

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. III.]

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[No. 116.]

BOSTON, MARCH 16, 1878.

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It is some years since a competition was held for designs for a new Congressional Library, — a competition which resulted in nothing but the awarding of two or three premiums for preferred designs, — and it may be believed that the need which was then felt is now more imperative. The librarian of Congress, Mr. Spofford, has kept it before Congress by successive recommendations in his annual reports, and in his last reminded them that the accumulation of a hundred thousand volumes since the need was first felt was crowding the library to such a degree as to greatly impair its usefulness. To this difficulty is to be added the insecurity of the books in their present position, to which we not long ago called attention. The United States Senate has lately passed a bill, which is now before the House, appointing a commission, and authorizing an appropriation, to provide plans for a new building or an extension. There are now in the library over three hundred and thirty thousand volumes, and a third as many pamphlets, a great part of which is rubbish, to be sure, owing to the law which compels it to receive two copies of every book published in the country. The same provision which has swollen it so fast hitherto will, it has been computed, in the course of this century require for it a building two-thirds as large as the present Capitol. This ought to be reason enough for rejecting one of the schemes proposed, — that the central part of the Capitol be extended to furnish room for the library. It is desirable that in due time the centre building should be modified into unity of design with the wings, and plans for this were prepared long ago by the architect of the wings. But it is likely that there will always be use enough for all the space that can be added without injury to the effect of the building; while it is not likely that, even if some means is devised to keep down the rising flood of literature, any space that could be so provided would be permanently sufficient for the needs of a library which will far outstrip all others in the country. Moreover, in spite of the convenience of having the books close at hand and under one roof with the halls of Congress, a library is a thing that more than most demands imperatively, for its well-being and security, a building of its own, isolated from all other uses. The difficulty of separation might doubtless be substantially relieved by providing a working library of the more essential publications, for which there would be room enough in the Capitol, and which might consist of duplicates. Another proposition is to build a new library on Judiciary Square, where the old City Hall is, a situation inconveniently far from the Capitol, we should think. Still another is to build it on ground east of the Capitol, which promises better. It has been suggested, we understand, that in this case it may still be a building of divided uses; but this again would be a serious mistake. However it is done, we trust it will not be in any half-way manner. A library brooks no rival; and a building that is well planned for it, cannot be well planned for any thing else.

It is said that the so-called Advisory Committee for the selection of American paintings to be sent to the Paris Ex-

hibition has after considerable labor made its final choice among a large number of pictures that were offered. About eighty have been accepted, mostly the work of New York artists, there being only three from Philadelphia and five from Boston. It is not reported that pictures have been received from any other cities. Of the whole number accepted a dozen are water-colors. The contributions of American artists who are abroad are expected to add some twenty-five more to the display; and of these it is rumored that the greater part will come from Rome, — a thing which was hardly to be looked for, considering that the strongest colony of American painters has generally been at Paris, where the exhibition is to be, and considering also the prominence of the Munich colony of late.

The Trustees of the Boston Museum of Fine Arts have published their second annual report, which gives an encouraging account of its administration and success. The Museum was open to the public on every day in 1877 except in August, when it was closed for alterations. Lately it has been free to the public on Sunday afternoons; and the average of visitors has been nearly as great on Sunday as on Saturday, the other free day. The whole number of visitors during the year was nearly one hundred and sixty thousand. Of these of course by far the greater number were on the free days, when the average was about fifteen hundred. It appeared, however, that the number of visitors on the paying days, which was only sixty-three, increased in spite of the addition of Sundays to the free days. It is clear from the experience of this and the Philadelphia Museum, which we mentioned last week, and of the Metropolitan Museum in New York, that the establishment of these means of general cultivation has not been in advance of the popular demand for them. The report of the committee on the Museum dwells with reasonable emphasis on the importance to its usefulness of the School of Drawing and Painting, which, though independently organized, has been given house-room and the use of the collections by the trustees, and for which two additional rooms have been fitted up in the past year. To the students in this school are to be added the architectural students in the Institute of Technology and the pupils of the Free School of Design at the Lowell Institute, to all of whom free access to the collections is given. The report shows that the principal running expenses are pretty evenly balanced by the current receipts; the sale of the catalogues meeting the cost of issuing them, and a trifle more; the receipts from admissions balancing the pay of the attendants; and the income from investments paying the salaries of officers and the cost of heating and lighting, and giving a small surplus for the purchase of works of art. This assures the Museum of its own maintenance, but leaves its accretions to be chiefly the result of individual contributions. These are not lacking, and already the complaint is of want of room to display the collections. This want has grown so pressing, that a subscription has been opened with the hope of raising a hundred thousand dollars to build the remainder of the front wing of the building, — the part now built being only a fraction of the complete design. Of this sum nearly ninety thousand had been raised at the last accounts, and there was little doubt that the work would be begun the coming summer.

At a recent distribution of prizes at the Sheffield School of Art, Mr. Barry, the President of the Royal Institute of British Architects, made a criticism which it would be well to repeat often, for the present at least, wherever there are schools of drawing of any serious purpose. He spoke with surprise and regret of the very small number of pupils in the school, a large one, who attended the class for the study of the human figure. This study, he said, was not only the highest branch of art, but by far the most useful, and the knowledge of it would do more than any thing to keep alive and vigorous the other branches of drawing and modelling. As an instance he mentioned the effect of it among the French as "seen in the broad, decisive and vigorous way in which they handled ornamentation of all sorts," — we should add, in the refinement and grace of their work.

The school in Glasgow is one of the old schools of art in England, having been founded by the efforts of the painter Haydon and a few others in 1843, before the "World's Fair" gave the impulse to the study of design which resulted in the South Kensington movement. The strength of the undertaking and the need it met may be inferred from the fact that in this town of Sheffield, a town smaller than Boston, given over more than any other to the condition of a purely manufacturing community, and to the deteriorating influences of trades-unionism, the number of scholars in the school of art has grown to nearly four hundred. Glasgow is a yet more striking instance of the popularity of such a school, where in a community of about six hundred thousand there are in a similar one thirteen hundred students. These are good examples for the manufacturing communities here. There is less to encourage in the fact that Mr. Barry should have found among the four hundred students at Sheffield only five or six who attended the classes for the study of the figure.

MR. BARRY here proclaimed an important and a much-neglected truth. There is no royal road to design, but that which comes nearest to it lies through the study of the figure. It is, of course, difficult for those who have not pursued the study to realize the increase of power which it gives, as it is for a near-sighted man to know how things will look to him through spectacles before he has tried them. Nevertheless it is true, and all experience shows it, that no other training gives the same power of line, and of composition, or so favors that directness, decision, and subtle unity of effect which we call style, and which is so wanting in most modern work. It is pretty safe to say that no one can be a great designer who has not learned to draw the figure. The study of other organic forms—flowers, plants, and trees—such as has been more common of late, is the next best thing, but distinctly inferior as a means of training. In all the great ages of design, and among almost all nations that were skilled in it, the study of the figure has been predominant. The only exceptions of mark are in Indian and Saracenic work, which, admirable as it is in its kind, by reason of the natural aptitude of those who wrought it, is yet on a lower plane than the rest. It was at the foundation of Egyptian and Greek design, and the Roman owed to it what excellence it had. All the beautiful ornamental design of the early Renaissance was the work of artists whose main study was to paint and carve the figure. Even in the thirteenth century, the golden age of Gothic architecture, though the common reliance was on other organic forms, the figure was always essential in any considerable work, and the sculpture of it had reached a point of excellence for which we too often forget to give it credit. In our day the French designers owe, as Mr. Barry intimates, their uncontested superiority, at least in skill, to their familiarity with it. Yet in our country there are but two or three schools where serious attention is paid to it, in spite of the great enthusiasm for all sorts of design which has sprung up. This is due probably to the fact that the study is exacting, and we are impatient of rigorous training; also, that it naturally comes last in a draughtsman's training, and that we are in haste to put an end to this training early, as to all others. But the neglect is none the less a serious shortcoming, and ought not to continue.

It has been a standing illustration of the impossibilities which architects were called on to accomplish, to say that their clients expected them to put a quart into a pint pot. It would appear that a way of accomplishing this, or something very like it, has been discovered in Boston. Some time ago the mayor of that city sent a special message to the city government, calling their attention to the urgent need of a new court-house, a need which has long been felt and argued, and recommending that it be put on a lot on Beacon Hill, now occupied by a disused reservoir, and extended by the purchase of adjacent land. The Aldermen's Committee on County Buildings, to whom the mayor's message was referred, has reported that this proposal is too expensive, since besides the cost of the additional land, which they set at \$214,000, the city architect, they say, estimates the cost of a new court-house upon it at \$1,200,000. The committee therefore proposes an economical alternative. It would divide the courts,

which are now crowded into one building, and build a new criminal court-house in the yard of the jail; then pull away the present court-house, and build a new one on its site for the civil courts alone. By this, not only would the county be saved the expense of buying new ground, which is an intelligible economy, but there would be a still greater saving in building; for according to plans prepared by the city architect, says the committee, two new court-houses can be built for \$500,000, which will accommodate all the courts and have eighteen rooms left over for the use of the City Hall, while, as we have seen, to build one will cost more than a million,—that is to say, two court-houses are cheaper by half than one. Unless there is some mistake in the figures, there is great ingenuity somewhere; and an economical committee may well plume itself upon it. Nevertheless it is perhaps not well to commit the county too hastily to the duplex court-house, lest it should be discovered that by subdividing the civil courts and occupying part of the Common three new court-houses could be built for three hundred thousand dollars, and perhaps have a whole one left over, which would be a yet more shining economy.

MR. CHARLES H. MOORE writes to the *Nation*, concerning the care of public monuments in Europe, to say that he has lately seen the south transept of the Cathedral at Florence covered with scaffolding "for the purpose of carrying on one of the most foolish and destructive processes of so-called restoration,—that, namely, of scouring off with strong acids all the old weather-stain, the golden color of ages; of picking out and replacing with new all cracked or broken fragments of mosaic; and of *tooling over the old sculpture*." And again: "I found the delicate capitals of the window-shafts entirely unprotected, and freshly broken in many places by chips which the workmen had let fall upon them from above. The exquisite gable-croquets—originally most wonderful for subtle carving of undulating surface, and spring of curvature—were ruthlessly hacked over and spoiled. I have ascertained that the intention is to go completely over the Cathedral in this manner, in order to make the old work look fresh and match the new façade now in progress." This is a kind of barbarism by which the traveller in Italy and even in France is frequently shocked. Aside from the beauty of the work which is thus attacked, there is here a peculiar cruelty in this treatment of the material. It is a characteristic of many of the buildings of Tuscany, due probably to the marble of which they are built, that they acquire with time a rich saffron tint, the "golden color of ages" of which Mr. Moore speaks. This color, of which the cathedrals at Florence and Pisa are conspicuous examples, is hardly found elsewhere, not even, we believe, in the intermediate towns of Lucca and Pistoia, and is very different from the gray and blackish staining which occurs in other cities, in Venice, for instance. The annoyance of the visitor at seeing these two cathedrals spotted over in glaring white where stones had been replaced has been softened by the feeling that in due time the new material would grow into harmony with the old, and his natural inclination would have been to hasten the process by a slight stain on the new stones: there are few, we fancy, to whom it would have occurred to do it by scouring the old. As for the new façade, whose place in the general esteem is yet to be determined, most persons would have expected to wait patiently for it to adjust itself to the rest. Not many except its builders would, it is to be hoped, have thought of adjusting the venerable cathedral to it.

