil heating surface placed at right angles to the path of rising hot gases, and having a scientific spacing between coils to insure maximum heat transmission.

A Burner that insures perfect combustion under variable conditions of gas pressure and quality.

A fuel control mechanism, having two separate, independent valves in the gas supply channel, one operated by the water flow and one by the water temperature.

Condensation sheds and collectors, giving a protection against destructive water of condensation for the heater base, burners and coil.

A design that separates heater and tank, thus freeing the tank from corrosive action of hot gases. Likewise, the tank is not in the flue channel, hence stored water is not subjected to the chilling influence of flue drafts when gas is not burning.

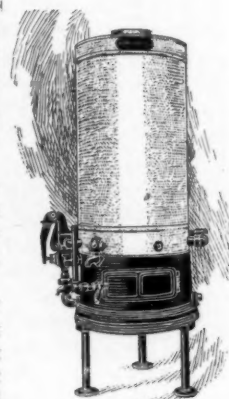
A tank that averages 50% heavier than commercial "extra heavy" tanks of the same capacity and having copper-brazed seams which are corrosion-proof and stronger than the plate itself.

A positive and permanent fuel control in the famous Ruud Thermostatic Moment Valve, which operates on the snap action principle. Built of the "everlasting metals," copper and brass, it is not affected by corrosion or deterioration, neither can any parts wear out of adjustment.

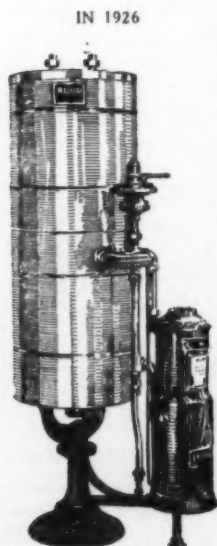
Simple and correct design, quality of manufacture and straight-forwardness in business conduct have brought the company from the position of struggling pioneer to the position of acknowledged leader, with factories in Pittsburgh, Pa. and Toronto, Ont.; with branch offices in practically every important city so closely linked that architects, no matter where they are located, desiring personal information are never more than twenty-four hours away from Ruud service.

You should have a Ruud Architect's Specification Folder in your files. It is printed with the idea of standardization, completeness of detail and fulfillment of purpose with the least amount of lost motion.

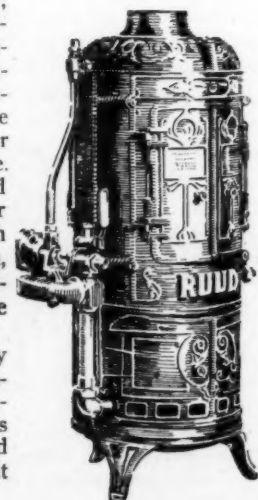
It contains all data necessary to the specification and installation of Ruud Gas Water Heaters and all this information is prepared in a compact and workable form—made to fit your files.



THE RUUD
INSTANTANEOUS
AUTOMATIC WATER
HEATER IN 1889



IN 1926



IN 1926

THE THATCHER COMPANY

Boilers—Furnaces—Ranges

SIDE by side with the remarkable architectural development during the last fifty years has been the tremendous growth of The Thatcher Company. Founded in 1850, the Company had become firmly established before the last half century of archi-



NEWARK PLANT

tectural progress. From then on the business continued to increase with this development and it may be said was one of the underlying reasons for it.

Mr. Thatcher made a very modest beginning as a manufacturer of coal cook stoves in Troy, New York which was at that time the centre of the Stove industry. Early in 1850 Mr. Thatcher invented and began to manufacture "The Celebrated Thatcher Tubular Furnace", using instead of the ordinary combustion chamber a number of smaller tubes thru which the air passed and was quickly heated with a very small consumption of fuel. This heater was far in advance of its contemporaries and soon won fame for its economy, quick and unscorched heat, and additional heating surface; and the tubular with many modern improvements is still the leader of warm air furnaces. Among Mr. Thatcher's many patents are anti-clinker grates and the first parlor stove to heat the rooms above as well as the one in which it was placed.

In 1889 Mr. Charles O. Lyon became president of the Company, and after the plant in Newark had been enlarged for the increased manufacture of high-grade warm air furnaces, the popular line of Thatcher cabinet kitchen ranges was added. As steam and hot-water heating became more popular a new plant was purchased in Garwood, New Jersey to manufacture heating boilers.

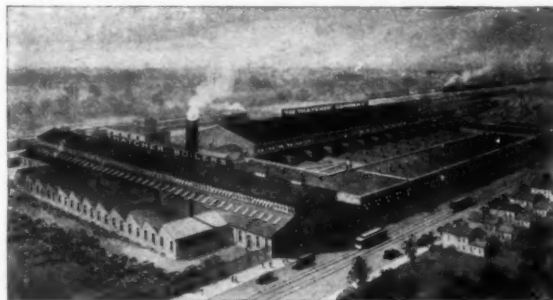
Gas Ranges and Combination Coal and Gas Ranges were later added giving The Thatcher Company a complete line of heating and cooking equipment. These include Steam and Hot-water Round and Sectional Boilers, Pipe and Pipeless Furnaces, Coal and Gas Ranges, Coal and Gas Ranges in Combination, Tank and Garage Heaters, Laundry Stoves and Ship Ranges.

These products enable the architect to specify Thatcher for all heating and cooking equipment and thus be sure of health, comfort and service for his clientele. The remarkable growth of the Company is due to the use of only the highest grade materials and skilled workmanship, the unquestionable quality of the finished article, the high standard of business policies and the guarantee behind the product. For these reasons the architectural trade has learned to rely on The Thatcher Company, and in doing so their confidence has not been misplaced.

In other ways, too, The Thatcher Company has done its share in aiding the architect and raising the standard in the architectural field. While most boiler manufacturers are raising their ratings with disastrous results to architects and builders, The Thatcher Company has maintained its former conservative boiler ratings, a fact which insures general satisfaction and economy of fuel for the owner.

For years the Company has had an Engineering Department to figure plans and draw up specifications, thus avoiding many heating mistakes. Every Thatcher salesman has a complete knowledge of plans and layouts, and everyone of these salesmen is willing at all times to help the architect with his heating problems.

Concise catalogs giving sizes and dimensions, ratings and other data in a plain readable way are always available for an architect's use. Exhibits at archi-



GARWOOD PLANT

tectural and building exhibitions are used to allow the architect to see first hand the qualities and advantages of Thatcher products.

The Thatcher Company endeavors by these methods of cooperation to lighten the task of the architect in specifying heating and cooking equipment and by only sound and fair dealing to be worthy of his utmost confidence. In this the Company believes they have succeeded and have greatly helped to advance the highest standards in heating and cooking.

THE THATCHER COMPANY

HOW *the* NAME COVERT BECAME KNOWN in CONNECTION *with* FIREPLACE CONSTRUCTION

Through three generations the Covert Damper has met the requirements for almost any condition that may be encountered in architectural practice.

IN 1898 Mr. Stanley S. Covert built a house for himself in New Jersey. He had three fireplaces and, wishing to have them as near right as possible, put in the cast iron Throats and Dampers then made in New England. Finding these crude in construction and faulty in operation, he conceived the idea that there was a field for a really good Throat and Damper that architects could specify with confidence in its structural integrity and practical utility.

Assisted by the mechanical knowledge of his father, Henry W. Covert, he proceeded to design the original Covert Damper, patterns for castings were made in four sizes, and it was ready to be marketed.

At this time wood burning fireplaces were becoming more popular as the revival of the Early American Architecture advanced. Architects aimed at greater sincerity and simplicity in domestic design, and the sham fireplaces of former days gave way to a Hearthstone that could be, as it should be, the center of family life. More attention was given to the practical designing of the fireplace so that logs could be successfully burned in it, and in this our printed matter and illustrations were of much assistance to architects. Never since Colonial days has the wood-burning fireplace been so popular as it is today. It has again come into its proper place in our home life—and has come to stay. This is said with confidence and with sincerity, because there is nothing that can give that feeling of comfort and cheer which is given by a few sticks or logs blazing on the hearth. The hearth-fire more than anything else creates that atmosphere of warmth and cheer which makes the distinction between a house and a home.

As a ventilator and purifier the fireplace has no equal, constantly withdrawing the air in the room and introducing a fresh supply.

If you are to have a fireplace, have a good honest one designed and constructed for burning wood; and have it so designed and constructed that the smoke will go up the flue—and not into the room.

Our iron Throat and Damper, designed to give the correct throat formation and control the draft, met all requirements, commended itself to architectural judgment, and was entered in many specifications.

The "Covert Improved" Damper, securing greater convenience of operation and economy in cost, was put forth about ten years later, and has met with very great favor. It has achieved a national reputation, and is carried in stock by a large number of dealers and agents throughout the country, so that an architect

specifying it can usually obtain it at short notice.

Another type of Damper, the "Face-Operating," has been added recently to meet the requirements of those who prefer that type. The great variety of types and sizes made by this firm enable an architect to select a damper that will meet almost any condition that may be encountered in architectural practice. They are made to cover fireplaces up to seven feet wide, which is a large fireplace.

The Covert concern has always made a point of giving personal service to the architect when special conditions require consultation or advice, and the knowledge gained

through long experience in meeting unusual conditions may be freely called upon at any time.

Incorporated in 1903, The H. W. Covert Company is now under the management of Stanley S. Covert, his two sons, Stanley B. and James D., and Mr. Robert H. McLaughlin, whose faithful devotion to the interests of the business for sixteen years has had no small influence in its progress and success. The office of The H. W. Covert Company is located at 137 East 46th Street, New York City.



THE LINOLEUM INDUSTRY IN AMERICA

Fifty-three Years of Remarkable Progress

MANY years ago the late Joseph Wild, founder of the Linoleum Industry in America, chanced upon a certain rolling of linoleum in his factory which was below the standard of established quality. The factory executive, at wits end to undo the error, suggested that it be sold at half price. "Yes," agreed Mr. Wild, "at any price provided you can remove my name from along the back. Otherwise scrap it!"

Probably that incident, with elaboration, illustrates as clearly as any why the history of linoleum in America has been one of remarkable progress from the day that Joseph Wild's "blazing of an unknown trail" began to make its impression upon the architectural profession, the naval authorities and the public in general.

Linoleum was the invention of Frederick Walton, an Englishman, and derives its name from "linum", flax; and "oleum", oil—linseed oil being obtained from the flaxseed. A few years previous to 1873 it had been made in England and small quantities of it had been shipped to this country. It was a new product, of doubtful commercial possibilities, unknown to the masses and received with incredulity by those whose business was concerned with floor coverings.

The possibilities did not appear to be doubtful, however, to Joseph Wild and his close associates in the firm of Joseph Wild & Company. In 1872 a member of the firm was dispatched to England to confer with Frederick Walton with a view to securing the rights to manufacture linoleum in the United States. Later Joseph Wild induced the inventor to come to New York, and supervise the erection and equipment of a plant on Staten Island for the newly formed concern, The American Linoleum Manufacturing Company. Joseph Wild & Company assumed the position of sole selling agents.

Shipments of Wild's Linoleum were begun in 1875. For that year they reached the modest total of 94,141 square yards. In 1885, 578,243 square yards were shipped. Shortly after that year the business began to get a real footing; the hopes of those who never lost faith were rewarded. In 1890 over 1,000,000 square yards were shipped and the record ever since has been one of continuous growth.

The introduction of Wild's Battleship Linoleum in 1899 greatly accelerated the development of the American linoleum industry. The endorsement and continued use by the United States Navy greatly aided in promoting its adoption as a flooring for offices and public buildings generally, resulting in a demand for hundreds of thousands of square yards annually.

A linoleum sufficiently able to withstand the severe usage aboard a battleship is suitable for almost any conditions of wear anywhere. In recent years the yardage required by the Navy is insignificant in comparison with the many miles which have been laid in

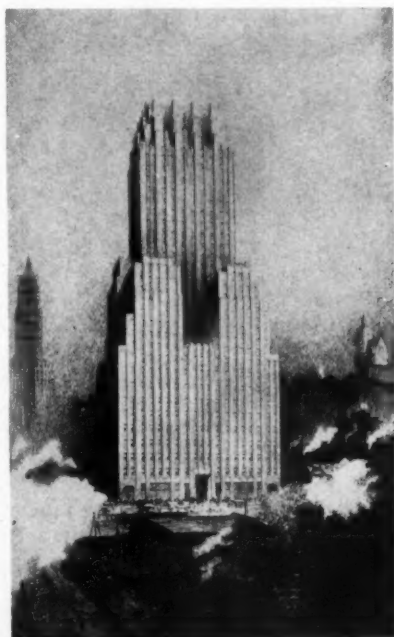
office and public buildings. The new Barclay-Vesey Telephone Building in New York alone required 100,000 sq. yards of 8/4 goods or 56 1/4 miles of Wild's lightweight Battleship Linoleum if 1 yard wide.

A recent development, of much interest to the architectural profession, to which Battleship Linoleum is ideally adapted, is the hand-set Battleship Linoleum Tiles, the linoleum in various colors being cut into interlocking or straight tiles and narrow separation strips and set by hand in a bed of linoleum cement. Many artistic installations have been made. The ultimate in aesthetic achievement, however, is the hand-cut and hand-set Linomosaics made with Wild's quarter-inch Battleship Linoleum and sponsored by a group of architects who have produced some truly exquisite effects in design and color and who foresee limitless possibilities for Battleship Linoleum in the realm of decorative art.

The American Linoleum Manufacturing Company produced the first linoleum made in the United States; the first

straight line inlaid linoleum; the first inlaid linoleum in the 8/4 width; the first parquet inlaid linoleum showing the true wood graining; the first inlaid linoleum in the 16/4 width; the first battleship linoleum; the first linoleum for Wifley Tables; the first desk top linoleum; the first American battleship linoleum used for hand-set linoleum tiles; the first battleship linoleum used for Linomosaics.

The uses to which linoleum may be put seem infinite. This company purposes to be in the van in every worth-while movement. Joseph Wild & Company, sole selling agents, New York, N. Y.



BARCLAY-VESEY TELEPHONE BUILDING,
NEW YORK CITY

MCKENZIE, VOORHEES & GRELIN, ARCHITECTS
100,000 square yards of 8/4 goods or 56 1/4 miles
of Wild's Light weight Battleship Linoleum if
1 yard wide, were laid in this building, being
cemented directly to the concrete floor.

The STORY of THE C. PARDEE WORKS, in RELATION to the BEGINNING and GROWTH of the TILE INDUSTRY in AMERICA

WHEN one considers that clay working is one of the oldest of the arts, and that the clay products of the United States now exceed by many times those of any other country in the world, it is amazing indeed to find that the tile industry in America had its beginning only in the final quarter of the nineteenth century.

The first factories of any consequence were founded in 1877 immediately following the centennial exposition at Philadelphia, where an elaborate display of European tiles stimulated the interest of American business men to these early efforts in American tile making.



POOL ON THE ESTATE OF MR. W. W. KNIGHT, TOLEDO, OHIO
A. D. TAYLOR, LANDSCAPE ARCHITECT, CLEVELAND, OHIO

As only two factories were established at that time, and no others, that survive in the great plants of today, were built until the very end of the century, The C. Pardee Works, founded in 1895, may well be considered one of the pioneers in the industry.

The manufacture of tile was then thought to depend upon the knowledge of some very few men, who had their experience from the older plants of Europe, and from years of study and experiment in the mixing of clays, and chemicals. These men guarded their knowledge with jealousy, surrounded it with the utmost secrecy and were considered the *sine qua non* of tile making, so it can be imagined with what consternation a factory in full operation faced the loss of so seemingly indispensable a person.

Such a situation confronted The C. Pardee Works not many years ago, and it was only as an alternative to closing down the Plant that two of the present officers of the company rolled up their sleeves and determined to find out how tile was to be made. So it is of particular interest that the early results of those experiments is the tile that has been manufactured from that day to this.

This was the end of the secret formulae, for now the clays and the approximate proportions of each are of common knowledge, and it is the working of

them that remains not the secret, but the art—the working of them and the adjustment of them to bring out of constantly changing conditions a product of unvarying perfection.

Another of the pioneers in the tile industry was the Grueby Faience and Tile Company, then of Boston, established in 1888. Mr. Grueby, its founder, was the first to discover the art of producing in a kiln a colored dull glazed tile; until his time, the dull glazes had been made by the round-about method of producing bright glazed tile and subjecting them to a sand blast to dull their surface.

Here again the wearing qualities, the fine texture and deep, rich colors of the Grueby glazes are not the result of any secret formula, but rather of the experience of nearly forty years of tile making.

The C. Pardee Works, for many years, had confined their manufacture largely to white bright glazed wall tile, and white ceramics, but, feeling the growing demand for color, formed in 1919 an association with the Grueby Company which resulted in the closing of the Boston Plant, and in extensive additions to the plant at Perth Amboy, where these famous products are now being made.

A further advance into the field of colored tile was marked by the good fortune of The C. Pardee Works in obtaining, in 1923, the exclusive right to offer in the American market the beautiful products of "De Porceleyne Fles", of Delft, Holland. This great factory has the distinction of having been in continuous operation since its founding in 1655, and so is without question the oldest factory of that famous tile making country.



HAVERFORD TOWNSHIP SCHOOLHOUSE, HAVERFORD, PA.
BOYD, ABEL AND GUGERT, ARCHITECTS, PHILADELPHIA, PA.

The discovery and development of the crystallized and metallic lustre or reflex glazes which are still new to America, the hand painted tiles for which Delft is so justly famous, and the production of replicas

of old Persian and Moorish tiles are but a few of the achievements which led the Queen of Holland to grant this factory as a mark of great merit the exclusive right to use the crown as its symbol—and so the term ROYAL Delftware.

While it will always be the policy of The C. Pardee



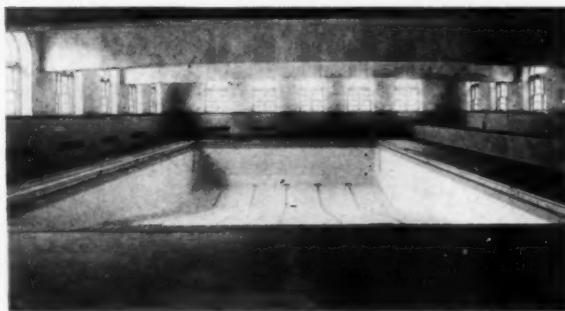
EXHIBITION KITCHEN OF THE CRANE CO., NEW YORK CITY
STARRETT AND VAN VLECK, ARCHITECTS, NEW YORK CITY

Works to concern itself most with the quality of its products, the demand for Pardee and Grueby tiles has left no alternative but to consider also production of them in greater quantity. This has led this past year to the making over of practically the entire plant and the addition of large tunnel or continuous kilns which will increase by several times the old capacity.

But a factory is not to be judged simply by its age, by its size, nor even altogether by the quality of its products, but too by what it has contributed to the industry. The C. Pardee Works has developed a bright glazed wall tile that is of a single and unvarying shade of perfect whiteness, a bright glazed wall tile that does not "craze". A short time ago it was necessary to add to an installation of Pardee wall tile that had been made some years before. Not only did no tile of the original installation show any sign

of "crazing" but the present run matched exactly in shade the tile that was already in place.

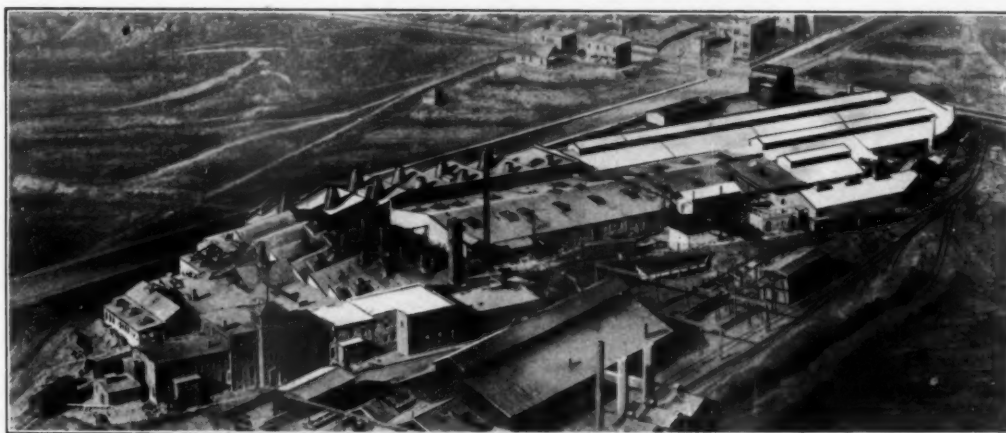
Of the Grueby products, Mr. Grueby will always be remembered as the creative genius. The Grueby blues in the Knight Pool color the water to rival the blue of a cloudless summer sky and yet withstand the action of frost to which each northern winter exposes them. In the Haverford School and the Crane Kitchen is the Grueby Hauteville, to imitate which so many and unsuccessful attempts have been made. In this is the pleasing shade variation of the Hauteville marble which is a characteristic of all the Grueby Faience. The high glaze of this particular tile will not receive a pencil or other mark and this intensely practical feature in addition to its beauty has led the Philadelphia Board of Education to its almost universal use in its schools. Of particular interest is the Grueby Sand Grey in the Heckscher Pool. In



POOL OF THE HECKSCHER FOUNDATION, NEW YORK CITY
MAYNICKE AND FRANKE, ARCHITECTS, NEW YORK CITY

addition to being a thoroughly vitrified and so stain proof tile, its slightly roughened surface makes it non-slipping.

In the development and production of these unique tiles The C. Pardee Works prides itself—but most of all that in the manufacture of products which by their nature defy perfection, the names of Pardee, Grueby and Royal Delft stand for a uniformity of excellence that is unsurpassed.



THE C. PARDEE WORKS, PERTH AMBOY, N. J.

METAL CASEMENTS in AMERICA

THE history of the metal casement window in England is a familiar one to architects. In the hope, however, that we may add to the general store of knowledge, we venture a few reminiscences on the history of metal casements in America.

So far as we have been able to ascertain, the first English Casement Windows imported from Great Britain were brought into America by Frank Miles Day and Brother, Architects, of Philadelphia. These were extruded bronze casements manufactured by George Wragge of Manchester, England, for the Newbold residence in Philadelphia.

We have on file a copy of a letter sent by the architects to Mr. Wragge, the full text of which is as follows:

FRANK MILES DAY AND BROTHER, ARCHITECTS
925 CHESTNUT STREET, PHILADELPHIA.

F. M. DAY

H. KENT DAY

March 1, 1899

Mr. George Wragge,
Salford,
Manchester, England.
Dear Sir,

Noting your full page advertisement in the "Specification" this morning reminds us that we have been intending for some time to write to you to tell you how admirably your casements in Mr. Newbold's house behaved during the recent blizzard. The storm was one of unprecedented severity, the snow being thirty inches on a level and it was accompanied by winds of great velocity. The snow being very fine and dry, found its way in generally through the slightest cranny. The blizzard was promptly followed by a rapid thaw that set everything afloat and caused quite serious damage through leaks. The conditions were probably the most trying that we remember during the course of our practice. Your casement frames perfectly resisted every force of that storm and the subsequent thaw. No snow whatever entered Mr. Newbold's house either through the doors or windows, nor did any water get in when the thaw came.

This, we think, shows not only the excellence of the goods of your manufacture but the fact that they were well installed by the men under our direction.

We are glad to be able to write you this, not only on our own account, but because the Owner of the house particularly wished us to express to you his satisfaction with your work.

Yours very truly,

Frank Miles Day & Bro.

A number of years ago Mr. T. L. Smith, then a draftsman in the employ of Cram, Goodhue & Ferguson of New York, purchased from a push cart peddler for ten cents a catalogue that George Wragge published in 1898. This was a remarkably artistic catalogue on casements, stained glass and metal work, the designs for

which were made by Mr. Edgar Wood, an architect of Manchester, England. This catalogue was shown to Mr. Goodhue, who found in the casement windows illustrated just the thing that he required for the West Point Academy buildings, which he was then designing. Following an inquiry made by Mr. Goodhue to Mr. Wragge, Mr. Frederick G. Draper was appointed American representative of George Wragge.

The first large contract awarded to Mr. Draper was for the Singer Tower, the casements for which, from the mezzanine floor to the top of the tower, were made in the plant of George Wragge in Manchester. The natural effect of the choice of metal casement windows for this world-famous building was to bring other foreign casement manufacturers into the



THE CLEMENT B. NEWBOLD RESIDENCE, PHILADELPHIA, PA.
FRANK MILES DAY & BROTHER, ARCHITECTS

American field, and it has been largely due to their efforts that the demand for metal casement windows has reached its present proportions.

The International Casement Company, whose five principal members served their apprenticeship under Mr. George Wragge of Manchester, was organized in 1912 for the purpose of manufacturing metal casement windows in America.

A BIT OF HISTORY

The Dahlstrom Metallic Door Company 1904-1926

IN the year 1903 the founder of our Company, Mr. Charles P. Dahlstrom, conceived the idea of a hollow metal door, and invented a simple and practical method of its manufacture. The Dahlstrom Metallic Door Company was organized early in 1904, and the first year of its existence devoted almost entirely to designing and making special machinery, to experimental work, and to tests of the fireproof qualities of the door.

After successfully withstanding the severe tests of the Board of Underwriters, and perfecting a finish that has become one of its outstanding features, the commercial manufacture of the Dahlstrom door was undertaken in a modest way.

Early in 1905 the first important contract was obtained. This called for some two thousand metal doors and trim for the twenty-two story United States Express Building, in New York City. With the infant Company's limited facilities, it may be imagined that the execution of a contract of this size, within the time specified, taxed energies and resources to the utmost.

This installation attracted widespread interest amongst architects, and augured well for the future. The Dahlstrom Company gained prompt recognition as a pioneer in the field, and has maintained its prestige ever since.

The next large contract was for the metal doors and trim for the Singer Tower. This famous building—the first of its kind—is fireproof throughout its forty-two stories. It is equipped with about twenty-five hundred Dahlstrom doors, and trim.

Although the United States Express Building and the Singer Tower were completed years ago, they are still considered today as modern office buildings of the first class. The specification of Dahlstrom Metal Products unquestionably goes far towards assuring the owner that his building will remain a modern structure for many years.

With the successful completion of these two large contracts, the position of the Dahlstrom Company was firmly established, and its future assured. New contracts were received in ever-increasing numbers, and

installations were made all over the world.

The expansion of the business has been reflected in the steady expansion of the plant, and the improvements in manufacturing and administrative facilities. The most recent addition is the new, fireproof building illustrated, which will be ready for occupancy in the spring of 1926.

All the machinery and equipment of the plant is of the best and most modern design. The construction methods employed in the manufacture of our products have been developed and perfected throughout a period of over twenty years. An almost unlimited variation in designs can be obtained by virtue of our extensive die and tool equipment.

From a beginning which had to do mainly with the manufacture and installation of sliding doors for elevator inclosures and a limited amount of swing doors for locations judged as special hazards our work has branched out so that it now embraces nearly all forms of interior trim which heretofore had been furnished in wood. In addition to complete elevator inclosures we are equipped and organized to furnish swing doors, jams, casings, scribes, transom sashes, borrowed lights, base, picture and wire mouldings, adjust-

able metal partitions, Conduo-Base, elevator cabs, revolving doors, bronze doors and bronze trim, as well as a variety of miscellaneous items that naturally follow.

