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THE convention of the American Institute of Architects assembled on Wednesday, November 19 (not on the 18th, as we said last week), at the building of the Equitable Life Assurance Society in New York, continuing through that day and the next. We have, of course, not yet received any account of the actual proceedings. The arrangement of the days was to be substantially like that of last year, the formal sessions of the convention being held in the morning and evening of the first day, and the morning and afternoon of the second, while the afternoon of the first day was to be occupied with excursions in the city, and the evening of the second with a dinner at Pinard's. The "excursions" comprised a visit to the new buildings of Columbia College, to the Lenox Library, and to the Columbia School of Mines, where an address on the Tenement-House Question, with pictorial illustrations, was expected from Professor Chandler. A number of papers on interesting topics were promised: one on the Proper Distribution of Weights to secure Equal Pressure on Foundations in Soft Soils, by Mr. F. Bauman, C. E., of Chicago; an Account of the Architectural Course at the College of the City of New York, by Professor Russell Sturgis, F. A. I. A.; on the Proportion of Inlet and Outlet Shafts in Ventilation, by Mr. Lewis Leeds, of New York: these in the morning session of Wednesday. For the evening session of the same day, were promised a paper on Atelier Instruction in Europe, by Mr. Wm. Watson, Ph. D., of Boston; one on the Influence of Size and Shape of City Lots on every Part of Houses built thereon, with illustrations of American and Italian stairways, by Mr. E. T. Potter, architect, of Newport; on Domestic Architecture as illustrated by the Early Dutch Settlers in New Jersey, by Mr. J. C. Cady, F. A. I. A, of New York; and on the Decorative Quality of Early Italian Painters, by Professor Charles Eliot Norton, of Harvard University. The papers for the Thursday session were, in the morning, on Some Suggestions for the Improved Construction of Building Acts, by Mr. Alfred Stone, F. A. I. A., of Providence; on Some Causes of Failures in American Architectural Designs, by Mr. W. A. Potter, F. A. I. A., of New York; on Interesting Devices of Fire-Proof Houses in Paris, by Mr. Watson, with illustrations; and on the Typical Sanitary House, by Mr. T. M. Clark, A. A. I. A., of Boston; in the afternoon, on Greek Antiquities, the result of a recent visit by Mr. Joseph T. Clarke, junior member of the Boston Chapter; and on Reminiscences of Viollet-le-Duc, by Mr. Edward Raht, architect, of New York.

THE first number of the promised *American Art Review*, for which many people have been looking with interested curiosity since its announcement a few months ago, has been issued by Messrs. Estes & Lauriat, in Boston, New York, and Chicago. It is a handsome monthly, with a page somewhat smaller than the *Portfolio*, of about the size and shape of the *Art Journal*, we should say, without having a copy of that before us. It is liberally illustrated with full-page etchings, wood-cuts, tail-pieces, and initials, and gives forty-eight pages of letter-press, the general make-up and aspect being as attractive as those of its European fellows, and its price the same as that of the *Portfolio*, — a dollar a number. The managing editor is Mr. S. R Koehler, of Boston; the associate editors, Messrs. William C. Prime, of New York, and Charles C. Perkins, of Boston. It prints an imposing list of contributors, among whom we see the names of most of the men who are known as writers upon art in the United States, and some Europeans. The strong feature in its illustrations is intended to be its etchings, of which three are promised with each number, it being the only American journal which has thus far been so illustrated; as it is the only one projected on an equal scale with the great European artistic periodicals, *L'Art*, the *Gazette des Beaux-Arts*, the *Portfolio*, and the *Zeitschrift für Bildende Künst*. The editors reasonably hope that their *Review* will be a means of healthy development to the practice of etching among American artists, and have announced a series of plates from those of them who practise the art, among whom they mention Messrs. Foxcroft Cole, Bellows, Swain Gifford, Smillie, Church, the Morans, Samuel Colman, J. W. Champney, Chase, Inness, Vinton, and others. Besides these they promise works of various noted European etchers, among them Messrs. Unger, Flameng, Rajon, etc. The *Review* proposes to be entirely æsthetic in tone, opening its pages to writers of all schools, and to supply its readers with original articles in all the departments of the fine arts, with a chronicle of all that is most important in the contemporary practice of art, its history, and its archæology.

FOR etchings in this number we have first a plate by Mr. Swain Gifford, a clever bit of pure line etching, very agreeable in tone, a rough bank crowned with a dwarf stone pine on the left, skirted by a path which leads the eye pleasantly to a charming distance of sea and low shore on the right. The second plate is a rendering by Mr. Smillie of a painting by Jacque in Mr. Belmont's collection, called a Landscape with Sheep. It translates very cleverly the sombre luminousness and vigorous handling of Jacque's work. The darks of the trees, bitten in with great energy and reinforced by the manner of inking the plate, are a little blotchy in effect, but give a very forcible impression of Jacque's way of treating masses of heavy foliage. The third etching is one of Rajon's remarkable portrait etchings, from a comparatively unknown portrait of Murillo by himself, in the Hungarian gallery at Buda-Pesth, formerly the Esterhazy Gallery. The masterly modelling of the face, the rich tone, and quiet handling of the whole plate are what one expects from Rajon. The printing of the etchings is very knowing, and must have been done with great care, especially in the plate from Jacque. The wood blocks are less interesting, carefully cut, but sometimes suggesting an effort to make up in blackness something that they lack in animation of drawing. The letter-press is of varied quality and interest. Many students of art must have wished to have the material of Overbeck's *Antike Schriftsquellen* made more accessible than it is in its native form, and here we have the first instalment of it, the citations translated and accompanied by a scholarly commentary by Mr. Perkins. Mr. Van Brunt contributes an excellent illustrated article on the Washington Monument, the first of two. A slip of the pen leaves us in doubt, by the way, whether it is Klenze's Ruhmeshalle or Schwanthaler's Bavaria that Mr. Van Brunt means to praise among modern monuments. There is an introduction, giving a popular description of etching, and notices of the etched plates, by the managing editor. Mr. Davidson gives an account of the new statue called of Hermes and ascribed to Praxiteles, lately discovered at Olympia, of which there is a cast in the Boston Museum of Fine Arts. There is a paper on the Barye bronzes in the Corcoran collection at Washington, by Mr. Macleod, the curator, and slighter articles on The Material of American Landscape and Impressionism in France, with several book notices, more than ordinarily good, and an Art Chronicle. The promise of the new magazine seems to us excellent. The only difficulties that we see foreshadowed are those that attend the effort to preserve entire neutrality among schools and tastes and doctrines; and the need which every artistic publication in this country — and most elsewhere — seems to feel of appealing at once to a professional and a popular constituency.

ABOUT one half of the thirty-sixth annual report of the New York Association for Improving the Condition of the Poor, which

we have received, is taken up with the consideration of the tenement-house problem, and contains matter that is of much interest to persons who have followed the recent movement in New York for improving the housing of the poorest classes. It gives a succinct account of the agitation of the subject during the past year; of public and private meetings, the revision of the Tenement-House Act, the *Plumber and Sanitary Engineer's* tenement-house competition, the formation of associations for building improved houses, and the general inspection of tenement-houses that has been carried on. It shows, especially in this last respect, how much labor is undertaken by those who are really doing the work for which the public meetings held last winter furnished the inspiration. It cites gratifying results from the practical experiments carried on by Mrs. N. Miles, of New York, in emulation of those of Miss Hill, of London, of taking in hand, that is, some of the worst of the existing tenement-houses, overhauling and repairing them and reforming their management so as to make them clean, orderly, and wholesome; experiments which show by the example of the Mulberry Street building that the thing can be done with pecuniary profit if it is done in the right way. The report contains some striking accounts of the result of tenement-house inspection by Mr. George C. Booth, and is illustrated by one or two plates, including a plan of a building in Paris used for work-shops and lodgings, and a rough view of the Peabody Model Dwellings in London. It sets forth pretty clearly, by both inference and statement, the difficulties that lie in the way of improvement and that will prevent the movement that is now on foot from effecting radical improvement unless it is followed up, more than popular movements are apt to be, by laborious and long-persistent effort. The greatest obstacles are naturally the inertia of the class that it is intended to benefit and the active opposition of owners, both of which are obstacles of a kind that is apt to be more long-lived than the enthusiasm of popular or philanthropic effort. There is no small difficulty, as the report intimates, in the necessary process of enforcing upon the very poor the doctrine that cleanliness and orderly living are at once essential to health and comfort, and practicable, since they look for enjoyment to different sources, and obstinately persist in maintaining an appearance of robustness under conditions which seem to persons of better habits no less than poisonous; so that, as the report says, "it is indeed a marvel that so many persons actually thrive amid filth." That they would thrive far more away from it is clear enough to those who know, but to make it clear to themselves is not easy.

The details given by Mr. Booth in his report of inspections are amazing, as such details always are amazing, even to those who have heard something of the kind before. It seems incredible that human beings survive, imprisoned in the midst of the nastiness that he describes. One shudders to think of the horrible result if pestilence should get a foothold in such places as he visited under the names of "Murderers' Row" or "Bulldog Alley," and one wonders that a plague does not germinate there. The ultimatum of crowding seems to have been reached in one case which he records; here he found a woman living with her husband and three children, and expecting a fourth, in a low upper room eight feet by twelve; all sleeping on the floor and covered by one rug. The woman was lamenting that her *lodgers* had run away without paying their rent. On inquiry he learned that the family had shared their room with another family consisting of a man and wife and two children. These also slept on the floor wherever they could find room, "so that in this room, about 8 by 12 and 5½ [?] feet high, nine persons had slept and eaten." To arrange sleeping accommodations for so many in such a space would seem to be almost as much of a task as planning a house. A significant and discouraging indication of the obstacles to improvement which would remain, even if proper quarters were provided, is found in the account given of certain houses on Cherry and Rooseveldt Streets which have been cleansed and improved, and where, with room for a hundred and fifty families, there are only fifty, notwithstanding improved accommodation and diminished rent; "so that in this instance at least, in the opinion of the housekeeper, it does not pay to enforce law and order." Experience teaches, and the stories of this report confirm it, that however hopeful it may be to offer opportunities for improvement to the better poor, there always remains a class which abhors restraint and painstaking and decency, and which, if means of cleanliness are thrust in its way and room afforded for decency and comfort, will prefer to live in filthiness and will leave empty space around them to huddle into unclean contact. Here is the residual problem of the tenement-house question.