URBAN HOUSING IN NEW YORK.—I.

THE INFLUENCE OF THE SIZE OF CITY LOTS.

As New York lies, it would probably be impossible to invent a system of tenement-houses, unless built with no windows at all, more perfectly adapted than is the present to deprive the homes of the poor of light, air, sunshine, and ventilation. The question has often been asked, "Can nothing be done to lessen the evils of tenement-houses in our large cities?" Can nothing be done, for example, to get air and light into the sleeping-places of those who live in such houses? Is there no way of getting a window into every bedroom, or must the majority of the bedrooms of the poor be always, as now, dark and unventilated? Perhaps every day this question is now asked not by one only, but by a large and ever-increasing number among those who suffer, or see others suffer, under the evils and wretchedness resulting from the present

system. No satisfactory answer to this question seems ever to have been made. Yet of its importance there can be no question. The evils are acknowledged; the need of remedy is urgent. It is my aim in these papers to show that this question, though it has long remained unanswered, is not unanswerable; but that, on the contrary, there is an answer ready, and a most satisfactory one.

It is common to attribute the evils of New York tenement-houses to overcrowding consequent on the limited size of the island on which New York is built. This notion is so generally accepted, as to make the tracing of the causes of these evils backward, step by step, seem useless study. In giving attention to tenement-house plans, and in endeavoring to find their chief evils, and then to find the immediate and direct cause of each evil, and so, without preconceived notions, to trace the chain of evils backward, I found myself led in quite a different direction. There seems to be a more immediate cause for these evils than the size of the island, and one happily not beyond human control. I found in the imposition by the city of artificial restrictions on the distribution of areas and sale of real estate that which has immediately brought about these evils in New York, and would bring about the same results in however large a space. And I find that these restrictions, where they have been imposed in inland cities, have led to results identical with those we deplore in New York.

The peculiar evils of the tenement-house system of the upper part of New York are not due to the limited size or narrow width of the island on which New York is built, as is generally supposed, nor are they due to overcrowding, but to the inflexible depth of 100 feet each of the up-town lots. The whole of New York above Fourteenth Street, that is to say four-fifths of the island or more, is laid out in lots all of one uniform depth. These lots are about 100 feet deep each. This is much larger than persons of moderate means can afford to build on. A shallow house would not pay on such a deep lot. By consequence, only very deep houses are built, in which only the rich can afford to live with comfort; in which people of moderate means cannot live with economy; and which, for the very poor, and even for mechanics and artisans, become tenement-houses of a sort which can be lived in with neither comfort, true economy, nor decency.

This is the Juggernaut under the pressure of which New York is fast becoming a city of only the very rich and the very poor; a city where only the very rich live in comfort, and where those of moderate or limited means are driven, if they remain in the city at all, into boarding-houses, in the best of which many have to sleep in inside unventilated rooms. It has thus become a city which discourages marriage, and where it is impossible for the young of the better classes to marry and go to housekeeping without a provision far beyond that required in any other city on the continent, or probably in the world. It has become a city where mechanics and artisans, as well as day-laborers and abject poor, are herded in tenement-houses where nine-tenths of the bedrooms are darkened and unventilated. It has become a city where manufactures do not, as in Philadelphia (where operatives, mechanics, artisans, and the like are happier, more respectable, more respected, because better housed, than anywhere else in the world), readily take the place of a departing or expiring trade.

Imagine a city where official blundering had resulted in making it impossible to buy flour or sugar or any other staple in parcels of either less or more than a hundred pounds, or cloth or textile fabrics of any width except in pieces of ten yards' length, and one will be able to form some idea of the absurdity of the system at present prevailing in New York, and which governs all dealings in real estate almost entirely throughout the upper, and by far the larger, part of the city.

In Philadelphia the way in which the large squares are subdivided by lesser streets, and the blocks so remaining are again and again subdivided, makes it possible to buy pieces of land of an infinite variety of size and situation and shape and price. In consequence of this principally, — for the city is shut in between two rivers, much like New York, — Philadelphia has become the paradise of mechanics and operatives. The number of persons who are owners of real estate there is thus enormous in proportion to the amount of real estate owned. This makes a vast number of citizens in proportion to the population of the city, who, though people of small means, are yet owners of real estate, and who thus have a stake in the community, and are members of that class, the existence of which most conduces to the safety and perpetuity of the state.

The same would be, in a much greater measure than now, the case in New York if lots of smaller size were procurable in fee simple, or on ground rent. And this would be the case whether the houses built upon them were intended for one or several families. An owner of a small piece of real estate has the same interest in the conservation of civil order, whether his property is occupied by himself only or by a dozen other families. But the smaller the size of such pieces of real estate, the larger will be the number of holders. And not only this, but the better and more comfortable will be the houses upon them for however many intended. Can any thing be worse than the majority of the so-called French flats which have become common in the upper part of the city, but which in Paris would not be allowed by law? They have, some of them, more dark, unventilated bedrooms than per-

haps the worst of our tenement-houses. Nor can this well be avoided where such a house is built upon a lot one hundred feet deep, and but twenty-five feet, or perhaps less, in breadth, and where the only light and air to be had is on the narrow ends of the house, or by wells of light which are adapted to disseminate a pestilence through a house, but not to allow it to escape.

Would it not be well for owners of real estate to consider whether it would be to their advantage to run short streets through their property, from north to south, say of the width of Jauncey Court, and furnished like that with gates at the ends, which can be often enough closed to retain a property-right in the street? Such a street, like a *cité* in Paris, could be lighted and kept in order and policed by the city, and the lots along its sides could be of such shallow depth as might be found convenient for those desiring lots shallower than the customary depth in the city. Such lots could be leased on ground rent like the lots of Columbia College, the Sailors' Snug Harbor, etc. Would it not be well for those in charge of the interests of the institutions just named, and others like them, to consider whether, by acting on this suggestion, they would not be introducing a reform which would, in the end, become a benefit to all classes? Again, in planning flats, tenement-houses, and the like, would it not be well to plan them as shallow buildings, or blocks run through from street to street, giving light and air to every room of each flat or tenement, and divided from one another by such streets as above described?

Many attempts have been made to overcome the evils which have gradually arisen out of the New York deep lot system. But of those attempts, either those which have been carried out, or those which have only been recommended, I cannot find one which, if it accepts the present New York street-lot system, then effectually overcomes the evils growing out of it. When such attempts are meant to serve the tenement-house population by the planning or building of model tenement-houses, such houses either embody the usual tenement-house evils, or avoid them by means which are not of general application. They either have dark, unventilated inside rooms, or they avoid them by building on a corner lot. But these dark, unventilated, windowless inside rooms are the worst feature of New York tenement-houses, and are without parallel in any other country; and the New York up-town blocks contain each from forty to sixty city lots of which only four are corner lots. Buildings, or plans for buildings, however well meant, which embody the evils they should aim to avoid, or which avoid them by means not of general applicability, are not and cannot be models.

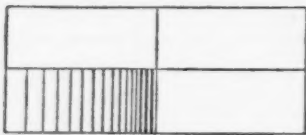
Those who have or would enter upon such enterprises, and in proportion as their motives are high and unselfish, should take care not to be misled into supposing that excellence of their plans is proved by any financial success whether brief or lasting, which such enterprises, where put into execution, may have. Financial success does not argue excellence of plan. The worst tenement-houses in New York are financial successes. Nor again does the fact that the poor desert the old tenement-houses, and crowd into the new model tenement-houses, prove any excellence of plan in the latter. From what I can learn, all old houses, on whatever plan, bad or good, will be deserted by tenants for new houses on whatever plan, whether good or bad. And all new houses (whether like Sir Sidney Waterlow's for instance, or better or worse) will, unless they cost too much, have a financial success, and a success otherwise in appearance for a time. Even convenience of plan should not be confounded with excellence of plan in a sanitary point of view. A house may be well planned, or it may be ill planned, from a sanitary point of view, and yet be very convenient. The convenience may be the result of much study and forethought. It is in itself an excellence. But it is not a sanitary excellence. Convenience is frequently, and in the city of New York almost invariably, at variance with sanitary excellence. And in New York this is the case not only in tenement-houses but also in private houses, and especially and to a very reprehensible degree, in most of the new flats and apartment-houses. Nor again should constant attention, any more than newness and convenience, be mistaken for excellence of plan. Constant attention, like that of that London lady who lives among her tenants, and collects rents, and supervises generally herself, and like that of a noble-minded lady in one of our own cities, and like that of all who from motives of charity or interest give constant attention, will secure success in itself, or it will prolong a success owed partly to the newness or convenience of a house. But this is as much the case with bad as with good houses. With every new house at the start, special attention, and such as cannot be depended upon later, is almost sure to be given to the character and demeanor of tenants. But whether special attention arises from philanthropic or only self-interested considerations, it is, though most worthy and commendable in itself, still outside the province of plan, unless a constant factor, to be always counted on.

Newness, convenience, and special attention ought to bring a very high degree of success and financial prosperity to any building, however bad its plan from a sanitary point of view. And that success ought to continue as long as the newness and the special attention last, and there are tenants who can appreciate convenience. But with time, and the falling-off of such more or less temporary attention, the success gradually disappears. Less

active interest in the house or houses on the part of its owners, less close attention on the part of their agents, less careful tenants, less cleanly houses, reduced rents, etc., in turn and gradually follow. As nearly as I can learn, this is likely to be the case, whether the plan built on is good or bad.

What then is the plan that we should aim at? A good plan, the plan that is most needed, would seem to be that which would combine most economically the greatest sanitary excellence with convenience, and would depend least on newness and special attention for its success. I should consider a well-planned house or tenement that in which not only good people could live commendably and with most advantage to themselves, but one in which bad people could live badly with the least harm to themselves or others.