The development of Dahlstrom Elevator Inclosures we have considered of sufficient importance to issue a book illustrative of typical installations with complete details of their construction and their proper relation to the structural framing, the surrounding masonry, and the elevator shaft. In this book we have also endeavored, insofar as paper and printers' ink will permit, to show the great variety of finishes which we are prepared to furnish.

In recent years our adjustable metal partitions have met with cordial reception, and we point with pardonable pride to our various installations of that nature in a number of the important office buildings in this country.



NEW ADMINISTRATION BUILDING, JAMESTOWN, N. Y.
OLIVER R. JOHNSON, ARCHITECT

HISTORY of the JOHNSON SERVICE COMPANY

Originators of Systems of Temperature and Humidity Control

FIFTY years ago, automatic temperature regulation, as applied to the adopted systems of heating and ventilating, was unknown. This addition to human comfort and to social life and this source of economy is due primarily and principally to THE JOHNSON SERVICE COMPANY. Professor Warren S. Johnson, the first president of this company, was the inventor and the first person to suggest an apparatus for automatic temperature regulation. The JOHNSON SERVICE COMPANY, which Prof. Johnson founded and organized in 1885, has, ever since, been constantly devoted to making automatic temperature regulation successful and of infinite value to human life and industry. It has required a long time and it has been a difficult task to prove the value and the necessity of automatic temperature regulation, and to place this industry on a substantial basis where it has proved its worth in the business of the United States and other countries. While the JOHNSON SERVICE COMPANY has not been alone in the effort to do this, it was the originator of the idea, has borne the brunt of the battle, and has been the leader in making the constant improvements which have made automatic temperature regulation the recognized success that it is today.

The apparatus originally placed upon the market was comparatively crude and many were the failures recorded against it. Some of them were due to faults in the apparatus and inexperience in installation, and people were not ready to recognize the merits of temperature control. One by one the faults were eliminated; one by one applications of the apparatus were made, and it is largely due to the use of automatic regulation that the great strides and advancements have been made in the arts of heating, ventilating and humidification. The apparatus was originally an electric and pneumatic combination, naturally complicated; but the use of electricity was eliminated by the Johnson Service Company in 1895, and from then on the thermostats have been steadily simplified and improved in appearance and efficiency.

During the past 40 years, the Johnson Laboratory has been devoted to the work of trying to improve the thermostat. Today their thermostat is accurate, reliable, attractive in appearance and, due to the fact that it is entirely *metallic* in its structure, it is practically indestructible from use. In the early process of manufacture of these instruments, a rubber dia-

phragm was necessary in its construction; it was the best element at hand for the purpose, but it was recognized that it was not as durable as was desired, and efforts were made to substitute something of metal for the rubber or organic element. The Johnson Service Company accomplished this with its Metal Diaphragm Model Thermostat. Other important Johnson improvements were the reduction in size of the thermostat and the invention of the "open" and "closed" indicator and positive shut-off.

Another contribution to the industry of Temperature Regulation is the development of the Dual, or Two-Temperature, Thermostat System, the use of which makes it possible to raise or lower the point at which all of the thermostats, or those that may be desired, are operating by the manipulation of a single push button by the Engineer or other manager. In other words, the temperature is regulated at seventy degrees in the daytime and entirely shut off at night or kept at some other low temperature such as forty or fifty, or certain rooms in a building may be thrown in or out of operation as desired. Its uses are obvious and many and the economical results are great. While the Johnson Service Company is not the inventor of this apparatus entirely, it has invented improvements and developed the apparatus to make it mechanically efficient and

to meet the desires of different architects and engineers.

The same may be said in the improvements of the valves on the radiators. Obviously, in operating valves by means of compressed air, some kind of motor was necessary to utilize the power of the air. This motor was in form of a rubber diaphragm, which confined the compressed air and furnished the means of communicating the pressure of the air to the spindle and disc that operate the valve. Rubber was the best available and apparently the most desirable substance to be used; but it was known at that time that metal would be more durable, and a constant search was made for a metal diaphragm. It was not until 1914 that the seamless metal bellows called "Sylphon", which has been invented by W. M. Fulton, was so perfected that it could be approved as desirable in diaphragm valve motors; and the Johnson Service Company immediately adopted this improvement and put on the market the first successful metal bellows diaphragm valve.



JOHNSON SERVICE COMPANY
MAIN OFFICE AND FACTORY
MILWAUKEE, WISCONSIN

All of this could not have been done without an organization and a fixed policy which has been adhered to from the inception of the Johnson Service Company to the present date, and which will be adhered to as long as the company is in existence. It is a policy based on sound, honest principles, ever searching and alert to give the best that is possible, always striving toward perfection as a necessary, practical solution as well as an ideal. The policy of the Johnson Service Company has been one that strives to make satisfied customers, with the result that their business has grown and the number of installations of their apparatus has increased because of the commendation of those who have experienced the benefits derived from the use of the JOHNSON SYSTEM.

The Johnson Service Company have endeavored as far as possible to make the best apparatus of this kind that could be made. As stated in the previous paragraph, they have constantly striven to improve the efficiency of the apparatus, by improving the design, by eliminating unnecessary parts, by making the apparatus with machinery that is being constantly improved for that purpose, and by thoroughly testing every completed part for the service it is to perform. It has been the policy of the Johnson Service Company always to use the very best material obtainable in the manufacture of their products. In this policy there has been no change since the beginning, regardless of price. They have occasionally been deceived in their purchases and the material bought was not up to their standard; but in all such cases they have shouldered whatever loss occurred and replaced the apparatus whenever they found that the material seemed to be beneath their recognized standard of quality.

None of the principal parts of the Johnson System of Regulation leaves the factory without going through a thorough test for efficiency and duration. Thermostats are tested for accuracy and close degree in operation. Valves are tested as to their steam holding qualities. Air compressors are tested for capacity and efficiency of operation.

The Johnson Service Company have endeavored also to improve their apparatus for the purpose of reducing the necessity of repairs. It is inconceivable that a machine shall continue to work forever without requiring repairs; nobody expects it. Machinery has wearing parts and will wear out, but it has been the endeavor of the Johnson Service Company to reduce these wearing parts to a minimum and to make the wearing parts of such material and of such construction that they will give long service. They do this in the interests of their customers as well as their own interests. The less repair work they are called upon to do, the better they are satisfied. They never attempt to make profit out of repair work. To assist their customers, the Johnson Service Company endeavors to inspect all of their installations once each year for the purpose of ascertaining their condition and then report to the owners whether or not repairs are necessary. They make no charge for this inspection; such repairs as are necessary are made at as reasonable a price as possible.

To insure the best results to their customers, the Johnson Service Company do not under any circumstances sell their apparatus to be installed by any but their own mechanics. They have been in business since 1885 and have installed thousands of plants. There are thousands of engineers and mechanics in the United States who know all about temperature regulation and how to install it. Nevertheless, they feel that no one will assume the responsibility and feel the same towards the plants that have been installed as they do. Should apparatus be sold to other contractors to be installed by them, there is always a possibility that the responsibility will cease when the plant is installed and the transaction closed. There is always the possibility of changes or even the passing out of existence of these concerns. Naturally, the manufacturer is not going to feel the same about looking after apparatus that was installed by other parties as he will towards apparatus installed by himself. The temperature regulating apparatus may last for the lifetime of a building, possibly twenty-five years or more, and in that time a great many changes will take place in the business world; but the Johnson Service Company will be in existence and will take the same interest in the plant that is twenty-five years old as in its most recent installation.

When the Johnson Service Company is given a contract, it executes it promptly and completely, as far as it is humanly and mechanically possible, to the satisfaction of the owner and the architect. It is worth money to any contractor to know that this very important part of his contract will require no further attention from him, because the Johnson Service Company will do the work.

To become leaders in the field of automatic temperature regulation has required an efficient organization. This organization is composed of many small units. First, there is the factory, located in Milwaukee, Wisconsin, a seven-story, brick, steel and concrete building, having a floor space of 150,000 square feet and containing the very latest and best machinery obtainable for manufacturing the product and the most complete equipment for testing it. The main offices are also located in this building, together with the headquarters for the executives of the company. Here their engineers have their experimental and testing laboratories; it is the place where all the problems come to be finally solved.

They also have branch offices located in most of the larger cities of the United States. These branch offices are entirely under the control of the main office. They are not manufacturers' agents, or jobbers, or salesmen maintained on a commission basis in any way whatsoever. They are organizations with a manager, a sales-engineer, a superintendent of construction, inspectors, and mechanics, for installing the apparatus, stenographers and bookkeepers for handling the clerical work of the office; each and every one is paid a salary and works exclusively for the Johnson Service Company. Every office carries a stock of parts and necessary material to install a plant or to repair any apparatus, and each office holds itself in readiness to give service on the shortest possible notice.

THE DEVELOPMENT of the BOILER THAT BURNS SMOKE as FUEL

FOR years engineers have striven to overcome the colossal waste caused by smoke. Like most great scientific achievements, it remained for the stress of war to develop a process whereby smoke could be consumed and fuel conserved. During the fuel shortage of the World War, the engineers of the Utica Heater Company discovered the great secret of practically perfect combustion as applied to heating boilers. For years they had searched for some means of checking the tremendous waste resulting from the escape of heat-units in the form of smoke and unburned gases. They found the answer to this problem and proceeded to build what has since become the outstanding achievement in boiler construction—the Utica Imperial SUPER-SMOKELESS Boiler.

The principle of smokeless combustion is not new. It has been used for years in the Bunsen Burner and Automobile Carburetor. Both of these devices use a small quantity of fuel and a large volume of air, and mix them together to produce effective combustion. Almost anyone who sees an automobile belching forth clouds of black smoke from its exhaust knows what the trouble is: "Too rich a mixture — not enough air." Fuel is being wasted and poor results are being secured.

The ordinary heating boiler is very much like an automobile without a carburetor. It burns the raw fuel inefficiently and extravagantly without obtaining successful results. A smoking chimney is not only a nuisance to the neighborhood and a menace to health, but it is also a sure indication of fuel waste. Smoke is composed largely of carbon, which is rich in heat value. To allow it to escape up the chimney utterly unused and wasted means a large loss of the heat value of the coal. The owner who pays for it is

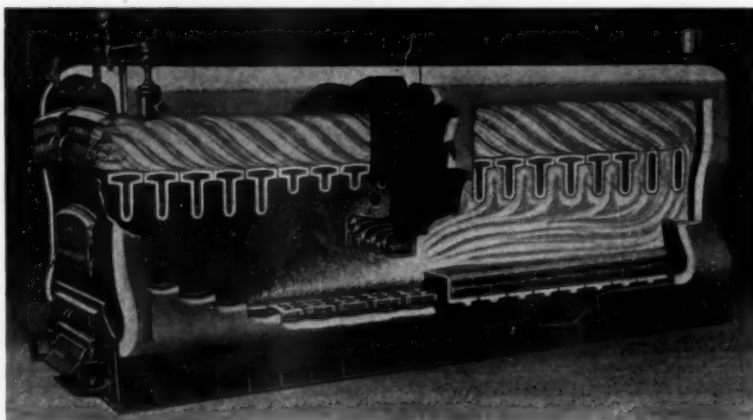
throwing away money just as surely as if he had in his boiler a merry little blaze of dollar bills. The total amount wasted each year in the form of smoke has been estimated as fifty millions of dollars!

In the SUPER-SMOKELESS Boiler, through a patented device, the required oxygen is ingeniously introduced at the right temperature and the right place. The smoke and gases are ignited and burned within the boiler as fuel of remarkable heating value. All of the heat units in the fuel are utilized, the smoking stack is eliminated, and every ton of coal burned gives out a greatly increased amount of heat.

Since the introduction of this remarkable boiler owners have been saved many thousands of tons of coal. Incidentally, attention to the boiler has been greatly reduced as there is less coal to handle, and, on account of the perfect combustion, the quantity of ashes is far less. Utica Imperial SUPER-SMOKELESS Boilers will burn even the cheaper grades of soft coal without smoke and with great economy and efficiency. They have proved remarkably successful for oil burning, and will, when occasion requires, utilize successfully hard coal or coke, thus protecting the owner against any fuel emergency.

Although widely imitated in partial detail, the SUPER-SMOKELESS remains the only boiler in which the Bunsen Burner principle of combustion is properly applied. No other boiler so completely and efficiently solves the smoke problem. High in efficiency, easy to operate, durable, elastic as to type of fuel requirements, conservative in ratings, the SUPER-SMOKELESS stands in a class by itself—the Standard of Smokeless Boilers.

Architects are invited to write for complete information to the



CUTAWAY VIEW OF
UTICA IMPERIAL SUPER-SMOKELESS BOILERS

UTICA HEATER COMPANY, Utica, N. Y.
Sales Offices in the Principal Cities

THE DEVELOPMENT OF METAL DOORS AND TRIM

BY—H. R. GRABLE

COMPARATIVELY young, as business lifetimes are measured, but old in its particular field of endeavor, the United Metal Products Company of Canton, Ohio, pursues the craft of metal working, one of the most ancient of the arts.

In this Age of Steel we complacently consider the marvels wrought with this universal metal to be developments of our own time, yet in most cases they are merely refinements of practices whose origin is buried in the mists of antiquity. In the drawing of wire, as an example, the great forward impetus came with the invention of the telegraph, yet records exist which specifically mention wire as early as 1700 B.C., and actual specimens have been found from the eighth century before Christ.

The very early metal worker was a decorative artist engaged in the production of jewelry and church ornamentation. It was not until the Middle Ages, when horse and man were encased in metal from head to foot, that iron-working became a highly developed profession. The ancient armorer was wonderfully skilled at his craft. Making men and animals practically invulnerable, while still permitting them freedom of movement, was a wonder of ingenuity and skill.

As iron became more widely used, and methods for handling it better known, it began to replace articles where its superior strength with greatly reduced bulk made its use desirable. This process of replacement of perishable materials has continued steadily to this day, metal doors and trim being a case in point.

The earliest metal doors, the ancestors of those of the present day, had fire-prevention or fire-confinement as their only purpose. In Germany a metal was mined called Calamine, which, while extremely ductile and nearly as soft as lead, had considerable fire-resistance. Wood doors protecting important wall openings were sheathed with this metal and while crude, were fairly effective fire-retardants. To this day doors of similar construction are sold in this country,

under the name "Kalamein," although the original Calamine metal has no part in their construction.

The United Metal Products Company, and others, have grown with the industry, improving construction, devising wonderful finishes, developing new designs, until metal doors and trim are replacing the wood of tradition in the finest buildings.

It is a long step from the early fire-door to the interior trim of the magnificent Stevens Hotel, at Chicago, the largest in the world, in which more than 300 elevator openings will be protected by United Metal Doors. This great gap has been bridged by The United

Metal Products Company through continuous improvement, unceasing study of better methods and materials.

The old method of tile and plaster for sub-dividing partitions has been replaced by fire-proof, sound-proof, space-saving metal partitions, which in commercial buildings particularly, are adaptable to changing requirements of tenants. Adaptability also is a feature of United Metal Conduo-Base, which permits wiring connections to be made at any time and at any point within the room.

Some of the country's finest structures are United Metal equipped throughout. Among the more recent installations are the Cleveland Public Library, the Cleveland City Hospital Groups, the

Detroit Masonic Temple and the Fire Underwriters' Building of New York.

Scores of prominent buildings have achieved a truly fireproof rating with these enduring materials.

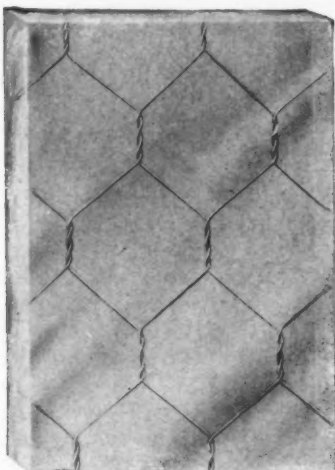
For the architect the United Metal Products Company has a consulting and designing service which is very complete.

In the Age of Steel it is but natural that the advantages of steel be employed to the fullest. In no connection are these advantages better demonstrated than in the Doors and Trim, Elevator Enclosures, Metal Partitions and Conduo-Base of The United Metal Products Company.



STEVENS HOTEL, CHICAGO, ILL.
HOLABIRD & ROCHE, ARCHT'S
GEO. A. FULLER CO. GEN. CONTR'S

UNITED METAL DOORS



POLISHED "WIRE GLASS"

ROMANESQUE "WIRE GLASS"
ALSO MADE WITHOUT WIRESYENITE "WIRE GLASS"
ALSO MADE WITHOUT WIRE

MISSISSIPPI GLASS COMPANY

Founded 1874

"He who cares not from whence he comes
cares not whither he goes."

In 1874 the Mississippi Glass Co., was founded by Mr. George D. Humphreys in St. Louis, Mo., for the purpose of making bottles and fruit jars and the factory was located on the west bank of the Mississippi River from which the company's name is derived.

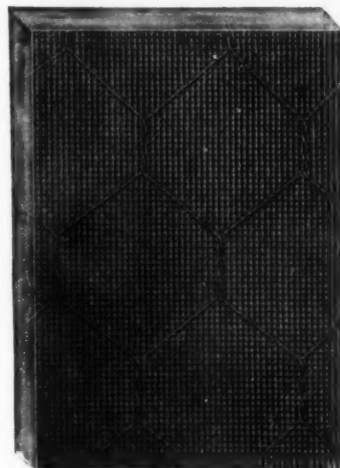
We are justly proud of our ancestry which consisted of clean cut old fashioned substantial business men of sterling quality who established a business policy which has survived and prospered for over a half century.

In 1876 Mr. George D. Humphreys, who was the founder of the company, died leaving its destiny to Mr. Solon Humphreys and Mr. John A. Walsh, who, up to the time of Mr. Walsh's death in 1883 continued the business with little or no change.

In 1883 Mr. Edward Walsh, Jr., was made president and in the latter part of 1884 the factory was converted to a Rough Rolled glass plant with one pot furnace producing colored cathedral glass for stained glass windows, and transom lights which were used in railroad coaches, a few of which may still be found. At this time the glass was annealed in a very crude way by placing it in an oven which was sealed for four days permitting the glass to cool gradually.

During 1888 the original factory was burned to the ground and rebuilt in 1889 at which time we adopted the continuous tank type of furnace which is used by all sheet glass manufacturers at the present time. We also at this time installed lehrs for annealing the glass which enabled us to produce a better refined and better annealed glass.

In 1892 a Mr. Elkins made the first Wire Glass at Tacony, Pa., under Shuman patents but did not meet with success until Mr. Edward Walsh, then president of the Mississippi Glass Co., perfected the art of manufacture in 1893 and produced the present hexagonal mesh Wire Glass on which the Underwriters standard is based. The future of Wire Glass



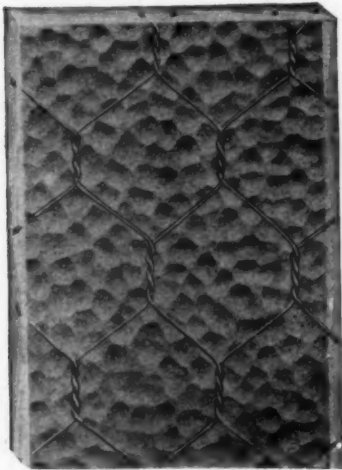
FACTROLITE WIRE GLASS
ALSO MADE WITHOUT WIRE



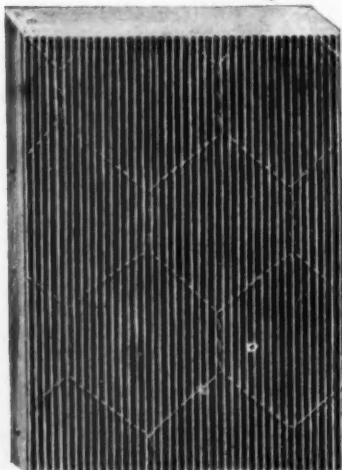
PENTECOR "WIRE GLASS"
ALSO MADE WITHOUT WIRE



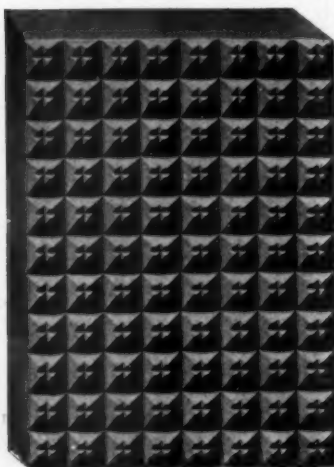
MAZE "WIRE GLASS"
ALSO MADE WITHOUT WIRE



ROUGH "WIRE GLASS"
ALSO MADE WITHOUT WIRE



RIBBED "WIRE GLASS"
ALSO MADE WITHOUT WIRE



APEX GLASS

was realized by many and for years we were compelled to carry on infringement suits at a tremendous expense.

After the death of Mr. Edward Walsh, Jr., in 1901, Mr. Julius S. Walsh, President of the Mississippi Valley Trust Company, succeeded his brother for a short time until the election of the late Mr. Edward Walsh Humphreys under whose administration the Mississippi Glass Co. of St. Louis consolidated with the Appert Glass Co., and manufactured Wire Glass under the name of the Mississippi Wire Glass Co. Since this time remarkable developments and improvements have been made in Mississippi products so that to-day the name Mississippi stands for the height of perfection in the manufacture of Rolled Glass.

Extensive research of illumination through building glass has been made and patterns such as Faetrolite, Pentecor and Aurora have been designed to serve definite purposes in the proper illumination of buildings by daylight.

The company has always encouraged architects and engineers to call upon it for its sincere co-operation on any subject relating to glass.

After the death of Mr. Humphreys in 1918, Mr. Julius S. Walsh again served as president until his death in 1923 after which Mr. C. J. Gundlach, formerly General Manager, who started with the company in St. Louis as a boy in 1884 and to-day is probably as well known as anyone in the glass industry, was elected president, and now holds the combined office of president and general manager.

The Mississippi Glass Co., and the Mississippi Wire Glass Co., have always enjoyed the reputation of a clean business policy and the production of glass second to none in its field, originators of many designs now imitated. Progressive and constructive. The leading Rolled Glass manufacturers of the world.

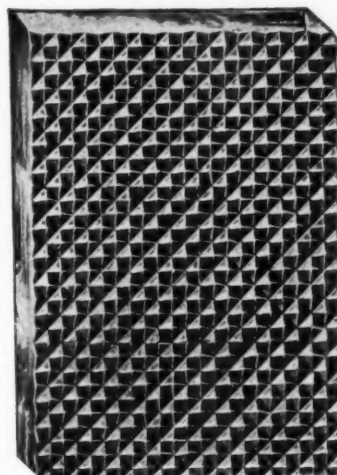
MISSISSIPPI GLASS COMPANY

MISSISSIPPI WIRE GLASS COMPANY

220 Fifth Ave. New York

360 N. Michigan Blvd.
Chicago, Ill.

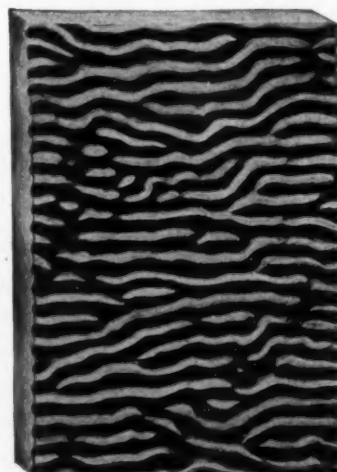
4070 N. Main St.,
St. Louis, Mo.



"AURORA"



FLORENTINE GLASS



ONDOYANT GLASS

GROWTH OF GORHAM'S MASTER CRAFTSMANSHIP IN BRONZE

BY LAURENCE H. De LABARRE

IN those early days which saw the beginning of the Gorham Bronze Division little was known of mechanically shaped-up-Bronze for architectural purposes. Almost all work was made-up in cast sections and the entire operation of making a bronze article was a matter of hand work from beginning to end.

Great weight of metal was also necessitated in comparison to the present day lightweight sections to produce the same contours and sections. The expense confined the use of bronze to the small number of operations built with little regard to costs.

However, the consistent fineness of the Gorham Bronze products made an impression from the first and as the demand increased, it was not long before a separate shop was set up for the exclusive handling of Bronze work. The size of the force devoted to Bronze steadily grew, as did the shop space required to accommodate it and today we find the demand for Gorham Bronze Products still on the increase.

About 1900 the Gorham Company adopted the then new process of extrusion in the production of shaped Bronze sections for architectural purposes. The consequent saving in costs over the same sections made by casting was materially lower. And the metal, because of its greater strength, beauty, and durability began to be more generally used. The Gorham Bronze Division of today is completely equipped to manufacture any item of Architectural Bronze, Tablet, Statuary, or Ornament. The traditional high standards of workmanship are adhered to as strictly as in the past.

The subdivisions of the Bronze Factories comprise:—*Designing Room, Drafting Room, Pattern*

The Gorham Designing Room is prepared to advance information and suggestions to clients and has an especial interest to those desiring tablets and memorials. Here also has been developed the series of Standard Designs of Building features, comprising almost every portion of building construction where Bronze is required,—Windows, Store Fronts, Doors, Banking Room equipment, Mausoleum Doors, Elevator Cabs and Enclosures, et cetera.



CORNER OF STATUARY FINISHING DEPARTMENT

These Standard Designs, placed in the offices of architects, have saved an incalculable amount of detailing. They have been the means of equipping many buildings with fine Bronze fixtures which, if specially detailed without knowledge of these designs, would most certainly have been installed in wood, steel or other less permanent material.

In the *Drafting Department*, the Scale Details of Architects are quickly full-sized and construction shown and made ready for the inspection of the Architect. This must be obtained before manufacture is commenced.

The *Pattern Department* is laid out to make all patterns necessary for the foundry. In this department, three separate forces of workmen are employed in the preparation of Wood, Plaster and Metal Patterns. The Gorham Pattern Shop is fitted up to take care of any type pattern work that may be required. A corps of Architectural and Sculptural modellers is employed who apply themselves entirely to the ornamental part of this work. The Gorham Foundries are among the world's largest for the casting of fine Bronze and make a specialty of French Sand molding. This, of course, is the



ASSEMBLING FLOOR—ARCHITECTURAL FITTING SHOP

Works, Foundries, Finishing and Fitting Shops, and Coloring Room.

recognized acme among processes for this work.

Wherever Bronze is cast the world over, the skill of the Gorham foundrymen is known and acknowledged,—their carefulness and pains in the facing of their molds,—their watchfulness over the mixing and heating of their metals,—their scrupulous attention to all the fine details of their trade, have merited for Gorham cast work, the favor of Architect and Sculptor.

Perfect Reproductions

By a patented process, the sole property of the Gorham Company, castings of intricate and difficult character may be produced which flawlessly and perfectly, reproduce models and patterns. The accuracy of this process is such, that using an electrotype as a pattern, a casting may be made which matches the original so absolutely as to defy distinction. Indeed the casting may be used successfully to replace the electrotype. Realizing the delicacy of lines in an electrotype, the possibilities of this process will be understood. By this process the models of sculptors may be reproduced in Bronze and no workman's handiwork is required after casting to sharpen up lost detail or restore lines that in the ordinary casting of Bronze by other processes would be required. The feeling, texture, tone of the model, placed there by the artistry of the sculptor, is reproduced faithfully to the finest lines.

In the *Fitting and Finishing shops*, castings, extruded shapes, sheets, rods, angles, are assembled into the various objects for which they are intended. Exquisite care is used in the making of all joints, which are brazed with a special hard solder. Rivets and screw heads are smoothly finished off, the whole piece being entirely gone over and filed down by hand, so that there is no visible indication of having been assembled of many parts.