The formidable character of the opposition of the owners is indicated by the figures. "The health authorities," says the report, "justly claim that they have to contend against great opposition. The tenement-houses of the metropolis represent two hundred million dollars' worth of property; their owners are organized, and are able and willing to spend money to oppose any reforms which touch their pockets. They have their representatives in the legislature, and they stubbornly resist improvement." It is not only in their pockets that they are touched; for besides the natural objection of any American to being interfered with in his private business, however noxious it may be, he need not be very thin-skinned to be spurred into opposition by a reform, however justifiable, which publicly brands him and his class as rapacious brutes. But if the estimate of the report is to be accepted, the pecuniary argument of the landlord is more cogent than we had supposed it to be. It is assumed that the income from this two hundred millions of tenement-house property is at least ten millions. We had supposed that such property was far more profitable. Even if it is true, as the report avers, that a small percentage on this sum would make the houses "truly sanitary," we can hardly wonder that hard-fisted landlords are unwilling to expend even a small percentage for the benefit of tenants who pay them only five per cent, unless they can be persuaded that the outlay will bring them an increase of rent; nor can we wonder if, looking at the matter with the eyes of unscrupulous monsters, they think it more profitable to employ a portion of this income in opposing adverse legislation than in what they may choose to regard as idle philanthropy; we should fear that, upon this computation, the work of reform was an up-hill undertaking. We can hardly think, however, that the margin is so small, in face of the universally accepted belief that tenement-house property is one of the most paying investments, or of the rates of rents that are everywhere published.

It is not often, fortunately, that a period of time passes which is marked by so many deplorable and distressing accidents in the several fields in which man exercises his constructive talents as have occurred during the past two or three weeks. Not one of these mishaps is unmarked by incidents of very unusual character; not one that has not a trace of romance amidst all its horror; not one that does not bear its warning for the future; nor yet one in which human culpability cannot be clearly traced. Passing by the singular succession of marine disasters, and the fall of the St. Charles Bridge, over the Missouri River, as being outside the limits of our proper province, neglecting also the fatal explosion of starch dust in the candy factory at Kansas City, Mo., the bursting of a warehouse filled with flaxseed in bulk, at Buffalo, and the fall of an onion-laden floor at another place, we come to two disasters in New York which, in spite of their being so common as to be almost vulgar, cannot be contemplated without feelings of indignant pity. The full accounts contained in the daily papers relieve us from the necessity of detailing the events of the burning of the tenement-house in Cannon Street, on November 14. This building was occupied by twelve families, and although it was not wholly burned, yet six persons lost their lives, because there was, as far as we can learn, but one staircase, which was filled with flame and smoke, no fire-escape in front, and no means of exit on to the roof. The fire which occurred, with fatal effect also, in the building of the *Churchman* on the same day suggests the thought that legislators would do well to turn their attention to the way in which are conducted in the midst of crowded cities manufactures of substances which are dangerous to the public welfare in either their manufactured state or during the process of manufacture. The fire in the *Churchman's* building started in the room occupied by the Celluloid Shoe Protector Company, whose stock, composed of one of the most dangerous materials of modern invention, spread the flames with frightful rapidity. We hope that the time is not far off when certain manufactures will be relegated to the outskirts of a city, with as unyielding severity as is now meted out to the manufacture of gunpowder and the grosser explosives. The hardships that would at first be inflicted on the manufacturers of and dealers in hydro-carbons, oils, explosives, celluloid, chemicals, and any of those articles in whose manufacture explosive dust is generated, would be much miti-

gated by the use that could be made of the telephone, most universally useful of modern inventions, and by the facts that ground rent would be cheaper and operatives could find cheaper and healthier lodgings.

ANY one who turns over the pages of our journal from its first number up to the present one can hardly fail to perceive that American draughtsmen as a body are far from being a skilful or an artistic class; but as an inspection of the illustrations of the early numbers of the English building journals would probably show that in the early days of those journals English draughtsmen were, considering their more advantageous surroundings, quite as backward as our own, it is proper to entertain the hope that the *American Architect* may play as important a part in instructing the eye, hand, and taste of American draughtsmen as its English prototypes have played in England. It would be interesting to enquire what part the illustrated building journal has played, not only in cultivating the powers of the modern draughtsman, but even in forcing him to exert himself to maintain his position as a member of an artistic fraternity. Coming into existence about the time that the photographic camera was beginning to promise to relieve the architect from the necessity of preparing with his own hand the most valuable portion, perhaps, of his working library, it has doubtless preserved and fostered, in the rising generation, the artistic feeling and the manual dexterity which have been the marked characteristic of so many architects of the preceding generations. Having few of the extraneous advantages which surround his English and continental compeers, the American must trust chiefly to books for his instruction, and as these are too costly for most persons to acquire in any considerable numbers, and as public libraries are obliged in self-defence to enforce rigid regulations as to the use of any books they may own, any enterprise that undertakes to put more or less directly into the hands of draughtsmen a good working library should receive all encouragement from the members of the profession.

SUCH an enterprise is that of Mr. George F. Hammond, a young architect of Boston, who is endeavoring to bring into being the Boston Draughtsmen's Association, the chief aim of which is to be, as set forth in the circular we have received, to establish a reading-room, where are to be found all the best English, French, German, and American technical journals on art, architecture, and engineering. These are to be placed at the disposal of the members for the most practical uses, subject only to such rules as shall prevent their total destruction; so that a draughtsman may have the opportunity to fill his scrap-book with tracings from designs ordinarily inaccessible, since the laws of the public libraries now prevent his making them from their books. It is also proposed to have classes in charcoal drawing, and in drawing from the life. Competitions with prizes of small value are to be held from time to time, and we dare say that other features will be introduced in the scheme of the association as time shows its needs and develops its resources, and if its managers take the pains to interest in its success some of the older members of the profession, it cannot but be that there will be a conscious gain of dignity and earnestness infused into its proceedings which may lead to the most satisfactory results. The scheme of the association is sufficiently broad to insure an ample membership, consequently a low annual assessment, three dollars, and a full list of periodicals. Although the enterprise was undertaken by an architect, yet those who have given their adhesion to the scheme number among them, besides architectural draughtsmen, engineers, engravers, draughtsmen in lithographic establishments, in jewellers' shops, photographic artists, pupils of the evening drawing schools, and members of various other classes of society.

HYGIENE AND PUBLIC HEALTH.[1] III.

IN the last two papers of the first volume is contained what we do not hesitate to call the best short treatise on ventilation within our knowledge. Not only are the facts related in regard to certain natural climates of great interest in the discussion of artificial heating and aeration, but the descriptions and criticisms of appliances in actual use are extremely judicious. The subject has been so much treated by writers with pet hobbies, or patentees interested in throwing an air of mystery about it, that architects who have little knowledge of ventilation dread to undertake work of the kind for fear of being led astray, as many of them are; while those who have made up their minds from actual experiments are in hardly less danger of being driven from their ground by the pressure of conflicting theories. The impartial references to existing buildings, which they can compare with their own experience, will be to them of peculiar value.

After a clear account of the composition of air, the author devotes some pages to evidence regarding the vexed question of the effects of carbonic acid in the air. We have heard so often that it is a neutral element, acting simply "by diluting the oxygen," as one writer asserts, and again that it is deleterious, and must be got rid of wherever found, that it is a satisfaction to be told, on good authority, that "we must not conclude that because the quantity of carbonic acid is small the effect is small. The conclusion is rather that minute changes in the amount of this acid are indications of occurrences of the highest importance." Of course, the occurrence which is chiefly indicated by an excess of carbonic acid is organic contamination of the air; but in some experiments quoted, where pure carbonic acid was introduced into pure air, two per cent was proved to give a mixture dangerous to life, although the experimenters asserted this atmosphere, in which candles were instantly extinguished, to be "by no means so unpleasant as a school-room."

Before describing the phenomena caused by organic contamination in the air, the author devotes some pages to inorganic impurities, and gives an interesting description of the office of oxygen in respiration.

Briefly, the oxygen passes through the thin walls of the lung-cells into the blood, where it enters into a loose chemical combination with the matter of the red corpuscles, and, being carried in this way into the muscles and tissues, is given off again in exchange for carbonic acid. Carbonic acid, when present in excess, merely remains in solution in the blood, ready to pass off as soon as pure air is supplied. Carbonic oxide, on the contrary, "combines with the matter of the blood corpuscles with such eagerness as almost to prevent the oxygen from entering into combination when inhaled, even after the poison has been removed from the air." Hence its deadly effect, which is said to be the same as that caused by the total deprivation of oxygen in drowning, and the relief, if any is possible, must be effected in the same way, — by keeping up artificial respiration until the poison is slowly eliminated.

Carbonic oxide is asserted to be often present in the atmosphere, and, as might be supposed, sometimes with fatal effects. Most people know the characteristic smell, and the blue flame, which show its existence around an anthracite fire freshly kindled, or burning with insufficient air, and can often recognize it in rooms heated by hot-air furnaces, so that a warning against its dangerous character will be of use. A possible future source of trouble is found in the so-called water-gas, which, as Dr. Lincoln says, "is produced by passing steam over incandescent carbon, which has a very powerful attraction for oxygen, abstracts it from the steam and unites with it to form, at first, a mixture of hydrogen and carbonic acid; the latter afterwards loses one half of its oxygen and becomes carbonic oxide. These gases burn without light, and require the addition of about ten per cent of petroleum or naphtha gas. This mixture contains from thirty to forty per cent of carbonic oxide, and would be *excessively dangerous to life*, if it were inodorous, as in some instances it is." This water-gas is now supplied in large quantities in many parts of the country for heating or illumination, and no one who is concerned with matters affecting the sanitation of buildings should neglect to inform himself of its qualities.