And in this connection we should bear in mind the difference between harm, and harm apparent, and not give our attention only and wholly to the latter. The main evils in bad plans are those of a sanitary nature, of which only experience and science have shown the danger; while minor evils, such as inconvenience, poor appearance, etc., are immediately apparent. The New York system of building is a remarkable one for hiding the evils which are inherent in it. Take for instance such a tenement-house as is not uncommon in New York. It is twenty-five feet wide, over seventy feet deep, and it has four families on a floor. It fronts well on a wide street; it has, say, a brown-stone front;



it makes a good appearance, and commends itself to outsiders. Each tenement in such a house consists of several rooms. But only one of the rooms in each is properly lighted and ventilated; for the tenements in such a house have, and, as will be seen from the diagram annexed, can have, windows, light, and air on but one of their four sides. The windows are on one of the narrow ends, and, as the tenements are three times as deep as they are wide, it will be seen that they are necessarily like cave-dwellings, dark and unventilated. If, in addition to such light as is received into the inner rooms by openings in the partitions dividing them from the outer room which has the windows, a sort of twilight gets into them also by means of wells of light as they are called in the body of the house, still these inside rooms are inadequately lighted. In most of them no bird would sing, no flower would bloom, no plant put forth green leaves. No human being can live in them except at a great sanitary disadvantage as to ventilation. Such wells of light, as before pointed out, are calculated to disseminate a pestilence through a house, but not to allow it to escape.

Yet, bad as such tenements are, most persons would prefer to hire one in such a house, rather than in an equally well-appearing house if it stood upon a narrow street or alley, even though the tenements of the latter possessed every sanitary excellence and were in every part well lighted and ventilated by windows opening on the street and yards. For the credit or discredit of living in a wide or narrow street is immediately apparent. But the evils of the system embodied in a 25x70 feet tenement-house with no thorough draughts of air, and no adequate ventilation or light except in one room of each series, are not apparent; they are concealed from outsiders wholly and always, and mostly from the occupants themselves, except in very hot weather. Few persons are very sensitive about bad air. It does not inconvenience them—at least, not much. Few persons will take much pains to avoid it, especially if such avoidance entails any other sacrifices or inconveniences along with it. Even among our wealthiest classes we have made our houses very convenient, but rather fever-breeding. We must expect that the poor, like the rich and the tolerably well-off, will prefer appearance and convenience, that first element of the luxury that we are all, and I suppose wisely, striving for, to any doubtful sanitary benefits.

But if we concede that (1) bad air is bad for the health, that (2) in inside rooms there will be bad air, that (3) the chances are that inside rooms will be frequently unventilated; and that (4) where a house is more than two rooms deep, and without windows on the sides, there must be one or more inside rooms in it; and if, further, we concede that (5) a house two rooms deep cannot be made much more than about thirty feet deep, with economy, for a race of five-to-six-foot-high people; and (6) if we only put one such house on a 25 x 100 feet lot,—then, it seems to me, that we must either be willing to let over two-thirds of our lot go unutilized upon, or we must have smaller lots.

THE ILLUSTRATIONS.

THE WHITING BUILDING AND OPERA-HOUSE, HOLYOKE, MASS.
MR. C. S. LUCE, ARCHITECT.

THESE buildings were erected for William Whiting, Esq., the present mayor of Holyoke, and are now rapidly approaching completion. The hotel-building is constructed of Philadelphia pressed brick, with finish of light Nova Scotia sandstone, and comprises stores on the ground floor, dining-hall, kitchen, parlors and chambers on the second and third stories and a public hall on the

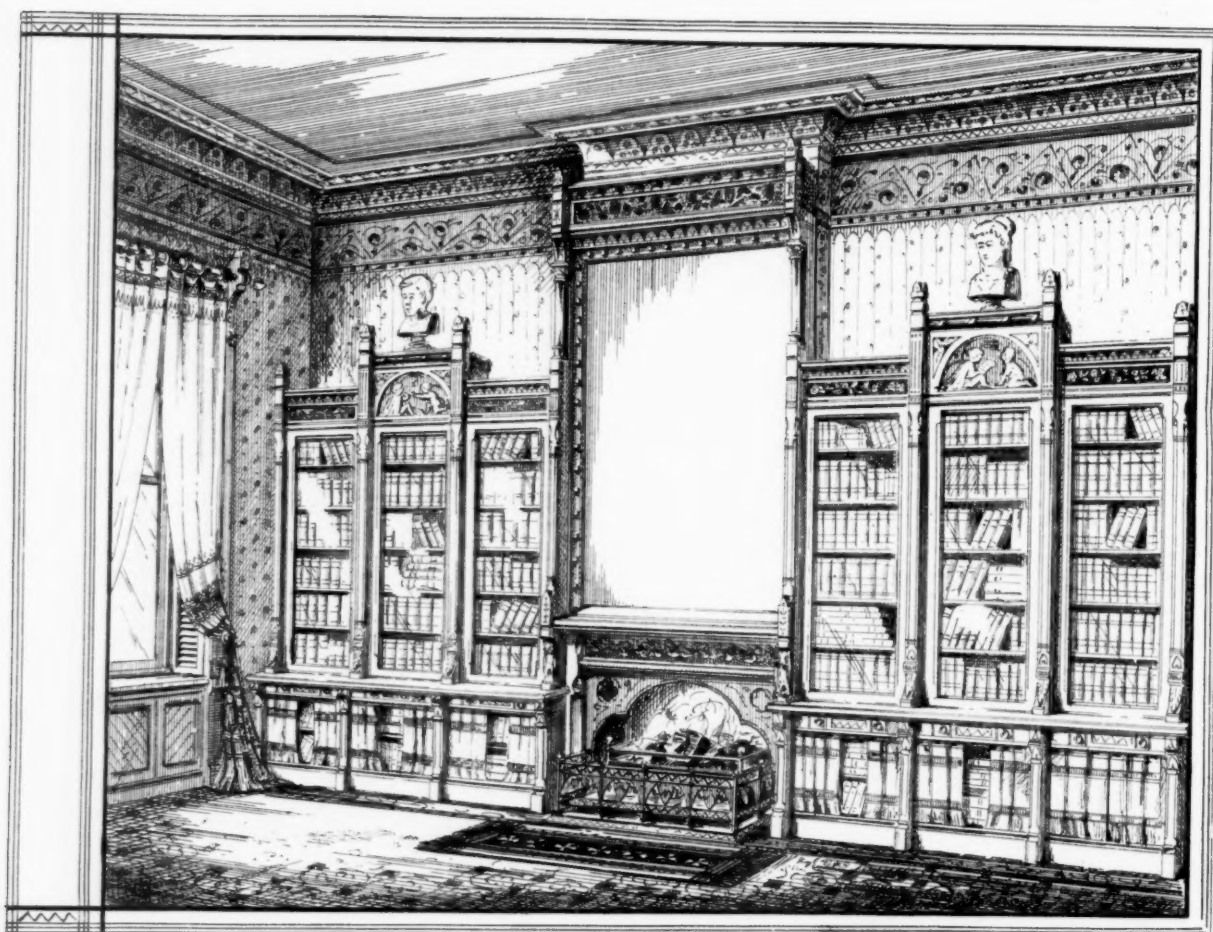
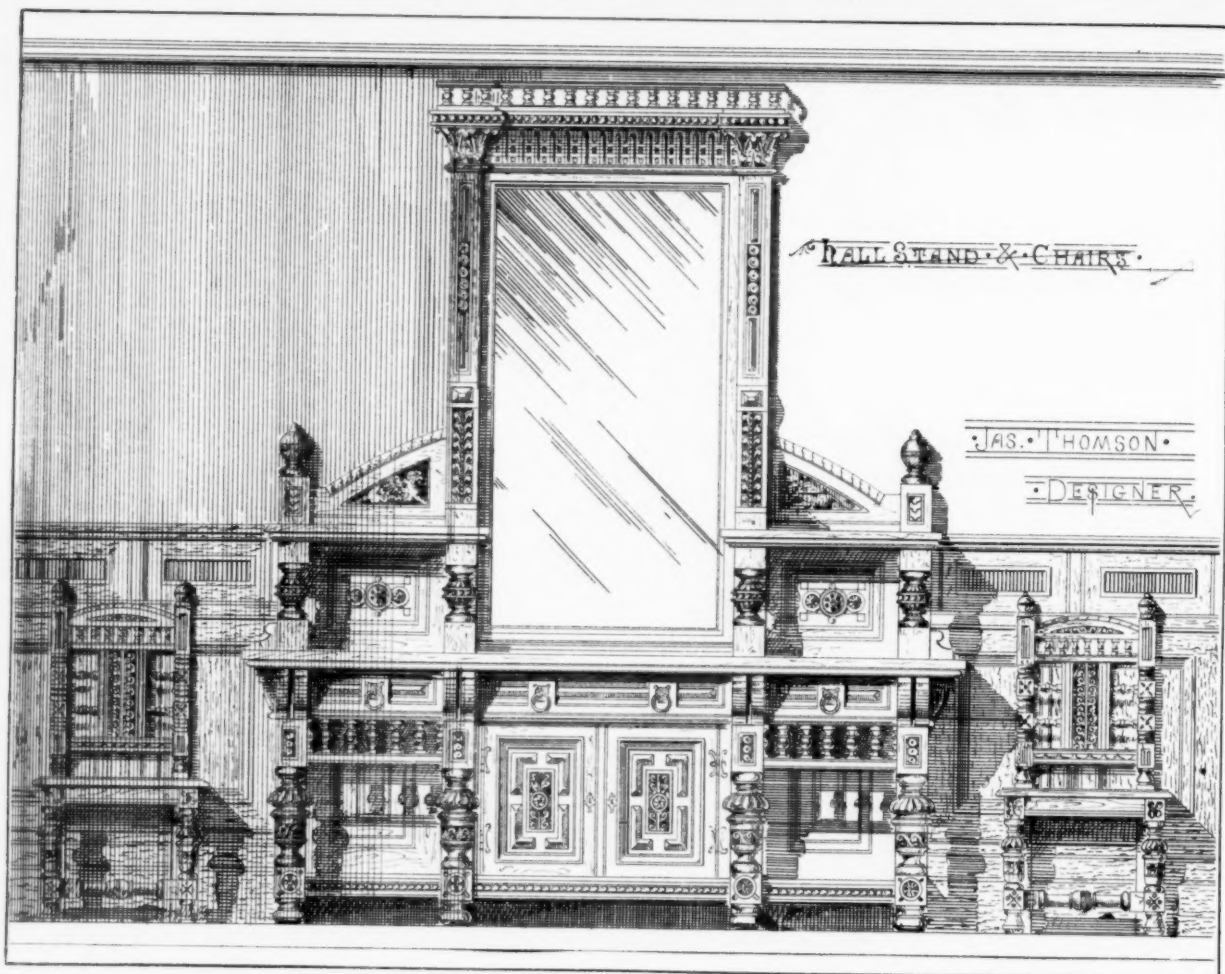
fourth story. The tower is about one hundred and fifty feet in height. On the exterior of the opera-house, light Philadelphia and dark Holyoke pressed brick are used; and bands of black brick and panels of maiolica tiles are introduced. The central gable is further ornamented by two circular panels containing heads of Comedy and Tragedy. The auditorium includes an orchestra, parquet circle, and one gallery, and has a seating capacity of about eleven hundred. It is finished throughout in the Neo-Grec style. The plan is circular. The ceiling consists of a large coved cornice, pierced by eight semi-circular lunettes (forming a series of furred vaults), surmounted by a flat dome, and is ornamented at the centre with a *rosace*, which serves as a ventilator to the auditorium, and from which depends a large brass chandelier. All the ornamental work is executed in papier-mâché. In the two prosceniums, though merely decorative features, an attempt has been made to render them essentially architectural. The entire theatre is being decorated, and will be ready for dedication by the middle of March. The cost of the two buildings, exclusive of the land, will be \$125,000.