In this department, powerful shears and brakes cut and bend the metal to any desired shape, length or form; planers swing tremendous doors to and fro; cutting them to the exact sizes of their openings.

Everywhere one finds the hammers and chisels of workmen busy imparting that high state of perfection which brings out the sparkle and gleam so necessary to the charm and beauty of fine Bronze work.

Secrets of The Color Room

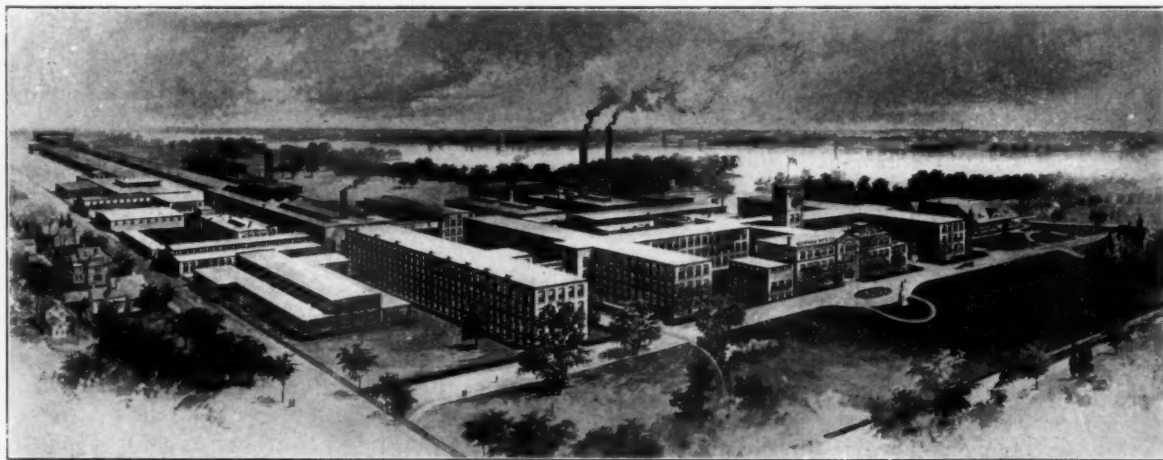
Colors are usually applied to Bronze to imitate as closely as possible the effect of the passage of time. These colors are as a rule brought about by the use of acids alone or are produced by burning pigments and acids into the metal by fire and flame. The secrets of the color room are handed down from generation to generation and are closely and carefully guarded by those possessing them. One of the most interesting of the processes employed in the manufacture of Bronze is the development of the color scheme for statue or building feature and the working out and application of the color itself on the metal.

Of Value to Architects

In the *Stock Room* is to be found a complete assortment of shapes and sheets for the manufacture of the work wanted at short notice. In racks, carefully catalogued, repose the forty years' accumulation of metal patterns, representing every conceivable ornament, the products of the designs of most of America's great Architects. To the Architect desiring a Bronze operation without the cost of special detailing and the consequent cost of special patterns and dies, this Gorham supply of standard materials and patterns is of especial value.

Situated as it is, in the heart of New England, easily reached from New York or Boston, the Gorham Bronze Division is the Mecca of artists—sculptors, architects, builders and all who are interested in the processing of this beautiful and interesting metal.

Willing and experienced guides are always available for the convenience of the visitor. To any of the craft desiring to augment his understanding of Bronze manufacture, a most cordial invitation is extended to come to Providence for a visit to the Gorham Company Bronze Division.



MAIN HOME OF THE GORHAM MANUFACTURING COMPANY

THE PLANT NOW COVERS OVER 37 ACRES AT PROVIDENCE

APPALACHIAN OAK in INTERIOR ARCHITECTURE

William McClellan Ritter first visited the Appalachian Highlands in West Virginia in 1890.

The future possibilities of the vast hardwood area so impressed the young man still in his twenties, that he returned to his home in Pennsylvania, disposed of his modest holdings in his native state and returned to the Appalachian Highlands, to begin the lumber business which has grown into the largest hardwood producing organization in the United States.

The W. M. Ritter Lumber Company has manufactured and sold in various parts of the world more than three billion feet of choice hardwood lumber to more than six thousand regular customers.

To do this has required the operating of more than nine hundred thousand acres of timber land, which means that if all of this timber lay in one compact body, it would cover more than a thousand square miles.

But more important than the size of the timber area in which the company's operations have been conducted is the unusually fine quality of the oak timber from which its products are manufactured.

The timber holdings of the W. M. Ritter Lumber Company are located in the heart of the Appalachian Highlands, known as the best oak producing territory in the United States.

The conditions which distinguish this region from the lowlands is the slow tree growth produced by the favorable climate, soil and drainage. This slow growth, in turn, produces the close, fine grain, mild, even texture and uniform color which are typical of all Appalachian Highland oak lumber.

More than twenty varieties of hardwoods are manufactured in the thirteen modern band mills of the W. M. Ritter Lumber Company.

For many years Ritter Appalachian Oak has been used in the manufacture of fine furniture in the leading wood-working factories of England, Canada and the United States.

Its fine grain, even texture and uniform color make it highly adaptable for modern furniture design. These characteristics make possible an exceptionally fine finish and assure greater beauty of grain and color in a completed product of the greatest durability and strength.

The constant aim of the W. M. Ritter Lumber Company is to provide an oak lumber that enables designers of furniture and interior trim to produce artistic work rivalling in elegance, refinement and dignity the best creations of all time.

Because of the fine quality of the oak timber from which it is manufactured, Ritter Appalachian Oak Flooring plays an important part in modern interior architecture in England and in America. In many places where the most artistic effects are desired, it has long been accepted as the standard oak lumber.

Its unvarying evenness of texture and its greater beauty of grain and color, plus the accuracy of manufacture, enable floor designers and architects to obtain the elegant and pleasing effects they seek.

Ritter Appalachian Oak Parquetry Flooring is being used in a variety of patterns in the floors

of city and country homes, hotels, memorial and other public buildings.

The use of Ritter Appalachian Oak Strip Flooring is confined largely to the better type of moderately priced residences, but its superior qualities make it available for unusual floor effects in the more expensive residences.

Complete information regarding the contribution which Ritter Appalachian Oak has made and is making to interior architecture in England and America will be gladly furnished to architects and designers on request. Address W. M. Ritter Lumber Company, Research Department, 120 East Rich St., Columbus, Ohio.



AUTOMATIC REGULATION, *the* FOUNDATION of MODERN HEATING

THE development of heating plants within the last fifty years, has advanced the typical heating system from a replica of Ben Franklin's stove to a scientific heating machine. The introduction of heat regulating devices over forty years ago by the organization now known as the Minneapolis Heat Regulator Company, greatly assisted in the perfection of the various types of heating systems and made possible the modern automatic types, which are rapidly growing in popularity.

The Minneapolis Heat Regulator was first manufactured in 1885 and the illustration shows the simple construction of the early thermostats. Although they have undergone great changes, they still retain the sturdiness and simplicity of design of the original models and operate on the same principle, resulting in accurate and dependable control.

With the growth and expansion of the heat regulator industry the design of the thermostats has been changed to accommodate the addition of one and eight-day clocks which automatically or semi-automatically (depending on the type of clock) lower the residence temperature during the night, and raise the temperature to the daytime level early enough in the morning so the home is warm at rising time and throughout the day.

The successive steps in the development of the clock type thermostat have been numerous and varied and the culmination of years of effort has resulted in the production of the Minneapolis Model 77 Thermostat—a reliable instrument furnished with a seven-jewel, eight-day clock, built for accuracy, strength and endurance in the Minneapolis Heat Regulator Company clock factory. Clock troubles have been reduced in this model to the minimum. The mechanism operating the thermostat indicator to lower or raise the temperature is entirely contained within the clock. The co-ordinated operation of the clock and thermostat proper is simplicity itself, and simplicity of operation makes for reliability.

The illustration of the Minneapolis Model 65 Hydrostat shows a device that supplements the action of the room thermostat in keeping an even room temperature. This dual controlling device may be mounted either on a hot water boiler or in a warm air furnace duct. It is a limiting device to safeguard heating plant temperature, as well as prevent greatly overheating the dwelling in case the thermostat continues to call for more heat—as when a window or door is inadvertently left open. The Model 65 is set at a safety limit and will shut off the heating plant when the boiler or furnace temperature reaches this set point.

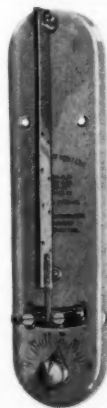
The Minneapolis Heat Regulator Company also

manufactures the Model 70 Pressurestat for an identical purpose, but for use with steam boilers. Either of these models may be used alone in connection with Minneapolis Motors or Switches for industrial purposes also—as in controlling temperature of enameling ovens, control of paraffin vats in manufacturing of wax paper, etc.—where an absolutely even temperature is necessary.

Just as heating plants have been adapted to the use of gas or oil as fuel, and as central station steam has become popularized in various localities, so have Minneapolis devices been readily adapted to control these various heating systems. And Minneapolis Controls for the various types of heating systems have been satisfactory to the home owner or tenant, from the standpoints of economy, convenience, comfort, health and safety.

Proof of "Minneapolis" popularity is readily apparent from the steady growth of the Company and the continued increase in size of the manufacturing plant. Frequent additions have been necessary until at present the factory is considered one of the largest industrial show places of Minneapolis. The Minneapolis plant is commodious and every square inch of it is in constant use. Sanitation, fresh air, ample light—both daylight and from lighting fixtures—cleanliness and orderliness of the entire factory and executive offices are subjects of much comment by visitors.

Continued growth of the Company due to continued demand for a satisfactory product, is further assured by the ability of the officers, an intelligent personnel and almost ideal factory conditions.



Minneapolis
Thermostat,
Model of 1885



Latest Model 77, 7
jewel, 8 Day Clock



Model 65, Hydrostat for
dual control



Modern factory of Minneapolis Heat Regulator Co.,
Minneapolis, Minn.

The CHAMBERLIN METAL WEATHER STRIP COMPANY

1890—House to House Vender

1926—85 Branch Offices

It has been said, that there is romance in every industry. The story of Chamberlin Metal Weather Strips is not alone an account of Chamberlin, but in it there predominates the fact that Chamberlin is not only the original metal weather strip but that its services and developments have constantly led the field.

For generations the construction of doors and windows in buildings of every sort of occupancy went on before any one troubled about durable or scientific weather stripping. The human mind seemed to turn naturally to attempts at covering the entire opening with storm doors, storm windows, blinds, shutters and the like.

Therefore, one of the principal factors in the growth of the Chamberlin Metal Weather Strip Company has been the spread of both practical and scientific information which beyond a doubt has proven the inefficiency of unweather-stripped windows and doors.

As far back as 1906 and 1908 Chamberlin conducted engineering research in both the laboratory and in a testing house located on the roof of a New York office building. These and countless other efforts not only assured Chamberlin the role of leader but also served as a stimulant to subsequent weather strip manufacturers who were usually always content to follow in the wake of the Chamberlin star.

In 1890 Albert Sims of Winona, Kansas, secured the first metal weather strip patent for sliding windows. He found the idea of metal weather stripping so new that he eagerly sold his patent two years later to John Chamberlin of Detroit for \$100.00.

In the beginning the marketing of his product was not an involved problem for John Chamberlin. He sold his weatherstrip from house to house in Detroit, had no factory of his own and charged according to the means of the people with whom he dealt. This simple procedure went on until 1893 when the present president of the Chamberlin Metal Weather Strip Company, Mr. C. H. Bredin together with Mr. James Bredin of Butler, Pennsylvania, and H. E. Kenny bought John Chamberlin's rights. This step definitely launched a Company from which evolved the present industry with branches thruout the United States. In 1910 a guarantee of five years was put in force, that being extended to ten years and later to the life of the building. The latter guarantee was made retroactive on all Chamberlin installations, a phase of the guarantee which shows its solidity and the faith of the Company in its product and the results therefrom.

From 1893 to 1907 the Chamberlin business of weather stripping was slowly developed by agents or licensees who bought the material, sold it to the con-

sumer together with an installation service entirely controlled by them. Every agent was virtually in business for himself and the success of Chamberlin was entirely in proportion to the agent's willingness or ability to make good with our line. During this decade, however, the idea of weather strips had taken hold but on July 1, 1907, the Company embarked on the realization of an ideal—the standardization of value and service. Agent's interests were bought out, a chain of branches established and all installations thenceforth came under the direct supervision of the Chamberlin Company.

A Chamberlin guarantee is really unique and worth considering in its entirety because it has been and remains so vital a part of Chamberlin service to the public. In brief, the directing heads of the Chamberlin Company came to the point where they felt that an unlimited guarantee was the only guarantee worthy of its product and the basis of the best service they could give their customers. They, therefore, evolved a blanket guarantee covering not only the material and workmanship, but the result as well. This guarantee was retroactive on all Chamberlin installations and applicable to any and all subsequent purchases of a Chamberlin equipped building.

The Chamberlin Metal Weather Strip Company has never had to guess about its product, or its results, but has proceeded endlessly with scientific tests on draught, dust and dirt elimination. The Chamberlin Metal Weather Strip Company has constantly searched for ways and means to perfect installation. The average of a long series of tests of actual 10, 20, and 30 year old installations in ten different cities from coast to coast have proven Chamberlin installation efficiency remarkably high in the elimination of air leakage—approximately 90% of the total possible leakage being prevented by Chamberlin equipment.

An installation of Chamberlin Metal Weather Strips involves a definite technique in which installation mechanics are carefully trained. This training is the result of the Chamberlin belief that weather stripping is not just a product to be sold, but a result to be achieved and that the attention to details on the part of Chamberlin mechanics reflects the inherent value of Chamberlin. A Chamberlin workman is really never alone, never solely responsible. Chamberlin employs also a practical executive, a supervisor, whose sole duty it is to travel about the country checking up on installations everywhere. He makes impartial reports on all mechanical activities and is vested with complete authority to make adjustments as he sees fit.

The Chamberlin Company early discovered that a definite and friendly service policy was the most important step in a sales policy. Consequently, the owner of a Chamberlin installation is never forgotten. There is a spirit and a theory in Chamberlin installation and policy quite different from that ordinarily encountered, for Chamberlin is the estimator, the salesman, the installer and the servicer.

No doubt the phenomenal growth of Chamberlin has been directly the result of this policy of personal installation, personal service and the absolute and unlimited guarantee. Architects and builders should remember that in the case of practically every other product they specify materials only. By specifying Chamberlin they actually specify a service, a result. Weather strip value cannot be properly gauged excepting from these angles—results, service, durability and guarantee.

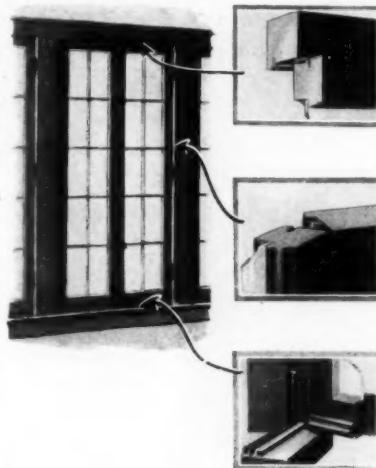
At the present time the Chamberlin Metal Weather Strip Company has grown to 85 branches employing 1200 skilled Chamberlin mechanics and over 300 estimating salesmen. The entire Chamberlin organization numbers close to 2,000 employees. In every Chamberlin Branch a spirit of ready cooperation with contractors, builders, architects and home owners is

evident. Whenever necessary the Company's engineers and experimental facilities are available to our branches to augment their efforts in giving the interested professions and trades the latest and most reliable data on air,

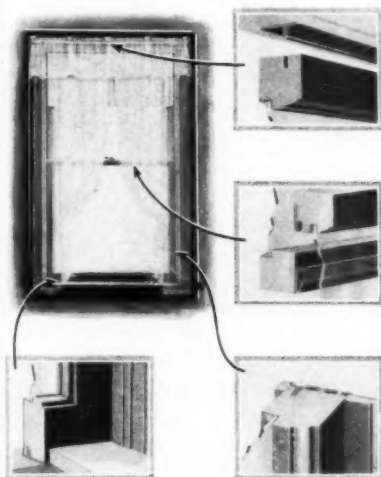
is one of the most complete books of its kind ever issued. It contains full size architectural details and information of utmost value. Twenty-four different types of Chamberlin equipment, applied to many kinds of openings are displayed. The drawings were made by an architect. The technique is based on Phillip

G. Knobloch's book, "Good Practice in Construction."

The facts and details contained in this catalog have



Chamberlin Interlocking In-opening Casement Equipment (See Equipment "D" in new Chamberlin Catalog of Full Size Details)

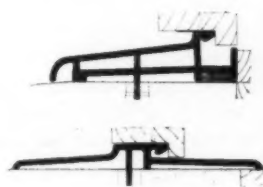


Chamberlin Double-Hung Window (See Equipment "A" in New Chamberlin Catalog of Full Size Details)

rain or soot leakage at windows and doors.

There is a Chamberlin equipment for every size and type of window or door opening. Every piece is built and installed with exact precision by Chamberlin experts.

The new Chamberlin Metal Weather Strip catalog

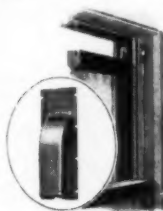


Chamberlin Outside Door Equipment (See Equipment "U," "V," "W," "X," "Y," and "Z" in new Chamberlin catalog of Full Size Details)

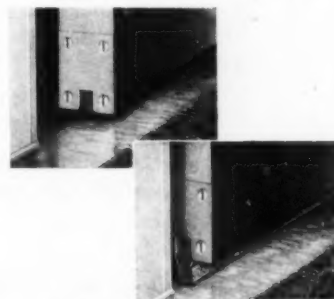
been very favorably mentioned by architectural and engineering magazines. The Chamberlin catalog is so arranged that it can easily be transformed into a loose leaf folder. It is of AIA style file size and is furnished with a standard AIA file folder.

You employ the greatest safety factor of certainty when you specify Chamberlin. Make

free use of our nation-wide service organization. Estimates furnished without obligation.



Chamberlin Pulley Guard (See page 45 in New Chamberlin Catalog)



Chamberlin Inside Door Bottoms (See Equipment "Z" in new Chamberlin Catalog of Full Size Details)

CHAMBERLIN METAL WEATHERSTRIP COMPANY

West Lafayette Blvd., Detroit, Mich.

A NOTABLE INFLUENCE IN MODERN BUILDING

The Truscon Steel Company Has Made Many Valuable Contributions to the Building Art



JULIUS KAHN

Who deserves the credit for the outstanding improvements made in building during the past 50 years? Is it the architect, whose knowledge of requirements and pride in his work inspired him to picture on paper something better than has ever been built before? Is it the contractor, whose sense of the practical enabled him to make visionary ideas become actual buildings? Is it the manufacturer of building products whose visions of possibilities caused him to develop and promote new and improved building methods? Is it the public whose insistent demand for progress furnished the urge for all the others?

Not one but all these factors have worked together to revolutionize building in the past half century. Their combined energy has given the world fireproof structures, daylight factories, high skyscrapers, efficient offices, sanitary hospitals, fine schools and comfortable homes. They have added materially to the safety, health, comfort and happiness of everyone.

Manufacturers of building products have contributed much to building progress. When the final story of the past generation of building is written, one man and his institution will stand out for their progressive influence. Julius Kahn and the Truscon Steel Company, of which he is President, have been a vital factor in the development of fireproof, permanent building construction. Some of the high spots of these developments properly belong in this historical review of the AMERICAN ARCHITECT.

* * * * *

In the early years of this century, reinforced concrete was practically an unknown construction—a few examples here and there, mostly abroad, and confined to unusual structures.

Reinforced concrete was looked upon with skepticism by the building world. Designers were unschooled in calculating it, contractors unskilled in installing it, the public uninformed of its possibilities and established constructions unrelenting in discrediting it.

This was the situation in 1903 when Julius Kahn had the vision to see the immense possibilities for the application of reinforced concrete to building construction. A graduate engineer, his wide experience in the United States and abroad had given him an unusual fund of practical knowledge. Finding inherent weak-

nesses in all available methods of reinforcing concrete, he determined to develop a system which would be theoretically and practically correct. The organization of the Truscon Steel Company and perfection of the Kahn System of Reinforced Concrete were the results.

The Truscon Steel Company with courage and vision undertook the education of the building world on reinforced concrete. A staff of designing engineers was organized, superintendents of construction were trained, and the merits of reinforced concrete were broadcasted to the public. Truscon worked hand in hand with the architect in the office and with the contractor in the field; an earnest, worth-while service sincerely given.

This high standard of Truscon service, founded in the earliest days of the company, has been fundamental in all stages of its growth. Today this service extends through every part of the United States as well as abroad. It embraces every branch of construction, from the small garage to the mighty skyscraper; from the modest cottage to the mammoth industrial plant.

The story of the growth of reinforced concrete to its present position of universal use is well known. Aside from the cooperation of the building world and the public at large, no one factor has contributed as much to its development as the Truscon Steel Company. Pioneers at the start, Truscon has been in the vanguard in every important improvement. Many types of design now in common use were introduced and perfected by them. Today, as always, Truscon research engineers are continually working on and perfecting better methods and products.

KAHN TRUSSED BARS.

A distinct improvement in reinforcing concrete was embodied in the Kahn Trussed Bar. Here was established a new principle of reinforcing concrete—the superiority of the rigid connection of shear members to main bars. Embodied in it were additional features:



Kahn Trussed Bar



Rigid Connection

- (1) Economy in the amount of steel.
- (2) Saving in labor of installation.
- (3) Assurance of accuracy in placing.
- (4) Additional factors of safety.
- (5) Superior fire and shock proofness.

The unit of shear and main members provides positive connection for the transfer of stresses, indepen-

dent of the adhesion of the concrete. It was a practical as well as a theoretical achievement.

RIB BARS.

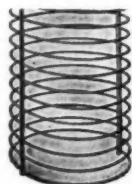
Rib Bars for reinforcing concrete are specially rolled sections with a series of cross ribs so designed as to secure maximum grip on the concrete. They are widely used for reinforcing concrete particularly in slabs, flat ceiling designs, vertical bars in columns and bent bars in beams. They furnish ideal reinforcement for concrete subject to tension, compression, temperature, expansion and shrinkage stresses, such as walls, abutments, domes, tanks, etc. Rib Bars are furnished either straight or bent as ordered and carried in stock at the main plant in Youngstown, Ohio, and in Truscon warehouses throughout the country.



Square Rib Bar



Round Rib Bar



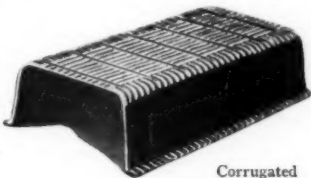
Column Hooping

COLUMN HOOPING.

Column Hooping for reinforcing concrete columns is shipped in the form of flat circular coils of exact diameter, and accurately spaced by means of special spacing bars. These coils spring automatically into a complete hooped column on cutting the small fastening wires. Rib Bars are used with Column Hooping for vertical reinforcement.

STEEL FLORETYPE AND FLOREFORMS

Among the systems of reinforced concrete developed by Truscon, Steel Floretype Construction has been very widely used in important building work. It consists of rows of specially formed steel Floretypes separated by reinforced concrete joists and covered with a thin layer of concrete. Hy-Rib Metal Lath extends continuously underneath and provides a flat ceiling for plastering.



Corrugated Steel Floretypes



Ribbed Steel Floretypes

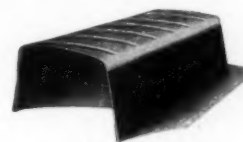
The deep, narrow joists carry the loads directly to the supports while the Floretypes act merely as a filler

eliminating the dead weight of large masses of concrete and producing a light floor of great rigidity.

The strength, depth and light weight of the Floretype Construction makes possible flat ceilings of long span without any objectionable intermediate beams. The hollow spaces in the tile assure soundproofness. Only simple and inexpensive centering is required.

The light weight saves not only in the floor itself but in the supporting framework and foundations. Floretypes insure greatest speed, simplicity and economy of construction.

Steel Floretypes are furnished in various types, including Ribbed Steel Floretype, Cantilever Floretype, and Removable Floretype. Steel Floredomes are similar, except used for two-way construction in which the loads are carried in two directions to the supports.

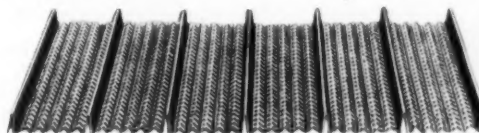


Removable Floretype

Among removable steel forms, the Truscon Wyde-span is exceedingly popular. It permits wide spacing of beams and is very economical. Suspended ceilings can be readily applied underneath if desired.

HY-RIB.

The simplification and elimination of form work for reinforced concrete for some time engaged the attention of the Truscon engineers. One of the early developments in this line was the perfection of Hy-Rib steel sheathing. Hy-Rib is a unit, combining metal lath and deep stiffening ribs, all formed from the same



3/4" Hy-Rib

sheet of steel. The ribs give unusual stiffness to the Hy-Rib, eliminating the necessity of forms to support the concrete and providing at the same time the reinforcement. The Rib Lath holds the plastic concrete, and also forms a perfect base for plaster.

Hy-Rib has many uses. For concrete floors and roofs, it provides both forms and reinforcing for the concrete, reducing costs and simplifying the construction. It is ideal for all forms of reinforced concrete slab construction. For walls and sidings it eliminates forms and stiffening members, providing a solid monolithic wall at half the cost of brick. For partitions it saves channels and the expense of attaching lath to them, providing a thin wall which saves valuable floor space, and which is fire, crack and sound proof as well as economical. For ceilings Hy-Rib saves channels and the labor in attaching lath to them and prevents cracks in plaster. For furring Hy-Rib does away en-

tirely with furring strips and the necessity of attaching lath to them.

Hy-Rib is furnished in various types. $\frac{3}{4}$ " Hy-Rib is particularly adapted for floors and roofs; also used in sidings and ceilings. Furnished in curved sheets, it makes excellent reinforcing for culverts, tanks, etc.; also ideal for furring where considerable air space is desired.

METAL LATH.

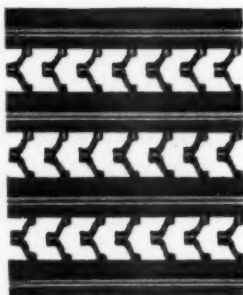


$\frac{3}{4}$ " Hy-Rib

$\frac{3}{8}$ " Hy-Rib Metal Lath is used for sidings, stucco, ceilings, partitions, furring, etc., also in connection with steel joists, floretiles and in fact anywhere where considerable stiffness is required for the metal lath base. Its use permits wide spacing of supporting members, saving channels and wiring.

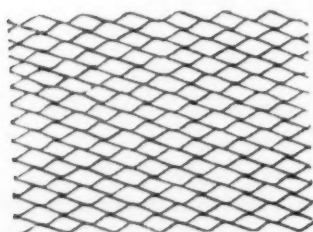
1-A HY-RIB METAL LATH.

1-A Hy-Rib Metal Lath is one of the most popular metal laths for plaster work generally. It permits wide stud spacing and saves plaster, providing a very rigid surface to work against and a perfect key for the plaster.



Truscon 1-A Lath

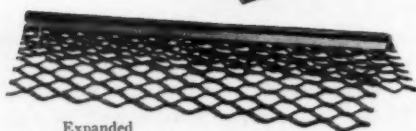
In addition to the Hy-Rib Metal Laths, a complete line of Diamond Laths of superior quality is furnished. This includes both the standard Diamond Lath and the Self-Furring Diamond Lath. Accessory products for use in connection with metal lath include two types of corner bead for protection of plastered corners, metal base screeds, steel channels and hollow studs.