Of the effects of organic impurity, a striking illustration is quoted, much more to the purpose of ordinary life than the horrible details of the Calcutta Black Hole, or the steamer Londonderry, as follows, relating to an experiment tried in the London Zoölogical Gardens: "A new house was built to receive the monkeys, and no expense was spared which, in the opinion of those intrusted with its management, could insure to those natives of a warm climate all attainable comfort and security. Unhappily, however, it was believed that the object would be best secured by making the new room nearly like what an English gentleman's drawing-room is. For warming it, two ordinary drawing-room grates were put in, as close to the floor as possible, and with low chimney openings, that the heated air in the room should not escape by the chimney, while the windows and other openings in the walls above were made as close as possible. Some additional warm air was admitted through openings in the floor from around hot-water pipes placed beneath it. For ventilation in cold weather, openings were made in the skirting of the room, close to the floor, with the erroneous idea that the carbonic acid produced in the respiration of the animals, being heavier than the other air in the room, would separate from this, and escape."

Such a room, supplied with warm air by indirect radiation from hot-water pipes, and ventilated by two open fireplaces, would, independent of any other openings, still be generally looked upon as the *ne plus ultra* of healthful and comfortable arrangement. Few drawing rooms, and still fewer school-rooms, have anything to be compared with it; but its effect upon the inmates showed that something was still lacking. "When all this was done, about sixty healthy monkeys, many of which had already borne several winters in England, were put into the room. *A month afterward more than fifty of them were dead, and the few remaining ones were dying. The cause of this mortality was consumption.*"

Nothing is more common in the better class of houses than to

[1] *A Treatise on Hygiene and Public Health.* Edited by Albert H. Buck, M. D. Vols. I. and II. New York: William Wood & Co. 1879.

find rooms heated by furnace or steam, in which one cannot sit with other persons for an hour in the evening without noticing the cold feet, hot head, sleepiness, or irritability which indicate the effects of foul air, but which the architect or owner points out with pride as an example of perfect ventilation, because they have open fireplaces in them, even though a fire may never be lighted.

An illustration of the extremely slight contamination which is sufficient to produce bad results is given in the well-known property which city air has in hot weather, of causing or predisposing to bowel troubles in young children, while country air at the same temperature shows no such quality, although to analysis there may be no difference in the constitution of the two atmospheres. To some similar inappreciable differences in constitution are probably due the variations of climate as to effect upon health. Perhaps the most refreshing and delicious air to be found in the world is that of the Alpine slopes, neither in the valleys nor at the top of the mountians, but half way up the ascent; and yet the analysis of air taken at the rocks called the Grands Mulets, half way up Mont Blanc, showed it to contain less oxygen and more carbonic acid than the average air inside a *theatre* in the middle of the performance, while the average of five analyses from the Faulhorn gave a proportion of oxygen very slightly greater than that of an ordinary stable on first opening it in the morning, and considerably less than that found in "a very small room in which a petroleum lamp had been burning for six hours." Even more difficult to explain is the circumstance that the mountain air, under an extremely low barometic pressure, should have the stimulating quality which on the lowlands is always associated with a high barometer. The clouds and rain which generally accompany a low atmospheric pressure may account for a part of the depression of spirits caused by it on ordinary levels, but even in sunshine the condition of low barometer which precedes thunder-storms, so far from giving any resemblance to mountain air, generally indicates one of the most trying states of the atmosphere which we have to bear.

Equally obscure is the effect of climate on diseases of the lungs. According to the tables, the liability to consumption shows a diminution in ascending from the coast to the highlands, and at a certain altitude, varying in different latitudes, the disease vanishes. In the upper Engadine, and in the valley of Davos, in the Grisons, phthisis is unknown among the natives, and the indications are that their dry atmosphere with low barometer assists materially in giving immunity from the disease to those brought up in them; while, on the contrary, of the recorded effect upon consumptive patients of various climates by far the best results were obtained from long sea-voyages, where the conditions as to dryness, low pressure, and temperature are completely reversed. It is reported that consumptive soldiers sent to the Himalaya Mountains showed a rapid increase in the dimensions of the chest, and it is a common observation that mountaineers develop great chest capacity, as if to compensate for the rarity of the air at great elevations. Perhaps this increased volume of the lungs confers a power of aerating the blood by means of air containing a small proportion of oxygen, which may greatly strengthen the subject against adverse influences, while the healing quality of pure air may be felt more quickly where it is presented in the greatest density, and with the maximum proportion of ozone and oxygen, as at sea, although the stimulus which excites the lungs to increased action and growth, by the insufficiency of oxygen which their ordinary inspiration of a lighter air would give, may be wanting.

But one thing is certain, that the essential element in the good effect of any climate is the opportunity of breathing an unlimited amount of fresh out-door air, whatever its quality, and we may confidently assume that whenever our buildings shall be so arranged as to insure a current of outer air through them, night and day, to the extent of not less than three thousand cubic feet per hour to each person, and our habits of life shall have increased our average breathing capacity, and accustomed us to out-door exercise to as great an extent as that habitual to the mountaineers, we shall not need to envy them their exemption from pulmonary diseases.

How far from attaining this desirable state of affairs we now are, is shown by the statistics. School-rooms, which should, in consideration of the susceptible organism, the quick respiration and undeveloped physique of children, be the best ventilated of all our rooms, are found to be by far the worst, so that they form in the reports a kind of standard of the worst endurable contamination. While the proportion of carbonic acid which, when derived from respiration, forms a measure of the organic contamination reaches in the galleries of theatres from two to four times the normal proportion, in school-rooms it is found in from four to thirty times the standard amount. The best schools noted, those of Boston and Philadelphia, have an atmosphere agreeing to within a small fraction with that of the underground railway tunnels in London, and the Michigan high schools, which stand next highest on the list, enjoy an air which averages slightly worse than that of ordinary railway cars, and far worse than the worst theatres. Beyond this there are no further means of comparison. The school-rooms enjoy undisputed preëminence over all other foul places, differing only in degree among themselves, up to the worst, which was more than five times worse than the average smoking-car. And in such places, it must be remembered, the young are condemned to remain, not occasionally from ten to thirty minutes, but for five or six hours every day, until their native power of resistance to the evil influence is exhausted.

This is a state of affairs which cannot be passed over lightly, or laughed away with accounts of the imitation registers frescoed on the walls, which have been known to do duty for ventilators in such places. Some thorough reform will soon be demanded. None know better than architects how limited are not only the means, but the knowledge, which they have at hand for supplying the demand, and they are glad to come to the physicians and learn from them the results of their practical experiments in hospitals, experiments which the architects themselves are rarely allowed to make at their client's expense, and have seldom the means for making at their own. The doctors have been rewarded with very great success. The ventilation of their buildings, as a rule, far surpasses that of the more ambitious structures erected for other purposes, even where good ventilation has been particularly sought for. They are to be congratulated upon this result of their science and perseverance, and if the architects could not have led the way, they, too, are to be congratulated on having such able leaders to follow. So we will put aside the temptation to regret that an architect's name had not appeared at the head of the little treatise on ventilating appliances which forms the last part of Dr. Lincoln's paper, and address ourselves to learning what we can from it.

One very sensible suggestion, which is not new, but is little acted upon, except in hospitals, is that "no room of ordinary size, or even a hospital ward" (and, let us add, school-room), "is the gainer by being made more than thirteen feet high. Indeed, the existence of abundant space may tempt us to neglect the necessity of abundant *renewal*, and so a large room be more unsafe than a small one. The only advantage of great space lies in the fact that we can *ventilate freely without giving rise to perceptible draught*." To this we might add that the carrying of all windows to within a few inches of the ceiling, the nearer the better, is of very great assistance in clearing the room wholly of the contaminated air which is apt otherwise to collect and remain under the ceiling.

The means for inducing a current are compared, and interesting examples collected, which seems to indicate that in difficult cases the air will need to be both pulled forward and pushed from behind, by an aspiration fan or chimney, combined with some mechanical means for introducing fresh air. This, we think, will accord with the experience of most architects. Every one does not realize that under the vacuum system alone, in which the source of motion is heat, a seven-foot gas burner, constantly lighted in a 12 by 12 flue of the height of an ordinary house-chimney, and supplemented by another flue of equivalent size for supplying fresh air, will change the atmosphere in an ordinary room only fast enough to supply three persons with such air as hospital patients and state prison convicts breathe.

With our ordinary 8 by 8 fireplace flues, the extraction of foul air, even with a fire lighted, would be not more than half of this. Without a fire it would be almost nothing.

Dr. Lincoln's opinion on this point is, that "the openings and ducts in ordinary buildings are almost invariably too small. Frequently they lead to no outlet. In some cases sufficient channels exist; but, from motives of economy, no heat has been supplied to warm them. The air supplied may enter at a point just under the point of exit, so as to compel the closing of the latter in order to retain the warmth. The air may be derived wholly from a furnace which possesses no arrangement for mingling cold with warm air. In this case, when the register delivers too warm air the only recourse is to close it, and thus lose a good part of the supply of fresh air. In short, common-sense is violated in all ways." There are few houses or school-rooms which do not illustrate this description.

The author gives many useful illustrations of various systems of ventilation, besides some, hardly less useful, of heating apparatus, upon which he makes remarks which are very sensible and useful. The practice, common in houses and apartments, as well as office buildings, of placing direct steam radiators in the rooms, without provision for the entrance of fresh air, the author considers "extremely objectionable," and he suggests the imperviousness of the painted walls and the tightness of the joinery in the "family hotels," as an additional cause of the discomfort felt in them. Another suggestion, which is familiar to architects, but which they find it difficult to enforce upon furnace-men and owners, is that no introduction of fresh air can take place without an outlet for the escape of foul air, and it is not safe to take it for granted that any so-called ventilating flues are in working order, except the chimney and open fireplace. In general, he thinks that no room is fit for habitation without a chimney.

