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LABOR troubles have continued during the past week, but in a somewhat modified form. The most important strike now in progress, and one also with which the public cannot but sympathize, is that among the operatives at the Pacific Mills in Lawrence, Mass. The mills are owned by a very rich corporation, and have hitherto been managed without any serious misunderstanding between the owners and operatives, but circumstances have made it advisable to reduce the wages of the employés, and a series of strikes has been the consequence. So contented and reasonable have been the operatives up to this time that they had formed no organization among themselves, and were not connected with the unions in other manufacturing towns, and their first step, to send a deputation to Boston and appeal to the owners of the mills against the action of their resident agent, showed a forbearance and confidence in the good-will of those for whom they worked that we hope will be justified. Every one must feel for the distress of poor people, dependent upon their weekly wages, at a sudden reduction of fifteen per cent in their pay, while the cost of living is advancing daily, and mill-owners and agents can do no less, if retrenchment is necessary, than to make the burden fall as lightly as possible, even at some temporary sacrifice to themselves.

SUCH a strike as this is a very different thing from the senseless and wanton attack on a great industry, which was made at Pittsburgh for the gratification of a few insatiate mischief-makers. Even in a union whose members have so completely surrendered their independence and common-sense to their noisy leaders as in the Amalgamated Association of Iron-workers, the uselessness of the demonstration to the interests of the workingmen aroused comment, and finally rebellion, the operatives in one mill flatly refusing to obey the order of the chiefs of the union. The machinery of ostracism and annoyance is brought by constant use into such perfection among the better disciplined labor unions that the recalcitrant iron-workers may yet be driven into submission, but their resistance, even if temporary, will seriously threaten the power of the worse than unscrupulous demagogues who have gained so baneful an authority in the trade. The real purposes of these agitators may be inferred from observing the movements which are now taking place under the direction of their prototypes in France, where a certain coal-mining district, that of Alais, was *drawn by lot* in the Socialist committee-room in Paris, and the miners ordered to strike, until their hours of labor should be reduced from fourteen and a half to eight hours per day, all fines abolished, and themselves admitted to join with the owners of the mines in fixing the wages which they should receive. It is easy to see that these terms were purposely made preposterous, in order to prevent any possibility of an adjustment, but the miners are forced to persist in them by the threat that if they go to work again upon reasonable terms, the ventilators of the mines will be destroyed by other strikers, or the emissaries of the committee, and themselves thus miserably suffocated in the depths of the earth.

MUCH to the surprise of the people of Boston, the bill incorporating a company to construct and operate elevated railroads under the Meigs system, and authorizing the company to introduce such railroads into any city or town in Massachusetts which should petition for them in accordance with a stipulated form, after being reported adversely by eight out of the nine members of the Legislative Committee, was passed in the House to a third reading by a very large majority, and will probably become a law. It is understood that this action is due to the influence of the representatives from the smaller cities, who, while they are not disposed to force elevated roads upon Boston against the wish of the citizens, see no reason why the people of Cambridge, Lowell, Springfield, Worcester or Salem should not have the privilege of travelling in that way if they desire it. As the bill now stands, the interest of the public and of owners of property will be well guarded, and there is little danger of any hasty steps being taken, either by the incorporators or those whom they try to serve.

IN the report of the Commissioner of Public Works for the city of Chicago a suggestion is made that the business quarter of the town should be formed into a separate water district, and furnished with an independent supply under a pressure which will carry the water above the roofs of the highest buildings. As in the commercial district of nearly all other large cities, the tendency in Chicago is to construct very lofty warehouses and office-buildings in the quarter where land is most costly, while simultaneously with this movement comes a diminution in the water pressure in the main pipes, due to the increased demand made upon them by the multiplication of offices and tenants; so that in the very districts where a conflagration would be most destructive, the means for extinguishing it are least effective. Chicago is fortunate in possessing an unlimited supply of water near at hand, and to furnish the whole of the region north of Van Buren Street with water under a head of a hundred and fifty feet will require only a new main circuit of large pipes, and an additional pair of pumping engines, all of which can, according to the Commissioner's estimate, be paid for before 1884 out of the surplus revenue of the Water Department. It is hardly possible that this suggestion should not be carried into execution, and if so, it should not be long before New York and Boston take steps for a similar improvement.