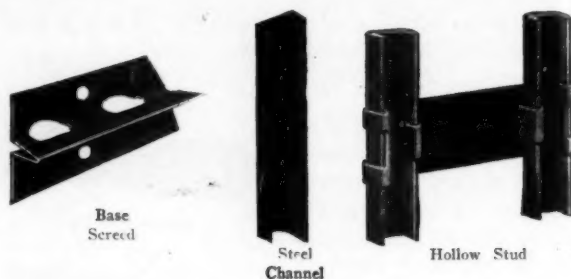
Diamond Lath



Double Bond Corner Bead



Expanded Metal Corner Bead



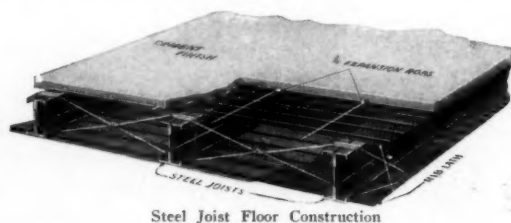
Base Screed

Steel Channel

Hollow Stud

STEEL JOISTS.

The demand for fireproof construction in light occupancy buildings, such as apartments, schools, hospitals, hotels, offices, etc., led to the development of Truscon Steel Joists. Ordinary forms of reinforced concrete were not particularly adapted to such buildings, because of their great weight and the cost involved in equipment, form work, etc. Steel Joists provide a self-supporting construction which is both light in weight and economical in cost. No form work whatever is required and several floors of the



Steel Joist Floor Construction

building can be installed simultaneously.

Truscon Steel Joist Construction saves time in installation and reduces the cost of supporting members and foundations. In fact, the cost of steel joist construction with cement finish is no more than that of wood joists with hardwood floors. Cement finished floors are becoming standard for light occupancy buildings of all kinds.

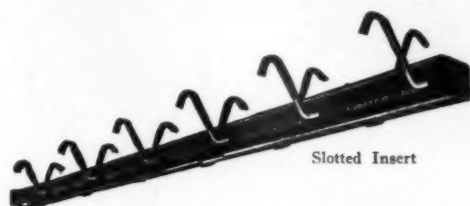
STEEL INSERTS.

The question of the attachment of shaft hangers, sprinkler systems, heating systems, plumbing and fixtures, etc., to reinforced concrete, was one of the early problems in the development of this construction. Truscon solved the difficulty very simply by the development of steel inserts which were embedded in concrete during the construction. These inserts provide a simple means of attachment and save slow, expensive drilling of the concrete after its completion.

The various types of inserts provide thorough flexibility in location of attachments and permit change in their location at any time. All the inserts are built in flush with the finished concrete and are practically invisible except for the point of attachment.

Truscon Steel Inserts are of three types. The slotted inserts are made in various lengths and permit wide variation in position of the attachments. Adjustable

inserts provide a moderate range of adjustability and Tapped Inserts are particularly adapted for work where locations of attachments are predetermined.



Slotted Insert



Adjustable Insert



Tapped Insert

STEEL WINDOWS.

The introduction of reinforced concrete ushered in a new era of industrial building. Heretofore factories with masonry walls were of necessity built with wide piers and little space left for windows. The great industrial expansion throughout the country demanded greater efficiency and economy in production. Mechanics had to have more daylight to do better work and increase their output. Reinforced concrete eliminated the necessity of massive walls for factory buildings. Their skeleton framework required only narrow columns and shallow spandrel beams. Practically the entire wall space was available for daylight.

Ordinary wood windows could not be used satisfactorily in such large openings without shutting out too



Std. Window



Typical Installation of Truscon Std. Windows

much of the daylight, and besides were not fireproof. Steel windows were the logical development. Their narrow mullions and muntin bars made it possible to get the maximum daylight from the window opening. Their quantity production in standardized sizes made possible an extremely low cost. Thus Truscon Steel Windows were developed in connection with its other

permanent building products. Steel Windows today are standard for all types of industrial buildings and Truscon installations are found everywhere.

Various types of Truscon Windows were developed for industrial use. The standard windows for side



800 ft. Runs of Truscon Continuous Sash

walls are center pivoted and swing horizontally. For monitors, sawtooth and other long runs of windows the Continuous Sash was developed.

The demand for fireproofness, ample daylighting and better operation has brought about the perfection of steel windows for commercial, public and residential buildings. Truscon Steel Windows now include a large variety of types to meet every building requirement.

In Truscon Projected Windows, the ventilators swing on sliding pivots and operate entirely outside the sash frame. There are no projections inside the building to interfere with equipment of any kind.



Projected Window

Truscon Counterbalanced Windows are composed of two vertically sliding units each balanced against the other; they can be used in schools, offices, industrial and commercial buildings.

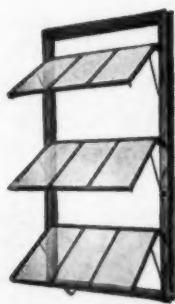
The Truscon Double Hung Window is a vertically sliding counter-weighted window in which each sash



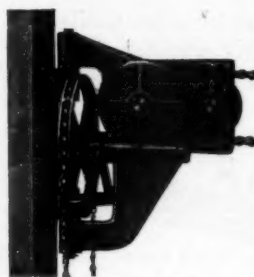
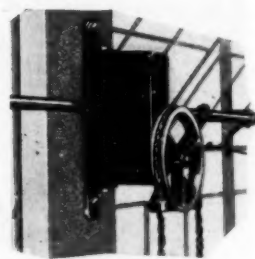
Counterbalanced Window



Double-Hung Window

Window
ClosedTwo Upper Sash
Open

All Sash Open

Tension Type Operator
Hand PowerTorsion Type Operator
Hand power

operates independently. It is furnished complete with frame and is ideal for use in the better type of buildings of all kinds.

The Truscon Donovan Window has been perfected for use in schools, hospitals and similar buildings. Its



Basement Window

operation insures ideal ventilating conditions at all times.

Truscon Copper Steel Basement Windows give double the daylighting in basements and are free from the inconveniences of the ordinary wood window.

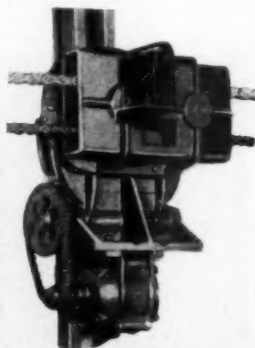
Truscon Copper Steel Casements for residential buildings are attractive in appearance and durable. They give double the ventilation and are rapidly becoming standard for all types of residences.

Casement
Window

MECHANICAL OPERATORS FOR WINDOWS.

The proper control of the ventilation for the building led to the perfection of the complete line of Truscon Mechanical Operators.

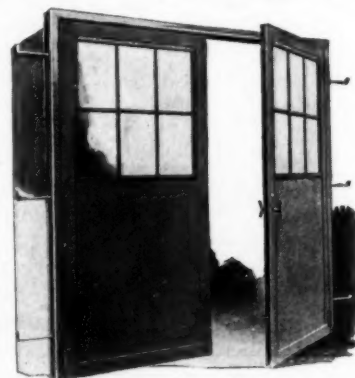
By their use, the mere pressing of a push button automatically opens and closes long runs of ventilators. In fact, these operators have been so perfected that all of the windows in a plant may be controlled from one central station and opened or closed to any degree desired. These operators are designed to meet particular requirements and to give dependable service.

Tension Type Operator,
Duplex Power

STEEL DOORS.

Truscon Steel Doors are durable and sturdily built. They are furnished in standard sizes for use in garages, service entrances, rears of stores and industrial buildings. Special doors including large railroad type are furnished to meet individual requirements.

Truscon Steel Partitions are also furnished for industrial and commercial use.



Double Swing Door

STANDARD BUILDINGS.

The field of one-story industrial buildings offered another opportunity for permanent economical construction. Here Truscon with their Standard Buildings developed a new improvement in building methods. These buildings are made of large sized solid

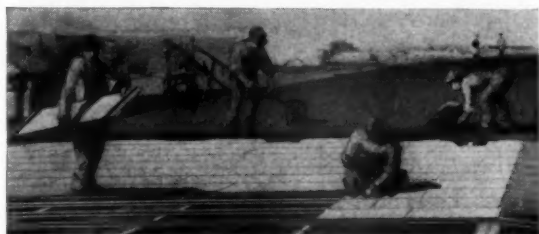


Standard Building

or window panel units of copper, steel, all interchangeable, shop-fabricated and simply erected. By the combinations of the standard units buildings of any size or type are available. With any arrangement of doors and windows. They are used for innumerable purposes as auxiliary buildings in industry and commerce. Although permanent, they can be readily dismantled and re-erected in a new location.

Ferrodeck

A notable improvement in roof construction is Truscon Ferrodeck. It is an insulated, copper steel roof waterproofed with composition roofing. Its light weight, non-combustibility and low cost makes it desirable for any straight away roof.



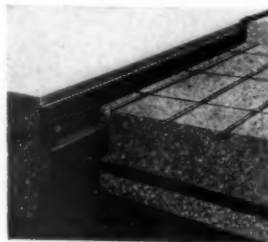
Ferrodeck Roof Construction

REINFORCED ROADS AND PAVEMENTS.

The advantages obtained by the reinforcing of concrete roads has led to the perfection of Truscon Wire Mesh, Truscon Contraction Joints and Truscon Road Forms. The Wire Mesh is equally suitable for reinforcement of driveways, garage floors, etc.,



Road Forms



Contraction Joint

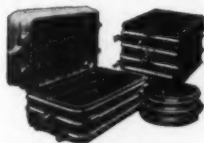
in fact, for floors resting on the ground or for cement finishes.

Truscon Curb Bars and Edge Protectors are used to protect corners of concrete work and prevent their chipping or breaking off.

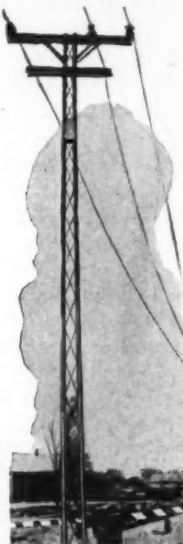


Curb Bar

PRESSED STEEL PRODUCTS.



Foundry Flasks



Steel Pole

The extensive experience of the Truscon Steel Company in steel fabrication of all kinds has led them into the manufacture of other steel products for industrial use, such, for instance, as Pressed Steel Parts for manufacturers, Alloy Steel Foundry Flasks, Alloy Steel Boxes and Platforms and steel forms of all kinds.



Boxes and Platforms

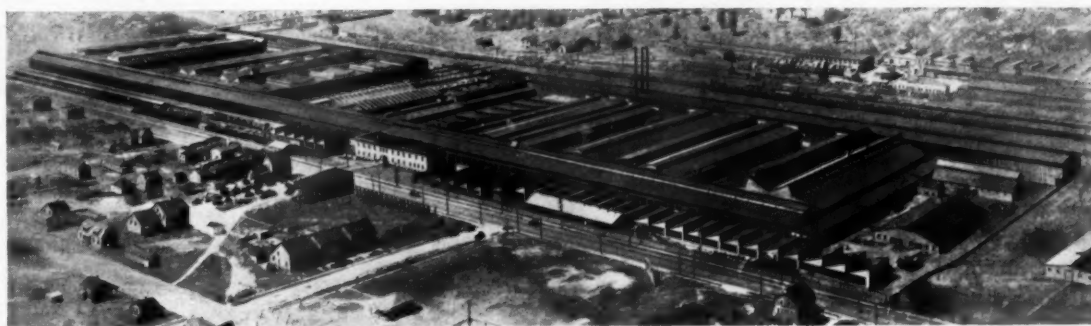
STEEL POLES AND LINE HARDWARE.

Truscon Steel Poles, including line hardware and specialties, are another recent development of the Truscon Steel Company.

* * * *

The basic principle on which Truscon Products have been developed is high quality of material and workmanship. These products are distinctive, and save time and labor in use. Back of Truscon Products is a thorough-going service which includes a fifty-acre manufacturing plant, warehouses in principal distributing centers, over sixty branch offices and thousands of dealers. Truscon Engineers are ready at all times to cooperate with architects and builders to insure the best results at the most economical cost. Truscon not only manufactures a complete line of the best products but backs them up with trained engineers to insure their proper use. Inquiries in regard to any phase of the application of Truscon Products are sincerely solicited.

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO



50 Acre Plant of Truscon Steel Company

Scientific Development of Waterproofings and Dampproofings

The Modern Way to Make Buildings Live Longer, Look Better, Serve more Efficiently and Cost Less to Maintain

TO architects, engineers and builders of America, and most foreign lands, WATERPROOFING and TRUSCON are two words which have become inseparable.

The foundation upon which today's standard of waterproofing practice was laid is a development of the Truscon organization, based upon the broad experience acquired in meeting actual waterproofing problems. The zest for technical research has been the motive force behind the Truscon Laboratories development.

Starting with a small laboratory Truscon has devoted all its efforts and energy toward advancing the methods and means of protecting structural materials against the disintegrating action of water. In the phenomenal advance of engineering practice in modern construction waterproofing has played a most vital part. The Truscon contribution to the building world has meant the saving and protecting of property in the hundreds of millions.

The Laboratories technical staff has been most fortunate in its very unusual association with a company which has been outstand-



Truscon Laboratory



Rochester Sewage Disposal Plant,
Rochester, N. Y.

ing in its contributions to the development of modern fireproof construction. This opportunity has resulted in perfecting both products and methods of successful waterproofing applications in modern construction.

Truscon growth has been a development from the practical to the scientific. After long research and experiment Truscon Waterproofing Paste (Concentrated) was perfected.



General Motors Building,
Detroit

This is the pioneer product of the Truscon Laboratories, and the thoroughness of its scientific development is evidenced by the millions and millions of pounds which have been applied in some of the most important concrete structures throughout the

world. From this seed has sprung a great industry, one of the most vital in the field of construction. Today hundreds of the nation's industrial buildings, huge government works, great municipal plants and residential constructions are protected and economically maintained with Truscon products.

Such outstanding structures as the Rochester Sewage Disposal Plant, Detroit Filtration Plant, General Motors Building, the Masonic Temple Building, the First National Bank Building, etc., are enduring monuments to the record of Truscon achievement.

Truscon Waterproofing Paste is most simple in application. It is merely added to the gauging water, or directly to the mixture, resulting in the most even and uniform distribution throughout the mass of the concrete. With the evaporation of the gauging water the Truscon Waterproofing Paste is left as a deposit on the walls of the pores, providing a repellent condition that is positive and permanent.

Truscon Waterproofing Paste not only eliminates disintegration of concrete from moisture, but also densifies the structure, increases rather than decreases its strength, and helps in the mixing, pouring and placing. In practically every type of construction involving the use of concrete the Truscon Waterproofing Paste is absolutely essential to the completeness of the construction.

As the years have enrolled, the Truscon organization



First National Bank,
Detroit

has kept up its steady advance in the science of waterproofing construction. Each year has been a mile-stone to accomplishment. Today there is a Truscon product to meet every requirement of architect,



Rochester Kodak Company,
Rochester, N. Y.

engineer, builder and industrial maintenance service. Truscon protection and maintenance are an important factor in the longer life, the greater efficiency, and the lower upkeep cost of construction work of a few leading Truscon products.

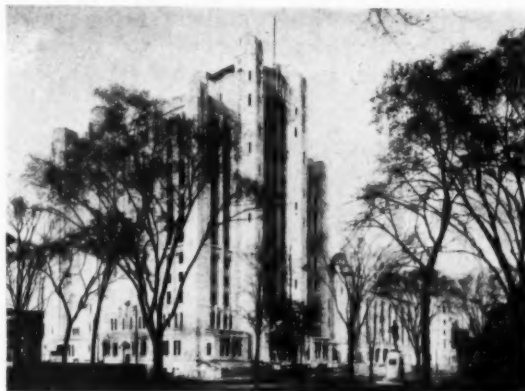
TRUSCON STONETEX—The specialized Masonry Coating for dampproofing, beautifying and improving every type of exposed masonry construction—cement, stucco, brick, limestone, concrete.



Dodge Bros. Plant, Detroit

TRUSCON SUPER POR-SEAL—A transparent dampproofing that does not change the color or physical appearance of concrete or any masonry surfaced, while protecting it against disintegration from moisture.

TRUSCON AGATEX (CRYSTALS OR LIQUID) is applied by sweeping over soft, dusting cement floors. Agatex actually enters into chemical



Masonic Temple, Detroit

reaction with the cement, forming new compounds, hard, enduring and resistive to wear.

TRUSCON FLOOR

ENAMEL—A concrete floor coating which makes floors attractive and corrects the tendency to dust or granulate. It penetrates and binds tightly to a concrete surface, showing remarkable resistance to wear. Particularly adaptable to office and public buildings, hospitals, schools, hotels, show-rooms, engine rooms, etc.

TRUSCON BAR-OX INHIBITIVE STEEL COATING

—It bars oxidation or rusting of steel and iron. The world's standard steel paint for priming and field coats on exposed structural steel, such as bridges, viaducts, tanks, frames, etc. Other special Bar-

Ox coatings; Truscon Bar-Ox Brine Coating, Truscon Bar-Ox Stack Coating, Truscon Bar-Ox Boiler Front Coating, Truscon Bar-Ox Embedded Coating, Truscon Bar-Ox Acid Coating, Truscon Bar-Ox Alkali Coating and Truscon Aluminum Bar-Ox.

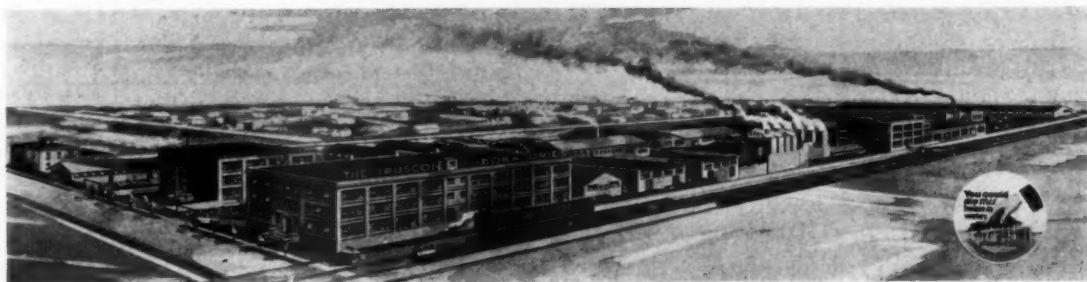


One of U. S. Lighthouses,
Panama Canal
Zone

THE TRUSCON LABORATORIES

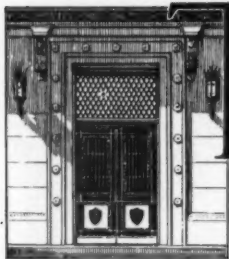
DETROIT, MICHIGAN, U. S. A.

Offices in Principal Cities



Truscon Laboratories and Main Plant, Detroit, Michigan

HOW COPPER, BRASS AND BRONZE HAVE BEEN DEVELOPED TO SERVE THE ARCHITECT



THROUGHOUT the entire history of architecture, from antiquity to the present, runs the gleaming thread of copper's story of permanence and beauty.

The tradition of noble art attaches to the name of its sister metal, bronze. From artists of the Golden Age of Greece, inspired craftsmen

of the Middle Ages, and the heroic builders of the Renaissance, this tradition comes down as a cultural heritage to leaders of architectural thought in America.

Centuries before the New World was discovered, such works as the gates of Ghiberti opened appreciative eyes to a new structural beauty in bronze whose spirit American architects are interpreting today in terms of American conditions of building and living.

THE RISE OF THE COPPER INDUSTRY IN AMERICA

The architectural profession in America has not always enjoyed either the means or the opportunity for adequate expression in copper, brass and bronze. In Colonial times, copper and brass obtained from England, were in everyday use for household utensils, and copper was employed to a considerable extent by our early builders. Typical of this period is the copper roof of Christ Church, Philadelphia, which, laid one hundred and seventy-five years ago, is still in service and good for many years to come. But bronze as applied to architecture in America has been extensively used only during the past fifty years.

This fifty-year period has seen far-reaching improvements in the mining and refining of copper, and in the manufacture of copper, brass and bronze. It has seen scientific accuracy, as typified by the electric furnace, replace manual control and limited production. As a result it has seen a corresponding increase in the availability of dependable copper products for structural and ornamental use.

The copper industry in America had its rise in the Naugatuck Valley, Connecticut, one hundred years

ago, and this development raised the country gradually to the same position of leadership in the manufacture of copper products, as its wealth of ores and pure deposits has given it in the field of copper mining.

Copper and its alloys are now produced in forms which meet the architect's requirements adequately. He need no longer be concerned with these metals as raw materials, for the industry, as typified by The American Brass Company, is now in a position to supply copper, brass and bronze in any desired shape.

ORNAMENTAL BRONZE

In no way has the development of the uses of copper and its alloys offered the architect greater service than in the adaptability of Extruded Bronze for ornamental work.

The architect of fifty years ago, when he wished to make use of bronze doors in a building was compelled to go to the trouble and expense of having all parts either cast or drawn especially for him.

The extrusion process produces shapes constant in cross-section with smooth surfaces and sharp corners which accurately reproduce the design in every detail. A valuable collection of dies has been accumulated during the years of manufacture. Through the coöperation of the designers and owners these are available for use. Dies for special designs will of course be made to order.

The use of extruded bronze shapes results in a great saving in cost and time. They may be used advantageously in combination with bronze sheet and ornamental bronze castings in the construction of entrances, doors, doorways, elevator enclosures, windows, store fronts, counter screens, grilles, hand rails, cornices, and general metal trim.

AMBRAC METAL

Ambrac Metal (principal components, copper and nickel), strong as mild steel and white clear through, is a most desirable addition to the metals available for building construction.

It was developed after years of experimentation by The American Brass Company to meet a long-felt need for a strong, white metal highly resistant to corrosion. Ambrac Metal is used for window



Ticket booth in the Albee Theatre, Brooklyn, New York, illustrating the use of Anaconda Extruded Bronze in combination with bronze castings. Thomas W. Land, New York, architect, William H. Jackson Company, New York, fabricators.

frames, door frames, store fronts and grille work.

Ambrac Metal cannot rust and therefore does not require painting. It can be formed easily into any desired shape. It possesses a fine grain structure and its natural smoothness of finish permits engaging parts to slide freely without binding. The surface of Ambrac can be highly polished. On exposure it takes on a silver-green tint, which harmonizes with stone, brick and terra cotta.

COPPER WORK

The changing conditions of modern life which have led to the development of new types of construction have brought with them many new uses of copper, brass and bronze.

Many architects of a generation ago reserved copper roofing for use on public buildings and monumental edifices. But the development of fire-proof construction, and the new importance attached to economy of upkeep, have caused architects to advise their clients more and more to use copper for roofing commercial buildings, and residences of moderate cost.

The same practical considerations which recommend copper for roofing also apply to its use for flashings, valleys, gutters and leaders. Through the influence of architects, copper has established itself so firmly for these purposes in many parts of the country that its use is practically taken for granted.

The copper store front marks a distinct improvement. Merchants surely owe a debt of gratitude for this development which increases trade through attractiveness and at the same time eliminates maintenance and repair costs.

BRASS PIPE FOR WATER SUPPLY

In the days of the old oaken bucket the architect was not greatly interested in water pipes. But the network of pipes in modern buildings concerns him very much. He knows that any pipe which requires constant replacing is exceedingly expensive, regardless of its original cost, whereas Anaconda Brass Pipe is a permanent investment since it lasts as long as the building.

In any type of building construction, rusty water is a potent cause of ill will; and whenever this trouble is augmented by burst pipes and ruined walls and ceilings, the result is disastrous. Many architects have become convinced that they cannot afford to specify anything but brass pipe in

any buildings put up under their direction.

DURABLE METALS REPRESENT TRUE ECONOMY

Every architect has seen examples of the plated hardware and plated lighting fixtures which march lustily under the banner of economy, but which invariably give up the battle as soon as their mettle is tested by Father Time. Every architect also knows that solid brass and bronze will give his clients truly economical service because they never wear off nor wear out.

Bronze Screen Wire is another development of bronze in the service of architecture. It is as rust-proof as copper and 50% stronger, and will not sag or bulge. This wire offers little obstruction to the vision when new, and since it does not require painting, it will always preserve this desirable quality. It represents the best investment in screen protection.

INVESTMENT VALUES

Although the architect is not primarily concerned in the financial phases of the building industry, he is, nevertheless, indirectly interested. The financing of building construction has grown into a thoroughly scientific activity, with the appraisers studying plans and specifications more carefully than ever before. Quality is gaining recognition in terms of investment value to such an extent that more money can be borrowed on buildings equipped throughout with non-corrosive metals. It has even become the policy of certain leading investment houses not to undertake the financing of any building which does not include the permanent construction features which copper and copper alloys alone can contribute adequately.

SERVICE TO ARCHITECTS

In every one of its branch offices throughout the

United States The American Brass Company is represented by men whose business it is to give the architect any information or assistance in their power on all matters relating to the use of copper, brass or bronze in building construction. This service is not only rendered gladly without obligation of any kind, but is supplemented, whenever necessary, by special assistance from the company's technical department.



Foyer of the Albee Theatre, Brooklyn

THE AMERICAN BRASS COMPANY GENERAL OFFICES: WATERBURY, CONNECTICUT

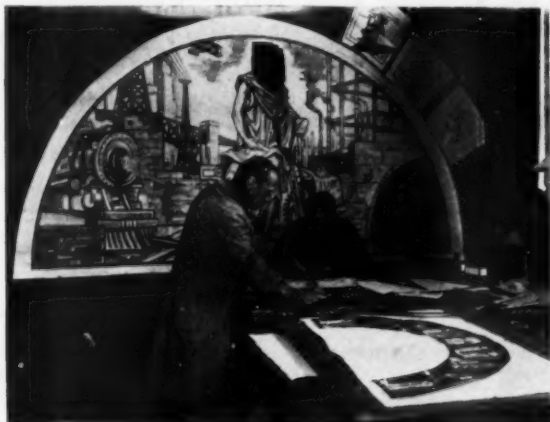
Offices and Agencies:—New York, Chicago, Boston, Philadelphia, Providence, Pittsburgh, Cleveland, Detroit, Cincinnati, St. Louis, New Orleans, San Francisco

Mills and factories:—Ansonia, Conn., Torrington, Conn., Waterbury, Conn., Buffalo, N. Y., Hastings-on-Hudson, N. Y., Kenosha, Wis.
Canadian Mill—ANACONDA AMERICAN BRASS LIMITED, NEW TORONTO, ONTARIO

RAVENNA MOSAICS, INC., REVIVE A LOST ART

WITH the revival of interest in color in architectural and decorative design, mosaic, by its brilliancy and permanency, offers a wonderful opportunity, and, besides, the technique in which mosaics are executed is very adaptable to the

the vitreous fluid is rolled into small sheets, about three-eighths of an inch thick, which, when cooled, are cut into strips about a quarter of an inch wide. The artisan laying the design chips off his squares from these strips as he needs them by hand with a steel tool



DRAWING THE DESIGN ON PAPER IN FULL SIZE



CHIPPING THE STRIPS PREPARATORY TO SETTING

structural character of modern building. Mosaic becomes actually a structural product, for it is imbedded into the plaster or cement walls while they are still wet, and its decorative design therefore must be in proper relation to its structural significance.