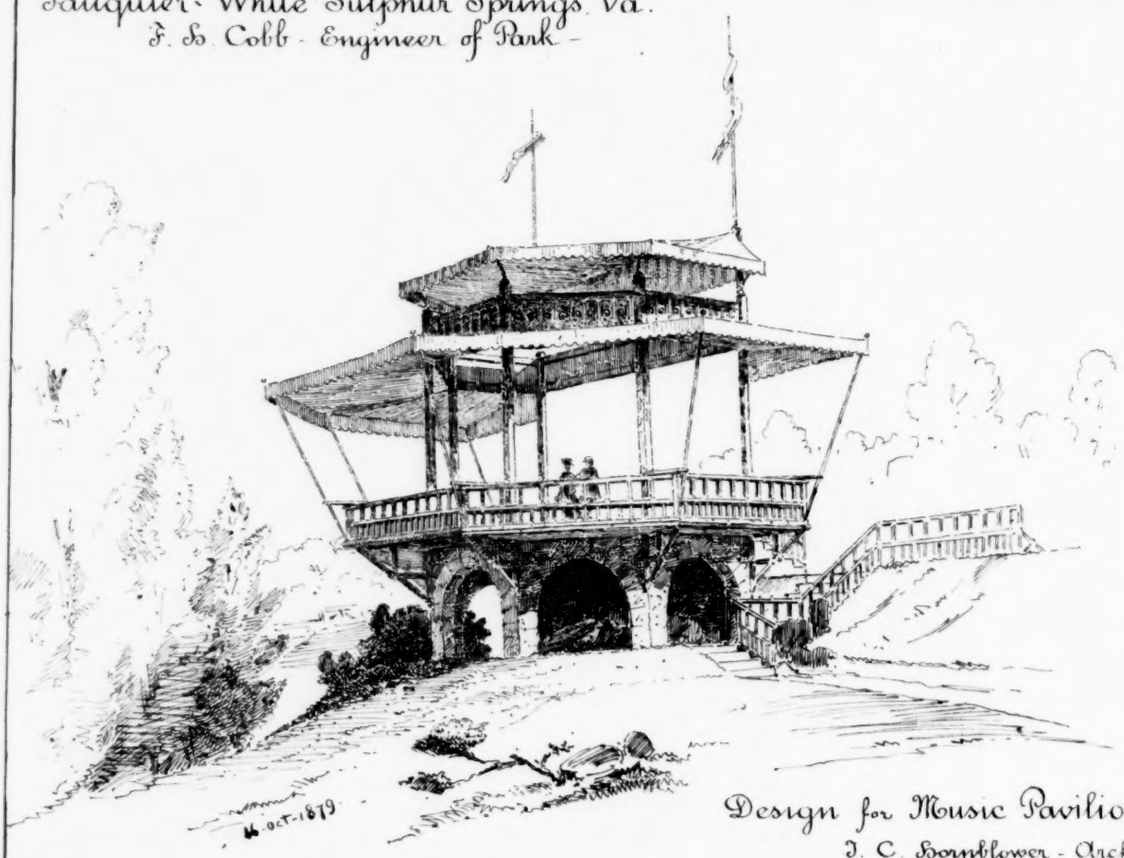
More matter upon this subject is to be found in the papers on Hospital Construction and School Hygiene, contained in other parts of the work; but we must refer our readers to the original, for further information, promising them that they will be amply repaid.

Some slight errors of proof-reading appear in a few of the papers. One of them always presents "matrass" instead of mattress, — a rather comic mistake. Names of localities are misspelled, as Dombes for Doubs, Tescudo for Tezcuco; but these hardly detract from the general excellence of the matter. The index might be much fuller with advantage, and we trust will be made so in future editions, which we hope to see.

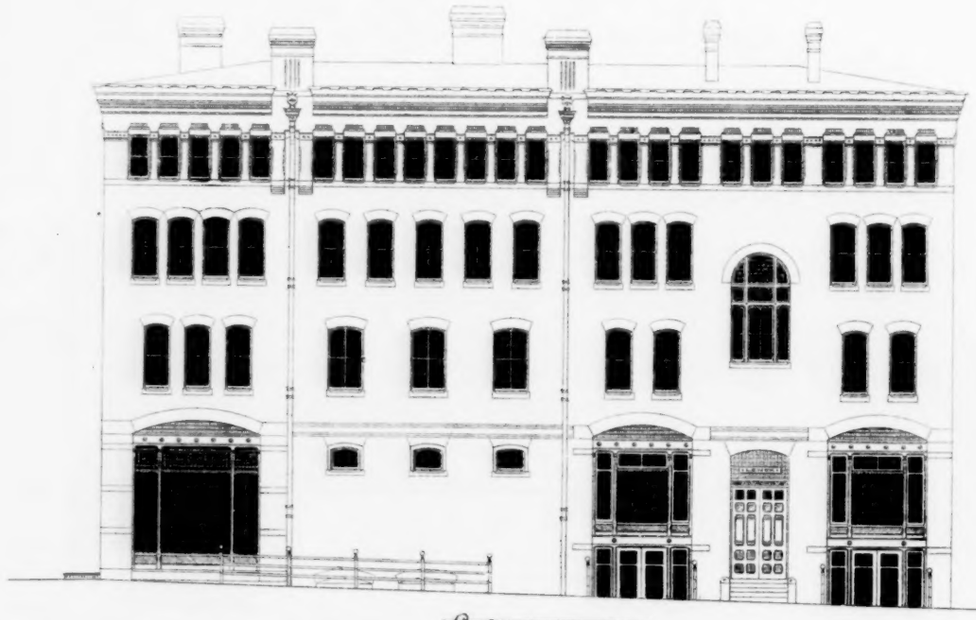
The Town Hall at Farbach. — A fire at Farbach, Prussia, between Trier and Coblentz, has just destroyed sixty houses, among them the town-hall, dating from the sixteenth century.

Scale ¼"
Plan of Steps
Details 1½"
Elevation of Railing
"Wrought Iron"
Plan of First Step
Detail of Rail and Newels
Sketch Plan
Parlor Cornice
Plan
Parlor Mantel
Drawing Room Mantel
Elevation of Stairs
Section A.B.
Newel
DETAIL SKETCHES OF
SEVERAL HOUSES
WASHINGTON D.C.

Fauquier White Sulphur Springs Va.
F. S. Cobb - Engineer of Park -



Design for Music Pavilion
J. C. Sornblower - Archt



G Street Elevation

Lenox Building - Washington D C
Designed for Jno. W. Vernum Esq by Painter
4 & 2½ Stories built 1879

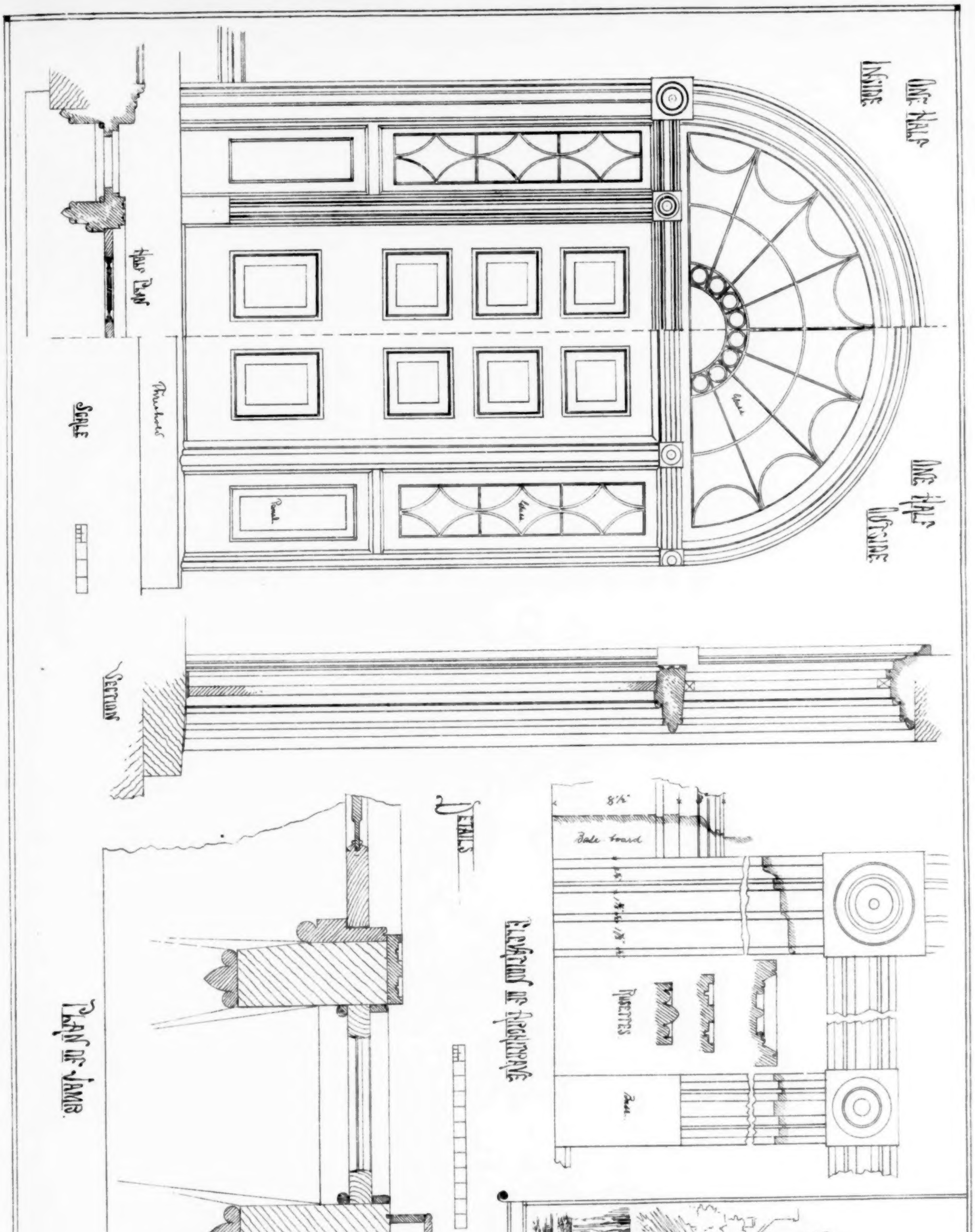
Jno C. Sornblower Archt.