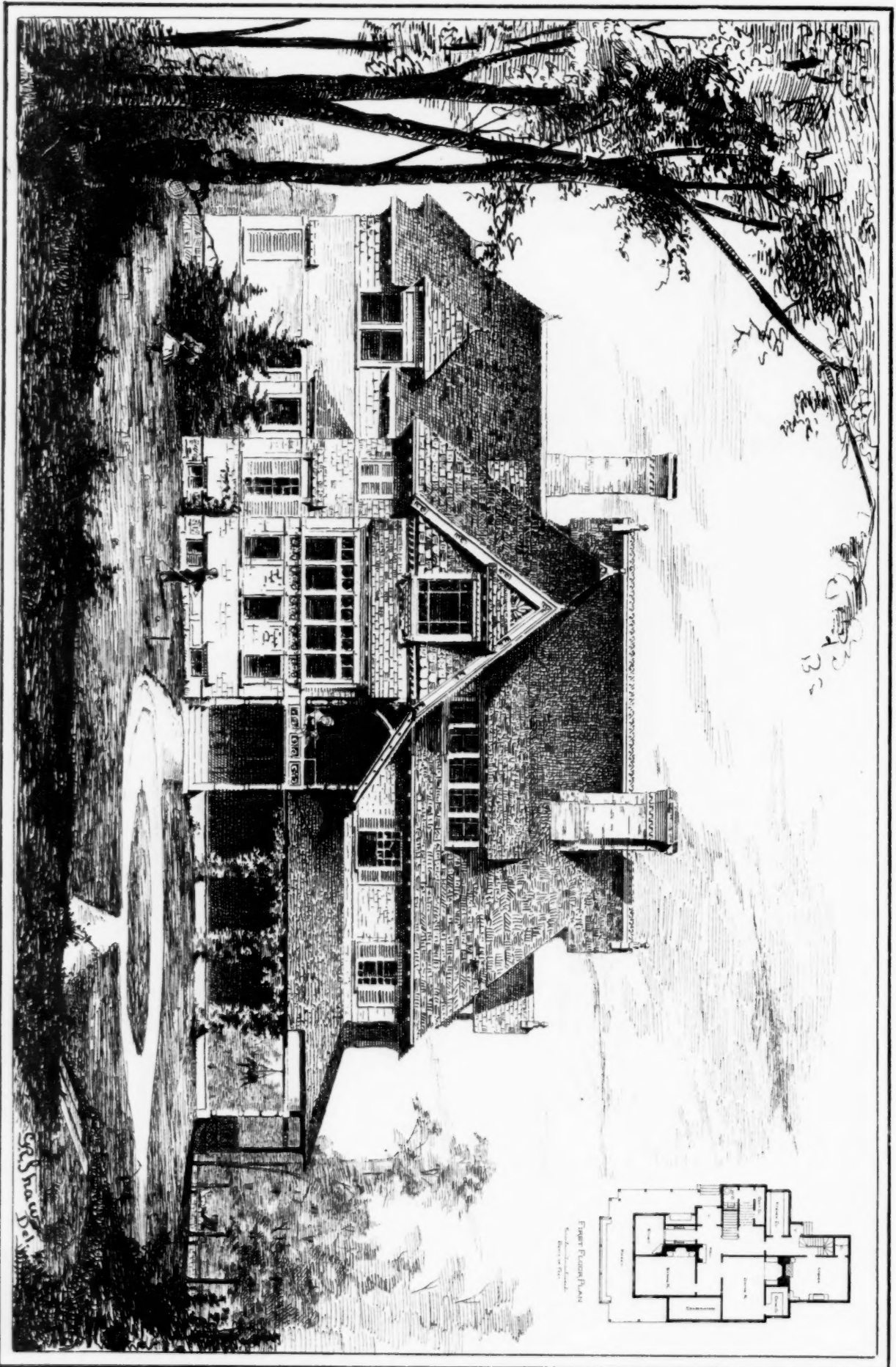
DESIGN FOR A DWELLING FOR MR. PIERCE, BROOKLINE, MASS.
MESSRS. G. R. AND R. G. SHAW, ARCHITECTS.

CONCRETE DWELLING-HOUSE IN VORWOHL.

Mr. Liebold, an architect of Holzminden, has published in the *Deutsche Bauzeitung* an account of a dwelling-house of concrete, lately built by him in Vorwohle for a gentleman engaged in the manufacture of Portland cement. Although the house (see illustration) was quickly built, it yet seems to contain a *tour-de-force* of almost every constructive form for which concrete can be employed. The rooms are covered with various kinds of vaults, many of which have a very considerable span. Over the vestibules of the different stories—spaces thirteen by seventeen feet—three vaults are superimposed without the use of iron, and depend solely upon the vaults of the adjoining rooms for a counteraction of their side-thrust. The original and striking feature of the building is the great cloister-vaulted roof, which, resting on the four principal corners of the structure, rises through a story and a half. At its base, the concrete of which it is formed is one foot in thickness; at its summit, only from four to five inches. It is to be regretted that it has received no architectural expression on the exterior; the objectionable mansard is excused by Mr. Liebold on the ground that it was desired by his client. The outer walls of the house are one foot thick; division-walls and partitions being from eight to ten inches thick. In the cellar these dimensions are increased by four inches. The walls are anchored at suitable points, and were built above ground by means of adjustable wooden boxes, into which the cement is poured. Below ground, the cellar and foundation walls were cast in trenches, the cellar itself not being excavated until after their hardening. The trenches, consequently, were dug to the depth of the cellar below the level of the earth, plus that necessary for the foundation below its floor. This total depth must have been between seven and eight feet, and can only have been obtained in firm soil.

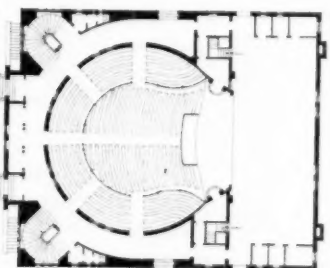
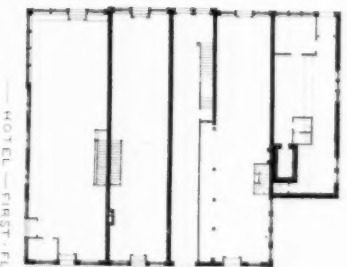
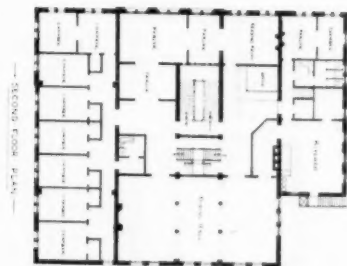
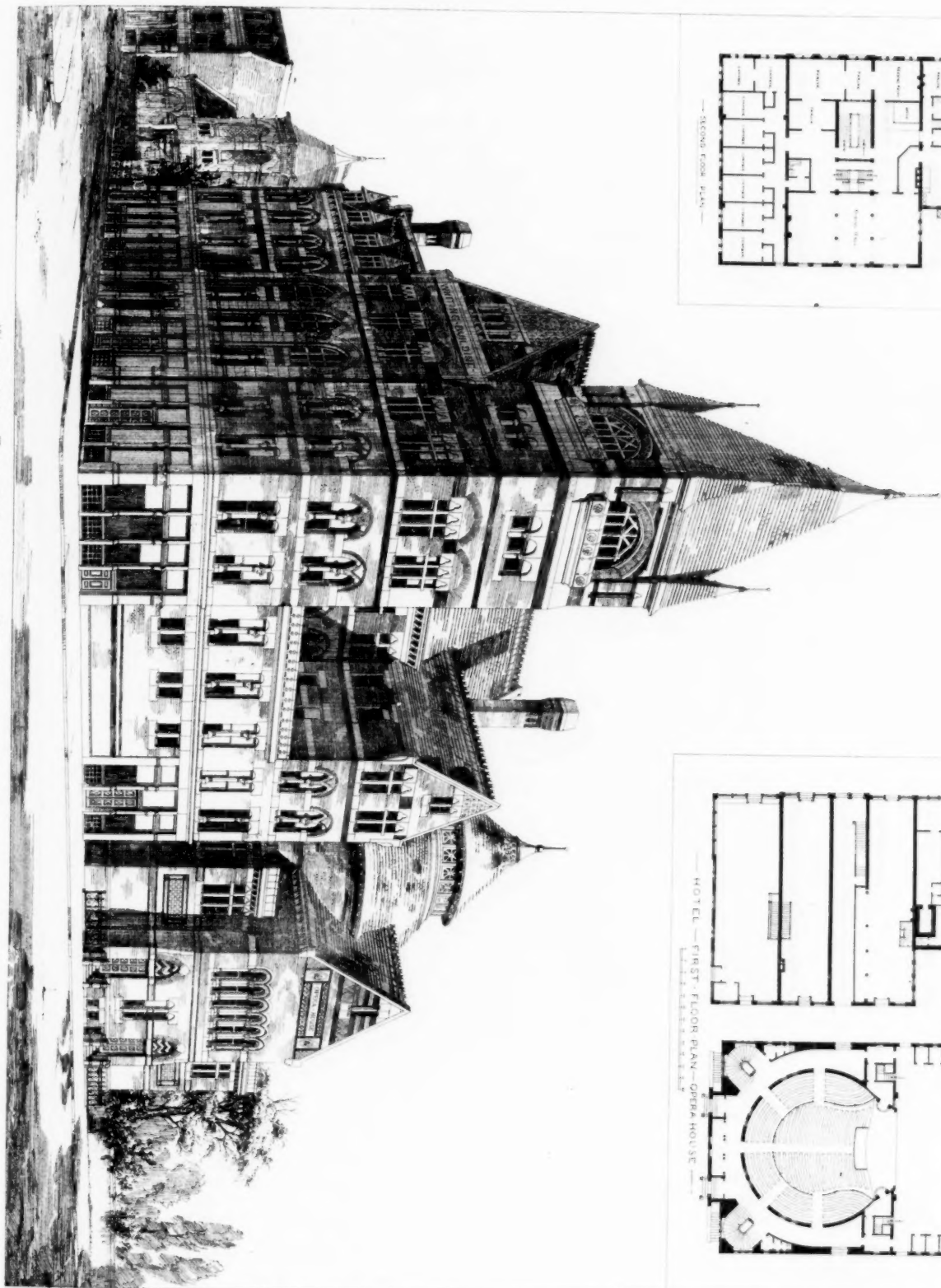
The concrete employed was composed of one part cement to seven and four parts respectively of gravel and sand. The stairs have treads of slate, and are cast so as to measure on the string four inches at the re-entrant and seven inches at the outer angle of each step. In them a coal-slag was substituted with good effect for the gravel; the weight of the concrete thus prepared being but from one-half to one-third that of the concrete made with stone. The cornices, window-casings, steps, etc., were formed of three parts of sand to one of cement, and were ready to be walled, or rather cast, into the walls, as the building advanced. The entire cost of the house, which is in effect a cube with a side of between fifty and fifty-five feet, was \$4,300 gold. From the itemized account it appears that all the interior vaulting cost \$420; the stairs, \$82; and the roofs and the platform, \$438,—all in gold. The cost of concrete walls, including the wooden forms, etc., was 13½ cents per cubic foot. The building was completed in four months, and its construction may be regarded as thorough in every respect. Immediately after it was roofed in, the inspector of buildings ordered the floors throughout the house to be weighted with sixty-five pounds to the square foot. This great weight did not produce the slightest hurtful effect on the vaults,—not even a crack in the plasterings. As a preliminary experiment, a pair of concrete vaults were built last year in Vorwohle over a space thirteen by fourteen feet, the length of which was divided into two equal parts by an iron I beam; the walls, also of concrete, were twelve and eight inches thick. The centre of this vault was weighted on a space containing thirty-one square feet with a weight of five tons, that is to say, over 330 pounds to the square foot; yet there was no displacement or crack either in the walls or vault. As a further example of rapid construction, a bridge was built of concrete, and prepared for use in six working-days, which was twenty-four feet long and twelve feet wide; and a smaller concrete dwelling-house, forty-three feet by thirty feet, was entirely completed in seven weeks. It is to be hoped that the official experiments now being made by the Polytechnic of Brunswick upon the strength and reliability of concrete will soon be made public, as their results bid fair to be surprising.