The stones used in mosaic are manufactured colored glass, semi-translucent, rich in tone and permanently brilliant. In the manufacturing process,



STUDIOS OF RAVENNA MOSAICS, INC., AT BERLIN

so that the glass breaks according to its grain in slightly irregular pieces. These pieces are set on the paper cartoon, on which the design is drawn in detail in full size, with one of the cut surfaces of the stone face down, when finally set in place, this surface being visible. As there are two cut surfaces, there is actually no front or back to the stones, for the rolled surface does not show. When the design is completely set, the cubes



SETTING THE STONES ON THE PAPER CARTOON



INSTALLING THE MOSAIC, AND REMOVING THE PAPER

are glued, face down, to a transparent paper, and the finished design is shipped intact to the place of in-

the cubes are completely embedded in it. When it is set, the paper is washed off, and the mosaic pre-



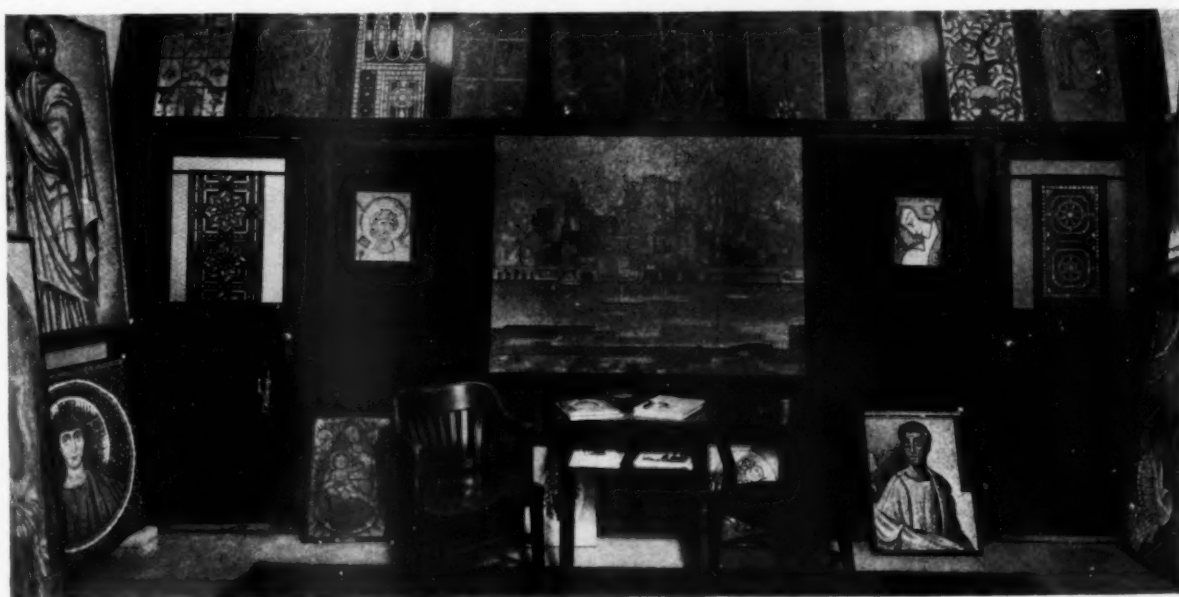
MOSAIC DECORATIONS IN THE ST. LOUIS CATHEDRAL



DETAIL OF A FIGURE IN THE ST. LOUIS CATHEDRAL

stallation. In the building where it is to be placed, the wall surface to be decorated is covered with wet cement, and, while this is still soft, the paper with its glued cubes is laid face to the wall and pressed evenly and firmly into the cement until the paper is flush with the surface of the wall, or until

sents a face of an uneven surface which catches the light at the various angles in which the stones are set. Ravenna Mosaics, Inc., also operate studios in St. Louis and New York, enabling architects to criticize and perfect their designs while in the process of execution.



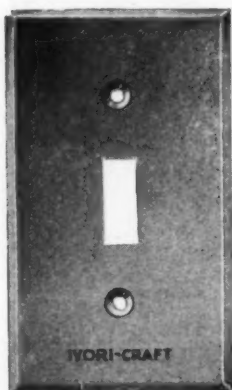
IN THE SHOWROOM OF THE NEW YORK OFFICES OF RAVENNA MOSAICS, INC., AT 101 PARK AVENUE

FLUSH PLATES FROM MILK CURDS!

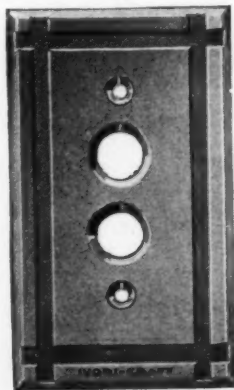


Long trains of pack mules bear bags of powdered milk from the plains of the Argentine to port. From there to here is a long trip just as the method of converting that powdered milk into "Ivori-craft" articles of enduring brilliancy and worth is a long process. But the end justifies the journey! For now architects and builders are offered flush plates, door-lock plates, door knobs, key-hole plates, push plates for swinging doors and lamp shades in a succession of almost unending variety of colors and of a material which is as nearly ideal for the purposes as anything very well can be.

The process of converting milk into the material of which "Ivori-craft" articles are made is not a new one. German chemists produced it nearly 15 years ago and it has been largely used all over Europe since. But it remained for chemists of this country to bring it to its present point of perfection and for the Ivori-craft Corporation to bring methods of manufacture to their present high development.



Tumble Switch
Type I



Push Button
Type S. P. Los Angeles

We are showing flush plates in flat gray on this page. So far as their resemblance to the actual product is concerned they might just as well not be there. It is literally impossible by any process of printing faithfully to reproduce "Ivori-craft" in all of its fascinating array of subdued and brilliant colors. Nor can its "feel" or finish be shown. It has been named "Ivori-craft" because it more nearly resembles ivory than anything else other than genuine ivory itself.

"Ivori-craft" flush plates are made in 28 standard colors and 50 special shades and varieties of colors to harmonize with any scheme of decoration. They are also obtainable in all standard shapes and types as well as made to any special design required. Thus

the punctilious architect or decorator who does not wish to use "this" color nor "that" but something just between, will find it here. And he may have "this" and "that" also.

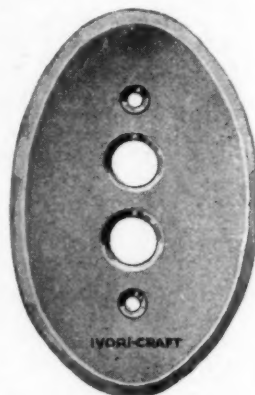
In 99 out of 100 buildings flush plates and other similar accessories are of glass or brass. There is a deadly sameness to them which makes one room a drab likeness of all the others. Monotony results.

Ivori-craft not only brings relief from monotony but it brings to the relief of the architect the ability to use color fittingly in all of its vivid beauty. It mirrors perfectly the art of the interior decorator. It lends itself to any delicate nuance of feeling which he may wish to express.

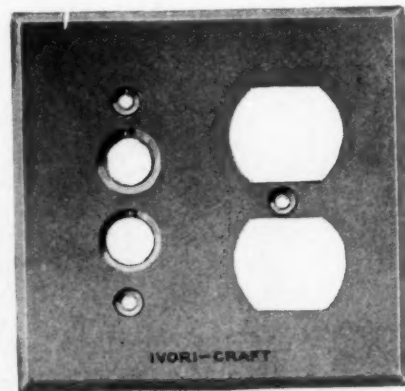
Naturally, when something new and novel is introduced into a building, whether it be home or hotel, school or church, factory or office building, it attracts unusual attention from prospective buyers or tenants. And when, as is the case with Ivori-craft, this element of novelty is decently decorous, it adds greatly to the "saleability" of the place. Or to its "rentability." In either case the architect has specified something which is eminently practical and worth-while.

Ivori-craft is non-inflammable and by test shows extremely high insulating qualities, thus making it an excellent non-conductor. It is also non-fragile and will stand considerable stress and strain.

We have prepared a sample card showing the actual material in 14 different colors. We shall be glad to send this together with a style sheet and price list to those interested.



Push Button
Type S. P. Gotham



Push Button and Single Convenience Outlet
Type P. D.

IVORI-CRAFT CORPORATION

IVORI-CRAFT BUILDING
290-292 CHESTNUT ST.

NEWARK, N. J.
U. S. A.

OUR PART in the GOLDEN AGE of ARCHITECTURE

NATIONAL LEAD COMPANY, 111 BROADWAY, NEW YORK, N. Y.

THE Golden Age of Architecture, marked by the past fifty years, has witnessed many improvements in the products of National Lead Company as well as the development by our organization of a number of new materials of interest in connection with construction and decoration. Some of our contributions to this period of great progress in architecture are those described below.

WHITE-LEAD

The day of "lead-in-oil" in wooden kegs has gone. Today this paint material, still the standard for exterior and interior decoration, is marketed in seamless pails and kegs of steel. The steel containers do not absorb any of the linseed oil, thus insuring the delivery of the white-lead paste with the same oil-content it has when it leaves the factory.

Except for the change in packing, the "lead-in-oil" of today, such as Dutch Boy white-lead, is not a vastly different product from the paste white-lead of fifty years ago. Its composition remains unchanged, but it has been improved from the standpoint of uniformity. Due to modern machinery, the present-day production of white-lead can be better controlled with the result that a more uniform product as regards purity and fineness is possible. These are qualities which make for a paint of extreme durability, great hiding power and exceptional beauty.

FLATTING OIL

It was not so many years ago that flat effects in interior decorating were obtained with white-lead by mixing it with turpentine. Flat paint so made has given place to flat paint composed of white-lead and Dutch Boy flattening oil. The advantages of this new flattening medium are its greater binding power and a handsomer finish. With a few coats of white-lead and flattening oil, it is possible to produce a finish of a beauty which closely resembles a many-coat, rubbed-down job. It is with this paint that the many distinctive interior finishes so much in vogue are being obtained, such as the Crumpled Roll, Sponge Mottle, Tiffany, Wiped Stencil, Lace Stencil, and so forth.

RED-LEAD

Fifty years ago, all red-lead was marketed in dry or powder form. Now this excellent paint material, which is used so generally for the protection of iron and steel structures against corrosion, can be had also in paste and liquid form. The paste and liquid products were made possible by a process developed by us which results in a more highly oxidized pigment. Highly oxidized red-lead when incorporated with linseed oil will stay soft in the container, which was not true of old-style red-lead. That the development of

a more highly oxidized red-lead was a distinct step forward is indicated by the extensive use these days of Dutch Boy paste red-lead and Dutch Boy liquid red-lead.

HOYT HARPLEAD

Many of the old-world architectural masterpieces, with their roofs and ornamental work of lead, stand today as evidence of the permanence and beauty of this metal. The lead used in olden times was soft lead. Today, the architect has at his disposal for building purposes the same metal but in an improved form. It is Hoyt Harplead. A special alloy of lead hardened with antimony, Hoyt Harplead possesses a much greater tensile strength than soft lead. It can, therefore, be used in thinner sheets, making it thoroughly practical and adaptable to modern building construction. It can also be stamped, formed, or cast in any shape desired and is quite generally used today for roofing, flashings, valleys, leader-pipes, cornices, gutters, ornamental pipe-heads, gargoyles, spandrels, and so forth.

CINCH ANCHORS

The advent of cinch anchors marked an advance in the fastening of ornamental and structural fixtures to concrete, cement and other masonry. Cinch anchors are based on the principles of the wedge, the screw and the lever. Each anchor consists of two or more expansion units which fit on a threaded or an unthreaded bolt. These expansion units are in two parts—an iron cone and a lead collar. The iron cone, when forced into the lead collar, either by calking or screwing up the bolt, expands the lead against the wall of the hole into which the cinch anchor is inserted. This insures a complete surface grip, thus providing an anchorage which will hold beyond the tensile and shearing strength of the strongest wrought-iron or steel bolt.

LEAD CAMES

Several important developments in lead comes have taken place. The first was the reinforced come. This come, which has a steel bar thru its center, makes possible stained glass windows of greater rigidity. More recently, we have developed a process of mechanically producing rustic and antique comes which in appearance are like the hand-wrought comes of the artisans of the past. There is the same soft, irregular outline in the designs, and no two pieces are ever exactly alike. The feeling and atmosphere of the old craftsmanship have been completely preserved.

If there is any special information that you want on lead or its many uses in art, industry and daily life, write to National Lead Company, 111 Broadway, New York City.



The Dutch Boy Painter

THE STORY of the INDIANA LIMESTONE INDUSTRY

BY H. S. BRIGHTLY

THE history of the use of limestone for building construction reaches back into the dim and distant past, almost back to the very dawn of the historical record of man's earliest cultural development in Egypt and elsewhere. It was quite natural



LAWRENCE COUNTY COURT HOUSE
BEDFORD, INDIANA

for man to employ this material for his monuments and other structures when he commenced to build in permanent settlements, for he had by long years of experience in pre-historic times found shelter and a convenient ready-made habitation within the cave formations in limestone rock deposits. He had already learned to cut and carve this material in a rude fashion by his early experiments in cutting outline pictures on the walls of his cave dwellings.

The cutting of stone is thus one of the very earliest of arts developed by mankind. Limestone buildings, both temples and monuments in Egypt, have been found that were built as far back as the 3rd Dynasty, some hundreds of years before the building of the great pyramids that followed.



DISTRICT COURTS BUILDING
WASHINGTON, D. C.

Space does not permit tracing even a brief outline of the use and development of Limestone as a building material through the ages that have passed since then. Furthermore this Golden Anniversary Number is to be devoted primarily to the developments that have taken place during the past fifty years in America, and these developments have been sufficiently great to warrant the exclusion of all else.

Fifty years ago little change had been made in the methods of quarrying and cutting stone; the hand processes employed were in a way primitive and, except for the improvement in cutting tools, were very much like the methods used by the Egyptian builders, in some respects less accurate. Except for such of the advancement in skill that was contributed to the art by the Gothic Masons, and to a lesser extent by the Renaissance Masons, based upon the lost art of ancient Greece and Rome, very little change had taken place in the work of the stone cutter from the time of the building of King Solomon's Temple about 1000 years B. C., on down to the building of court houses and other stone buildings in the pioneer days of America. The rough stone blocks were rudely quarried, often in irregular shaped



UNIVERSITY CLUB
CHICAGO, ILL.

pieces, and then were split to somewhere near the shape and size required after which it was necessary for the stone cutter to do all of the shaping and finished cutting with mallet and chisel. Column sections, balusters and other round members were produced in this same way by hand, at a great expenditure of labor.

Today all of this is different, for not only is most of the cutting but also a large part of the quarrying operation done with the aid of machinery. Steel and steam have played just as important a factor in the development of the stone industry during the past fifty years as they have in

other manufacturing industries and in transportation, etc.

To understand the development of the stone industry in America, one must go back for a moment to the early settlers and from that point follow the ever continuing march westward in the development of the country.

Since the rock deposits along the Atlantic seaboard and east of the Allegheny Mountains, generally speaking, are mostly of granite or granitoid formations and marbles or metamorphosed limestone deposits, it is only natural that the early American builders in those parts of the country that were settled first, should use these rocks for the walls and trim of their buildings.

These early settlers, however, brought with them building traditions that were based largely upon the employment of the easy-working limestones of England and France, and it was only natural that the lighter colored stones available were given preference.

With the settlement and development of the mid-west during succeeding generations, the fine easy-working limestone deposit of southern Indiana was found and this at once gave the builders of the Nation an abundance of the very sort of material that had so long been needed and sought for by preceding generations. Its pleasing light color-tone and texture, fine working qualities, strength, homogeneity and quite apparent good weathering qualities were at once recognized.

It provided them with an exceptionally good quality easy-working stone, similar but superior to those so extensively used in Europe, which the mechanics who emigrated were accustomed to working in the Old Country, a stone similar to that of which many of their fine cathedrals and public buildings were constructed, and therefore came into immediate favor.

The first Indiana Limestone, then called Bedford stone, was shipped into New York City in the early eighties, at about which time the Indiana State Capitol was built of this material. From then on it came rapidly into use and gradually replaced, especially in

the ordinary run of work, most of the building stone used up to that time.

The history of the development of the Indiana Limestone Industry from then on parallels the history of stone working machinery. Channellers, saws,



HELLMAN COMMERCIAL TRUST & SAVINGS BANK
BUILDING, LOS ANGELES, CALIF.

planers, lathes and other machinery, and later on milling machines and air tools were adapted especially for the economical working of the stone, until today the work of the cutter and carver has been lifted from one of arduous labor to that of the skilled artist-craftsman who is called upon only to put the finishing touches and fine work upon this, The Aristocrat of

Building Materials, which due to its economical machine production and universal usage, has justly been termed "The Nation's Building Stone". Nor has this machine development destroyed to any extent the work of the craftsman, for the individual hand of man must still place upon it in the finishing processes that intangible effect of hand-wrought workmanship that leaves the impress of individuality in all forms of art.

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

Box 765, Bedford, Indiana

[Service Bureaus in New York and Chicago]



LIBRARY, COLUMBIA UNIVERSITY
NEW YORK CITY

THE STORY of the AMERICAN FACE BRICK ASSOCIATION

THE idea of facing a wall with bell-burned brick in order to increase its structural permanence or its attractiveness is about as old as brick manufacture itself. In the earliest days, on the plains of Shinar, when it was discovered that an adobe or sun-baked brick could be made more attractive and more enduring by fire, these better brick were employed in facing the walls of temple or palace in those regions where stone was difficult of access. In all subsequent building of brick where its manufacture had been carried to the point of skill, a distinction in use was always made between the brick that were selected because of quality and appearance for facing of the wall and the commoner sort used for general structural purposes. This practice is strikingly noticeable in Roman and subsequent Italian building.

Our country naturally followed the European inheritance in this particular. At first from the kiln-run there was selected the better quality of brick to be laid with special care in the wall surface in order to enhance its durability and appearance. In the East, where this requirement was recognized at an early date, some brick were more carefully handled in moulding or in setting in kiln and were known as "stretcher" or "front" brick. It was natural that as our country increased in population and prosperity a great variety of tastes should be expressed on the part of the intending builder or architect, and that to meet these varied tastes, the inventiveness of the American brick manufacturer would exhaust itself in the production of a great variety of brick colors and textures for facing purposes. It is thus that a distinct face brick industry has gradually grown up in this country and has assumed, at the present time, striking proportions. In fact, this practice of endeavoring to beautify the brick wall surface has led to a great variety of attempts in using all sorts of material from the kilns, even clinkers, over-burned or deformed brick on which the architect expends much of his valuable time in order to secure a rough wall surface, often fantastic and at times departing from the real spirit and meaning of the brick unit as such.

The extension in the use of face brick during the past generation has been largely due to advertising on the part of individual manufacturers, and latterly

to the national cooperative effort of the manufacturers in advertising and merchandising their product.

For many years there have been locally small groups of brick manufacturers who have associated themselves for the advancement of their industry, resulting in the formation of a national brick manufacturers' association as early as 1886. In 1909 out of, or in connection with, this general association a "clay products club" was formed as a result of an address given at Rochester by Dr. Herbert S. Houston, then of Doubleday Page & Company, on the possibilities of extending the use of brick through reasonable and persistent advertising. Finding itself somewhat hampered in the rules it had adopted, this club in another year formed itself into what was known as the Building Brick Association, which collected a fund and issued

a number of excellent educational booklets on the subject of building in brick. Competitions were held and three fine plan books assembled and distributed. In view of the great extension of the face brick industry during the past few years, it is interesting to note the rumble beginnings of this old B. B. A. It was proposed to raise the enormous sum of \$25,000 a year for literature and advertising. It was found, however, that the brick manufacturers could not be induced to respond to the extent of this tremendous sum. However, the Association went forward on what it had. After getting out its booklets and advertising in the Saturday Evening Post and Everybody's Magazine during the fall months of 1910, it had



HOTEL ROOSEVELT, NEW YORK
GEORGE B. POST & SONS, ARCHITECTS

to report an indebtedness of \$1,393.00 which, fortunately, might easily be covered if the somewhat reluctant, delinquent members could be induced to pay their small assessments. Needless to say, the debt was finally liquidated, but the whole situation remained unsatisfactory to the small, struggling Association which still remained a branch or department of the larger general Association. Consequently, very heroic methods were determined upon and during the winter of 1912-13, when a clay products exposition was held in the city of Chicago, the present American Face Brick Association was formed.

The beginnings were humble, it is true, but the enthusiasm over the great artistic possibilities in the brick wall surface was great, and as these associated members more clearly worked out their policy of con-

centrating upon a definite product they found the Association taking hold of the country and growing in strength and clearness of purpose. Unfortunately, for anything like an adequate expansion of the Association, the fateful years of the great war intervened. In fact, our own entrance into the war in 1917 had a most disastrous effect on the face brick business because by government orders the vast majority of building was stopped. However, the Association continued handling the various associational problems that came before it, with promptness and success, and proved itself to be of especial usefulness in cooperating with government activities whenever called upon. But there was always in the minds of the members an anticipation of the time when, as a great American industry, it might frankly go before the public in a campaign of publicity.

In 1919, the time seemed to be auspicious and a general agreement was made among the members for a campaign of promotion. Funds were gathered and in 1920 the great face brick industry as a whole was presented to the American public. From that time on the public have shown a great interest in beautiful brick construction. While it is true, the dearth of buildings, as the result of war restrictions, necessarily resulted in a tremendous building activity, the publicity of the Association resulted in greatly expanding the ratio which brick building had heretofore shown in connection with other structural types.

This expansion revealed itself not simply in the great cities where business blocks, churches, schools, and other monumental buildings had always shown a fair proportion of face brick, but in suburbs and smaller communities where brick residences rose from 5% and 10% of the whole to 40% and 50%, depending upon the market conditions as well as the character of the brick dealers in such localities. The expansion of this industry may be somewhat indicated in comparing its expenditures today for publicity with those proposed in 1910 and only partly carried out. If in 1910 the Association was ambitious to spend \$25,000 a year, in 1926 it is in position to spend ten times that amount. By reason of the expansion of business, the cost per unit becomes exceedingly small.

As indicated by government reports, it is seen that for the past five years face brick production has expanded $2\frac{1}{2}$ times or, to be more accurate, 156% over the 1920 base. And these figures do not tell the whole story of expansion because many manufacturers who are selling face brick do not report them to the govern-

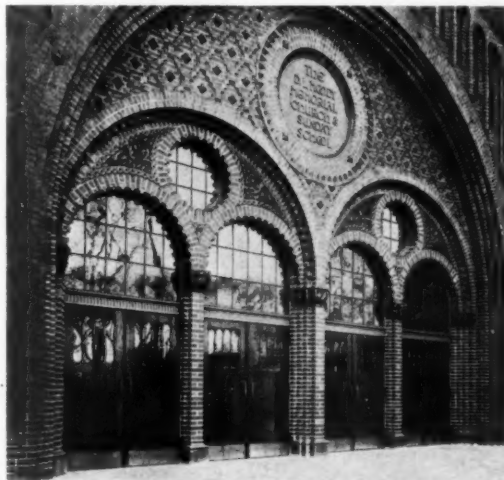
ment as such, and many small manufacturers do not report at all. This phenomenal growth in the use of face brick, aside from the effect of consistent advertising, must be attributed both to the soundness of the associational cooperative activities in improving methods of manufacture and distribution, in standardizing products, and in scrupulously and loyally working with the government's requirements, and to the soundness of the material itself, which is structurally enduring, artistically beautiful, and economically within the reach of men of moderate means.

It is well to call attention to what many very able men in the architectural profession have recognized that, in the great variety of beautiful brick that are put on the market by the American manufacturer, the architect has practically a new material never before offered in the history of architecture, with which to adorn and beautify the wall surface. There is no country in the world where this material has been so greatly expanded in its possibilities as an artistic medium for the architect's use. The somewhat easy affectation of merely imitating the effects of old world brickwork which often grew out of the poverty and limitation of the people concerned, is a confession of weakness in color designing, or an artistic defeat in the presence of material which has before it unexampled and unlimited possibilities of beauty.

Indeed, the community as a whole, as well as all professional men, may well recognize a certain obligation to those who have had the vision and who have been willing to bear the burden of creating materials for the expansion and enrichment of our economic

values. It is ultimately the manufacturer or the man who creates from worthless natural resources products that are useful and desirable for the general good. It is he who develops the wealth of the country that makes possible the leisure of the professional man who can develop the sciences and the arts. This activity is reciprocal for the development of the sciences and the arts greatly improve and encourage the methods of manufacture; but at the beginning little or nothing could be accomplished unless the manufacturer risked his investments and put forth his efforts to create and develop all those objects of use and desire for which society pays a reward.

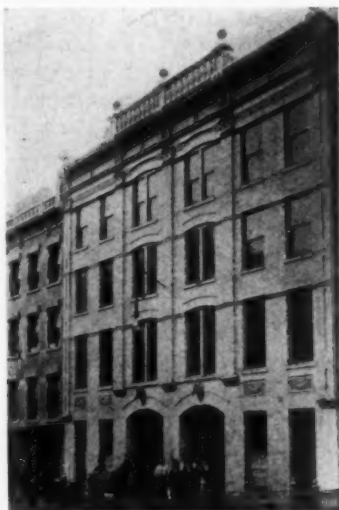
It is very gratifying to the members of the American Face Brick Association to note the many architects of high standing whose ability in designing and whose taste in color have enabled them to use face brick material with artistic effect in so many striking cases of both monumental and humble buildings.



THE D. L. MOODY MEMORIAL CHURCH
CHICAGO
FUGARD & KNAPP, ARCHITECTS

The Development and Growth of the New Jersey Terra Cotta Company

DUFFY'S
LIVERY STABLE
ORDER NO. 1
NEW YORK CITY
1888



THE development and growth of the New Jersey Terra Cotta Company is very closely allied with the history and development of architectural terra cotta in this country. It was just 38 years ago that this Company had its inception in a small plant erected on the site of the present plant, adjoining the tracks of the Lehigh Valley Railroad at Perth Amboy, New Jersey. In this plant the finely modeled horseheads and few ornamental band courses for "Duffy's Livery Stable" New York City were manufactured, and the actual beginning of the Company was accomplished.

Less than twenty years after the completion of our first order we were awarded the contract for the world's greatest skyscraper "The Singer Building," New York City. With the steel framing of tall structures, it became necessary to find new methods of construction, and terra cotta on account of being so readily adaptable to steel construction soon found a large demand. Buildings which were formerly only trimmed with terra cotta were having the entire facades faced with our material.

Since 1888 when the Company was established it has been continuously under the same management and administration and many thousands of buildings large and small in all parts of the United States and Canada have been supplied with our material. The plant has been remodeled from time to time to take care of increased production and today stands as one of the largest individual modern plants in the East. The laboratory department thru years of experiment and scientific research work has developed many new and distinct colors, tones and surfaces. We have always

prided ourselves being ahead of the field on the development and improvement of colors. We manufacture architectural terra cotta in various finishes and in all colors and shades. We have further specialized in pulschrome and polychrome terra cotta.

We are illustrating here our original order, thirty-eight years ago, the Singer Building furnished about twenty years later and the Liberty Bank of Buffalo furnished recently. Other buildings furnished by us are The Vanderbilt Hotel, Mount Sinai Hospital Group, Federal Reserve Warehouse, Princeton Club, etc. all of New York City, The Syracuse Hotel, Syracuse, N. Y. Masonic Temple and Detroit Metropolitan Building, both of Detroit, Michigan, the Keith Theatre Doctors Bldg. and Schmidt Office Bldg., Cincinnati, O. The Sacred Heart Church, New Orleans, La. State Office Building, Richmond, Va. Jackson Office Building, Asheville, N. C. City Saving Bank, Albany, New York, and many others throughout the east and middle west.