THE HELIOTYPE PRINTING CO. 240 DEVONSHIRE ST. BOSTON

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON.

MORAVIAN CHURCH OF THE HOLY TRINITY PHILADELPHIA PA

J. PURSELL, ARCH'T.


OLD
SETON:HOUSE.
FRONT ENTRANCE
WASHINGTON
D.C.
PERSPECTIVE VIEW
ONE HALF INSIDE
ONE HALF OUTSIDE
HALF PLAN
SCALE
SECTION
DETAILS
ELEVATION OF ARCHITRAVE
ROSETTES
PLAN OF JAMB
Base board

THE INTER-OCEANIC CANAL.

THERE is an almost irreconcilable difference of opinion among American engineers about the best route across the Isthmus. Some of them desire that a crossing be made at Nicaragua, where, though it will take four and a half days for a ship to go through the canal, the capital required for the undertaking will be no more than $86,000,000. Another party of engineers favor a canal across the Isthmus of Darien, where the expense will again be comparatively small, probably not over $100,000,000 at the furthest, the canal proper being about thirty-one and a quarter miles long, and having two locks. A third and numerous party of engineers prefer the magnificent San Blas route, the shortest of all, in a region free from floods, where the ground is hard, and where a canal can be constructed on the sea level, without locks, for $95,000,000. This is the tunnel route, on which the mountains will have to be bored for eight and a quarter miles. The advocates of these several plans are enthusiastic and persistent in regard to them; and it is not easy to see how a decision is ever to be made between them, even should a new Congress be convened to consider the matter.

One thing, indeed, appears to be certain. The projects of the Americans were not adequately treated at Paris, and the Congress assuredly voted somewhat in the dark. This appears beyond question from the printed volume of the proceedings of the Congress, which the *Tribune* has just received from M. Henri Bionne, the Secretary General of the Congress. Valuable as was the work performed by that gathering of eminent philanthropists and geographers, in putting on record the ripe opinions of experienced engineers concerning the inter-oceanic canal and its advantages to the world at large, an examination of the volume of proceedings of the Congress inspires some regret as well as much admiration for what was done. Few of the delegates had, previous to the meeting, any adequate idea of the colossal nature of the question with which they were to be called upon to grapple. They came together expecting to adjourn in eight days. When they confronted the problems presented by the canal, the eight days stretched out to two weeks. Even then all the proceedings became so hurried that the presiding officers were compelled to refuse a hearing to the plans of a large number of American engineers. The Congress itself sped on to a vote on merely a partial presentation of the facts. Nor was that all. When the Committee on Routes reported to the Congress, the cost of all the purely American routes was estimated at double the figures fixed by their respective authors. The cost of the San Blas Canal was raised to $240,000,000; that of the Nicaragua project to $230,000,000; and the Atrato-Napipi route to $200,000,000. This was an inexplicable proceeding, unless it be admitted that the Americans are all wrong about the canal. The figures were raised against the protest of the delegates from the United States, and no reason was given as to why they were so raised, except that the committee regarded the estimates as too low. The Panama Canal was estimated at about $220,000,000 by the committee; and it was upon this showing of comparative cost that the whole Congress, in general session assembled, voted. There appears to be some foundation, therefore, for the unanimous assertion of the delegates from this country, and of engineers in general at home, that the decision of the Paris Congress was not based upon an accurate knowledge of the facts. Their position is justified by the record.

Even if the Congress acted hastily, however, it does not yet appear that its decisions are likely to have much weight with M. de Lesseps, or that he is likely to begin an inter-oceanic canal without a complete knowledge of all the facts. He has, indeed, suspended the business of taking subscriptions for the capital stock of the canal company, until a new survey of the Isthmus of Panama of the most serious and thorough description can be made; and his engineers, under the lead of M. Blanchet, have been sent to Panama to make that survey. Until they report, and public confidence in the route is established, there is no probability that a pick will be struck into the ground or a dollar of capital be expended for the construction of a canal at Panama. — *N. Y. Tribune.*

THE ILLUSTRATIONS.

DETAILS FROM THE OLD SEATON HOUSE, WASHINGTON, D. C. SKETCHED BY MR. G. R. TOLMAN, ARCHITECT, WASHINGTON.

THIS house, numbered 708 in E Street, N. W., Washington city, better known as the old Seaton house, was built in 1821 by Wm. W. Seaton, Esq., one of the editors of the *National Intelligencer*, then the leading journal of the United States. For ten years Mr. Seaton was mayor of the city, a position at that time of singular prominence, and one severely taxing the social qualities and capacities of its incumbent, and this house was the rendezvous of the leaders of political society, as well as of the more exclusive higher circles of the capital. Here were constantly to be met the leading members of both political parties, and the beauty of all sections of the country. Webster, Clay, Calhoun, Hayne, and the other central figures of that marked period in our political history met at the lavish board of this generous host. At his door General Harrison mounted his horse to ride to take the inauguration oath of a President of the United States. The house is about square in plan, being 40 feet in width. When built it was the only residence in the block, and the view to what are now the Smithsonian grounds, several blocks to the south, and thence to the river, was unobstructed. Though now showing signs of age and decay, the building still evidences its former state. The grounds in which the house stands face north 60 feet upon E Street, and are 126 feet in depth. The building may be said to face backwards, the pantry and bath-room being at the front, and the drawing and dining rooms, two large communicating apartments, facing south, and opening upon a broad piazza the full length of the house. From this piazza was descent into the large and eminently Southern yard, about 60 by 80 feet.

A commodious hot-house stood at one side of Mr. Seaton's grounds, and in addition to this æsthetic occupant of the yard was a more prosaic, and at that time necessary, adjunct — a smoke-house, in which, long before Sam Ward's day, the regal mayor had a way of curing his own hams. In the growth of Washington the residence and grounds became gradually hemmed in; and when the late Board of Public Works of the District ran riot in its "comprehensive system of improvements," the grandeur of the place disappeared to give way to the present far from grand aspect of the spot. The building is still, however, as staunch as when first built, the fourteen-inch walls showing no signs of failing, and the old mantels and cornices, still remaining, attest, like the relics of Monticello, the designer's taste. The old mantel-piece in the drawing-room, of which a sketch is given, is of pure Parian marble, and is still intact. The house and grounds are a landmark, though at present devoted to the more modern purposes of a summer garden. But they promise shortly to succumb to the utilitarian demands of a day in which space is considered valuable in more than a horticultural sense, and an old house, no matter how sanctified by recollection, is deemed rather an eye-sore than a shrine.

MORAVIAN CHURCH OF THE HOLY TRINITY, PHILADELPHIA, PA. MR. ISAAC PURSELL, ARCHITECT.

This church is now being built at the corner of Twelfth and Oxford Streets. It is a two-story church, facing on both streets. The tower is on the corner and is 180 feet to the top of the spire. The first floor is divided into Sabbath-school, lecture, class, and library rooms. The second story contains the audience room. The pews are arranged in semicircles, and will seat comfortably 640 persons. The organ will be placed in a gallery over the pulpit. The walls are constructed with Trenton brown and Falls of Schuylkill gray stone. The contract price of the work is $18,700, excepting the pews, stained glass, and heaters.

THE LENOX BUILDING, WASHINGTON, D. C. MR. J. C. HORNBLOWER, ARCHITECT, WASHINGTON.

MUSIC PAVILION FOR FAUQUIER PARK, WHITE SULPHUR SPRINGS, VA. MR. J. C. HORNBLOWER, ARCHITECT, WASHINGTON, D. C.

THE TRADES-UNION CONGRESS AND FEMALE LABOR.

THE dislike which workingmen entertain to the idea of female labor was very plainly shown at the Congress. No subject can well be more embarrassing than this, because on none are the arguments on both sides so apparently conclusive. On the one hand the physical injury often done to women by prolonged hours of work, coupled with the fact that, left to themselves, women will usually work more than is good for them, points to the necessity for some legal restriction. The community suffers by the degradation of a whole class, and if women are allowed to work to excess, a large proportion of them will be liable to become degraded. On the other hand, a law which forbids women to work more than a certain number of hours a day is a law which says, "Be ye warmed and filled," without giving them the means of being either. These women have to live, and in almost every employment they can only live by making it the interest of masters to employ them in preference to, or, at all events, as willingly as men. If they are hampered by factory acts and the like, how can they possibly hope to do this? Men are free to work as long as they please, and even their self-imposed limitations in this direction are often merely a means of making a higher charge for overtime. Women are forbidden by law to work more than a fixed number of hours, and thus are prevented from commending themselves to employers who care more for the amount of work than for its quality. Undoubtedly, if society were organized on an ideal basis, the men would have the best of the argument. If every woman were maintained by her husband, or father, or brother, home would be all the better cared for, and children all the more healthily brought up. But the maintenance of every woman by her male relatives is as purely imaginary in modern society as the maintenance of every man by his proper rood of ground. As a matter of fact, women have very often to keep themselves, and not unfrequently to keep, or help to keep, their male relations. It hardly becomes workingmen, therefore, to speak as though the desire of women to work, and their impatience under laws which make it more difficult than it would otherwise be for them to find work, were a mere piece of feminine wilfulness. In the educated classes the desire to play their part in vocations hitherto confined to men may be an evidence of restlessness and vague discontent. But it is certainly not so among the poor. Their work is often the alternative, not to home, but to the workhouse. If women cannot earn their bread for themselves, they have often no means of getting it except from the relieving of-

ficer. The speeches made on the question at the Trades-Union Congress left this aspect of the question completely out of sight. They contain no suggestion of a solution of the difficulty, no hint even that the difficulty had been recognized or appreciated. The strong class feeling which binds the members of trade-societies together seems not to extend beyond the male members of the class. Women are viewed simply as trade rivals, much as Chinese or coolies might be. If the Congress had been entirely made up of doctors it could not have been more determined to protect itself against female competition. — *Saturday Review.*

THE HYPÆTHRAL QUESTION.