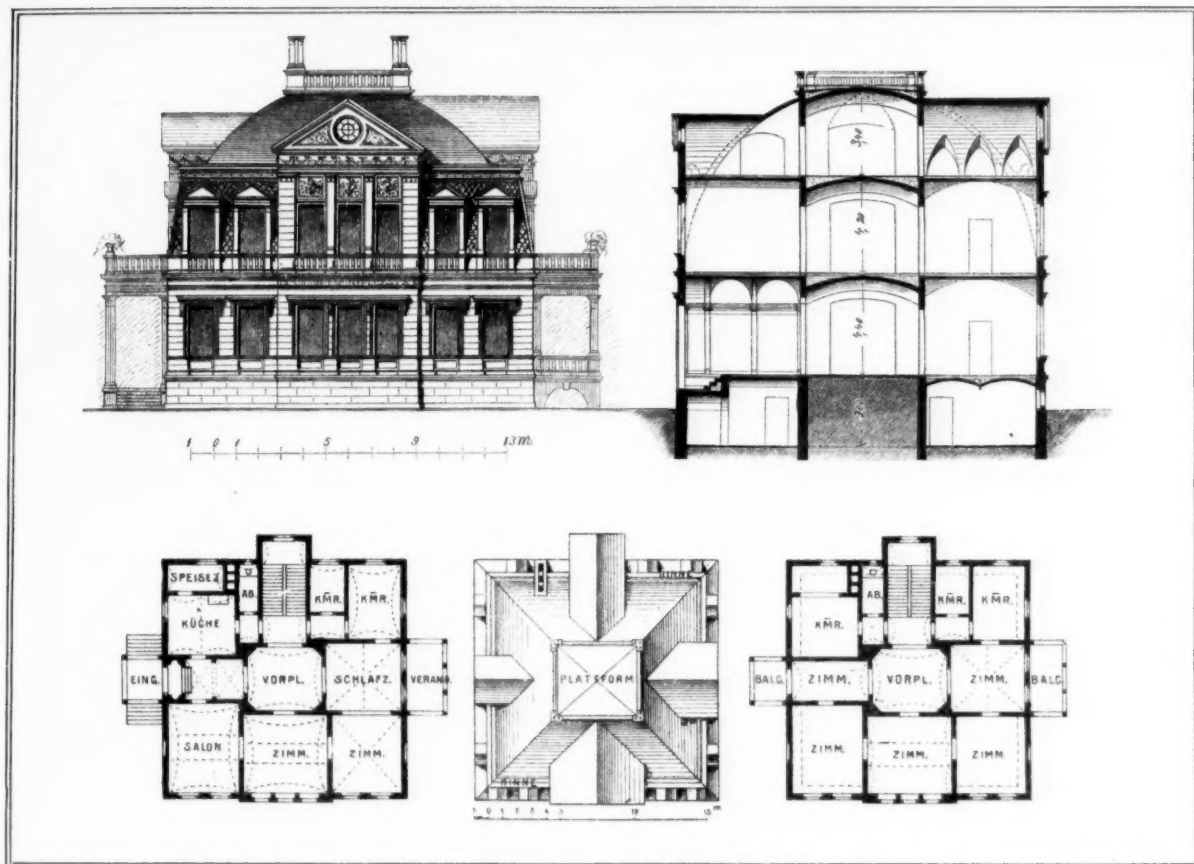


HOUSE OF MR. PIERCE, BROOKLINE, MASS.
— MESSRS. C. & H. SHAW, ARCHITECTS. —

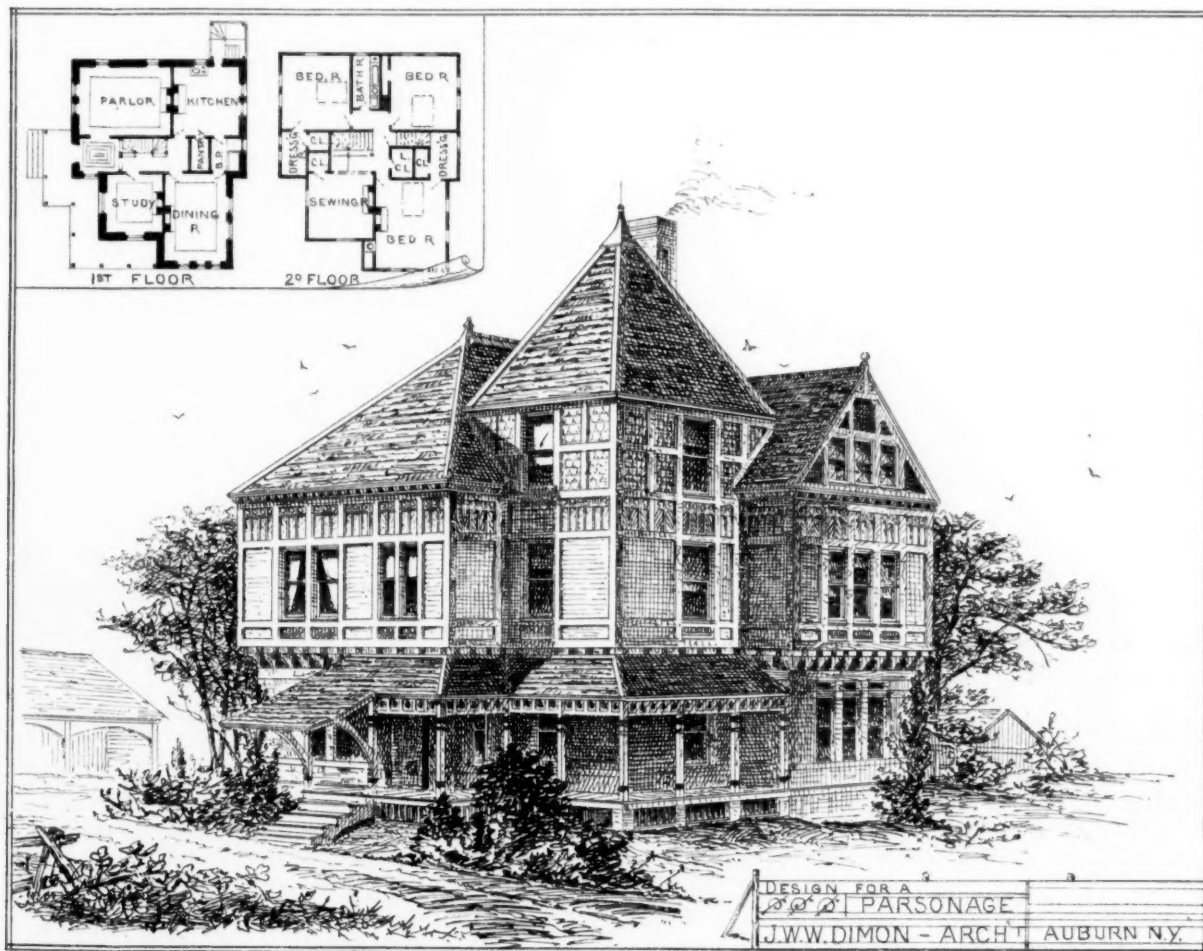
THE BUILDING WAS DESIGNED BY MR. C. LUCE, ARCHITECT.



WHITING BUILDING AND OPERA HOUSE HOLYOKE, MASS.
MR. C. LUCE, ARCHITECT.



CONCRETE HOUSE AT VORWOHLE



INTERIOR OF A LIBRARY. — HALL-STAND AND CHAIRS.

PARSONAGE. MR. J. W. W. DIMON, ARCHITECT.

The first story is of stone, while the outside panels are plastered in the second story, and slated above that.

BOOK NOTICES.

HAUPT'S ENGINEERING SPECIFICATIONS.¹

In some well-regulated engineering and architects' offices, there may be found a collection of printed forms of contracts and of specifications; preserved specimens, as it were, of the blossoms whence once developed the fruit of that and of other offices. The book before us is so constituted that it may take the place of the above-named motley collection. There can be little question, of course, in the minds of experienced persons, as to the utility of a handy collection of forms for contracts, specifications, bonds and advertisements belonging to the profession. These are matters of wearying detail, which it were sinful waste to excogitate out of the depths of one's own consciousness and experience at every call thereon. Whence it happens, that in the United States and other public architectural and engineering offices of the country, there are printed blank forms for all such documents; and it is from a very judicious selection of such forms, and some derived from private practice, that the present book has been put together. They include not only engineering works, as the title might lead any one to suppose, but a good deal of architectural work besides. We have, for example, "Estimate for an art-building at the International Exhibition, specifications for a college building, and for a railroad depot." As a connecting link between architecture and engineering, unless it may be found in the railroad depot, is a set of documents, being all that is necessary for the specifying, the advertising for bids, and the contracting for the erection of a lighthouse, and the same series of papers for a large variety of the works that ordinarily come within the province of the engineer, classified under the heads, "River and Harbor Improvements, Municipal Works, and Railroad Engineering, including engines and rolling stock." And as the future writer of specifications and contracts, the student, for whom more especially this work seems to have been designed, must know something of the nature of drawings, and of the manner of making measurements and estimates of all kinds of work, two short chapters on these subjects precede the bulk and body of the work. The close consists of a semi-legal consideration of the nature of contracts with samples of contracts for different kinds of work. No great originality ought of course to be expected from a work like this, in which the classification of documents already in existence must play so important a part; but this classification has been exceedingly well done, developing, not infrequently, into a codification of the subject matter.