1925



SINGER TOWER
NEW YORK CITY
1907
ERNEST FLAG, ARCH.



LIBERTY BANK OF BUFFALO, N. Y.
ALFRED C. BOSSOM, ARCHITECT
JOHN J. GILL AND SON, BUILDERS

THE NEW JERSEY TERRA COTTA COMPANY

OFFICE, SINGER BUILDING, NEW YORK CITY ESTABLISHED 1888 WORKS, PERTH AMBOY, NEW JERSEY

THE PAINT ENGINEER - His Service to Industry

BY C. J. ROBISON

PREVIOUS to 1888, no one had ever thought of applying engineering practices to the manufacture of paint. Paint was "just paint,"—a mixture of pigment and oil that was known in a general way to have protective qualities. But this idea of paint included nothing more than protection against ordinary weather conditions. Although the problems of the corrosive destruction of metals in various industries was beginning to be seriously discussed, the possibilities of paint as an inhibitive and protective measure had not attracted any considerable amount of attention. In fact the breaking down of paint coats under the action of sulphur and other acid fumes, the mysterious erosion of metal even under a paint coat, and the rapid disintegration of paint under severe extremes of temperature, discouraged any such use of paint.

Most paint manufacturers had little more faith in the industrial uses of paint than the industries themselves. But for some years, a small group of paint technologists had given themselves to arduous study of and experimentation in the protective possibilities of paint in industries. They became familiar with the mysterious destructive forces that were costing industries millions of dollars in imperfectly protected surfaces. They became authorities on corrosion.

They devised new kinds of paints, new manufacturing processes, new principles of paint applications. So, in 1888 the Goheen Manufacturing Company (now the Goheen Corporation of N. J.) announced a new branch of the paint industry—Paint Engineering—specialized paint technology service for industries.

Although so many industries are still paying tribute to corrosion through improper painting or even lack of painting, the growth of the Paint Engineer has been the finest endorsement of the idea behind this comparatively new profession. At present their clients include some of the largest railroads, bridge builders, and industries. Their paint formulas have been approved by state highway commissions and various government bureaus! These paints are standard protective coatings in several industries where once paint was supposed to be out of the question. During a period of 37 years, the idea of fitting the paint to the peculiar conditions imposed by each industry, has gained remarkable headway. NOW, instead of or-

dering "just paint", architects and designers are calling upon the Paint Engineers of the Goheen Corporation to specify the exact paint and methods of application for every portion of the structure. They have found that the knowledge of painted surfaces, possessed by these men, is worth a great deal to them. They are virtually mixing their paint with engineering brains.

In the manufacture of Goheen Protective Paints there enters a distinct difference of process. These paints are not mechanically mixed as are other paints.

Instead, the oil and the pigment are *chemically united*. There can be no settling as in other paints. The pigment remains in suspension. They are not made today and shipped out tomorrow. Every barrel of Goheen Paint is allowed to "cure" long enough to make this union of pigment and oil permanent. This, of course, makes a more uniform coat as well as guaranteeing that the oil will remain in the coating as an actively protective element. This chemical mixture of paint effects not only the ingredients of the paint but actually forms an intimate union between the paint and the surface of the metal. These Goheen protective coatings are more than simply independent films of paint. They become an inseparable part of the surface itself.

Among the thirty paints

regularly manufactured by the Goheen Corporation their chief products are:

GALVANUM for galvanized iron, which requires no weathering, acid wash or priming coat.

CARBONIZING COATING, a coating for all characters of structural iron.

HIGHWAY RED—a chemically combined red lead paint.

CONCREWALTUM PAINT, for damp-proofing, beautifying and preserving concrete, brick, stonewalls and masonry construction.

GOHEEN'S MILL-WHITE—a washable, non-fading inhibitive and protective interior white.

THERMOKOTE—a high heat resisting paint unaffected by acid fumes and gases.

Literature and samples on each of these paints and other protective coatings are supplied to architects on request to the

GOHEEN CORPORATION OF N. J.
Paint Engineers, Newark, N. J.



COMMERCE BUILDING, U. S. DEPT. OF COMMERCE
WASHINGTON, D. C.

Galvanum protects all the galvanized iron in this building

NOTABLE CONTRIBUTION to TERRA COTTA in ARCHITECTURE

FAR back through the history of world civilization may be traced the evolution of many of the great industries of the present day. The mills of Minneapolis are but a projection of the growth of centuries, founded in antiquity when man first bruised corn between rough stones to make meal for bread. The huge transatlantic liner was begun when the hollowed log served the savage to cross the stream. The cotton mills of New England were in a sense conceived in days before the kings of Egypt lived. Food, clothing, transportation and the roof beneath which we live all have been born in the shadows of the past. Developed through the ages, processes of manufacture have come down to us. Hand has given place to machine. By a seeming law of acceleration each recent year has seen strides forward which often have surpassed the progress of a previous century.

Two thousand years before the Christian era they who lived in the rich valleys of the Tigris and the Euphrates baked in the hot sunshine or in fire, clay, in order that the forms in which it had been moulded might be imperishably preserved. So was born "terra cotta", a later name which may be roughly translated as baked earth.

Many were the early uses for this ancient discovery. Chiefly, perhaps, it found a primary purpose for the manufacture of brick and tile. But also it was employed for the recording of public records, chapters of the early history of man which in no other form could have been preserved. Sharp and clear as though



THE COMPANY'S "FACTORY" IN 1877. IT OCCUPIED A LOT ABOUT 25 x 75 FT. THE PRESENT CHICAGO PLANT COVERS ABOUT 25 ACRES

of time. The Egyptians used it; Greece and Rome found in it a material which they largely used. Statues, friezes, cornices and capitals of terra cotta have endured where metals have corroded and stone has crumbled into dust.

Then as art and architecture followed the widening boundaries of advancing civilization, the manufacture and use of terra cotta extended into other lands. The Italians of later centuries seized upon it, de-

veloped and improved upon it. Into the northern lands of Europe it was carried. Wherever man builded it is found.

In the eighteenth century, works were established in England for the manufacture of architectural details, statues and vases. And in the nineteenth century its popularity grew as architects perceived its rare qualities for the obtaining of certain effects in combination with brick and stone.

It was in the later part of the eighteenth century that terra cotta was first produced in our own country in the form of tiles for roofing. But it was not until the middle of the eighteenth century that attempts were made to manufacture architectural terra cotta in the United States.

Slowly the industry developed. Inhibitions had to be met with and overcome; prejudice was against it; manufacturing processes were crude and inefficient; the product was faulty and there were decided limitations in form and colors.

But with this almost unnoticed growth of an infant industry came other developments which hastened its



CHICAGO PLANT OF THE NORTHWESTERN TERRA COTTA COMPANY

fresh from the recorder's hands these terra cotta cylinders and tablets have come down to us.

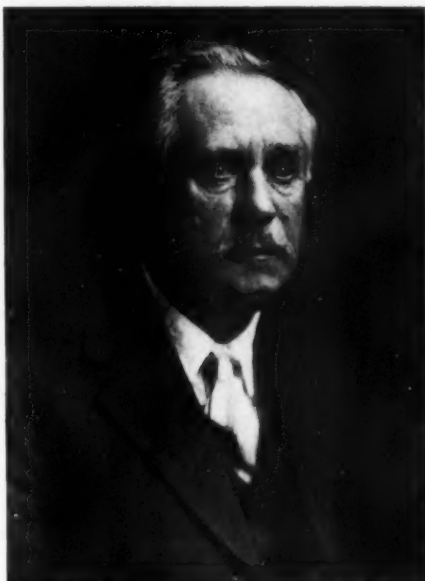
Babylon and Nineveh are treasure houses to the archeologist and the historian because the terra cotta which they contained so richly has resisted the touch

recognition and acceptance. Tall buildings began to lift above the city streets; steel frames requiring a surfacing with some light and durable material became an accepted type of construction; the increasing hazard of fire required a building material that could

resist the withering blast of flames before which many building materials would disintegrate or crumble. Then dawned a new era in building construction. The day of terra cotta was begun.

Almost sixty years ago The Northwestern Terra Cotta Company, a true pioneer in a great industry, was founded. Its founders were young men, endowed with earnestness and vision. A hardware clerk, a carver of ivory, a terra cotta stove maker and a maker of flower pots—such were their varied abilities, but it was on this nucleus that the company which today stands foremost in the world was begun.

There were several changes in the home of the organization during its early days. The original company was first organized by Hovey and Nichols, seedsmen, who brought from Indianapolis a small works for the manufacture of garden furniture and vases. But the time was not ripe for terra cotta as a building material and the scant capital of the promoters was soon exhausted in an effort to popularize the material in vases and statues. Then a Chicago architect, Sanford E. Loring, took over the company in 1869, and it was reorganized under the name of the Chicago Terra Cotta Company. This Company was succeeded in 1870 by the Chicago Terra Cotta Works. New methods were introduced and a much superior product began to meet with acceptance. Then in 1880 John R. True, the former hardware clerk, became shipping and time clerk, Gustav Hottinger, the ivory carver of Vienna, lent his skill as modeller; John Brunkhorst of Berlin, the stove maker, became foreman clay worker, and the moulder of flower pots,



GUSTAV HOTTINGER, PRESIDENT
SOLE SURVIVING FOUNDER OF THE NORTH-
WESTERN TERRA COTTA COMPANY

name was changed to True, Hottinger and Company and in 1888 it was incorporated as The Northwestern Terra Cotta Company.

Many were the problems to be met and mastered in these early days. To Loring must be given much credit for his efforts to fabricate a fireproof material to meet the requirements of the developing type of fireproof construction. And to him also must be given credit for his vision in surrounding himself with men who from their past experiences were able to contribute to the development of the work.

The activities of the Chicago Terra Cotta Works embraced a wide range, from the roughest to the finest. Gradually came a growing demand for stock patterns, such as window and door caps, and following the Chicago fire, ornamental tile, both hand and machine, found an increasing

sale. Cornices and trimmings for large buildings became more frequent. Contracts for hip-rolls and crestings appeared, and a considerable business grew in residence trimmings and chimney tops.

With the reorganization Gustav Hottinger and John Brunkhorst stepped in the fore. "Never do less than our best" was their inviolate creed,—their inflexible rule: "Never let a soft-burned piece escape." A new esprit de corps infused the organization, everyone filled in wherever he was needed, all workers and officers seemed tacit partners in the enterprise.

In 1882 the present site of the plant on Clybourn Avenue was selected and a factory building and four kilns were erected. And five years later Burnham and Root, gave to the company the terra cotta contract for the facades and court of the Rookery Building, a



WESTERN PLANT OF THE NORTHWESTERN TERRA COTTA COMPANY, AT DENVER

Henry Rokham, undertook the duties of clay finisher. Again efforts were redoubled, and under the name of True, Brunkhorst and Company the present company may be said truly to have begun.

On the death of John Brunkhorst in 1886 the firm

contract which marked the recognition of all those preceding years of striving.

The Rookery was by no means the first large building in Chicago to use terra cotta, but it was at that time a specific innovation in many ways and plainly

marked an era in the terra cotta business of the middle West. It was in the court of this building that the first considerable amount of glazed terra cotta manufactured in the United States was used.



THE TWIN WRIGLEY BUILDINGS, CHICAGO. THESE MODERN BUILDINGS ARE FACED ON ALL SIDES WITH ENAMELED TERRA COTTA. GRAHAM, ANDERSON, PROBST & WHITE, ARCHITECTS.

In this ten year period immediately preceding the Worlds Columbian Exposition, history was being made rapidly in Chicago. The leading architects, following in the footsteps of W. L. B. Jenney, developed the skeleton steel frame type of construction which completely revolutionized building in America and throughout the world. Terra cotta was particularly adaptable to this type of construction and large contracts were placed for its use in many of these old and prominent buildings, among which are the Home Insurance, Rookery, Tacoma, Masonic Temple, Monadnock, Schiller, Columbus Memorial, Old Colony and many others.

In 1894 the first Enamel terra cotta front was undertaken for the Reliance Building at the Southwest Corner State and Washington Streets, Chicago. This met with immediate favor among Architects and Owners and was the forerunner of the many enamel terra cotta facing jobs throughout the country today.

With the death of John Brunkhorst in 1886 Fritz Wagner in large measure undertook his duties. The business was now growing with rapid strides, and the three surviving original partners, True, Rohkam and Hottinger, with the cooperation of Wagner, carried on

the work.

As the years have passed others joined the little group and one by one the original partners passed on, leaving behind their imperishable mark on the institution, until the year 1919 found Gustav Hottinger the sole surviving founder. Among those who helped in a big way to advance technical development through many years of hard work and study was Adolph F. Hottinger, who from his interest in the chemistry of clays, went far to make enamelled terra cotta commercially possible. H. J. Lucas, later (1915) brought to the company from the East the asset of years of general business and manufacturing experience and became General Manager.

Following in the way of all Pioneers, the Northwestern Terra Cotta Company did much to advance the cause of the terra cotta industry through its vast research and development work. It built the first Down Draft Kiln for burning terra cotta; it manufactured the first glazed terra cotta and the first enamel terra cotta in the United States; it developed the first Rubbing Bed used in the terra cotta industry for the grinding of terra cotta blocks to true and uniform joints; it developed the first Grinding Machine



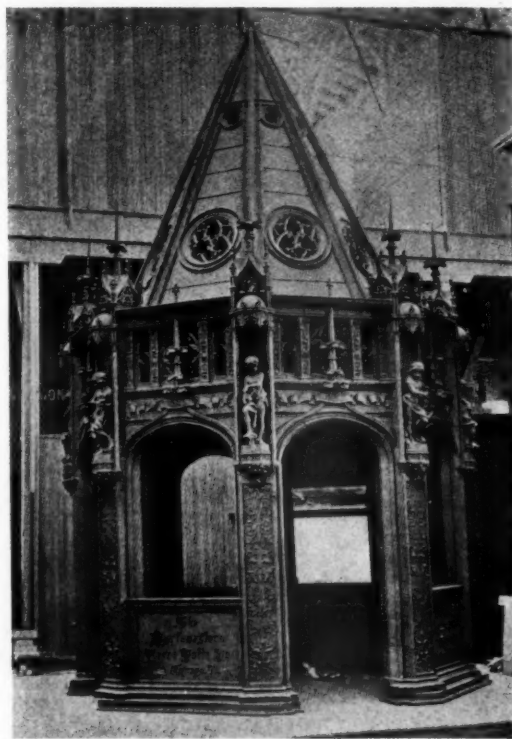
RELIANCE BUILDING, CHICAGO, ILL. ENAMELED TERRA COTTA FRONTS. THIS WAS THE FIRST LARGE BUILDING ERECTED WITH ENAMELED FRONTS

for grinding terra cotta blocks (replacing the rubbing bed referred to above); it developed and built the first Spraying Machine used for the application of ceramic finishes—prior to this time the ceramic finishes had

been applied through the use of a brush or by dipping the terra cotta blocks; it developed and built the first Spotting Machine for application of ceramic finishes, making possible the application of mottled and conglomerate colors so much in use today; it was first to develop and use Automatic Clay Mixing Machinery for the preparation of clays used in the manufacture of terra cotta; it built the first continuous (tunnel) kiln in the terra cotta industry for the burning of terra cotta and Northwestern and its subsidiaries are the only terra cotta companies at the present time using this most modern kiln equipment for the burning of terra cotta.

In the past sixty years this company has contributed greatly to the upbuilding and rebuilding of American cities and in the growth of these cities is written in permanent form the history of this great industry. Some of these more prominent buildings are, in Chicago, Stock Exchange, Railway Exchange, Blackstone Hotel, Conway, Wrigley, Jewelers; in Detroit, Buhl, Dime Bank, Whitney; in Cleveland, Rose Bldg.,

Winnipeg, Winnipeg Electric Railway Co.; in Seattle, Sisters of Providence Hospital; in San Francisco, Eyre, Phelan, Gunst; in Los Angeles, Chamber of Commerce; in New Orleans, Tulane Newcomb, Orpheum Theatre; in Jackson, Miss., Lamar Life In-



PAVILION, EXHIBITED AT WORLD'S FAIR, CHICAGO, 1893 GOLD MEDAL—LIGHT RED IMPERVIOUS TERRA COTTA
ARTHUR HEUN, ARCHITECT

Athletic Club; in Pittsburgh, Oliver, Union Arcade; in Brooklyn, Union League Club; in Buffalo, Prudential; in Boston, Blake; in Omaha, Nebraska Telephone Co.; in Kansas City, Mo., Waldheim, City Club, Athletic Club; in Denver, The Denver Gas & Electric Co., East and West High Schools; in Toronto, Canadian Pacific Railway, Dominion Bank; in



GRAND PRIZE PAVILION AT LOUISIANA PURCHASE EXPOSITION, 1904. CREAM ENAMELED TERRA COTTA
OTTO ZIPPWOLD, ARCHITECT

insurance Co.; in Memphis, Peabody Hotel; in Peoria, Peoria Life Insurance Co.; in Milwaukee, Wells, Plankinton Arcade; in Louisville, Kosair Temple; in Cincinnati, Ingalls; in Columbus, American Insurance Union.

In 1923 came an event almost unique in the annals of American business, for in that year the \$4,000,000 business of the Northwestern Terra Cotta Company was turned over by the owner, Gustav Hottinger, to a group of executives and workmen who under the long years of his guidance had built the business to its preeminence of today.

A business policy of expansion was very soon thereafter inaugurated; The Denver Terra Cotta Co. was purchased by the Northwestern Company in 1923 and The St. Louis Terra Cotta Co. was purchased in 1924. Both of these Companies were active and successful and added assets to the parent Company in increased capacity, new and wider markets, experienced men and successful executives.

Foremost among the great architectural terra cotta companies of the world, the Northwestern Terra Cotta Company and its subsidiaries, owned by the men who have put their imprint on its product, stands an example of faith, sincerity and vision, a great national industry, holding today as always for all that is best in architectural terra cotta.

COINCIDENT ANNIVERSARIES

THE month which marks the Fiftieth Anniversary of "The American Architect" marks also the Fortieth Anniversary of the NEW YORK ARCHITECTURAL TERRA-COTTA COMPANY.

These forty years have witnessed tremendous advances in the manufacture and utilization of architectural terra-cotta.

The old red terra-cotta of "New York's" infancy is still to be had and has never lost its charm in the eyes of many of our Architects. But as the years went along, trained ceramists came into the industry, and today there is practically no limitation to the color, finish, texture or tonal effect which may be had in architectural terra-cotta.

The old cut reproduced on this page shows the Architect's conception of the New York Company's plant, built in the spring of 1886.

From the outset the conception of the New York Company has been **QUALITY**. Its product is made from the most carefully selected clays ground to a degree of fineness which nullifies the possible structural ill-effect of of any impurity which escapes the man at the clay pit. The clays thus prepared are capable of

easy mixture in the dry condition and are only used in terra-cotta manufacture after the most thorough pugging and adequate aging.

This is costly, but when buildings come down after a life span of thirty-five or thirty-six years,—as, for instance, Delmonico's a few months ago,—and the New York Company's terra-cotta is taken from the wall just as perfect as the day that it was installed, the added expense seems but a small matter after all.

And from this properly prepared terra-cotta body, New York Terra-Cotta is "pressed-up," with honest faces, sides and ends, with adequate struts, and with skilled workmanship and careful inspection entering into each individual piece. This has built "New York's" reputation among Architects and Owners, and possibly it is worthy of review when an Anniversary rolls around.

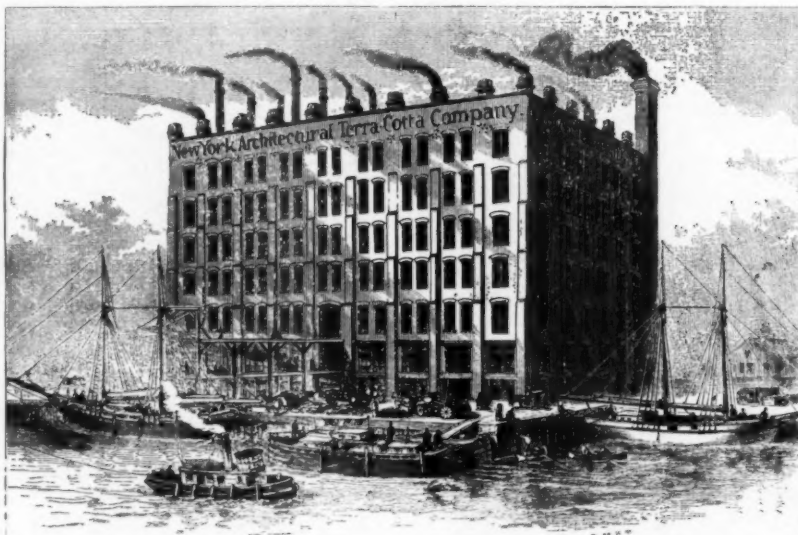
In the last generation architectural terra-cotta has come to occupy a position of steadily increasing importance in American architecture.

The amount used upon the individual building varies from running courses of plain profile through trim and embellishment of the most ornate character to a point where terra-cotta is used as the complete surfacing for all elevations from the sidewalk up.

With the development of modern machinery, it has been found possible to fabricate running profiles by machine, and splendid material of machine fabrication is today installed on many of the most important structures.

All shapes of special character are, however, fabricated by hand from plaster moulds, and it is in the plasticity of terra-cotta that the Architect finds his widest and most adequate scope for expression.

The extraordinary range of ceramic coloring obtainable in the glazed terra-cotta is perhaps best exemplified by such buildings as Mecca Mosque, on the north side of Fifty-fifth Street west of Sixth Avenue, New York City, where the Ottoman style gives the Architect full play for the use of the brilliant



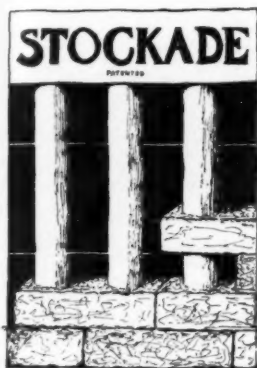
CLARENCE B. CUTLER'S RENDERING OF THE PLANT OF
NEW YORK ARCHITECTURAL TERRA COTTA COMPANY
RAVENSWOOD 1886

coloring of the Orient.

Less striking as individual examples, but perhaps more significant as typical of our American life, are numerous instances of parti-colored terra-cotta made to appear as though fire-flashed and in which tonal effects to harmonize with buff brick have not only been very effectively obtained but in which a black or very dark flash has been successfully applied to the old terra-cotta red in such manner as to produce a most pleasing coloring combined with a softness in texture.

Since the founding of the New York Company, the Greater City has come into being through consolidation,—Ravenswood has become but an address of memory; but, except for this change in political designation, the address of the New York Company remains the same as in 1886,—401 VERNON AVENUE, LONG ISLAND CITY, NEW YORK.

THE STOCKADE SYSTEM OF BUILDING



WHILE war is undoubtedly all that Sherman said it was, it is also responsible for vast improvements and for giant strides ahead in many fields. The World War stimulated the inventive genius of many men in nearly all countries and is responsible, in part, for "Stockade."

James Monroe Hewlett, a former presi-

dent of the Architectural League, a Director and Fellow of the American Institute of Architects and a member of the firm of Lord & Hewlett, architects, realized with the outbreak of the war that waste in every direction must be cut to the bone. Turning naturally to his own field of endeavor he observed with new eyes the appalling waste involved in the erection of permanent wall structures composed of heavy masonry units, the weight and strength of which are utilized to but a relatively small extent. The excuse for them he reasoned lies only in their permanency, their insulating qualities, the always heavy weight of custom and the fact that there was no adequate substitute.

He believed that the invention of a substitute which would have every desirable quality of heavy units plus others not possessed by them was within the range of possibility. Whereupon he began exhaustive research and experimental work and eight years later the manufacture of Stockade moulds was begun on a commercial scale. That was four years ago. Since then many new buildings have been erected and

others of less substantial construction have been enclosed in Stockade with no necessity in any case of a change in the system.

The Stockade System of Reinforced Concrete Construction is a scientific and economical grouping of all the elements of a wall into its two separate and simple functions, with no conflict of the two, and with the best scientific solution of each. There are, first, strength in abundance to carry the superimposed loads and, second, protection against those forces of nature which continually seek to penetrate and destroy.

The insulation, waterproofing, furring, lath and scratch-coats of stucco and plaster are grouped together in the fibrous Stockade biscuits. The reinforced concrete frame of Stockade is one solid, continuous unit throughout. The Stockade biscuits have no capillary attraction and are highly fire-resistant. The concrete frame cannot warp or settle, and is amply protected against fracture by heat, frost or shock due to its permanent deep embedment in the Stockade biscuit.

The resultant wall, with its interior plaster and its exterior of stucco, brick or other finishes, is one of great strength. It is one of great beauty in its honest depth of reveal through which heat, cold, sound and moisture cannot be induced. Now the architect has available to him, through the Stockade System, depth of wall, which had grown rare because of its cost. The Stockade System presents remarkable advantages to the architect, builder and owner and should be thoroughly investigated. A new bulletin will be sent upon request.

Briefly, Stockade is simple, like all good things, and is the least costly structure yet devised for permanent human habitation. More, it is the most economical to maintain. Yet it has every advantage possessed by more expensive forms of structure and many advantages which some of the higher priced types cannot aspire to.



HOUSE AT SCARSDALE, NEW YORK—HARRISON GILL, ARCHITECT AND BUILDER
WALLS OF HOUSE ERECTED IN THREE AND ONE-HALF DAYS BY ONE MECHANIC
AND TWO LABORERS

STOCKADE BUILDING SYSTEM, INC.

103 PARK AVENUE, NEW YORK

WHAT DUNHAM HAS CONTRIBUTED TO MODERN HEATING AND TO ARCHITECTURE

BY OLIVER J. PRENTICE

THE sightseer and the proud urbanite alike are prone to point out and consider their great modern buildings, named as skyscrapers, as merely a kind of super-statuary. Following an advertising suggestion, in their minds' eyes they stand the Liner "Mastodonia" on its nose beside the building and make comparisons, and like to know how many millions of dollars went into the investment which towers before them. They do appreciate its beauty of design and that dignity which its great size alone gives it, and many architects would be happier if they realized how deeply the general public does appreciate beauty of facade and entrance.

But, for the great majority, the appreciation ends there. Their thoughts do not go as far as the function of the skyscraper — its actual reason for existence, nor the factors that make its existence possible. Even those who work in the tallest, the biggest, the costliest or the newest fail to notice the finer details of equipment — equipment that enables it to function, and without which the shell would be no more useful than the ruins of the Forum, though the plaster were not so much as scratched anywhere. This lack is merely the ignorance of the layman. Naturally enough, only a technician can appreciate fine technique. And only the architect and engineer can fully appreciate the refinements of lighting, heating, plumbing, etc., and every detail of the perfection of function in a modern building. To the layman who works in a great office building, everything works so smoothly that he sees nothing to remind him that he is surrounded by achievements, and there is no holiday called "Inventor's Day."

On the rolls of those who have contributed something noteworthy to the workaday world is the name of Mr. C. A. Dunham. In 1903 he first offered to commerce the device which revolutionized steam heating—made economical low pressure steam heating possible. It is significant of the man that when it was offered its function, then novel, was perfected. The first Dunham Radiator Traps on the market worked exceedingly well, and many of the original traps are still operating satisfactorily and with promise of working indefinitely.