Boston, October 29, 1879.

To the Editor of the American Architect:

Dear Sir, — Any regret I may have felt at the unintentional asperity in the tone of my criticism of Mr. Clarke's "Hypæthral Question" is entirely dispelled by his reply. For in it the same vagueness of statement, the same recklessness of assertion, and the same illogicality that characterized his pamphlet appear in increased measure. These are grave charges and ought not to be made without good grounds. Unfortunately these are not difficult to adduce. Before I proceed to take up Mr. Clarke's points *seriatim*, allow me, in order to obviate misconception, to say that I hold no theory on the "hypæthral question." I simply say that we have, thus far, no data sufficient to lead us to a definite conclusion in the matter, and that Mr. Clarke has not adduced in favor of his view a single unambiguous fact, or a single testimony from an ancient author.

1st. In reply to my assertion that Mr. Clarke had not been able to state the hypæthral question, he replies: "By hypæthral I understand, as is always understood in architectural usage, lighted from above, through a horizontal opening in roof and ceiling." This, indeed, may be admitted to be the ordinary English usage; but then Mr. Clarke has no right to appeal to Vitruvius as countenancing any such meaning, or to bring his testimony into connection with the question at all, for Vitruvius evidently means by "hypæthral," not "lighted from above, through a horizontal opening in roof and ceiling," but entirely open to the sky. This Mr. Clarke knows; for he says on page 7 of his pamphlet, that it "could hardly be applied to a mere orifice in the roof, as it means, literally, without any covering whatever." Thus it appears that the term "hypæthral," as used by Vitruvius in the famous passage which, according to Mr. Clarke, "is the hinge upon which the entire matter has turned," has a meaning altogether different from that accorded to it by English usage, and, therefore, that the passage has no bearing on the question. It is strange that Mr. Clarke, holding to the English meaning of "hypæthral," should yet speak of the temple at Bassæ as "an enclosed court."

2d. When Mr. Clarke, who tells us that he is "reasonably familiar with the literature of the subject," asserts that "only one writer has ever questioned the belief that this was the manner of lighting these buildings" (*i. e.*, by means of an "hypæthron"), he places himself in direct contradiction to Michaelis, who, in his great work on the Parthenon, page 24, note 69, says: "The existence of hypæthral temples, *recently often called in question*, especially by Ross, *Hellenika*, page 1, seq., in opposition to K. F. Hermann, has been placed by Bötticher beyond all doubt." I am not even "reasonably acquainted with the literature of the subject," and therefore I leave Mr. Clarke to settle this matter with Michaelis.

3d. My remark that "it is not true in any sense that the passage from Vitruvius, *in so far as it relates to the point at issue*, is obscure," Mr. Clarke first garbles, by omitting the limiting clause here italicized, then cites as obscure the very phrase which I had expressly admitted to be so, and taxes me with asserting *it* to be "explicit, clear, and unequivocal," whereas I distinctly confined these terms to the rest of the passage.

4th. Mr. Clarke next accuses me of altering the Latin text, in reading *est* for *et* in the obscure clause. I am not fortunate enough to be the author of that reading. It was adopted long ago by Vossius (ad Melam, page 73, edition of Burmann), and is stated by Schneider in the notes to his edition of Vitruvius to be "*virorum quorundam doctorum opinio.*" It is true that by so doing I make the sentence "refer alone to the temple of Olympian Zeus, at Athens," and this not without reason, as I will show. Vitruvius's first words referring to hypæthral temples are: "*Hypæthros vero decastylos est in pronao et postico.*" Now, as Mr. Clarke very well knows, there was but one decastyle temple in Athens, or even in Greece; consequently the words must refer to it, and it alone. But Vitruvius tells us that the example he cites was *octastylos*. He does not, however, say that it was *octastylos in pronao et postico*, as Mr. Clarke asserts, and, indeed, he could not, having already informed us that the hypæthros was "*decastylos in pronao et postico.*" I think I was justified, therefore, in looking for the eight columns elsewhere, and I modestly conjectured that they might have been in the interior at the two ends of the "hypæthros." Mr. Clarke declares dogmatically that this is impossible; but until he brings forward better evidences than his *ipse dixit*, I shall hold my judgment in suspension. When he says, "To consider an hypæthron [I was very careful to avoid "hypæthron" and say "hypæthros"] — that is to say, simply nothing — as being built into a permanent temple, thus leaving an opening in the roof of the structure, when this 'ran all the way around it,' is, indeed, a curious architectural conjecture," he forgets that a piece of real estate, even when not walled in or roofed over, is hardly "simply nothing." Elsewhere he himself cites τὰ ὕπαιθρα from Polybius as meaning "the open country." The open country is hardly "nothing." Moreover, I never said a word about "leaving an opening in the roof of the structure," — *nor does Vitruvius.*

5th. In defence of his assertion that Vitruvius "wrote more than four centuries after the decline of Greek architecture," Mr. Clarke now says: "Considering that the degeneration of the styles of Greek architecture, the gradual substitution of formalism for thought, began in the third quarter of the fifth century B. C., it may be said that Vitruvius, who wrote very near the advent of the Christian era, was about as far from Iktinos as we are from Jeanne d'Arc." He was about thus far from Iktinos, whether we consider the degeneration or not; but what that has to do with the question I cannot see. Both the Propylæa and the Erechtheion were built after the beginning of the third quarter of the fifth century,[1] and the works even of Iktinos were as perfect in Vitruvius's day as they had been four hundred years before. If Vitruvius had left us a building instead of a book, Mr. Clarke's defence would have some relevancy. His statement that Vitruvius had never been in Greece, he has failed to show to be other than the baseless assumption I pronounced it to be.

6th. Mr. Clarke devotes a good many words to proving that the temple of Zeus, at Athens, was unfinished (ἡμιτελές, *inchoatum*) in the time of Vitruvius. That I frankly admitted; but I have yet to see the proof that it had not all the roof it was ever intended to receive. The citation from Vitruvius proves nothing, being simply a list of the portions of which the Roman Cossutius was the architect. "*Cujus,*" he laments, "*commentarium nullum est inventum.*"

7th. When Mr. Clarke says: "No more need be said concerning the passages from Justin and Strabo [he evidently means Pausanias] than was in my paper, to which I would refer for much Mr. Davidson has overlooked or ignored," he is making a groundless assertion. I neither overlooked nor ignored anything of the smallest relevancy, as any one who reads my criticism may easily discover.

8th. Mr. Clarke, in his pamphlet, made the rash statement that "Hyperoön galleries existed in all those Greek temples which are now assumed to have been lighted from above." To my assertion that "we have no proof that there were galleries in any Greek temple save one," he replies, "Now, to speak of Doric temples alone, there is direct literary evidence to the existence of the hyperoön in the Delphian as well as the Olympian temples." Any fear I might be affected with lest Mr. Clarke should hereafter confront me with a list of Ionic temples having "hyperoa," is dispelled when I look at the evidence upon which this now qualified assertion rests. For the existence of "hyperoa" in the Olympian temples (mark the plural!) I am referred to Pausanias, v. 11. Turning to that, I find the passage which I myself cited when I admitted that we had direct evidence for the existence of galleries in *one* temple, namely, that of Zeus. Not a word is said of galleries in any other temple, either in the Heræon or the Metroön. As to the reference (Pindar in Paus. x. 5) proving that the temples at Delphi had upper galleries, I hardly know what to say, so much does the citation of it reflect on Mr. Clarke's fairness. In the chapter referred to there is, indeed, a brief description of the Delphic temple of Apollo, and in it a quotation from Pindar. It runs thus: —

Χρύσεαι δ' ἐξύπερθ' αἰετοῦ ἔιδον Κληδόνες,

and means, "and above the eagle (*i. e.*, the pediment?) sang the golden mystic virgins." The old editions of Pausanias, indeed, read ἐξ ὑπερῴου; but this rests upon no MS. authority, and has long since been abandoned. (See Schubart's *Pausanias*, vol. ii., *præf.*, page xx, and Bergk's *Pindar*, page 294, seq.) Thus the force of the citation falls to the ground, and Mr. Clarke has failed to produce any literary evidence that more than one temple in Greece had galleries. But he goes on to say, "It [*i. e.*, the hyperoön] is to be seen and measured in Pæstum, and he who can study so many Sicilian temples and can attempt to picture to himself the antique arrangement of the Parthenon interior, without becoming aware of galleries, must advance to the question with prejudice or with insufficient architectural understanding." This is, I imagine, a severe reflection on me; but I am in good company. Doubtless we all have insufficient architectural understanding, if Mr. Clarke, on the authority of his imagination, sharpened by the study of "so many Sicilian temples," says so; and I, for one, advance to most questions with a prejudice that forbids me to generalize from a single example. I have not seen the "so many Sicilian temples;" but I have examined, with all the care of which I am capable, those of Pæstum, and I have failed to find in them traces of hyperoa. As, however, my untrained eyes are of little authority in a matter so strictly technical, I will quote the words of M. Labrouste, member of the French Institute, who in 1824 received the *prix d'architecture*, and who five years later made plans of the Pæstum temples. He says: "Il me reste de parler des escaliers qui sont semblables à ceux que l'on remarque à presque tous les temples de la Sicile conduisant dans le comble. On conçoit, en effet, que les plafonds en pierre exigeaient une inspection assidue et une vigilance particulière. Ils ne pouvaient conduire à des tribunes intérieures, comme le suppose de Lagardette, car de semblables escaliers sont placés à l'entrée de tous les