MR. Esterbrook, the New York Superintendent of Buildings, according to the *Scientific American*, joins with the fire-engineers in condemning the ordinary iron shutters as being worse than useless in case of a conflagration, serving much more effectively to prevent the firemen from obtaining access to a burning building than to repel fire from the outside. Wooden shutters covered with tin are in his opinion "far better" than those of iron, resisting the flames longer, and not being liable to shrink or curl away from the openings which they are intended to protect. Mr. Esterbrook's opinion is, as our readers know, supported by men of the greatest authority and experience in such matters, but it is as yet far from being generally accepted. In New York, for instance, we should be curious to learn what the underwriters would say to a dry-goods warehouse protected by tin-covered wooden shutters to the rear windows, and we imagine that the manufacturers of the better class of iron shutters would be very far from conceding the superiority of wood to metal for resisting fire, however it might be with the superior advantages which it offers to firemen — and burglars —for effecting an entrance upon occasions.

THE Boston *Herald* calls the attention of its readers to a point which the owners of real estate in cities would do well to bear in mind. A member of the Massachusetts Legislature, as ignorant as most persons on the subject, asked a lawyer to explain to him the statute under which the telegraph workmen entered and went up through his house to the roof in order to string their wires, and was astonished to learn that there is no such statute; that in Massachusetts, as in all other states, the running of telegraph, telephone or electric-light wires over the estate of a private citizen is a trespass, for which his consent must be obtained, by purchase or otherwise, and that in the case of wires already carried over his land, unless by virtue of a previous arrangement with him, he can order them removed. Some proprietors have already learned the extent of their rights in this respect, and claim and obtain compensation, the owner of a certain building in Boston receiving, it is said, five thousand dollars per annum from one telegraph company for the privilege of maintaining its standards on the roof. In a few

cases the stretching of the lines has been done with so little judgment as to injure the buildings of which the companies enjoyed the gratuitous use, as for instance where wires have been attached to chimneys at such an angle as to exert a constant pulling strain upon them. The general practice has, however, improved in this respect, and except for possible danger from electric-light wires, the erection of standards and stringing of lines does not appear to involve any important annoyance or risk; but this circumstance does not affect the right of proprietors to refuse to tolerate them if they choose.

An ingenious woman in Hoboken, N. J., recently invented what may perhaps prove to be an improvement on the peppermint test for leaky waste-pipes. Noticing an offensive odor in the parlor of the house which she occupied, she suspected a defect in the waste-pipes, and sent to the agent to request that a plumber might be sent to examine them. The agent assured her that the plumbing was perfect, but this did not satisfy her, and after consultation with her neighbors she procured a phial of oil of peppermint, and poured it into a washbowl in the upper story. The perfume of peppermint was soon apparent in the parlor, and the woman went again to the agent, assuring him that there must be a leak in the pipe on the first story. He was still incredulous, and to make her proofs still more convincing, she devised a new test. After borrowing two cats from her friends, she purchased some oil of valerian, and stationing the animals in the parlor, went up stairs and poured the valerian into the basin, in the same way that the peppermint had been previously applied, and then descended to watch the result. Cats are extremely fond of the odor of valerian, and it was not long before both of them began to sniff the air, and move toward the door of a closet through which the waste-pipe ran. The door was opened for them, and they immediately sprang upon a certain shelf, where they remained, purring with satisfaction. A third time the woman went to the agent, who, though still unbelieving, consented to send a plumber to make further investigations, and on cutting away the plastering so as to expose the pipe, a joint was found completely separated at the place which the cats had indicated.

A novel application of a well-known principle has been made in Scotland by a gentleman who had observed, during the construction of a mill-dam under his charge, the remarkable effect of a few drops of oil from the machinery in calming the agitation of the water during a violent wind, and conceived the idea of using a similar method on a large scale for calming even the waves of the sea in certain cases. Application was made to the British Government for aid in carrying out his plan, but refused, and the inventor finally constructed works at his own expense, choosing the harbor of Peterhead near Aberdeen as the scene of his operations. This is a port on the east coast of Scotland, open to the wind which sweeps with great violence across the German Ocean, so that it is in stormy weather impracticable to bring vessels of any kind to the piers, on account of the breakers which roll in from the sea outside. A shed was first built upon the shore, near the entrance of the harbor, and a powerful force-pump set up inside. The outlet pipe from the pump was carried down the beach to deep water, and continued across the mouth of the harbor by a gutta-percha pipe, lying on the bottom, and pierced with holes seventy-five feet apart. The pump was arranged to draw from a barrel of crude seal oil. For some time no storm occurred of sufficient violence to furnish a thorough test of the merits of the apparatus, but finally notice was sent by the Meteorological Office of the approach of a severe gale, and a considerable number of sea-captains and other persons interested were invited to witness the conclusive experiment. The storm broke upon the coast with such force as to carry away the breakwater which protected a neighboring harbor, and filled the port of Peterhead with a tremendous surf. When this was at its height, the force-pump was set in motion, and a hundred gallons or so of oil pumped into the sea. A few minutes only elapsed before a magical change was observed to take place on the leeward side of the line of pipe. The foam and spray disappeared entirely, the billows which rolled into the harbor sank as they passed the pipe to long, low swells, and although the sea ran as furiously as ever outside, within the harbor the smallest boat could ride as safely as in a profound calm.