While thus commending the book as a whole, we take the opportunity to warn the youngest readers of the work against the fascinations of chap. vi., the part treating of contracts and of the law of contracts. "Every man should know a little of law," said the English father of law, Justice Blackstone; "and the less, say we, the better," says the comic Blackstone. We miss a word of caution to the student, not to trust too much to such knowledge of the law as may be derived from the study of this one chapter. The great American people need no lesson taught them so much as that which induces each man to mind his own business. Let us consult lawyers on matters of law, as we believe in being consulted on matters of architecture and of civil engineering. And if these remarks hold good of chap. vi., what shall be said of the appendix, containing the ruling of a single Philadelphia justice upon the bearings of a common clause in contracts of the kind here treated? The students of the Middle Ages had a sensible proverb, "Beware of the man with the one book;" but from a study of this appendix we should add, "the lawyer with the one decision." This sort of law will not do to be relied upon. In the humble opinion of the reviewer, it is going too far, even, to allow this one ruling, and the single unusual set of circumstances that seem to have led to the suit in which this ruling was rendered, to introduce the clause in the contract printed on page 260, as seems evidently to have been the case. An architect or an engineer having a work in charge should be, and generally is, an honest man; the clause making him the sole arbiter in disputes as to the meaning of the specifications, and of quantities of work, is an old one and a common one; it has contributed no little to the honorable standing that these professions have, that it has been found that the duties imposed by this clause may be put upon them. It makes them respected alike by the builders and contractors, and by the parties who pay for the work done. The maintenance of this clause in its present entirety should therefore be jealously guarded by the profession. In this vicinity, certainly, no case has arisen within the last fifteen years, — and before that time men are said to have been still more honest, — wherein a well-founded complaint could be made against the integrity of the architect or

engineer umpire. The complaints of this sort that are usually tried have, so far as the reviewer knows, always consisted of pleas for extra compensation, when agreements as to the value or amount of such extra work were not specific under the contract, and could honorably give rise to differences of opinion. But if, as now proposed on page 260, as cited, the party of the first part is to dispute the certificates of the engineer, why not also the party of the second part? and if both parties are to dispute his certificates, why have him at all? It is but another version of the old query of "who will watch the watchmen?" And the remedy is none other than experience has shown to be the only proper one. Put an honest engineer or architect in charge; if you are deceived, pay the bills and do better next time. But the chance of such an event, be it noted, is in this instance so small, that it may well be left almost out of consideration. We venture the assertion, that, should a second edition of Professor Haupt's book appear, the clause which has been discussed will by that time be found to have been modified, even in the temporarily excited city of Philadelphia.

While commending the general nature of this work, the good arrangement of its contents, and other indications of good editorial work, we wish we might say as much for the mechanical execution of the book. Though agreeable in outside appearance and in type, the binding is execrable; the red paint on the edges of the book soils the reader's fingers; the advertisements in the back of the book, and as per frontispiece, have ceased to be in good taste in an "American book" also. However, the price is reasonable, and to a multitude of people, it is worth the money; and that, after all, is the main thing we each of us want to know about a book.

The first number of the *Useful* for 1878 appears in a new dress, with the imprint and address of a well-known firm of furniture-makers and decorators in Boston, but without too strong a savor of advertising. It shows an intention of returning to its first proposal to publish "ornaments of all periods and styles, by giving two sheets of ornamental details historically classed, and one of Pompeian decoration." One of the sheets of details is of architectural features, chairs and candelabra said to be of the time of Louis XVI. The other is entitled, by a queer misnomer, "Roman Details," the adjective being apparently borrowed directly from the French, — unless the editor is an extreme disciple of Mr. E. A. Freeman, — for the details are shafts, capitals, and archivolts which clearly date from the eleventh and twelfth centuries. The clever original designs are not so carefully drawn as heretofore, and betray throughout the number a decided tendency to reptilian forms.

In our notice of the *Rohrleger* (*American Architect*, No. 111), we inadvertently did injustice to the *Metal-Worker*, published in New York, in saying that the *Plumber* was the first paper in this country to give special attention to sanitary plumbing. The *Metal-Worker* has made this subject a conspicuous specialty for some time past in an intelligent and progressive way of which we are glad to make this recognition.

We have received from Messrs. A. Williams & Co., guide maps of London and Paris, copyrighted by George H. Young, and published, no doubt, with an eye to the crowd of Americans who may be expected to cross the Atlantic on the way to the French exhibition of this summer. They are block plans, as it were, issued at a low price, printed in a tint, and show clearly the principal streets and landmarks, omitting a great many of the smaller streets and alleys that fill in among them. They are covered, after the manner of the cheap plans popular in Paris, with illustrations in their proper places of the chief buildings of interest, not too clearly printed, but obvious to the eye. The plans are without scale, and the inexperienced traveller might be disappointed in finding that the distances on them much exceeded his expectation, or that the street on which he secured his lodging was not laid down. They are, however, maps of a kind to give the information that most travellers desire, with little trouble to them, and that prove to be convenient and popular. These are apparently as good of their kind as those that are commonly met with abroad, and there is an obvious convenience in providing one's self with them before one sets out on his passage rather than after.

AMERICAN INSTITUTE OF ARCHITECTS.

BOSTON CHAPTER.

An adjourned meeting was held at the office of the President on Thursday, March 7, for the purpose of taking action on the report of the committee having in charge the consideration of the question, what aid, if any, should be given by the society in furtherance of the proposed enterprise of Mr. J. T. Clarke, junior member, viz., to visit the unedited remains of Greek Doric temples in Sicily, Corfu, and the islands of the Aegean Sea, with a view to acquiring additional knowledge of the spirit and methods of Greek art.

After discussion it was finally voted to appropriate to this purpose the sum of three hundred dollars, provided an equal additional sum can be raised by a committee of three, to be appointed by the President. Messrs. Longfellow, Sturgis, and Van Brunt were appointed on this committee. The meeting then adjourned.

¹ A Manual of Engineering Specifications and Contracts. By Lewis M. Haupt, Professor of Civil Engineering, Towne Scientific School, University of Pennsylvania, etc. Philadelphia: 1878. J. M. Stoddart & Co.

CORRESPONDENCE.

A NEW APARTMENT-HOUSE.—THE BUILDINGS IN CITY-HALL SQUARE.

NEW YORK.

THE spring is opening rather lazily in the building line, though there is a very manifest improvement over the aspect which affairs bore a year ago. With the Astor Office building at the lower end of Broadway, and a few other large buildings which will be erected if the Department of Buildings shall do its duty in condemning several old rookeries about town, the chances are that the building-trades will be fairly busy.

Mr. William Kuhles has under progress a large French-flat building for Mr. C. R. Peters, to stand on Fifty-ninth Street, between Fifth and Sixth Avenues, overlooking the Park. The lot is fifty feet wide by one hundred feet deep, and is to be entirely covered by the building and its air-spaces. Each floor will have two suites of apartments, giving more than the usual allowance of room. The front is in Philadelphia brick with Nova Scotia stone up to the second story. There is the usual pair of polished red granite shafts on either side the main entrance. In panels below the windows of the principal floor, and in a series of spaces over the windows, Mr. Kuhles has decided to use the German sgraffito work from the Charlottenburg works near Berlin. It is of a compact texture, with light-tinted bas-relief ornaments upon a dark ground. The work will be inserted in recesses of the stone-work when that is finished, and Mr. Kuhles is of opinion that it will be found to stand well in this climate, though no example of its use now exists in this city. In the broad faces of the brick wall, several other medallions have been inserted, and in other parts the architect has followed a very eclectic course in the use of materials. The entire building, six stories in height exclusive of an attic story, will cost about \$70,000.

At the other end of the city from this building, an important work is going on in the patchwork additions to the new Court House standing in the City Hall Park. The work is not out of place, since the Park has long been a place for every thing and any thing. To a critical observer, a few moments spent in this place will not rouse encouraging thoughts of progress in art in this city. There are old buildings and new ones, but merit and novelty do not come together. The old City Hall, built in the early years of this century, stands to-day solid and firm; a good Italian model, unpretentious yet excellent, with faults, but beyond question the best of the public buildings in the old Common. The Post Office building by Mullett, in its paltry greatness, its poverty of invention, and meanness of motive, but barely covered by its bulk and the excellent materials used, in the popular mind is accounted good, but pretty much on the ground that the Pyramids might be styled excellent art, because they are bulky and built to last. There are a few minor court-rooms in another building, whose chief characteristic is its wretched ventilation; and then last on the list of this congeries of buildings stands the New York Court House, the place from which the most magnificent public stealing known in municipal history was done. Its architect, the late Mr. Kellum, chose the Palladian Italian style, and carried it out fairly into a building whose halls and passages are the darkest in the city, and whose waste of interior space is most remarkable. Upon this has recently been grafted an addition by Mr. Leopold Eidlitz. Of course no attention was paid to the design of the existing building, and within and without a rank Romanesque runs cheek by jowl with the old Italian, one bald, the other florid; cream-colored brick and buff sandstone come in juxtaposition to white marble. What was merely proposed to be done in the case of the Albany Capitol, has actually been carried out upon our unfortunate Court House, and only raises the provoking wish that the whole edifice had been done by the hand that could produce the excellent though misapplied addition. As it now stands, the ensemble will always remain an eyesore to those who believe that purity of style and freedom from admixture, in forms and spirit, is a merit. If, as more than one prominent architect in this city declares, "style is nothing," then the criticism of such mongrel buildings as the Court House must be approached from a different standpoint; but at present, protest must be entered against the tacking on of additions, however excellent, to buildings designed under a totally different motive.

W.

NEW WORK.—A CHURCH COMMITTEE IN THE OLD RÔLE.

ST. JOHN, N.B.

A NUMBER of peculiarities in construction may be noticed in practice here, such as the use of hard-pine lintels in place of iron or stone to carry the store-fronts,—large three or four story buildings having their façades supported in this way; another manner of accomplishing the same object is by brick arches, the tops of the iron columns being cast in the form of skewbacks with a segmental arch thrown from one to the other, which gives the front an appearance of support which it lacks usually, and presents also a somewhat pleasing effect.