Nowadays efficient heating is produced so readily that the difficulties of yesterday are forgotten. Two decades ago, buildings had their heating systems and they were as modern as possible in that day, yet tenants accepted certain great annoyances as inevitable. Only the ten-penny novelist, describing the crash of cannonade, the perils of boiling geysers and hissing anacondas, could work in peace beside the radiator of those times.

Noise and inefficient heating were accepted things in 1892 when Mr. Dunham, in charge of a large state institution with buildings covering nearly forty acres, set to work to correct this condition. His

mind could not accept the results he gained with the equipment and technology of heating in those days. He began to concentrate his attention on heating, and so well did he apply himself that he became an authority on the subject, frequently consulted, and a sought after contributor to technical publications.

Believing that only the two pipe system could be successful, he began to work out a device for positively and automatically closing the radiator against the escape of steam, thus to enable a steam heating system



DUNHAM BUILDING
CHICAGO

D. H. BURNHAM & CO., ARCHITECTS

to keep the radiators hot at an economically low pressure. The result was the Dunham Radiator Trap, which in working principle is identical with the Dunham Radiator Trap seen everywhere today. Functioning through a thermostatic diaphragm of great sensitivity, expanding and contracting uniformly by reason of the volatile liquid within it, and seating or unseating the outlet valve automatically, steam is trapped in the radiator until it has given off all its heat, and the cooler air and water readily and silently pass off to the return piping system.

Upon this invention and the perfection of its workings depends the whole low pressure vacuum system of steam heating which the great modern buildings use. Because of the Dunham Trap, engineers and building managers are able to balance great efficiency with great economy in heating. Almost everyone has forgotten the difficulties of the past, and the tenant of the skyscraper or of any modern building enjoys, without thought of the why and wherefore, the benefits of a smoothly working heating system that is silent, flexible and adequate at all times.

From the manufacture of the Dunham Radiator Trap, Mr. Dunham has risen to the head of a great industry, which manufactures the Thermostatic Radiator Trap, and a complete line of low pressure vacuum steam heating specialties, which now perform the highly technical functions of what has become nationally known as the Dunham System of Heating. The Dunham Research Laboratories carry on constant, extensive tests on trap performance under actual working conditions. Under the sign of "Dunham Heating Service," the campaign of improvement and education goes on in the United States, Canada, the United Kingdom, Europe and Asia. The civilized world benefits universally from the energy and ingenuity aroused many years ago, and exerted continuously since to the architectural—the human—problem of adequate economical heating.

1926 sees not only this contribution of Dunham invention and manufacture but also a genuine contribution to architecture itself through the Dunham Building here shown, and which this spring will become the headquarters and home of the Administrative Section and General Offices of the C. A. Dunham Company.

Located but 250 feet from Chicago's Outer Lake Shore Drive and within a stone's throw of Lake Michigan, the Dunham Building appeals to those who desire the best there is in offices, and to those whose business demands choice and dignified space with correct and efficient service. This attractive building is set in surroundings worthy of it, there being grass and flower gardens on the premises.

The following description is given by D. H. Burnham & Co., a firm irrevocably associated with the architecture of the great metropolis on the shores of Lake Michigan and whose founder—the late Dan H. Burnham—gained international recognition by reason of his vision and work in the "City Beautiful" plan for Chicago.

Description—Building to be nine stories and basement in height, steel frame and tile arch floor construc-

tion and fireproof throughout—to be devoted to office purposes exclusively.

Exterior—Bedford stone for first two floors, dark red face brick next five floors, top story and attic of buff terra cotta to match Bedford stone, with face brick as panels in pleasing combination. The building carries architectural treatment on all four sides so as to have an attractive appearance from all points.

Entrance to the building has an open loggia two stories high with free standing stone columns supporting the wall above.

The top of the building does not terminate with the usual box effect but is featured by a similar open loggia surmounted by an arch, above which is a wide pediment embellished with carved ornament forming the crowning feature of the building.

Interior—The entrance vestibule gives access to the elevator and stair lobby which has a marble floor and tavernelle marble wainscot 9 feet high, surmounted by a decorative plaster cornice and a coffered ceiling in colors. The finish of this entrance and lobby is equal to the finest in the loop. The elevator doors opening into the lobby are of polished bronze.

There are two high speed electric elevators of the latest type located in the center against the east wall, and grouped around them are all the utilities such as stairs, closets, toilets, pipe shafts, smokestack, etc., with a small exterior court to assure light and air for the toilets.

Opening off the stairs on each floor is a lavatory—men's and women's alternating by floors—entirely sanitary and up-to-date in equipment.

There is a package or freight entrance in the rear of the building having direct access to the freight elevator through a vestibule.

With one inconspicuous exception there are no interior columns in the space to be rented, thus making the space unusually flexible.

* * *

Many factors have contributed to the growth of the Dunham Organization with factories in Marshalltown, Iowa, and Toronto, Canada, with over sixty branch and local sales offices in the United States and Canada, and a dozen or so foreign sales offices in the United Kingdom, Europe and Asia. Most important of all of these is the fact that always the name Dunham has stood for progress in the science of heating, for quality in product, for integrity in manufacture and in service, and for an idealism that is interpreted by conservative business principles which are as clean cut and straightforward as they are resourceful.

A Dunham System means heating service to the owner. He invests his cash in certain metallic fittings, etc., but he does not buy those parts that he may possess them, but that he may possess that which they make possible. In every Dunham installation, service is sold, but Dunham service means more than the physical heating service. Dunham service is the knowledge, the experience, the applied science that is in and back of every installation, and which makes possible the delivery of efficient economical heating.



Fifty Years of Hardwick & Magee Carpets and Rugs

THERE are doubtless many readers of the American Architect whose memory will carry them back to the "parlors" of their parents or grandparents fifty years ago; long rooms, somewhat dim, formally furnished, and seldom used except for "company." Frequently the carpet was a large medallion pattern with elaborate scroll work and highly colored flowers. To remember such a carpet and compare it with the carpets and rugs of today is to realize the development in floor coverings of the last half century.

Today the designing and coloring of carpets and rugs have reached a very high plane. This is particularly so in the Wilton fabric which is the finest floor covering woven by machinery and which lends itself to perfect delineation of form and beautiful blending of color.

We are specialists in Wilton floor coverings and were the pioneers in the manufacture of the modern Wilton rug, now in such general use. As it is the proud boast of this country that it leads the world in the manufacture of carpets and rugs woven by machinery, so it is with pride that we point to the important place

occupied by goods of our own manufacture. Whether it be a Wilton rug for a bedroom or a superb high pile Wilton carpet for a magnificent hotel dining-room, there is a Hardwick & Magee grade of suitable patterns and colors, beautiful to begin with, and yielding long and satisfactory wear.

The new Palmer House, Chicago, just opened—the third building in its long and honorable history, dating back to 1870—is carpeted with Hardwick & Magee goods. When the entire building is finished there will be about 115,000 yards or over 70 miles of these carpets in this enormous hotel. The Loew Theatres in the east and the West Coast Theatres in the west are using them with increasing satisfaction.

These are conspicuous and typical examples of their selection where both beauty and great wear resistance are of the utmost importance.

In countless homes throughout the country Hardwick & Magee rugs and carpets are adding beauty to their surroundings and rendering splendid service. For public or private use they may be specified or recommended with the knowledge that they will yield complete satisfaction.

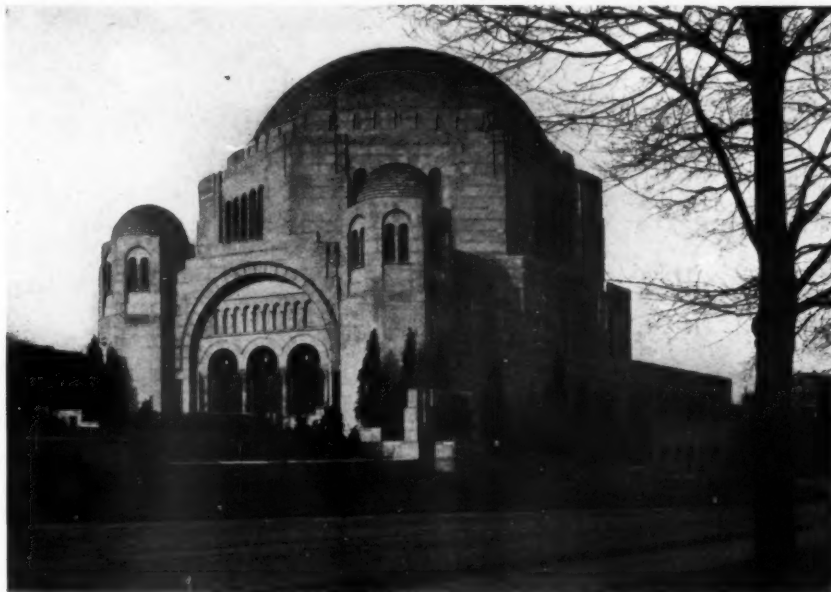
Specifications on some of Hardwick & Magee fabrics appear in the American Architect Specification Manual. For further particulars address

HARDWICK & MAGEE COMPANY

650 W. LEHIGH AVENUE

PHILADELPHIA

TWENTY-FIVE YEARS of EFFICIENT HEATING



THE NEW TEMPLE, Cleveland, Ohio

CHARLES R. GRECO, ARCHITECT

A. R. BRUEGGEMAN & CO.—HEATING CONTRACTORS

THIS issue is dedicated to the progressive advance of American Architecture, to the beauty and dignity of the structures created by the genius of the American Architect. It is fitting to remember that the mechanical, sanitary and electrical arts have kept pace with architectural advances in contributing the appliances which make for utility and comfort, so that beautiful structures are livable today as never before.

Among Companies who have thus served Architecture, The Illinois Engineering Company has devoted 25 years to the improvement of steam heating, and has cooperated with the Architectural profession in satisfactorily and efficiently heating thousands of buildings.

With the background and experience gained by these 25 years of successful effort in the heating of all classes of structures, we offer our services and facilities to the Architect. For his convenience, we maintain offices in 40 cities in the United States.

The New Temple is a typical example of architectural beauty to which we have contributed the item of heating comfort so vitally essential.

Of the Temple it has been truly said; "The mountain of the height of Israel"—that is the best phrase to describe the new Temple. Like a mountain top its dome first catches the rays of the rising sun; bears aloft through the winter its crown of snow; receives with perfect grace the drifting shadows of the clouds at noonday; transforms itself into a great jewel of amethyst against the golden west at sunset; and becomes a heap of silver beneath the magic of the moon.

As a building it is one of the masterpieces of the city. Of an ancient style adapted to modern needs, pleasing in mass and charming in detail, rightly placed in its peculiar lot and tastefully planted, it is a perpetual object lesson to all in architectural beauty.

REPRESENTATIVES IN 40 CITIES OF U.S.A.

ILLINOIS ENGINEERING COMPANY

ROBT. L. GIFFORD President

INCORPORATED 1900

CHICAGO

BUILDING a TERRA COTTA BUSINESS

A GOOD workman needs good tools, but good tools alone do not produce good work. This was in the minds of the officers and directors of the Midland Terra Cotta Company when that company was organized in the Fall of 1910. At that time there was built in Cicero, Illinois, the most modern terra cotta factory which a skillful and experienced architect could plan, but it was also built around an organization of carefully picked foremen and workmen who formed a nucleus of an organization whose purpose was to produce the best terra cotta. It was the hope of the organizers that the advantages of high quality would be recognized by architects and builders. That hope was justified, for the business of the Midland Terra Cotta Company has steadily grown and its reputation spread until today its products are being used from Montana to New Jersey and from Minnesota to Louisiana.



Midland Terra Cotta Company not only to improve its product, but to decrease the cost and for that purpose it is maintaining a research department, comprising trained scientists who are constantly studying the raw materials and the factory processes. Their work is keeping the Midland Terra Cotta Company in the forefront of progress.

Architectural ideals are changing and the architects are constantly becoming more skillful in the use of color and ornament. To fulfill the architect's needs terra cotta, as a building material, is pre-eminently fitted and the Midland Terra Cotta

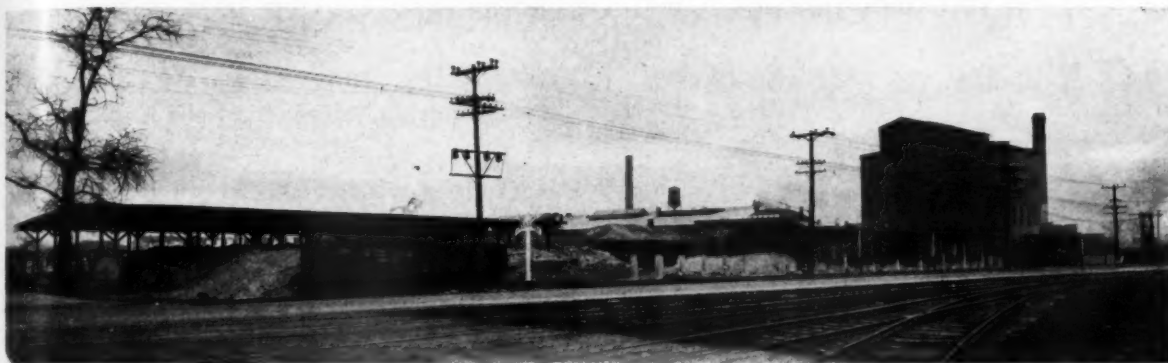
Company is prepared to supply the architect's need in every way. Its staff of modelers has been carefully chosen and its ceramic department can supply an almost unlimited range of colors and finishes.

The Midland Terra Cotta Company has always taken pride in the fact that no order is too large for it



A manufacturing business is a living, human organization and, like all other human things, if it does not go forward and progress it goes backward and deteriorates. It has been the constant object and ideal of the

to execute successfully or too small to be worthy of all the care and attention which could be lavished upon it. It has always taken pride in the fact that it has maintained an enviable reputation for making deliveries



when promised. Its past achievements are memorialized in countless buildings erected in the past, a few of which are named herewith:

Medinah Temple, Roanoke Building, Roosevelt Theatre, Diversey Theatre, Tower Square Theatre, Saint Mary's of the Lake Church, Surf Apartment

Hotel, Saint Giles Apartment Hotel, South Shore Apartment Hotel, Sisson Apartment Hotel, all of Chicago; Central Trust Co., San Antonio, Tex.; High School, Manitowoc, Wis.; Junior High School, Bay City, Mich.; Mizpah Temple, Ft. Wayne, Ind.



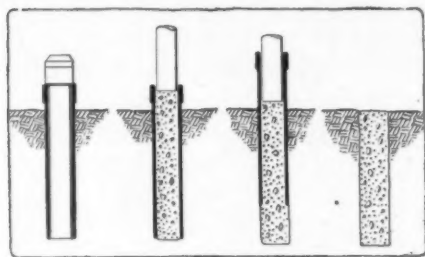
MIDLAND TERRA COTTA CO.,

105 West Monroe St., Chicago, Ill.

FOUNDED 1908—FOUNDATIONS EVER SINCE

The original MacArthur Pile was the invention of Mr. Hunley Abbott and was known as the Pedestal Concrete Pile. It was 18 years ago that Mr. Abbott patented his device. Since that time it has been clearly developed by this Company that the idea of one pile for all conditions is a fallacy and that a special pile for every condition is both sound theory and

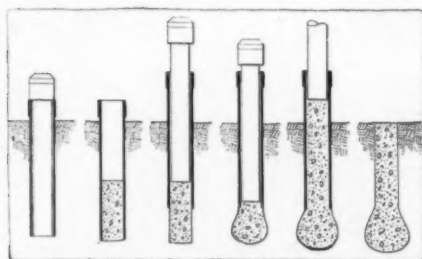
good practice. In turn, the Company has demonstrated to the architectural and engineering world the truth of its idea, and this



Standard Straight Shaft Pile

fact is ably supported by the evidence of buildings of character the country over standing solidly on MacArthur Piles of one type or another.

With the Company bent on continual improvement, those difficulties which were occasionally encountered with the Pedestal Pile in certain conditions were overcome. As faults developed they were corrected. The result is a perfected Pedestal Pile which is recommended where the conditions are right; such as, for



Pedestal Pile

instance, where the fair strata is not good enough to prevent a straight or tapered pile being punched through and where, if a pile fetches up on rock which may not be normal to the axis of the pile, the Pedestal Pile is of great value in preventing side slip.

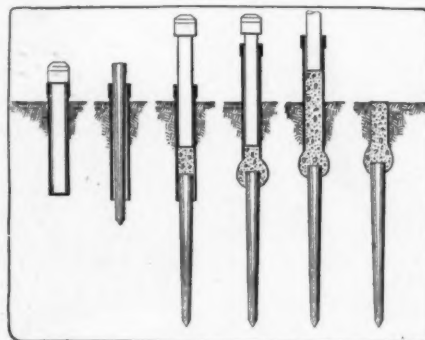
It will be observed, therefore, that the Company, after making complete improvements in the Pedestal Pile, limited its usage to well defined conditions. For a long time experiments with the Straight Shaft Type were conducted by the Company and, after it had been thoroughly proved to be the best, applicable to the large majority of foundation conditions, it was

adopted as standard by the MacArthur Company.

The advantage of a cylindrical pile is self-evident. Piles are generally used because the surface soil is of low bearing value, and it is necessary to carry the pile through the poor soil to a strata of better bearing value below. It is obvious that the cross-section of that portion of the pile on which the carrying of the load depends should be at least as great in cross-section as the portion in the poor soil above. Since skin friction depends on the surface exposed to the surrounding soil, a straight shaft pile offers a large surface for skin friction and is consequently not only an end bearing but a skin frictional pile.

To overcome the expense of too long concrete piles and the excavation necessary for wooden piles, the MacArthur Composite Pile was developed. The pile consists of a concrete section extending below the permanent water line with a wooden pile below. The Company claims one great advantage for its composite pile over any other of similar type—the MacArthur System assures perfect alignment between the wooden and the concrete pile. The method of accomplishing this may be seen in the illustration.

One great reason for the success of all types of MacArthur Piles is the fact that each is formed under great compression. While the steel casing used in the MacArthur System is being withdrawn, the concrete is being compressed or tamped by the weight of the steam hammer and mandrel, about eight tons. The result is a column of concrete in the ground, heavy, dense, strong—and knitted or bonded to the soil itself. The Company believes implicitly in an uncased pile, where it can be used, and only employs the permanent casing for conditions where the soil is so soft that uncased piles under compression would be prohibitive in cost. A great feature is that all of the piles used in the MacArthur System can be installed without change of rigging and the consequent loss of time.



Composite (Wood and Concrete) Pile

A series of bulletins describing each type of MacArthur Pile, the Apparatus used and the Procedure may be obtained upon request.

MacARTHUR CONCRETE PILE AND FOUNDATION CO., Inc.

55 John Street, New York, N. Y.

BRANCH OFFICES - PRINCIPAL CITIES OF UNITED STATES AND CANADA

THE STORY of LINCRUSTA-WALTON

LINCRUSTA—a permanent wall covering, built up in solid relief with a combination of linseed oil, cement, lithophone, etc.,—was first made in the United States in 1885 by James C. Walton, a son of the original manufacturer of English linoleums—hence its name “Lin-crusta-Walton.”

The first plant was acquired in 1889 by the Frederick Beck Company of New York City. Several years later it was taken over by the Pallas Company, the machinery being transferred to their factory on Staten Island. During the World War, the making of Lincrusta-Walton was temporarily discontinued.

In 1919 the Lincrusta-Walton Company was organized by George Tait, President of the Tait Paper and Color Industries, Inc., thereby becoming an integral part of that corporation, concededly the largest producers of wall paper hangings in the World. The Tait Paper and Color Industries, Inc., have important factories at Glen Falls, New York; Hackensack, New Jersey, and

Plattsburg, New York. It operates besides the Lincrusta-Walton Company, The Imperial Wall Paper Company, William Campbell Wall Paper Company, The Hobbs Wall Paper Company, The Plattsburg Wall Paper Company, The Imperial Color Works, and the Underwood Paper Mills. The two last named are manufacturers of various color products and raw stock which enter into the making of wall paper.

The Lincrusta-Walton Company, upon acquiring all of the machinery and the exclusive copyrights, patent and production rights, formulae, patterns and rollers of the original company, together with those of the Pallas Company, reestablished the business at Hackensack, N. J. Here the distinctive character of Lincrusta-Walton wall covering has not only been consistently maintained, but it has been improved upon in many ways, until today its appeal to home makers, architects, interior decorators and builders is wider than ever before and constantly growing.



ILLUSTRATING THE DECORATIVE QUALITY OF THE PRODUCT

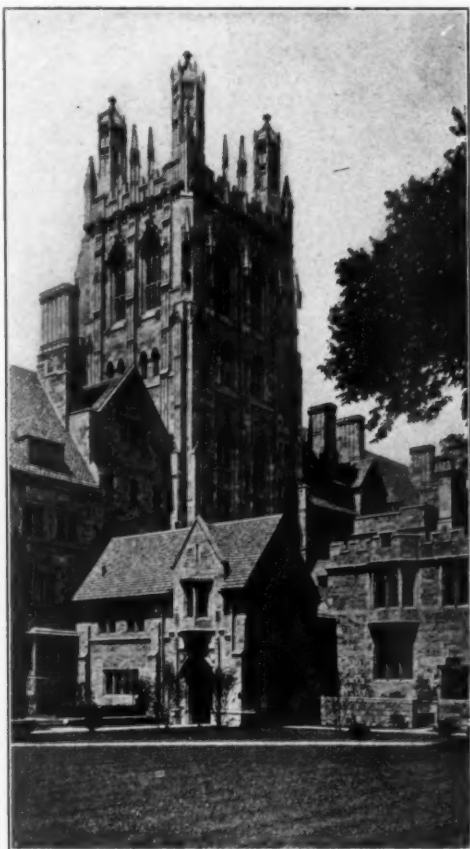


THE FACTORY OF THE LINCRUSTA-WALTON COMPANY AT HACKENSACK, NEW JERSEY

A HARDWARE BUSINESS THAT HAS KEPT PACE WITH ARCHITECTURAL PROGRESS

FIFTY years ago, when the AMERICAN ARCHITECT first appeared, the hardware manufacturing establishment of Sargent & Company, New Haven, Conn., had developed from small beginnings

In the early 80's Sargent & Company began the manufacture of Door Locks, Knobs, Escutcheons, etc., on a large scale and entered a period of even greater development than in previous years, due largely to



MEMORIAL QUADRANGLE YALE UNIVERSITY,
JAMES GAMBLE ROGERS, ARCHITECT

into one of the most important concerns in its field. The first factory was in New Britain but in 1864 the growth of the business necessitated its removal to New Haven where sufficient property was secured to provide for the development and expansion that have gone on steadily. When incorporated in 1864, the company had a capital stock of \$300,000. It now has capital, surplus and undivided profits of more than \$8,000,000 and factory premises comprising more than twenty acres of floor space, with a well organized personnel of experienced workers. This growth has been accomplished without at any time departing from the principles and ideals of the founder, Joseph Bradford Sargent, who built into the business the corner-stone of service—the best possible service through representatives and, following that, the utmost in service rendered by the goods sold.



HOTEL AMBASSADOR, NEW YORK CITY,
WARREN & WETMORE, ARCHITECTS

the architectural development of the same period with which the company has kept pace.

For about a quarter of a century Sargent & Company have used the columns of the AMERICAN ARCHITECT more or less regularly for advertising its product. Early advertisements were simple but earnest statements of the features of the goods advertised. However for many years it has been the practice of the company to show in this paper illustrations of buildings in different parts of the country that have been equipped with Sargent Locks and Hardware.

If the buildings shown in these advertisements could be grouped together the result would be one of the most beautiful architectural cities possible, comprising within its bounds governmental, state and municipal buildings, hotels, apartment houses and dwellings, colleges, schools and churches, theatres, hospitals, insti-



RESIDENCE OF MR. J. C. HAMLIN, PORTLAND, MAINE
JOHN P. THOMAS, ARCHITECT

tutions and society buildings, and commercial structures of all kinds designed by architects whose names if listed would comprise a veritable "who's who" in architecture.

It is the firm purpose of those responsible for Sargent & Company's destinies to continue along the same lines that have governed in the past; to contribute

their full share to the development of architecture by supplying hardware that will enhance its beauty and add to its utility; and to so conduct its business that the company may retain the same measure of good will in the architectural profession that it has enjoyed throughout its history, without which it could never hope to attain its maximum growth and usefulness.



VIRGINIA TRUST COMPANY, RICHMOND, VA.
ALFRED C. BOSSOM, ARCHITECT



JOHN CRERAR LIBRARY BUILDING, CHICAGO, ILL.
HOLABIRD & ROCHE, ARCHITECTS



**A Few of Our
Important Buildings**

Job	Piles
A Bryson Apartment, .. Chicago, Ill.	1901 350
4 Crunden-Martin Ware- house, St. Louis, Mo. 1904	1500
6 Union Electric Co., Dubuque, Iowa	1904 458
14 Crunden-Martin Ware- house, St. Louis, Mo. 1905	3000
26 Statler Hotel, Buffalo, N. Y.	1906 363
45 Denver Auditorium .. 1907	398
62 Boardwalk — Atlantic City, N. J.	1908 360
85 St. Louis Patent Office 1908	1971
110 Brewster Bldg., Long Island City	1909 1351
131 Cotton Mills, Lowell, Mass.	1910 1399
194 St. Mary's School, St. Mary, Ind.	1911 1183
230 General Vehicle Co., .. Long Island City	1912 1194
295 Hungerford Bldg., New York	1913 2342



**A Few of Our
Important Buildings**

Job	Piles
349 East Ohio Gas Co., Bldg., Cleveland .. 1914	671
433 Republic Iron & Steel Co., Youngstown .. 1915	3000
487 American Can Co., New York	1916 1800
621 Bancroft & Isherwood Hall, Annapolis, Md. 1917	2405
671 Government Ware- house, Brooklyn, N. Y. 1918	10300
775 Aluminum Goods Mfg. Co., Manitowoc, Wisc. 1919	1100
906 Metropolitan Life In- surance Co., L. I. City 1920	3016
1006 Federal Reserve Bank, Cleveland, Ohio	1921 2995
1085 School House, Philadel- phia, Pa.	1922 900
1125 Butler Warehouse, L. I. City	1922 3989
1221 Cincinnati Terminal Warehouse, Cincinnati, Ohio	1923 5273
1469 American Can Co., Seattle	1924 1153

"A form for every pile. A pile for every purpose"

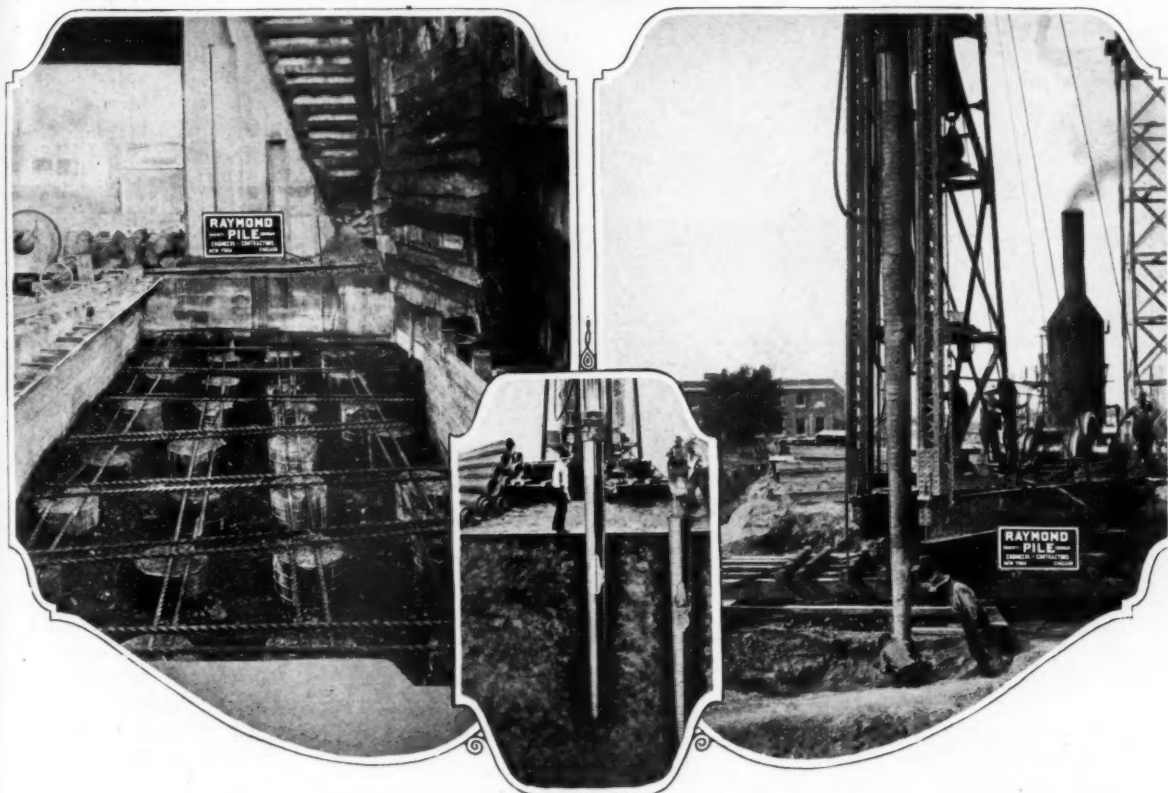
A saying, which is probably at least as old as is THE AMERICAN ARCHITECT, declares that, "A doctor's failures are buried." The contrary is true with Raymond Concrete Piles—their successes lie far beneath the surface. And the evidences of their successes rear skyward from coast to coast and from Canada to Chile.