The professional jury which will award the prizes in the competition for the new Parliament-House at Berlin has been appointed, and consists of eight members, six of whom, Adler of Berlin, Von Egle of Stuttgart, Von Neureuther of Munich, Persius of Berlin, Schmidt of Vienna, and Statz of Cologne, are Royal Inspectors of Buildings; one, Haller of Hamburg, is an architect in private practice, and one, Anton von Werner, is the Director of the Academy of Painting in Berlin. Three of these gentlemen, Messrs. Von Neureuther, Schmidt and Statz, were members of the jury of 1872. So far as now appears, the number of participants will be at least equal to that of the contestants in the competition of ten years ago. More than five hundred copies of the programme have been asked for and delivered, and if only one in five of them who receive them offer designs, the number will equal that of most modern competitions.

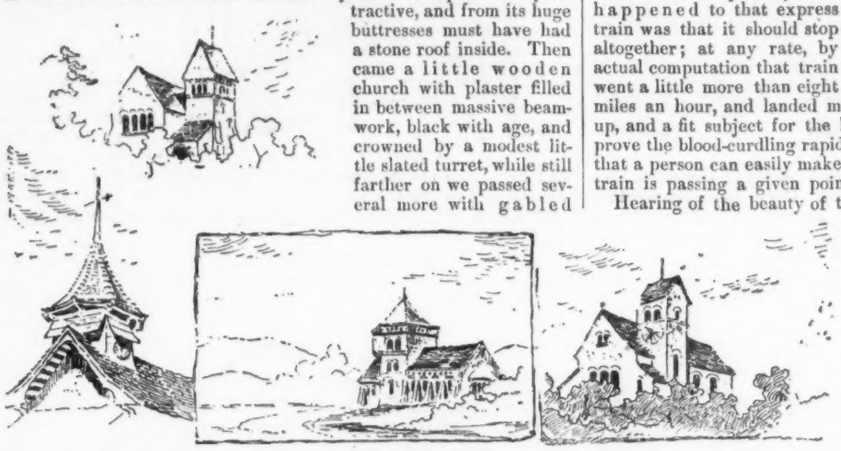
Some remarkable experiments have recently been made by Dr. Rosenberger of Würzburg, in Bavaria, which seem to show that our present theories in regard to the nature of septic and other malignant blood-poisons need some important modifications. The phenomena hitherto observed have led to the belief that the infections of which the peculiar tainting of the blood known as septicæmia is a type were due to the introduction into the circulation of some low organism, like that so well known to us under the name of yeast, which had, like yeast, the property of propagating itself with great rapidity, inducing perhaps at the same time a change analogous to that by which the sugar of fermenting malt or dough is transformed into alcohol. So widely accepted has this view of the subject become that some of the most eminent surgeons, in conducting operations which involve much exposure of sensitive membranes, keep the part surrounded by the vapor of carbolic acid, which is found to destroy microscopic organisms of this class. Dr. Rosenberger has, however, found that the presence of living bacteria in septic matter is not necessary to endow it with poisonous properties. To prove this, he took portions of septic blood and serum, and heated them to a temperature of nearly three hundred degrees Fahrenheit for two hours, then, after filtering and evaporating the liquid, infused it into the circulation of animals, which died with all the symptoms of septicæmia, and in their blood the septic virus was found reproduced, just as in the case of direct transmission of the poison. As the heat to which the ferment had been subjected was sufficient not only to extinguish all vitality, but almost to decompose it, the true explanation of the phenomenon of infection is, it would seem, yet to be discovered.