Among the new buildings to be erected the coming season may be mentioned the post-office, custom-house, and savings bank buildings, all for the Dominion Government, the plans of which

have been prepared by the chief architect, Mr. Scott, at Ottawa, and are to be superintended, I believe, by local architects. The city government itself has not been behindhand in building-operations, as may be seen by the buildings for the water-commissioner, a police-court, hook-and-ladder house, ferry-house, and city-hall; the first three of these are nearly completed, while operations on the latter two will begin as soon as spring opens. Mr. W. G. Preston's design for the police-court is perhaps the most noteworthy of any that have been executed. Mr. Preston is also the architect of the ferry-house. The city-hall will undoubtedly be the most costly of the municipal buildings. I have not seen the design, but, to quote one of the local newspapers, "The style of architecture adopted is the Renaissance, but treated in a manner suggestive of the 'Queen Anne' mode, at present the reigning fashion in England." Whatever this may mean, is left for the readers to infer. It will have a frontage on Prince William Street of fifty-eight feet, with a depth of forty-six feet, and is to be of freestone, three stories high with a mansard roof. On the front, emphasizing the main entrance, is a pavilion, carried in the form of a tower some twenty feet above the roof. The interior finish throughout will be of hard wood. Messrs. McKean and Fairweather are the architects.

Very few dwelling-houses worthy of mention have been built, so far. A costly one in Germain Street is characterized by the extensive use of galvanized iron. Perhaps the neatest and prettiest little house in town is that by McKean and Fairweather, in Orange Street, for Mr. Donald McKenzie. There has been, of late, much talk of rebuilding the Victoria Hotel, the work to be undertaken principally by Boston capitalists. The old hotel was undoubtedly the best in the Maritime Provinces; but as it did not pay, it is questionable whether enough money will be forthcoming to warrant the rebuilding of it.

The Methodists in the adjoining town of Portland, purposing to rebuild their church edifice, which was destroyed in the fire of last autumn, called for competitive drawings. They were sent in. Members of the committee then went to several architects, giving them to understand that they each had been awarded the job; afterwards it was voted in committee-meeting to employ a certain firm as architects, and to confer with them in relation to percentage. This firm would not undertake the work under the usual five per cent; another man steps in, and says he will do it cheaper; and the committee are now vacillating between one and the other. This is not an isolated instance of the practices of architects and clients here. It is understood that the competition for the German-street Methodist chapel has been awarded to Mr. John Welch of New York, who is also the architect of the new Centenary Chapel. A large number of architects and draughtsmen are here from all parts of Canada and the United States, many of them without employment. A large number of those who came here last summer after the fire have already returned home. It is doubtful if work will be very lively the coming season.

WARRINGTON.

DIRECT RADIATION AND VENTILATION.

ALL physicians and sanitarians fully agree, I believe, that the conditions of atmosphere and the application of heat found on the sunny side of a mountain on a bright, clear day in autumn, are the best adapted either for the recuperation of the exhausted system or for the maintenance of robust health. We should take the conditions found there, as we understand them, for our standard, and endeavor to imitate them as closely as possible in our artificial arrangements. But the popular method of warming buildings is by placing all the heating-surface in the cellar, and making use of the fresh air supply to convey the necessary warmth to the various rooms in the building. For this purpose all the air must be over-heated; it must be warmed sufficiently in excess of the required temperature of the room, to compensate for the loss of heat through the cold windows and cold walls.

By this method of heating, the air of a room must necessarily be warmer than the solid objects of that room. The persons in the room are surrounded with and inhale air warmer than the temperature of the room as indicated by the thermometer.

We scarcely realize that a thermometer in a room may be very far from giving the temperature of the air in that room. It is possible for the air to be at zero, and yet the thermometer surrounded by that cold air to indicate 100°, or even higher. We could realize this by imagining ourselves standing to the windward of a great fire. The radiated heat might make it unbearable several hundred feet distant. It is stated that at the Chicago fire the radiated heat was sufficient to destroy buildings on the opposite side of the street, directly against a strong wind.

A very simple experiment made in a room with an open fire, and an open window through which into the room blows cold air, will illustrate this. If we take two ordinary thermometers, hanging them back to back, one turned towards the fire and the other towards the window, we shall immediately find a great difference of temperature indicated, yet both surrounded by air of the same temperature.

The subjoined diagram, giving the results of seven experiments made from 11.20 A.M. to 2.45 P.M., Feb. 26, 1878, will illustrate more definitely the proportion of indicated temperature due to

direct radiation, and that due to air-currents. A metallic box filled with ice and salt was placed twelve inches from an ordinary steam radiator. Three thermometers were hung against the heated radiator, and three against the ice-box. The thermometers numbered 3 and 4 in the diagram were placed in a double tin tube, open at both ends for the free circulation of air, but protected from radiated heat.

So placed, No. 3 indicated 57° as the temperature of the air descending by the ice-box; while No. 4 indicated 85° as the temperature of the air ascending by the radiator. The other four thermometers were placed in half cylinders of double tin, exposed on one side for radiation, but open at both ends, and therefore subject to the influence of the surrounding air. Being arranged as shown on the diagram, Nos. 2 and 5 present a strong contrast. No. 2, hanging against the ice-box in a current of air of 57° , indicates 93° , which is 36° higher than the air surrounding it. This added heat was due to direct radiation; while No. 5, hanging against the radiator in a current of air of 85° , indicates 73° , or 12° less than the air surrounding it, showing that the thermometer had radiated its heat to the ice-box. (This illustrates the loss of heat which frequently occurs from the person to a cold wall or window in proximity.) Nos. 1 and 6 indicate a temperature nearly 90° different; one receiving the full force of the radiation from the radiator, and the other losing its heat to the ice-box.

These experiments show how a room may be filled with air at 100° , and yet, with cold walls and windows and floors, the thermometer might indicate only 70° , and *vice versa*; and indicate the weak point of the common method of over-heating the air, leaving the walls and floors cold to absorb the animal heat from the persons occupying the room.

Compare this now with our standard, and we find this remarkable difference. In the external atmosphere the solid objects are invariably warmer than the air surrounding them. In the direct rays of the sun this difference between the temperature of the air surrounding us, and the actual warmth upon our bodies, is very great. It is not an unusual condition in winter, to have the air below the freezing point, and the sun shining so powerfully that a thermometer exposed to its direct rays and yet surrounded by this cold air would indicate ninety-eight degrees, or a temperature equal to that of the human body. Out of doors, while surrounded by a cold, invigorating atmosphere, we have the sun pouring upon us its vivifying rays, and filling our bodies with the vital element of heat, instead of having to pour out our vital heat to the cold walls.

Unimportant as this difference in condition at first appears (having received but little attention from physiologists), yet more careful study reveals facts worthy of our serious consideration. From the few experiments that have been tried to ascertain the effect upon the body, of air at different temperatures, it is assumed that twice as much carbonic acid is exhaled when the body is surrounded with and we are inhaling air near zero, as when we are surrounded by and inhaling air near the temperature of the body. Should more careful investigations prove these surmises to be well founded, this would explain the great difference between the distressing, debilitating feeling experienced in our cold-walled rooms filled with hot air, and the bracing and invigorating effect noticed in the open atmosphere on a clear, bright day.

Americans are more to blame for the popularizing of this great national curse of air-heating than any other people. They have pushed it more persistently than any other nation; and many of the most intelligent of them still insist on pouring more and more of the heated air into all our public buildings and our legislative halls; notwithstanding that year after year the legislators assem-

bled in these buildings protest against it, and refuse peremptorily to be comforted by the ingenious schemes of the engineers, or the most subtle artificial mixtures of the scientists.

If, on the contrary, it is possible to double the working of our whole system in a perfectly natural way, without causing its more rapid destruction, a splendid opportunity is thus offered for the ingenuity of the sanitarian; and should this cold-air theory of invigoration prove correct, the physician may yet learn that he has no agent readily at command half so effective as the air surrounding his patient.

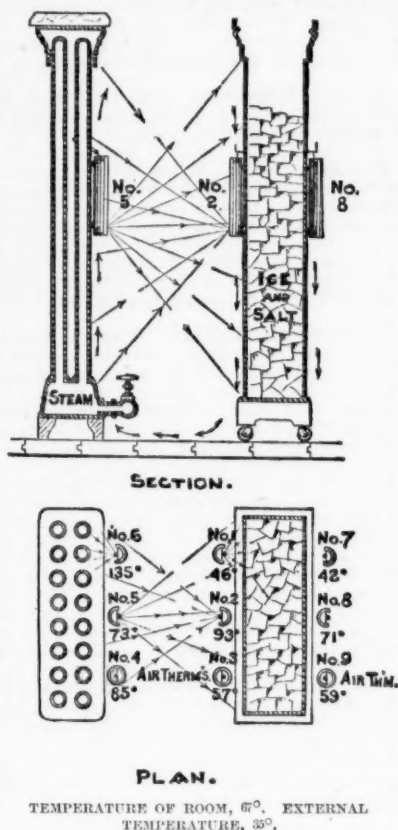
How important, then, that in buildings intended for the education of our children, these fundamental principles should be fully illustrated; and further, that they should be fully instructed as to the great sanitary importance of having cold air for breathing, and not be allowed to accept this or that method of heating and ventilation merely for its mechanical convenience!

Believing as I do that the over-heating of the fresh air supply is entirely inadmissible on sanitary grounds, the next point to consider is the suggestion of a better system. If the air in the room is cold, there must be some other means of giving the necessary warmth to the person. From a sanitary point of view, the open fire is the most perfect arrangement for artificial heating with which we are acquainted. All the air warmed directly by the fire escapes up the chimney, and we have nothing but the pure radiant heat coming into the room. This radiant heat warms the persons and solid objects in the room, but does not warm the air if pure. But to keep up open fires in every room in a building would be attended with much trouble; it would also consume much fuel; the distribution of heat is also very uneven. Very good results are obtained, giving general satisfaction, by warming the floors and walls of the rooms, or by placing exposed heating-surfaces directly in each room; and this brings us to our second proposition.

Until recently but little attention has been given to warming separately and by radiation each room of a whole building from one central source; consequently the mechanical contrivances for accomplishing these results are as yet very imperfect. Such inconveniences, however, must be met and overcome, for sanitary necessity requires it. The simplest form, which has already been adopted in many cases, is to place coils of pipe or other heating-surface directly under each window. In this case the excessive cooling of the window is counteracted by the excess of heat directly under it. The convenience of obtaining a fresh air supply by simply raising the window directly over the heater is of considerable importance; the meeting in each room of the extremes of heat and cold at times requires some care of adjustment to produce the desired result.