[1] Even the Parthenon was for the most part built after this date.

temples de la Sicile, qui, à coup sûr, n'avaient pas de tribunes dans la cella; ils servaient donc seulement à l'inspection des plafonds, et j'ai remarqué en Sicile, qu'il n'y a que le temple de Jupiter Olympien, à Agrigente, qui n'ait pas d'escaliers, et l'on sait qu'il était hypæthre ou sans plafonds." And M. Beulé, something of an authority in architectural matters, I believe, says: "L'escalier si admirablement conservé du temple de la Concorde, à Agrigente, avec ses paliers, ses rampes droites à retours, ses petites fenêtres triangulaires, nous apprend comment les anciens se ménageaient un accès dans les combles de l'édifice, prévoyant les incendies, les réparations, les besoins de chaque jour. Mais quoiqu'il y eût deux ordres de colonnes, il n'y avait point de galerie accessible au public, même dans le Parthénon, nous l'avons vu jadis (*Acropole d'Athènes*, t. ii., ch. 1) la double colonnade n'est qu'une décoration." Poor, prejudiced M. Beulé! Even Michaelis, who restores the Parthenon with galleries, does not pretend to have any authority for so doing except the analogy of the temple of Zeus, at Olympia (see *Der Parthenon*, page 23). Galleries, I am quite well aware, appear in many restorations; but, so far as I can discover, they are all purely conjectural. It would, indeed, be strange if the temple at Olympia had been the only one having galleries; but at present, I think I may say with safety, we have no positive proof to the contrary.

9th. Since Mr. Clarke was acquainted with the view of the Acropolis published in the German *Mittheilungen*, he might very easily have explained to himself how the Parthenon might, in the Middle Ages, have been covered with the original tiles, and yet that fact have "no bearing on the lighting of Greek temples," as I asserted. But he chooses to substitute for "covered" "covered completely," on the authority of Tavernier, who speaks of the roof as "*tout entier de pierres plates de marbres.*" This was doubtless true of so much of the Parthenon as had any roof at all, and the words *tout entier* mean no more; but the view in the *Mittheilungen* shows that the roof of the pronaos had entirely disappeared, and thus would have been obtained the additional tiles necessary to complete the covering of the roof of the cella, after it was raised. So I reaffirm that the condition of the roof of the Parthenon in the seventeenth century has no bearing on the lighting of Greek temples.

10th. I can assure Mr. Clarke that the explanation of the Pantheon "hypæthron" has not been thrown away. I can thoroughly appreciate its value, and I can also assure him that the small building near Karystos was not originally intended as a goat-house. I am pretty familiar with Greek goat-houses, and Mr. Clarke will be troubled to find one among them all resembling this. There is a description of this edifice in Guhl and Koner's *Leben der Griechen und Roemer*, page 7, seq., and to that I must refer.

11th. If I have in any way misjudged Mr. Clarke's essay from not knowing that it was "but the single chapter of a projected work," that is certainly his fault and not mine. When he promises not to omit "to consider any argument or testimony in favor of the hypæthron upon which weight has been laid by its advocates," he gives no hint that this is not to be done in the essay itself.

12th. On the strength of a passage which he declares to be "notoriously obscure" Mr. Clarke unqualifiedly asserts that Vitruvius refers to *two* temples at Athens as hypæthral. Until he shows how a decastyle temple can, at the same time and in the same sense, be octastyle, I shall deny this and hold that the Vitruvian passage has no bearing on the lighting of Doric and Ionic temples.

13th. That "the supposition that Greek constructors 'who could rear a Parthenon' were unable to roof temples like those of Zeus, at Ilium [he means Selinus] and Athens, ... need not be discussed before architects," I am willing to admit; it must, however, be remembered that the people who built the Parthenon did not attempt the other task, and that we have the direct testimony of Strabo to the fact that the temple of Apollo, at Branchidæ, "remained roofless on account of its size."

14th. Not able to deny that the great temple of Demeter at Eleusis was lighted from the roof, Mr. Clarke asserts, dogmatically, that it was "not a temple, but a house of assemblage," as if the two things were incompatible. However, it certainly was a temple. Strabo, Θ, 12, page 395, calls it τὸ τῆς Δήμητρος ἱερόν, and Vitruvius calls it not only *cella* (translating σηκός), but also *templum* (Bk. vii., *præf.*).[1] Its form may have been that of a basilica, as Mr. Clarke says, though that is at least doubtful. At all events it affords an undoubted example of a Greek temple lighted from the roof. I very much doubt his explanation of Plutarch's phrase τὸ ὀπαῖον ἐκορύφωσε. In any case the verb κορυφοῦν has nothing to do directly with κόρυς, the verb from which is κορύσσειν. Κορυφοῦν comes from κορυφή, and does not suggest, even "figuratively," a helmet. Again, ὀπαία is not defined by Hesychius as equal to "θυρίς, window or doorway; a vertical opening." Here Mr. Clarke garbles Hesychius, who defines ὀπαία as θυρὶς ἡ ἐκ τοῦ κεράμου, that is, a window cut in the tile roof, hence *not* vertical. The word is similarly defined by Pollux, ii. 54. I fear that if Mr. Clarke has no better proof that the great temple at Eleusis was surmounted by a clerestory than his interpretation of this passage, he will not find many converts to his view.

15th. In his remarks about the use, by Pausanias, of the phrase οὐκ ἔχον ὀροφον, Mr. Clarke again garbles my assertion by omitting the limiting clause, and so his references only go to bear me out. He evidently does not know the meaning of the term "Metroön," for he speaks of it as the temple of Metros Theos, a divinity of whom, I should like to wager, no one ever before heard. This is something for Mr. Clarke to correct in his MS. I must here omit a few of his minor arguments, holding myself ready, if need be, to show that they are not pertinent, and follow Mr. Clarke into one of his flights. He says: "The eternal principles of constructive truth and rhythmic beauty, 'æsthetic notions' to Mr. Davidson, are not of to-day nor yesterday [nothing eternal is!], but are and ever will be the same as when so eloquently expressed in the architecture of Greece twenty-four centuries ago." If I could understand these words, I might, perhaps, agree to them; but after all I might still reasonably doubt if these eternal principles had ever come into the consciousness of any human being to such an extent that he could reconstruct Greek temples by means of them. I fear they come into all our minds as "æsthetic notions," which are very unsafe guides in determining the taste of by-gone periods. It seems to me better to study the facts of ancient art carefully and minutely, and base our theories upon them, than to set out with preconceived "eternal principles," and impose them upon things which we only half comprehend.

16th. In regard to the Erechtheion, I will only call Mr. Clarke's attention to the fact that the western windows are not in the Pandroseion, but in a chamber or chambers once separated from it by a wall.

Mr. Clarke claims to have made only two oversights in his essay. I think I have pointed out many in it, and still more in his reply, and my list is not complete. I think, moreover, I have more than substantiated all my charges, and also shown that he has not yet brought forward a single cogent argument or fact in support of his theory of artificial lighting. He conceives my aim and spirit to be different from his, and I am entirely willing he should. That I did not treat him with "delicacy" is true; but the question remains whether there are not certain works that forbid delicacy in an honest critic, and whether the "Hypæthral Question" is not one of them. That let others decide. I am, dear sir,

Very truly yours, THOMAS DAVIDSON.

P. S. November 18. A few days ago my attention was called to a communication in your issue of August 30 in which Professor Norton, who wrote the preface to the "Hypæthral Question," invokes in favor of that essay the authority of Dr. Reber, of Munich, to whom he gives a very high testimonial, as the author of an "elaborate and authoritative work," etc. I had supposed that for educated men the day of authoritative works was long past, and that they had all learnt to demand facts as a ground-work for theories. What Dr. Reber's unsupported authority is worth may be judged from the single circumstance, very germane to the present question, that in his *Kunstgeschichte des Alterthums* (Leipzig, 1871), which Professor Norton considers "the best existing concise history of ancient art," he treats with sarcasm and contempt the well-established fact of the curvature of the horizontal lines in Greek temples. (See the criticism of Koumanoudhis in the Ἀρχαιολογικὴ Ἐφημερίς, 1874, page 481.) In spite of this if Dr. Reber will produce evidence that Greek temples were artificially lighted, I shall listen to him with as much respect as I should to Professor Norton himself.

T. D.

[1] One might suppose from the text of Strabo that the σηκός and the ἱερόν were distinct edifices. That they were not, is clearly shown by the passage from Vitruvius.

THE TANAGRA FIGURINES.

[Apropos of our notice of the Tanagra figurines we have received the following letter, which we have referred to the writer of the notice.]

NOVEMBER 11, 1879.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — An amateur of the "Tanagra Figurines" begs for additional details regarding them, from your able correspondent of October 25, who seems to be the most original of all writers who have treated this interesting subject. It is desirable that examples should be given of figurines modelled on the higher statuary of their day, "copies or imitations of famous works," the absence of such types having been noted by foreign critics and collectors. This is a special discovery and demands publicity. It may be useful, also, to notice the moving of a certain historical date quite sixty years from its accustomed place. Will your correspondent kindly inform us whether he maintains his position on the battle of Tanagra, recalling the distinction which Sir Walter Scott is reported to have earned on the field of Waterloo. M. F. C.