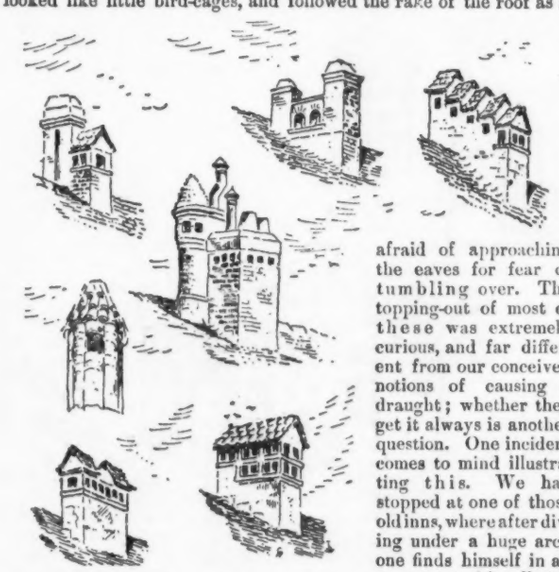
A remarkable story is told in the Cincinnati *Gazette*, about the discovery of a vast treasure of inscribed tablets at what is supposed to be the site of the ancient Sippara, a town concerning which we know little or nothing except that it is said by the ancient Chaldean historian, Berosus, to have been the place where Xisuthrus, the Babylonian Noah, buried his sacred books before entering the ark which preserved him and his family from the effect of the deluge. According to Berosus, after the subsidence of the deluge Xisuthrus returned to Sippara, and rebuilt the city, over which, with the rest of Babylonia, his successors reigned for thirty-three thousand years, until its conquest by Cyrus. Of course, the very name of Sippara has long been forgotten, and the story of Berosus has been considered altogether mythical; but it seems that Mr. Rassam, a well-known English explorer, passing through Bagdad not long ago, was told by an Arab of certain ruins about fifteen miles off, which did not correspond in situation with any known city of antiquity. Proceeding to the spot he found extensive remains, and resolved to make a small trial excavation. After four days' digging, his laborers came to the walls of a large building, in which they excavated four rooms, paved with bricks or stones, and containing a few inscriptions. Beyond these was a fifth room, paved with asphalt, and on digging up the asphalt a coffer was found buried beneath, containing two cylinders covered with inscriptions. At this point Mr. Rassam was obliged to return to England, but he left his men at work, and soon afterward they came upon a trench under one of the rooms, from which they took ten thousand inscribed tablets, which have already been shipped to England. Mr. Rassam, on what ground is not quite evident, hopes that these may prove to be the antediluvian records, and intends to return at once to the spot, to make further explorations. It certainly speaks well for the durability of asphalt pavements, if this one has remained unimpaired for thirty-six thousand years, and we are afraid that the tablets will prove to be of somewhat later date than the deluge, but if they are authentic, they will certainly be interesting, whatever their age.

SKETCHES ON THE WING.

WE left Paris one bright morning for a run into Switzerland, intending to stop at a few places of interest on the way, although it had often been said in our hearing by that type of American who must see the whole of Europe in a week and be back by the next boat, that there was absolutely nothing of interest between Paris and the Jura mountains. Our sketch-books proved the contrary, however, for we found our pencils constantly at work almost of their own accord.

Little churches of the most picturesque type abounded and seemed to spring up on every hand, and their great number surprised us much. One of them was perched upon the outermost edge of a high precipice which only became visible as we passed almost directly under it; another with its little corner staircase turret and balcony above was particularly attractive, and from its huge buttresses must have had a stone roof inside. Then came a little wooden church with plaster filled in between massive beam-work, black with age, and crowned by a modest little slated turret, while still farther on we passed several more with gabled towers, a style that seemed very common but none the less beautiful. Scattered between all these bits were numerous chimneys, some on their last legs, some running up on a zigzag, and hundreds which looked like little bird-cages, and followed the rake of the roof as if afraid of approaching the eaves for fear of tumbling over. The topping-out of most of these was extremely curious, and far different from our conceived notions of causing a draught; whether they get it always is another question. One incident comes to mind illustrating this. We had stopped at one of those old inns, where after diving under a huge arch one finds himself in an open court with galleries around inside leading to the rooms. After making our bargain for rooms we ascended, and it being cool ordered a fire. This caused quite a commotion. After talking and discussing some time two men entered, and one proceeded to remove a fire-board fully five feet square and decorated with an immense painting, while the other crawled in under the arch and looked up as if to assure himself that there was really a hole up to clear sky above. Being convinced on this point they both descended, and after a twenty minutes' delay came up with the materials, filled the room with smoke, and at last got a fire that was a day later fully represented on the bill, — which would have done credit to a child of Israel, besides showing that there was draught enough in that fireplace to eat up a half-cord of wood in an evening.





It may seem strange that it was possible to sketch these little features of which I have spoken from a train of cars; but when you consider that a live Yankee can generally step off between stations, and make a respectable bargain, or transact any business of an ordinary nature, the fact explains itself. I remember one day after a short sickness being anxious to again join my companion, and so, regardless of expense, taking a first-class express ticket. The journey was from Morlaix to Tours, and by the usual method of ratiocination I made up my mind that the train ought to cover the distance in at least three hours. Alas for human calculation! Surely the only accident that could possibly have happened to that express train was that it should stop altogether; at any rate, by actual computation that train went a little more than eight miles an hour, and landed me late in the evening, completely used up, and a fit subject for the hospital a second time. This goes to prove the blood-curdling rapidity of French trains, and also the fact that a person can easily make a sketch of small magnitude while the train is passing a given point.