Perhaps more effective results may be obtained, and requiring less attention, by having the heat diffused over a larger surface, warming moderately the floor and the inner surfaces of the exterior walls. So little attention has as yet been given to this form of warming, that special mechanical contrivances might be required for its successful execution. This form of warming would probably produce the most satisfactory results. The question of the amount of air-supply to each room, as well as the temperature of the contained air, is of the greatest importance. In this connection the independent heating in each room has very great advantage. It has been found exceedingly difficult to control the movements of heated air satisfactorily. Many contrivances producing very unsatisfactory sanitary results have at times been resorted to in attempting to carry out the unnatural system of heating by hot air. The entering air being warmer than that longer in the room, it is almost impossible to prevent its rising quickly towards the ceiling; and if openings are provided there for ventilation, it at once escapes, carrying the much-needed warmth with it, thus producing waste. To obviate this, all openings in the ceiling are closed for the purpose of attempting to force the heated air near the floor; but it is still impossible, even by this process, to get a cold floor warmed to the temperature of the air surrounding the head. The feet are still cold, and the head hot. Another condition often obtained in a room thus warmed is where the air surrounding the person is so nearly the temperature of the body that almost complete stagnation occurs; such rooms closed tightly at top are often very oppressive and disagreeable, and at best can only be endurable, even for a languid, inactive person. I believe sanitary necessity requires a very liberal escape of the vitiated air from the ceiling of a room at all times; and this escape from the ceiling can be much better provided for when the heat is held in the floor itself than when contained only in the moving air. With the warmed floors giving warmed feet, and a gentle radiation of heat from the surrounding walls, the air may be at 40° and pass through the room quite rapidly without producing inconvenient draughts; then a liberal escape of the air from the ceiling may be allowed with but little loss of heat.

The varying direction and force of the external currents, often so troublesome with hot-air heating, have much less effect when heating by direct radiation. The heat is always contained in the solid objects in the same position. The air is left at liberty to move in any direction caused by the various surrounding conditions, but having little effect upon the heat. Moreover, with direct radiation the heating-surface can be so exposed as to be



readily cleaned every morning. With the nests of pipe used for air heating, the surface frequently becomes covered with animal and vegetable matter, the heating up of which causes a very unpleasant and unwholesome odor.

While I believe it would be best, physiologically, to have each room filled with cool air, and the necessary warmth given to the person by diffused radiation from the solid objects of the room, yet owing to the general apathy and the almost universal ignorance of the sanitary effect of such a system of heating, it would be very difficult to get the necessary care in the management of a system at present so little comprehended or appreciated. Very cold air is probably a very powerful agent in favorably affecting the human system, but like all powerful agents requires great care in its application. In passing large quantities of very cold air through a room, great care would be required to prevent some portions of the body being exposed to a stronger influence from the cold air than was counteracted by the direct radiation; consequently, for the present I would suggest compromising the matter, and partially warming the air in very cold weather.

Air at 45° or 50°, with good bright radiation, is not bad, especially for mere existence when no special activity is required. The partial warming of the fresh air supply can be done in various ways. I like it done in large masses so that it may become well mixed, avoiding unpleasant jets of varying temperature, making the halls the great reservoirs for the fresh air supply. * * *

SOOT-STAINED PLASTER.

Pittsburgh, Feb. 19, 1878.

EDITORS OF AMERICAN ARCHITECT.

Gentlemen, — Can you tell me through the *Architect*, or by letter, any thing which will take sulphur out of plaster? It was caused by putting old brick in the wall, which had soot on them.

Yours truly,

A SUBSCRIBER.

NOTES AND CLIPPINGS.

PUBLIC MONUMENTS. — The bronze bust of the Italian republican Mazzini is to be unveiled in Central Park in New York, in the latter part of May. It is five and a half feet high; and the granite pedestal is to be sixteen feet high. The foundation for it has been laid opposite the statue of Daniel Webster. The cost will be \$22,000.

A monument to be erected at Annapolis to Baron DeKalb is proposed by the Maryland Legislature. Congressional aid is to be solicited.

The Kentucky Legislature has passed to second reading a bill appropriating \$10,000 for a monument to John C. Breckenridge, and has incorporated an association to collect funds for the same purpose.

The statue of the city of Manchester (N.H.), nine feet high, for the soldiers' memorial fountain in that city, modelled by Bupal at the National Fine-Art Foundry, New York, has been accepted by the committee, and by the architect, Mr. George Keller of Hartford. It will be cut in granite at Quincy, Mass. Four statues representing the army and navy of the late United States volunteer service, to be placed on a parapet wall around the fountain, and a bas-relief, representing the call of the volunteers, to decorate the pedestal of the central shaft, are now being modelled in New York, and will be cast in bronze at the same establishment. It is expected that this important work will be completed in September next.

MODERN ANACHRONISMS. — The *Saturday Review* discourses on the vagaries and inconsistencies of modern decorative art as follows: "When the Newton of the future excavates Kensington Gardens in search of the Albert Memorial, of which vague traditions will record the site, he will publish his discoveries in some such shape as this: 'At about the depth of seven feet, we struck on fragments of strangely debased and barbarous pottery. The plates were glazed and gaudily colored, with the feeble designs of an effete civilization. From the dress of the characters represented, we conjecture that a Japanese convict colony of deplorably low culture had overthrown, on this ancient site, a village of the English of the thirteenth century. Beneath a layer of plates covered with designs Oriental in conception, but idiotically savage in execution, we discovered many examples of equally debased mediæval works executed by machinery. Mixed with these were specimens of porcelain which we can only attribute to the influence of the neighboring lunatic asylum at Hanwell, mentioned in the poetry of the period.' These will be the just and highly creditable inferences of the archaeologist of A. D. 4878. What he will make of tablecloths 'which illustrate the history of the Assyrians,' according to Mrs. Loftie, or which are covered with pictures of the 'Ten Little Niggers,' it is impossible to say. He will probably guess that these objects had a religious significance."

CLEOPATRA'S NEEDLE. — The owners of the Egyptian obelisk lately brought to London filed affidavits in the action for salvage now before the Admiralty Court, to the effect that the obelisk was only worth \$1,250, not so very much more than the value of the material as imported building-stone; while the iron caisson was rated as old iron at a valuation of \$250. Naturally the salvors objected to this belittling of a work of art, and at length obtained a decree from the Admiralty Court fixing the valuation at \$125,000.

AN ARTESIAN WELL. — Water has been reached, at a depth of eighteen hundred and forty feet, in an artesian well at Charleston, S.C., which has been boring for fifteen months. It is proposed to supply the city with water by means of such wells.

LAKE MAREOTIS. — In 1801, during the French occupation of Egypt, the English cut the Alexandria Canal dikes, and let the Mediterranean into Lake Mareotis, destroying 150 villages on the shores of the lake, and turning the plain into a morass. A Dutch company has obtained from the Khedive a concession to drain and cultivate the swamp. It is expected that 75,000 acres of land can be reclaimed, which will be turned into vineyards, where an endeavor will be made to cultivate the once famous Mareotis grapes.

GERMAN EXHIBITORS at PARIS. — It is said that the Emperor William has given the German painters and sculptors leave to participate in the Paris Exhibition.

UNDERGROUND vs. OVERGROUND TELEGRAPHY. — The ultimate saving that may be effected in substituting a subterranean telegraph system for the present system is well instanced by the damage wrought by a storm in March, 1876, to the government telegraph-lines in Germany, whereby 1,073 poles were broken, 9,372 poles displaced or overthrown, 1696 stays and anchor-posts torn up; while the wires were broken in 1,631 places, and twisted in 729 places; thus making more than 32,000 miles of wire practically useless.

POWER OF THE WAVES. — Those who have never lived on a stormy coast, nor have been to sea, can form no adequate idea of the effect that can be produced by the impact of a succession of waves or of a single wave. What has happened at Wick on the extreme north-eastern coast of Scotland, where a breakwater has been building for some years past, may give an idea of what is meant by wave-power. It was found that stones of ten tons weight were as pebbles to the waves, which have been measured to be here forty-two feet from crest to the bottom of the trough. The outer end of the breakwater, where the storms beat most violently, was built of three courses of one-hundred-ton stones laid on the rubble foundations; next above these were three courses of large flat stones, and upon this a mass of concrete, built on the spot, of cement and rubble. The end of the breakwater was thought to be as immovable as the natural rock; yet the resident engineer saw it slowly yield to the force of the waves, and swing round into the less troubled water inside the pier. It gave way not in fragments but in one mass, as if it were a monolith. The displaced mass is estimated to weigh about 1,350 tons.

STRENGTH OF SLATE. — MM. Blavier and Brossard, mining engineers, have studied the comparative resistance to rupture of the Angers slates, marble, and Tonnerre stone. The experiments were made with slabs of about 1 metre (39 in.) long, .15 (5½ in.) to .5 (19½ in.) metres wide, and .008 (¼ in.) to .05 (1¼ in.) metres thick. The rupturing load P was weighed, and the co-efficient of rupturing resistance R was calculated by the formula:—

$$\frac{P(b-a)}{4} = \frac{Rl^2}{6}$$

in which l is the distance between the supports, b the breadth of slab, c its thickness, and a the breadth of the ledges. The following mean values were found for R : for slate cut lengthwise, 5,621,000; slate cut crosswise, 2,733,000; marble, 1,140,000; Tonnerre stone, 630,400. Slate has the added advantage of being easily split into slabs, while the other stones require the use of a saw. — *Annales des Ponts et Chaussées.*

ENGRAVING ON GLASS BY ELECTRICITY. — M. G. Planté covers a surface of glass or crystal with a concentrated solution of nitrate of potash, by simply pouring the liquid on the plate, placed horizontally on a table or in a shallow dish. In the liquid film and along the borders of the plate he lays a platinum wire communicating with the poles of a secondary battery of fifty to sixty cells; then holding in his hand the other electrode of platinum wire, surrounded except at the end by an insulating sheath, he touches the glass covered by the thin film of saline solution, at the points which he wishes to engrave. A luminous notch is made wherever the electrode touches, and, however rapidly one writes or draws, the marks are found sharply engraved on the glass. In writing or drawing slowly, the marks are engraved deeply; if the wire which serves as electrode is sharpened to a point, the lines may be made extremely fine. Either electrode may be used as a graver, but a weaker current suffices for the negative electrode. Although these results have been obtained by using secondary batteries, it is evident that any other source of electricity of sufficient quantity and tension might be employed for continuous work, such as a Bunsen pile of a sufficient number of elements, or a Gramme machine, or even a magneto-electric machine with reciprocating currents. — *Comptes Rendus.*

HISSARLIK. — The *Times* says Dr. Schliemann has secured a new firman, and intends to renew his excavations at Hissarlik as soon as it is safe for him to work in the country.

THE BATHS OF DIOCLETIAN. — Recent excavations in the Baths of Diocletian have brought to light a Christian chapel (*oratorium*). The apse is ornamented with a mural painting of Christ and the twelve apostles, below which, in panels, are smaller representations of Biblical subjects. According to the decision of Rossi, they were executed between the years 360 and 430.

MEXICAN ANTIQUITIES. — At a recent meeting of the St. Louis Academy of Sciences, Mr. J. A. Dacus presented drawings of the ruins of a vast palace at Xayi, Chiapas, Mexico. Some discoveries have just been made in the subterranean portions of this ruin. It is supposed that a library has been found, perhaps of sacred writings, which are contained upon a very large number of tablets, each six by eight inches in surface and half an inch thick. The material is spoken of as terra-cotta. The inscriptions appear to be in a language possessed of an alphabet, but they have not been translated.