[To which our contributor replies as follows:]

MR. EDITOR:

If I had known of the identification of any of the Tanagra figurines as copies of existing antiques I should have said so. The fact that there is no such identification was good cause for confining myself to simple conjecture. The reasons for assuming that the figurines did not owe their inspiration solely to the men who modelled them are artistic rather than historical. It is difficult not to believe that their style, their treatment, and often their poise and the handling of their draperies were due to the higher sculpture of their time. A few of them approach nearly enough to the character of ideal sculpture to suggest that they found their originals not in daily life, but in works which were favorites in their day, though they are not among the comparatively small number that have survived to ours.

Hence my conjecture that some were "perhaps actual copies or imitations more or less remote of famous statues." If it had occurred to me that anybody would fail to apprehend my meaning I might have added "unknown to us," or something to that effect.

The date which I have "moved" was in correction of the book under notice, where the battle of Tanagra is set at 426 B. C. The year I had in mind was 457 B. C., which, I believe, is the received date; but writing in a haste which is unlucky in those who venture to criticise, I wrote thirty-one years *earlier* instead of *later*. Your amateur does not assume the defence of the writer whose work I noticed, and I will not accuse him of ignoring the mistake I meant to correct; but the dispassionate acumen which was quick to score the slip of my pen might profitably have instructed your public as to the other error.

THE BIRCHARD BUILDING, MILWAUKEE, WISCONSIN.

Milwaukee, November 10, 1879.

To the Editor of the American Architect:

Sir, — At a meeting of the Common Council, October 13, the following resolution was presented by Alderman Chapman: —

Resolved: That the Committee on Public Buildings be and are hereby authorized to cause a thorough inspection of the building now in the course of erection on the corner of Grand Avenue and West Water Street, known as the Birchard Building, as the same is being erected in a dangerous condition, and report the facts to this Council.

Referred to the Committee on Public Buildings.

On Friday, the 24th, the *Sentinel* published this paragraph: —

Yesterday afternoon the Committee on Public Buildings inspected the Birchard Block, on Grand Avenue, which is now being remodelled. They are of the opinion that the building is unsafe, and will recommend that the Board of Public Works be instructed to make a thorough examination of it.

At the meeting of the Council, held November 10, the matter was referred to the Board of Public Works, by the adoption of the following resolution: —

Resolved: That the Board of Public Works be and are hereby instructed to cause a thorough inspection of the building known as Birchard's Block, on the corner of Grand Avenue and West Water Street, as to its construction, and whether or not it is dangerous to the public, and report to the Common Council.

Adopted.

In the mean time the work progresses on the building regardless of resolution and reference.

The words in the resolution, "now in the course of erection," are liable to mislead those not acquainted with the building. The building has been erected at least fifteen years, but until a few weeks ago was a two-story building; now another story is added on the same old walls. The building has for many years been considered unsafe, the corner pier is settled very considerably, and the walls on each front, at the line of the second story, are bent outwards and badly cracked. Most certainly the outward appearance of the building seems to justify the words in the concluding part of the resolution, "as the same is being erected in a dangerous condition," but without a proper examination judgment cannot be rendered. That such an examination by competent men should be made, and that speedily, is the opinion of all careful builders. There is no such thing known in this city as a building inspector. We are waiting for a few murders to be committed by buildings tumbling down. It is only a question of time.

A. B.

PUBLICATIONS RECEIVED.

Illustrations of the History of Art, Architecture, Sculpture, and the Industrial Arts among the Nations of Antiquity. A series of illustrations arranged chronologically, and forming an atlas to be used with any work on the history of art. Authorized American edition, published under the supervision of S. R. Koehler. Boston: L. Prang & Co. 1879. Parts I. and II., price $1.50 and $2.25.

NOTES AND CLIPPINGS.

The Antiquity of Glass. — The oldest specimen of glass bearing anything like a date is a little moulded lion's head, bearing the name of an Egyptian king of the eleventh dynasty, in the Slade collection at the British Museum. That is to say, at a period which may be moderately placed as more than 2,000 years B. C. glass was not only made, but made with a skill which shows that the art was nothing new. The invention of glazing pottery with a film or varnish of glass is so old that among the fragments which bear inscriptions of the early Egyptian monarchy are beads, possibly of the first dynasty. It cannot be doubted that the story preserved by Pliny, which assigns the credit of the invention to the Phœnicians, is so far true that these adventurous merchants brought specimens to other countries from Egypt. That the modern art of glass-blowing was known long before is certain from representations among the pictures on the walls of a tomb at Beni Hassan, of the twelfth Egyptian dynasty, but a much older picture, which probably represented the same manufacture, s among the half-obliterated scenes in a chamber of the tomb at Thy, at Sakkara, and dates from the time of the fifth dynasty, a time so remote that it is not possible, in spite of the assiduous researches of many Egyptologists, to give it a date in years. — *Saturday Review.*

The Bridge of Lessart. — We find in the *Journal of the Society of Arts* this further account of the building of the railroad bridge over the Rance at Dinan, and not, as was stated last week, at Dinard: "The Western Railway Company of France is at present engaged in constructing a branch line from Dol to Dinan; this has to cross the River Rance at about two miles below the latter town by a single span at an elevation of about 100 feet. The method by which this has been accomplished is considered unique in this country, and deserves some notice. The iron portion of the bridge itself is of the usual diagonal construction, its length is 96.5 metres, or 314 feet, and its total weight 1,300 000 kilogrammes, equal to about 1,250 tons. It has been constructed by the Maison Joly, of Argenteuil, a well-known firm, and has by them been put together on the line of railway immediately joining the intended span. Large wheels or rollers were placed beneath the bridge, and it was determined to push or propel the bridge across the stream by hydraulic power. In order, however, to regulate this operation, and to prevent its over-topping into the river below, a portion of a viaduct of a lighter construction, intended for another section of the line, has been temporarily attached or bolted to the fore end of the main span; this is about 150 feet in length, while another section is attached to the near end of the main iron bridge. It is evident that by adopting this method the fore end of the total iron construction will arrive at the supporting pier on the further side before the centre of gravity of the main span will have passed that on the home side; it will then be supported at both ends until finally placed in position. As soon as this is accomplished, the two sections of the lighter viaduct will be removed. To M. Morse, engineer-in-chief to the railway company, is due the credit for this bold and original conception, and under his able direction and supervision this great undertaking has just been successfully accomplished."

The Palace of the Trocadéro. — It has finally been decided that the Trocadéro building will be utilized by making it the home of the Ministry of the Fine Arts.

The Railroad up Mount Vesuvius. — The latest reports from Naples represent the railway destined to carry tourists to the top of Vesuvius as progressing fast toward completion, and the walls of the station which forms its terminus are already rising above the ground. The line is to be laid along the western slope of the mountain, and will be rather less than 1,000 yards in length. The station itself, which stands at the bottom of the volcanic cone, is 2,500 feet above the level of the sea, and the line rises rapidly to the verge of the crater, at an incline which averages 56 feet in the 100, but reaches at its steepest part as much as 63 in 100. The construction of the railway has been a matter for serious debate, and it was only after long consideration that the projectors determined upon the system planned by the engineer, Olivieri. According to the principle adopted in this plan, the whole of the inclined plane, from top to bottom, is covered with a thick platform of wood, resting upon the lava and other crumbling soil, which would of itself be much too unsteady to form a proper bed for the sleepers. Above the cinders and detritus, of which the mountain-side is composed, the platform is like a gigantic raft, and upon it the rails will be laid with ease and regularity. The wheels of the carriages are to be so firmly attached to the rails that they can never jump or slip off, and the trains are to be drawn up by means of two steel cables worked by a steam engine stationed at the bottom of the volcano. They will also be provided with a brake so powerful that even in the unlikely case of the breakage of both cables they can be brought to a standstill very quickly, even on an incline of 50 in 100. The only other difficulty which faced the projectors of the new railway was that of water-supply, for it was calculated that the expense of bringing from Resina enough water to supply the engine would run away with more than all the profits that could reasonably be expected. In order to avoid this alternative, two large reservoirs are being constructed, which are expected, even under the peculiar circumstances of the position, never to run dry. — *London Globe.*

The Spanish International Exhibition. — A French architect, M. Colibert, has just been charged with the preparation of the plans of the building which will be needed for the international exhibition at Madrid in 1882.

Discovery of a Colossal Statue at Gaza. — At Gaza, on the 6th ult., an Arab was quarrying stone at a place about four and a half miles distant from the town, and unearthed a marble figure of a man. The following are the dimensions given by an Arab eye-witness, namely: "Three feet from top of head to end of beard; 27 inches from ear to ear: from top of forehead to mouth, 13½ inches; from shoulder to shoulder, 54 inches; from crown of head to waist, 81 inches; and 54 inches the circumference of the neck; the total height is 15 feet. The hair hangs in long ringlets down upon the shoulders, and the beard is long, indicating a man of venerable age. The right arm is broken in half, while the left arm is crossed over the breast to the right shoulder, where the hand is hidden by the drapery of a cloak covering the shoulders." I presume the statue is nude, though this fact is not stated. There is no inscription either on the figure or on the pedestal, and the latter is a huge block, carved in one piece with the god. It was found in a recumbent position, buried in the sand upon the top of a hill near the sea, evidently removed from its original site, which is unknown. Its estimated weight is 12,000 pounds. The Pacha of Jerusalem has ordered a guard to watch this interesting relic of ancient art, and prevent any injury by the fanatics of Gaza. Judging merely from the "long hair and long beard," and the position of the left hand, I should be disposed to assume that it is an Assyrian monument commemorative of their invasion of Palestine. But it is premature to conjecture until further and more precise particulars can be had from Gaza. — *Jaffa Correspondence of N. Y. Herald.*

A Great Conservatory. — Possibly the largest private conservatory in the world is that recently completed for the King of Holland in the Schloss Park, adjoining his favorite country residence. It contains about 46 000 cubic yards of space, while its glass dome is 90 feet in height and 180 in diameter. This is flanked by two lofty towers resembling Turkish minarets in shape, which give an Oriental character to the whole structure. The hot-water pipes laid down for its heating are 15,000 feet long.