Hearing of the beauty of the old cathedral at Sens, we stepped off the train, and were soon surrounded by the usual array of interested waiters who, not seeing the end from the beginning, were assiduous in their endeavors to make life as easy as possible. Their endeavors, however, were always more marked than successful, and we got tired of having our steps constantly dogged. Opposite our room was a row of houses which causes one to wonder whether any one lives in them, whether they find any real use for windows, or prefer darkness rather than light. The inhabitants don't look very dangerous, either, so we put aside the Biblical suggestion of reasons, and watched them as they came and went, their huge wooden sabots clattering across the pavements, and their voices anything but musical.

A very marked and interesting feature of all these little towns is the places set apart for the washwomen, many of them picturesque enough to please any poet. We were walking down a little sequestered lane beside a brook over which the trees drooped and nearly formed an arbor when we came upon an old bit of wooden gallery work, the floor of which was nearly level with the water, and on which knelt the women engaged in their purifying devotions. Hammering and pounding the clothes with a stone regardless of lace or buttons, slushing them now and then into the water with rapid strokes, it seemed as if they must demolish every vestige of a covering to the human form divine. Others were standing around with their arms akimbo on their buttress-like hips, the colors of their faded apparel bearing resemblance to the approved tints of the day, and talking and discussing as if their lives depended upon the proper solution of the point at issue.

While engaged in these rambles we visited the grand old cathedral of St. Etienne, a church interesting to Englishmen certainly, since it was probably the parent of the Canterbury choir, which was designed by William of Sens. The church, founded in 972, has been twice rebuilt, the latter work being done by Viollet-le-Duc. Near

by was an old building, the detail of whose entrance was so delicate and beautiful that we longed for a good photograph, something hard to obtain in these little French towns. Roaming around thus we spent two days in this old town and then took the cars for Cluny, a little off the main line.

Readers of Viollet-le-Duc will remember that one of the most interesting features of the town are the old Roman houses, which almost every guide-book totally ignores, but which are extremely interesting. Thinking to find some of these we commenced a tramp through the dirty little streets and soon came upon one in the square facing the church of Notre Dame. Very pretty it is, but I certainly think the little building would have pushed out its first story had it not been for being propped in between two other buildings. The most charming feature, however, was the second story, which, although partly filled in, still showed some of its original beauty in the carved columns supporting the bold lintel above. Over the upper windows was a cat-head with tackle and pulley, showing it to be at present a store, house and warehouse combined. Two more stood together on another street, evidently of different dates. One column of the third-story arcade was gone, yet the spandrel held itself intact, nor was there any sinkage in any part of the arch. Open-timber-work filled in with brick formed the walls of the adjoining house, and where the plaster had been torn off the blackened timber testified to its age. There was still another one with its huge first-story pointed arch,

as solid and firm as when built, and having a second-story arcade running across the whole façade, each spandrel filled in with a beautiful rosette. The upper floors of this house have long been destroyed, so it is impossible to tell how it looked when completed; but the main feature in all the houses seemed to be the breadth of wall-surface, often perfectly plain, and giving a satisfaction which is totally lacking ... the chopped-up architecture which too often lines our streets at the present day. Coming back to our hotel we found that with a very little Yankee ingenuity it would be possible for us to get the mass of the Abbey remains from our hotel window; but in order to do this we were obliged to assume the undignified position of sitting on the window-sill with our feet hanging into th

street below, a proceeding which seemed to surprise the townsmen and soldiers, who soon gathered in a crowd below, and gaped at us with wondering eyes. The old monastery of Cluny, like others, has passed through several religious wars, each of which has destroyed part after part until only one main tower and numerous other smaller

parts remain of what was once the largest institution in France, having seven towers, five aisles, and chapels without number. A museum fills one of the old parts, and in it we found several very beautiful carvings, which showed what this old monastery of Cluny must have been in its days of prosperity.

THE SEPARATE SYSTEM OF SEWERAGE. — I.

MUCH the most comprehensive, reasonable and temperate discussion of this question, from the adverse point of view, is to be found in a paper by Eliot C. Clarke, C. E., Principal Assistant Engineer in charge of Improved Sewerage, Boston, published in the Public Health Supplement of the second Annual Report of the State Board of Health, Lunacy and Charity of Massachusetts.