It was in 1896 that the idea for the concrete pile first came to the late A. A. Raymond, then a contractor doing bridge work for railroads mostly and driving wooden piles as a matter of course. As he watched the timber piles being driven into place he saw that those which tapered from broad butt to narrow tip—which were more wedge-shaped than the

ordinary run-of-forest—must of necessity present a greater resistance to the load. And it occurred to Mr. Raymond that there was no need to depend upon the irregularity of Nature—piles could be made, of unvarying form of course, and fashioned to meet requirements. Like the history of most successful invention, the origin of Raymond Concrete Piles was formulated in a simple idea and developed to its present scope through much experimental work.

In 1901 the first building to be erected upon concrete piles was completed. The Bryson Apartment Building, illustrated on this page, was then the "last word" in fine apartment houses. It stands today, a monument to the skill of its designer and a tribute to the

RAYMOND CONCRETE PILES



inventive genius of Raymond. With this beginning started what may be fairly termed a revolution in foundation methods. Practical elimination of shoring, underpinning, sheeting, pumping and deep excavation and the reduction of masonry. The center line of columns could be brought nearer to the building line. Important savings in time—that highly essential element in building—were made all along the line.

As an indication of the proportions to which the concrete pile industry has grown, it may be interesting to know that for the past eight years the Raymond Concrete Pile Company has placed an average of more than one and one-half million lineal feet of piles per year. After all is said and done, probably the real "history" of any concern is the actual record of suc-

cessful achievement throughout the years of its existence. Beginning with Job Number One, we show a partial list of successful work performed by Raymond Concrete Piles.

Today fourteen branch offices exist in principal cities in the United States and in Canada and England. In addition to the standard Raymond Piles the Company designs, manufactures and places Reinforced concrete bearing piles, concrete sheet piles, interlocking piles, composite piles and special construction such as docks, bulkheads, sea walls, ore bins, dams, highway bridges, the Gow System of Caisson Piles, etc. Thus it lives up to its slogan, "A Form for Every Pile, a Pile for Every Purpose." Raymond Concrete Pile Company, 140 Cedar Street, New York.

RAYMOND CONCRETE PILE CO. 140 Cedar Street, New York

CONCRETE PILE

LEST THE AUDIENCE FALL ASLEEP!

How the "Nu-Notch" Air Diffuser Prevents It

Up to 15 years ago an audience in any auditorium had its choice of being cooled into a coma or lulled into solemn slumber while, in either case, the artists labored to get their efforts "across." This was not conducive to either pleasure or profit.

One does not have to cast back very far in one's memory to recollect when the boy went through the aisles with an apparatus similar to the one now used to rid the house of flies, and squirted ill-smelling "perfumery" over the floor in the hope that one odor would kill the other. In court rooms bunches of aromatic herbs were hung around to ward off the dangers of bad atmosphere. A feeble step in the right direction was made when radiators or grilles were set into the floors, walls or ceilings. Bad air would be drawn out and good air forced in through these openings. But draughts resulted; draughts brought sneezes; sneezes interrupted performances. Probably a performer's worst enemy is an uncomfortable audience. There were many of them in those days!

Then the ingenuity of William J. Baldwin, heating and ventilating engineer, combined with the inventive genius of the late George E. Knowles brought forth both the system and the device for thorough and effective diffused ventilation. The Knowles Mushroom Air Diffuser, by simple adjustment of the opening, distributed the air uniformly throughout the auditorium. Each person received the required quantity of fresh air, either warm or cool, and without draughts.

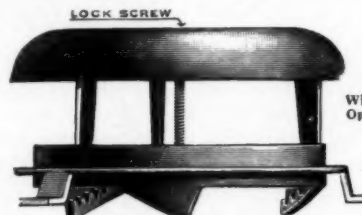
Today, there is scarcely a prominent theatre in the country from the great New York Hippodrome to Pantages, San Francisco, which is not equipped with Knowles Mushroom Air Diffusers. The roster of public buildings, from Eastman Music Hall, Rochester, to Shrine Temple, Los Angeles, so equipped, reads like a list of the Elect. Churches like the First Scientist, New Orleans, to the Methodist Church of Calgary, Canada, have installed Knowles Mushroom Air Diffusers, while from 12 Knowles equipped High Schools in Los Angeles to 42 Knowles equipped High Schools in New York, this device is

helping to keep a high standard of scholarship all over the country. Even London, in its beautiful new Plaza Theatre, has paid tribute to the diffuser which has won leadership in America.

These paragraphs are not written in a spirit of idle boastfulness but as an appreciation to the architects who have specified and builders who have installed Knowles Mushroom Air Diffusers. It is because of them that our ventilators have become standard and that the usual specification reads, "Knowles Mushroom Ventilators."

The Knowles Mushroom Ventilator has become standard, perhaps for one reason because it has never become "set." That is to say, we have improved it constantly since its inception. Now comes the finest model of them all, the 1926 "Nu-Notch," Mushroom Air Diffuser, illustrated on this page. We believe this device to be as nearly perfect as any

which can be produced. It has the rigidity of three outer bearings and is not dependent upon a screw to hold it in place; the top cannot be moved by feet when cap is locked in recessed notches by the lock screw. It has a fine regulation of air from wide open to tight closed through three series of recessed notches. There are just two parts, the bottom floor piece and the cap.

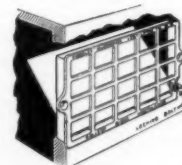


Wide Open

Nu-Notch
REG. U. S. PAT. OFF.

There are no set screws to become loosened and no springs to become worn or bent. It is an improvement on the finest because it is an improvement on our own!

We also illustrate the Knowles Gallery Riser Ventilator which has so successfully solved the problem of ventilating balconies of auditoriums. Bulletins on these and other Knowles devices will be sent upon request.

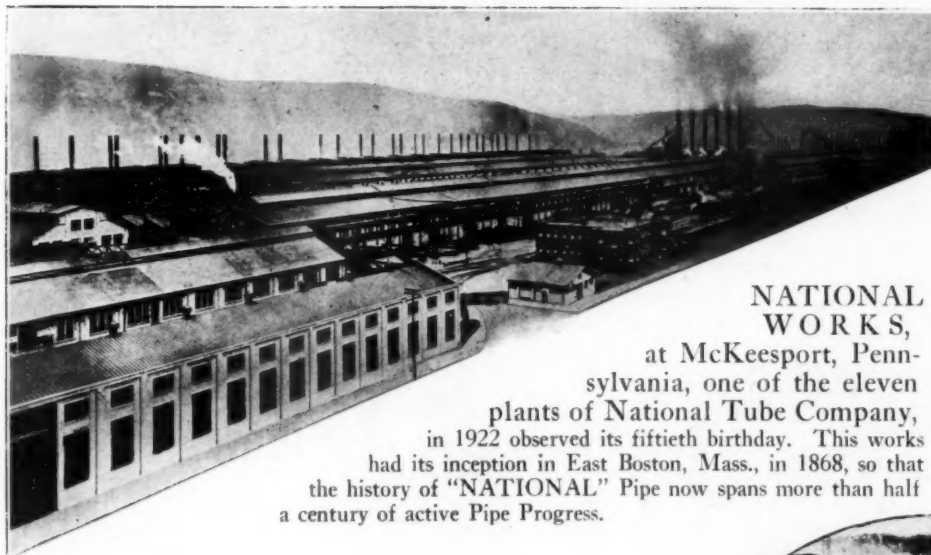


A Contented Audience Is An Attentive Audience
The New York Hippodrome Equipped
with 2,200 Knowles Mushroom
Air Diffusers

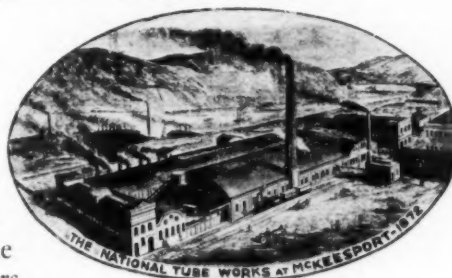
KNOWLES MUSHROOM VENTILATOR COMPANY,

202-204 Franklin Street, New York

A HALF CENTURY OF PIPE PROGRESS



**NATIONAL
WORKS,**
at McKeesport, Penn-
sylvania, one of the eleven
plants of National Tube Company,
in 1922 observed its fiftieth birthday. This works
had its inception in East Boston, Mass., in 1868, so that
the history of "NATIONAL" Pipe now spans more than half
a century of active Pipe Progress.



AFTER FIFTY YEARS' existence—Whether it is a man's personal life, a great political movement, a notable industry or invention, this seems a natural point at which to stand and look back over the accomplishments and failures of the half century, and to balance the realization of today against the struggles of the passing years.

From a modest beginning in 1872, with a small plant and a few acres of ground, the history of National Works of National Tube Company has been one of continual progress, until today it stands unrivaled in its position of leadership among concerns manufacturing tubular goods. Keeping abreast of the times, keeping faith with the consumer, and with a desire to serve in an ever-increasing measure, is the keystone upon which progress and growth have been made.

This anniversary attracted editorial attention throughout the country, and as typical of such the following is quoted from the *Journal of Commerce*, Philadelphia, September 30, 1922.

"When one glances back over the pages of manufacturing and commercial pursuit during the past half century he will find much to interest him in the origin and inception of the leading concerns of the present day, for the onward and upward career of these enterprises in the majority of instances is merely the substantial fruit of success which usually comes to reward intelligent and energetic effort, no matter in what direction or in what capacity it may be applied.

Tracing the history of prominent and old established Pennsylvania enterprises it will be found that there is probably none which enjoys a wider prestige and reputation in its special line of activity than the National Works of National Tube Company located at McKeesport, Pa., which a few days ago had the pleasure and satisfaction of celebrating the 50th anniversary of its founding. It is one of the oldest concerns of the country and has developed to its present large proportions from a small beginning, but its growth and expansion have been consistent and gainful. The real secret of the continued

success of the firm will be found in the fact that its management has always proven it is fully in touch with the progress and trend of the times, studiously striving to place upon the market a line of products that would sell themselves through the efforts of their own merits and qualities.

The people of McKeesport are naturally proud of the past record, present stability and future promise of the city's representative commercial and manufacturing enterprises; proud of that integrity of business dealing and consistency of energy of purpose which successfully meet the commercial rivalry and competition, because of known quality of product and reliability of service; proud of that up-to-date spirit of effort and endeavor which makes the success of the past the foundation upon which to build and plan for still greater achievements in the future, and in all of these essentials the National Tube Company is typical of that commercial energy and enterprise which won for the United States a position of leadership among the nations of the world."

For more than Half a Century "NATIONAL" Pipe has been The Recognized Standard of Wrought Pipe

For Over Forty Years the History of Cabot's Creosote Shingle Stain Has Been the History of the Development of the Country and Suburban House Architecture in America

CABOT-STAINED HOUSES IN THE 1880's



Cram & Wentworth, Architects, Boston

CABOT-STAINED HOUSES IN THE 1890's



Andrews, Jaques & Rantoul, Architects, Boston

CABOT-STAINED HOUSES IN THE 1900's AND 1910's



Wilson Eyre, Architect, Philadelphia



Fisher & Lawrie, Architects, Omaha, Neb.

CABOT-STAINED HOUSES IN THE 1920's



Walls treated with Cabot's Old Virginia White; roof stained with Cabot's Creosote Stain. Charles A. Platt, Architect, New York



Cypress shingles, brick chimneys and stonework finished with Cabot's Double-White; roof in blended browns of Cabot's Creosote Stains. Clark & Arms, Architects, New York

Samuel Cabot Boston, Mass.
Incorporated

New York, Chicago, Philadelphia, Kansas City, Minneapolis, Los Angeles, San Francisco, Portland.

Cabot's Creosote Shingle Stains, Stained Shingles, Old Virginia White, Double-White,
Stucco Stains, Mortar Colors, Insulating and Deadening "Quilt"

Specifications of most products advertised in THE AMERICAN ARCHITECT appear in the Specification Manual

By Way Of Louis Of France And George Washington Greenhouses Come To You

Leddra Wood

YOU will agree with us, that aside from a radio talk on the nebular hypothesis, nothing is more deadly dull than the so-called history a firm writes about itself.

Therefore, instead of history-izing, let's have a little chat together about some outstanding worth-whiles in connection with the regal lineage of glass enclosures.

You may have forgotten that it is said Louis XVI of France was the first to have glass covered gardens.

This pleasure loving King had built for him, glass roofed orangeries—a passing whim as ephemeral as the structure itself.

Then in pre-Revolution days an ambitious New Yorker built a "glass shed" as he called it—a lean-to. It wasn't heated—just a conservator of the sun's heat, so he could have early vegetable plants to set out, and also lengthen the Fall garden.

The Lymans of Waltham, near Boston, hearing of this glass shed, employed George Washington's services as a surveyor to lay out the foundations for one, with adjoining buildings.

It was heated by carrying an exposed horizontal brick flue through the center of the so-called shed.

This same shed has been in constant use by the Lyman descendants, until last year when its condition compelled its replacement.

When Washington came into the possession of Mt. Vernon, it is said that among the first things he did, was to have a glass roofed house erected on the Northern boundary of the box lined garden.

When Washington's adopted son, George Washington Curtis, the Father of Gen. Robert E. Lee's wife, built his "Columned mansion-on-the-hill" at Arlington, he built a "plant room" as it was called, on its East and Southern exposure.

Later came a greenhouse modeled after the one at Mt. Vernon, and on the reputed site of which the present one stands.

Just before the Civil War when many of the wealthy New Yorkers were buying estates, and building fine residences along the Eastern bank of the Hudson, lean-to greenhouses or conservatories became the essential.

This being in the days of cylinder stoves and the Baltimore Heater; the question of heating them was a

Problem. Hot water or steam heating of houses had not yet been developed.

It was then that E. A. Hitchings, a man of natural inventive and engineering trend, designed a curious camel-humped affair of riveted steel, that he called a water heater. Connecting it with horizontal runs of cast iron pipe, he was able to independently heat the conservatories.

After the war, separate conservatories as they were then called, were built, and the Hitchings' riveted, humped back heater was changed into a cast iron boiler and used exclusively for such heating.

It wasn't long before several concerns sprang up for the sole purpose of building greenhouses. Hitchings always did the heating for them.

Then about 50 years ago, one of the greenhouse building companies started to make their own boilers. So what more natural than that the Hitchings Company should in turn start building greenhouses?

As the old hump boiler is a thing of the past, so are the heavily constructed glass enclosures.

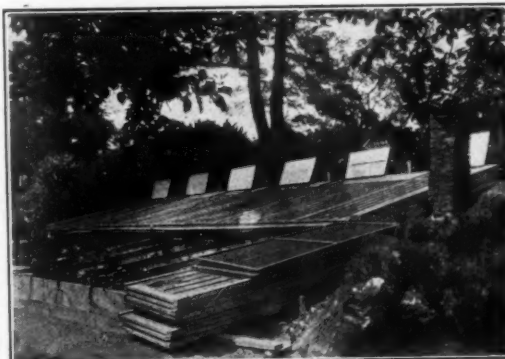
Now we have the cast iron sectional boilers, and light, attractive, sun-flooded houses of steel frame and cypress.

The "sun-sheds" have become so large that its no uncommon thing for one to cover an acre.

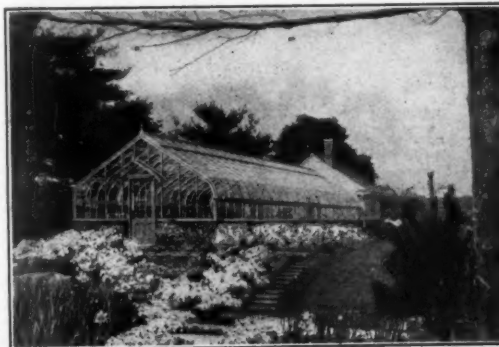
Conservatories have expanded into glass enclosed living rooms—sun-parlors, swimming pools, sleeping roofs, sludge bed covers; and a more recent development, kiddy play-places.

The little old shop near the corner of 10th Street and Broadway, has long since succumbed. After outgrowing several other locations, we are now housed in an extensive up-to-date plant at Elizabeth, New Jersey, where we make practically everything that goes into our structures, except the glass and steel.

Considering that the greenhouse has come down through such a lineage as a King of France, George Washington, the Lees, and a pioneering man of vision like the elder Hitchings, we have a great pride in knowing that today we are building and equipping glass structures in the best possible way, and consistently living up to the ideals and traditions of the founder of our Company.



Glimpse of the Lyman "sun-shed", the ground for which was surveyed by George Washington. It has been in constant use until a year ago, when its condition compelled replacement.



One of our modern curved eave houses, 18 feet wide and 50 long.

Hitchings Company

General Offices and Factory

ELIZABETH, N. J.

NEW YORK
101 Park Ave.

WILKES BARRE
P. O. Bx218

Oak Lane, PHILADELPHIA
6700 North Broad Street

BOSTON
161 Massachusetts

ALBANY
P. O. Bx921

Specifications of most products advertised in THE AMERICAN ARCHITECT appear in the Specification Manual

Putting SAFETY into the Elevator Landings of the Modern Office Structure

THE architects of the First National Bank of Boston used precast Alundum Aggregate slabs before all the elevator doors. These slabs are of a neutral tone made by combining gray Alundum Aggregates and gray cement—no marble chips. Precast Alundum Aggregate Treads of the same tone were used on all the bank service stairways, with landings and platforms of monolithic construction to match.

NORTON COMPANY, WORCESTER, MASS.

NEW YORK CHICAGO PHILADELPHIA
DETROIT PITTSBURGH HAMILTON, ONT.



First National Bank Building, Boston
York & Sawyer, New York, Architects
Stone & Webster, Inc., General Contractors

T-162



NORTON FLOORS

ALUNDUM TILES, TREADS, AND AGGREGATES

Specifications of most products advertised in THE AMERICAN ARCHITECT appear in the Specification Manual

The PUBLISHERS' PAGE

DURING 1926, (we were near to writing 1925—"how use doth breed a habit in a man")—we shall continue our endeavors to fulfill our obligations to our readers,—and to ourselves. In writing the announcements that logically find a place on this page, it is difficult to submerge the "ego." This page is, of course, the place where the publishers of this journal will discuss the things that lie nearest to a publisher's idea of his obligations to his subscribers.

The Golden Anniversary Number is, we hope, now with you. We shall be glad to learn your reactions. If it conveys to you the idea the publishers at all times had in mind,—an outline of fifty years of architectural development, and an earnest effort to serve in the most efficient way,—we shall rest content.

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In this issue there is the authorized presentation of the prize winning design of John Russell Pope, architect, in the Theodore Roosevelt Memorial in Washington, D. C. As the remaining eight designs, by distinguished competitors, are too important to restrict in space, we shall group them in our issue of February 5. These designs will provide a record of one of the most notable competitions in recent years.

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Competitions are, for many good reasons, always interesting, and as far as possible those of sufficient importance will be presented from time to time. Following this policy there will appear in issue of February 5 the prize winning design by Raymond M. Hood, architect, in a competition for a Municipal Building in the village of Ridgewood, N. J. Mr. Hood's solution of this problem is particularly clever and will, we feel sure, be found a valuable contribution to the civic buildings in small communities.

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Arthur Woltersdorf, F. A. I. A., is now on his way to Spain where he will sojourn for a month and return by way of Germany, France and England. Mr. Woltersdorf has agreed to set down his impressions of recent architectural progress in Germany. The deductions and critical comments of so high an authority will be of considerable value inasmuch as architectural Germany since the armistice has received little notice in this country although both English and French architectural journals have devoted considerable space to the topic.

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The value of *THE AMERICAN ARCHITECT* as a medium through which employers and employees

can connect with each other is well illustrated in the following quotation from the letter of an architect in Florida telling of his experience.

"You will recall that the last advertisement I sent you appeared in one of your August issues. I might say that I received twelve replies and have secured several good men. Since your paper is issued only twice a month and being in a hurry, I decided at the time also to insert an advertisement, and for seven days, in the *Atlanta Journal*.

"It may interest you to know that I got just one reply as a result of the advertising in the *Atlanta Journal* and the man was unsuitable."

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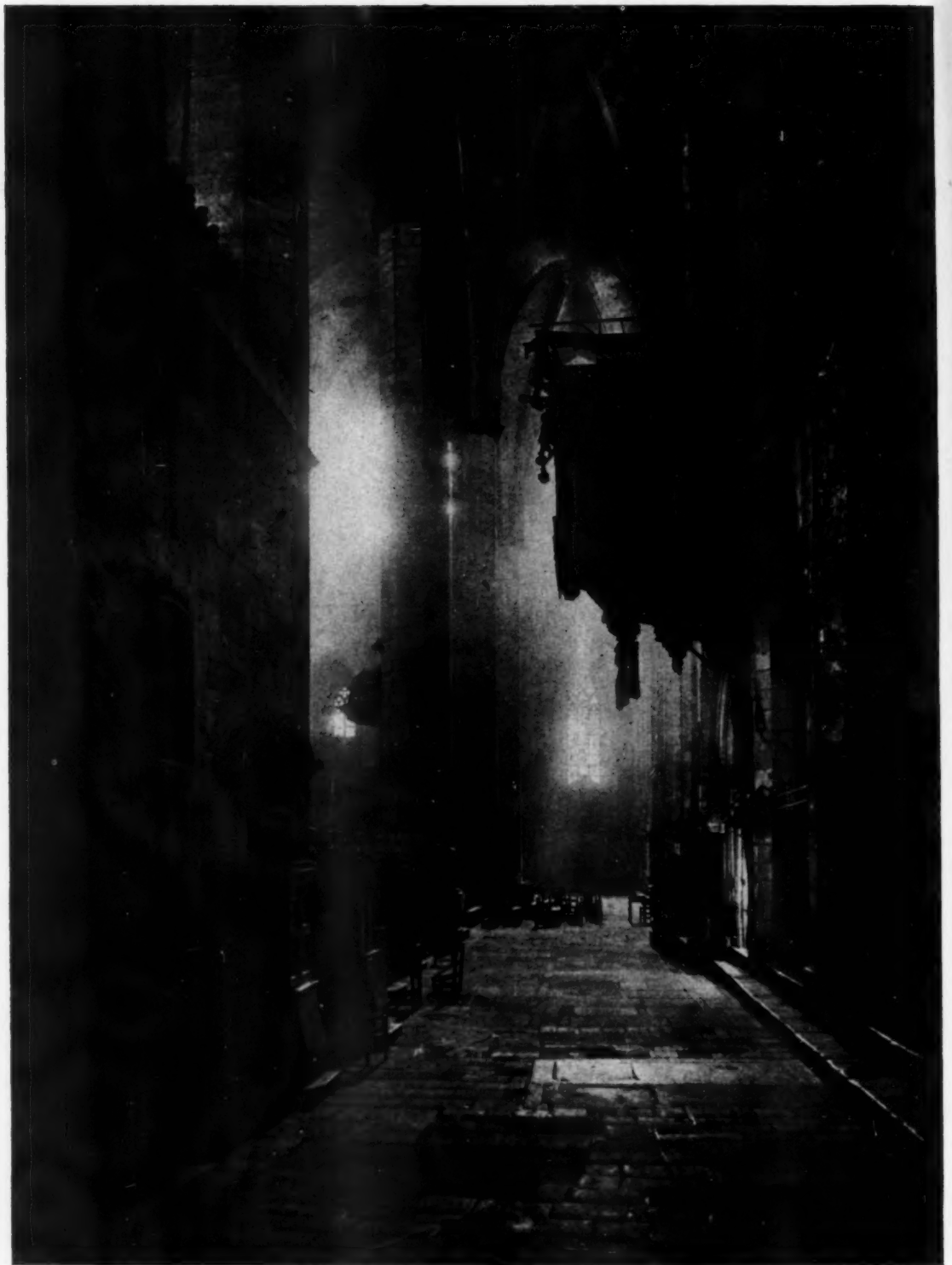
We are not disposed to claim that the postal business of this country would be better conducted if under private control, but we are strongly of the opinion that no private management would pursue a policy similar to the Government plan in the transportation of mail matter. A committee of publishers recently appeared before a committee of Congress and showed in the most emphatic manner that transporting mail by passenger train routes was an ultra expensive method and largely responsible for the excessive postal rates now charged on second and third class matter. Every subscriber to a periodical is indirectly made to suffer from those excessive rates, and in most instances poor service, and should take the matter up with his members of Congress.

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Since the late Sir Frederick Leighton, one-time president of the Royal Academy, a great many years ago painted a picture that has become celebrated, and sold it to a famous soap manufacturer for advertising purposes, there have been many occasions in England when an artist of great distinction has not felt it beneath his dignity to lend his efforts in the exploitation of a standard article. The co-operation between business men and members of the Royal Academy is, we believe, closer in England than it is in this country.

These reflections are suggested by observing in a recent issue of *The Architect's Journal*, of London, a splendidly executed etching by Frank Brangwyn, R.A., of the interior of a marble works of a firm of experts who desire to bring their product to the attention of architects.

We can imagine no more dignified or artistic method of exploiting a good product than in this fashion. We are not prepared to say whether or not our national academicians would lend their art to such purposes, but we are quite certain that a closer co-operation between the large advertiser and the fraternity of artists would result in a decided artistic betterment of advertising everywhere.



NORTH AISLE, SANTA MARIA DEL MAR, BARCELONA

(Clisé Arxiu Mas)