As Mr. Clarke, on the whole, favors the combined system, the importance of the subject to the general public makes it desirable that his argument should be carefully reviewed. He begins, after referring to the uncertainty among engineers as to the proper size to be given to sewers, by stating the claims set up by those who advocate the separate system, and these claims he discusses seriatim. (The quotations in this paper, when not otherwise credited, are from the document under discussion.)

"1. The primary object of sewerage — the all-important and only essential requirement of it — is the removal of sewage proper, that is, of water holding in solution or suspension waste organic matters liable to decompose and become noxious. All other functions are comparatively unimportant and secondary and should not be permitted to lessen its adaptability to the essential purpose."

This does not state the case as I should state it. The primary object of sewerage is the removal of fouled waste waters *and of subsoil water*; that is, of the water which fills the interstices of the soil, which finds its way by gravitation into the cellars of houses, which gives an unstable foundation for pavements, and which on sloping ground is discharged at the surface. In discussing this point Mr. Clarke says: "It is also true that sometimes the removal of surface and *subsoil* water is if not an equal essential still an essential requirement and both for sanitary and economic reasons is usually an important function of a sewerage system." The sanitary argument in this case applies almost exclusively to subsoil water. He says that sewers are often built into thinly settled regions "in order to expedite the removal of rain and soil waters. The danger from a damp soil and subsoil is not less real, though possibly less in degree and less easily traced to its source than that from the proximity of sewage." This is quite true and is a fundamental basis of all acceptable practice in separate sewerage. He then refers to the oft-quoted statement that chemical analysis detects little difference in impurity between water-closet matter and sewage from which excrement is excluded. Even where excrement is withheld from the sewers, kitchen waste is admitted with much household rubbish and garbage. The materials thus admitted are of precisely the same chemical combination as those which have gone into the human system to produce excrement as one of their products; and, on their decomposition, they are still substantially the same. It is impossible to determine, from the odor, appearance or analysis of the contents of an old cesspool whether excrement has been discharged into it or not. It is doubtless true, as stated, that much horse-manure and other filth is washed into public sewers; but it is also true that it ought to be kept out of them, and that with proper paving and street cleaning, a safer and more profitable disposal of these substances would follow as a matter of course. It is, therefore, not in point to say: "Certainly this first portion of rain, loaded as it is with impurities, the droppings of animals, and much other organic refuse, is as obnoxious as an equal amount of ordinary sewage, and equal care should be taken to get rid of it." It is also not in point to adduce this argument at all unless it is a question of ultimate disposal of the wastes of a town. Whether this street rubbish is removed by sewers or by carts, it had better not be brought into communication with house-drains, as it is in the combined system.

"2. The amount of polluted water-supply from any district is so insignificant in proportion to the quantity of rain-water falling on it during rain-storms that sewers designed for receiving storm-waters are thereby impaired as to their efficiency for conveying sewage, because, being much larger than would otherwise be necessary, the depth and velocity of the ordinary flow is less." This statement is too mild. We maintain that storm-water sewers are inefficient for conveying sewage for the reason stated, and for the further very important reason that they become obstructed with mud, stones, brickbats, sticks, leaves, and other road rubbish which is washed into them through the catch-basins, and that the foul sewage from houses is arrested by these obstructions and remains in the sewer to putrefy. To equalize the depth and velocity of flow Mr. Clarke suggests that the bottom of a large sewer (egg-shaped) may be given the same radius as a pipe sewer. This would, of course, give the same depth to the ordinary current of house sewage, *provided* the obstructing materials above referred to as coming from the streets can be excluded, which, in the combined system, they are not and cannot be. He says: "In order that the floating bodies may not strand, the centre depth should probably be at least three inches." This depends on the diameter and inclination of the sewer. In a six-inch pipe laid on an inclination of 1 in 250, where the ordinary flow near the upper end, when a bath or water-closet is discharged, is found in practice to be less than half an inch deep, some solids brought into a sewer by such a stream are stranded. Such stranded bodies are carried forward by a discharge from a flush-tank or otherwise which increases the depth of flow to *one inch* (I speak from observation, not from actual measurement). After the point is reached where the constant flow is an inch deep, there seems to be no stranding of matters delivered into "separate" sewers. In a "combined" sewer constructed with a lower cross section equal to that of a six-inch pipe, the rubbish brought to it from catch-basins would doubtless require the full three-inch stream prescribed and more. This difference is a constant one as applied to the two systems, and its collateral relations have a bearing on other important elements of the discussion. It seems to me that Mr. Clarke has made the mistake of assuming that the substances to be flushed out of the sewers are the same in both cases, and that in both cases the same flushing force is required.

Much importance is attached in his argument to the fact that large sewers of low grade will, during heavy storms, run half full, and that such a flow will flush them completely. This is true; but it is also true that at the tail of the storm fresh obstructions come in from the street, that such cleansing storms occur but rarely, that, even for many weeks together, there is an increasing accumulation in storm-water sewers of putrefying substances awaiting removal, and that in the mean time undergo an offensive and dangerous decomposition. Such decomposition results from a radical and inadmissible defect in every sewer in which it takes place. If anything approaching sanitary perfection is to be hoped for, this condition must be rendered impossible. Organic wastes lodging in the sewer must be swept clean out of it within twenty-four hours or less. If left for a longer interval they begin to do mischief. If removed within this interval they are of no consequence. This proposition, I think, will be accepted by all sanitarians as a sound one. The conditions indicated may be secured with the largest combined sewers as completely as with separate sewers; but in the one case we need a trifling amount of water sufficient to transport what enters the sewers from the water-closets and kitchen sinks of a house; in the other we need the great volume necessary to fill the sewer to such a height as to secure a cleansing velocity not only with reference to household wastes, but with reference also to the sticks and stones and rubbish washed in from the streets, some of which generally fail of removal, even during storms, and remain to accumulate organic matters in greatly increased quantity. For the efficient performance of the necessary service in the case of large combined sewers, we need more water than it is practicable to use.

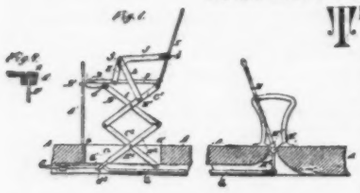
Reference is made to the analysis of the atmosphere of a foul sewer in Boston which failed to detect a dangerous degree of pollution. This point will be referred to hereinunder in connection with Mr. James T. Gardiner's report to the State Board of Health of New York. Concerning the evidence of this analysis and other points which it is assumed that "some zealous advocates of the com-

bined system" might raise, Mr. Clarke says: "these arguments have considerable force; and the answer to them is that, however slight the risk from deposits in sewers may be, still as it is a risk affecting health and even life, it is not right to impose it upon a community if it can be avoided." It can be avoided.

The opinion is expressed that the daily flushing practised with the Memphis sewers, "as it is equally adapted to large as to small sewers, may wisely be adopted for sewerage systems constructed on the combined system." It is not equally adapted to the combined system for reasons fully set forth above.

George E. Waring, Jr.

THE CONSTRUCTION AND ARRANGEMENT OF THEATRES.[1]—I.



THE frightful catastrophe by which our city was overtaken on December the 8th, 1881, has once more brought the question of the construction, arrangement and safeguarding of theatres into the foreground. The purely humane aspect of this terrible misfortune has found expression in a most touching manner by general sympathy and energetic momentary assistance. But the public have also come to the conclusion that something more effectual must be done, and such measures taken as will render similar calamities impossible in the future. Although there is every desire to meet the case, and to expiate the heavy guilt of neglect, it is, in the first place, necessary to recognize the conditions demanded for the full safety of a theatre-going public. In order to arrive at this knowledge, it is requisite to investigate the causes of fires in theatres and the accidents connected therewith, the consideration of which forms the first portion of the labors of the committee. From the teachings of these sad statistics only will it be possible to point out those arrangements and measures which might tend to ward off such dangers in the future from the public frequenting theatres, or at least to reduce such risks to a minimum.

Owing to the limited time placed at their disposal for inquiry and deliberation, the committee will only be able to state general views; but they hope, nevertheless, to give a practical direction to the always well-meant but frequently *dilettante* efforts for improving our theatres which are now being made on all sides. Although on this occasion they will scarcely be in a position to say anything essentially new, and many references must be made to sufficiently known facts, a general view may be obtained of universally-recognized rules for the construction and arrangement of theatres by a correct elucidation of such facts and a suitable grouping of all data. The present time appears likewise appropriate for at last carrying into execution all that has so long been proposed for the protection of the public and all desirable reforms in theatres. The committee, for this reason, do not consider it necessary to connect its investigations into the causes of similar catastrophes with the circumstances, not yet fully explained, attending the fire in the Ring theatre. This case is by no means an isolated one; it forms a mere link in the chain of accidents in theatres, which may be explained by their structural conditions, and by which the public are temporarily frightened out of the habitual recklessness with which they seek pleasure in dangerous buildings, without even the most necessary steps being taken for a radical remedy after confidence has returned.

Fires in theatres are by no means of rare occurrence; they are as old as our modern habit, dating from the middle ages, of constructing and arranging theatres, and are most intimately connected with this system. The history of the classic theatre, even, tells us of fires in theatres, and the frightful catastrophes connected with them. But it was from those recurring and sad experiences, and in correct appreciation of what was required, that the instructive and wonderful system of the ancient theatre was developed, which was designed for the presence of large masses at representations, as well as for accessibility, and by means of which, owing to its sensible arrangement and architectural construction, fires and similar accidents, to which our modern theatres are liable, were excluded. Most of those ancient theatres were utterly destroyed by the fall of classic life, and but few massive ruins of those wonderful structures have been able to defy the storms of twenty centuries. Our modern theatre may, in many respects, especially as regards durability, be looked upon as the very reverse of the classic theatre. It originated in quite different conditions. As the classic theatre had for its exit the bottom of the valley, and as this natural formation, so suitable for large masses and corresponding accessibility, found architectural expression in permanent theatres, so our modern theatre was principally developed out of the courts of monasteries and similar courtyards used for the representation of passion plays. The roofing in of such courts, as well as the transformation of courtyard windows into boxes, has gradually led to the modern system of construction, which in its essentials has remained unchanged for the last two centuries. The scenic requirements, which have grown especially within recent times, and more particularly those for illumination and lighting effects, have enormously increased fire risks in theatres; while in old-established theatres the antiquated system of communications, which does not adequately provide for the safety of the public, has remained essentially the same. The ancients possessed a wonderful power of adaptation, which enabled them to develop their buildings by the experience gained in provisional wooden structures, suiting what they had to requirements, and thus proving their title to architectural development.

The same cannot, unfortunately, be said of the modern theatre. The ever-recurring calamities in theatres, ever increasing in intensity, fully prove that the planning and construction of modern theatres have not kept pace, even proportionately, with their constantly increasing dangerous nature; that strikingly little use has been made for these structures of the great progress achieved by the architect and engineer; that the frequently very rich and costly exterior, which gives to a theatre the appearance of architectural merit, is in no proportion to the condition of its interior arrangement, to which is attributed the comparatively short life of our theatres. Herr Fölsch, in his excellent work on "Fires in Theatres," states the average age of a theatre at 22¾ years, which agrees nearly with the age given by Signor Rigione for Italian theatres, namely, 22 years. With this fact before us, it seems strange that millions are spent on buildings of such a perishable nature, and that the life of the theatre-goer, in whom the monumental appearance of such structures gives rise to something like a feeling of safety, should thus be exposed to existing dangers, while, at the same time, and principally, that safety ought to be attained by improving the interior arrangements. Not until then should the modern theatre be treated, like its classic model, architecturally. Although it cannot be overlooked that in newer theatres, as compared with older buildings, essential improvements have been effected—as, for instance, the auditorium is made fire-proof, and the communications are improved upon,—a more careful consideration will lead to the conclusion that even in the largest and most handsome edifices of this description it has not been possible to exclude the fear of accidents, and that a coincidence of unfavorable circumstances would give rise to serious catastrophes. To indicate them in a few words, it need only be pointed out that the stages of all theatres of the present day, from surrounding conditions contain the origin of their destruction. But even the parts of the theatre intended for the public, although they are said to be constructed fire-proof, and are spacious in some parts, do not supply a sufficient guaranty in cases of serious danger. The spaciousness only benefits the public using the boxes and stalls, while less care is taken of the upper tiers and galleries.

A few data taken from the work of Fölsch will suffice to prove by statistics what has been stated. We find there a list of 460 theatres totally destroyed during the last 100 years. But the danger of fire is permanent, and a conflagration is mostly nipped in the bud by constant supervision and instant quenching of easily-kindled fires; but should this fail, should the fire once seize upon larger portions of the combustible materials or parts of the building, the doom of the theatre is sealed. Experience teaches that fires in theatres, if once developed, cannot be extinguished, and those 460 cases cited by Fölsch have only ended in the complete destruction of theatre buildings. As in the list mentioned there appear also important theatres constructed according to most recent plans, which, in spite of all supposed improvements, could not be saved from complete annihilation, there can be no longer any doubt but that the cause must be sought in the system upon which stages are arranged. This supposition is confirmed by the fact that the number of fires in theatres and their destructive effect are continually on the increase, which may be partly explained by the multiplication of theatres, but which also proves that rational progress in removing the element of danger has not been made, as the following statement shows: —

For the years	1761-1770	are noted	8	fires in theatres.
"	1771-1780	"	9	"
"	1781-1790	"	11	"
"	1791-1800	"	13	"
"	1801-1810	"	17	"
"	1811-1820	"	16	"
"	1821-1830	"	30	"
"	1831-1840	"	25	"
"	1841-1850	"	43	"
"	1851-1860	"	67	"
"	1861-1870	"	97	"
"	1871-1877	"	90	"

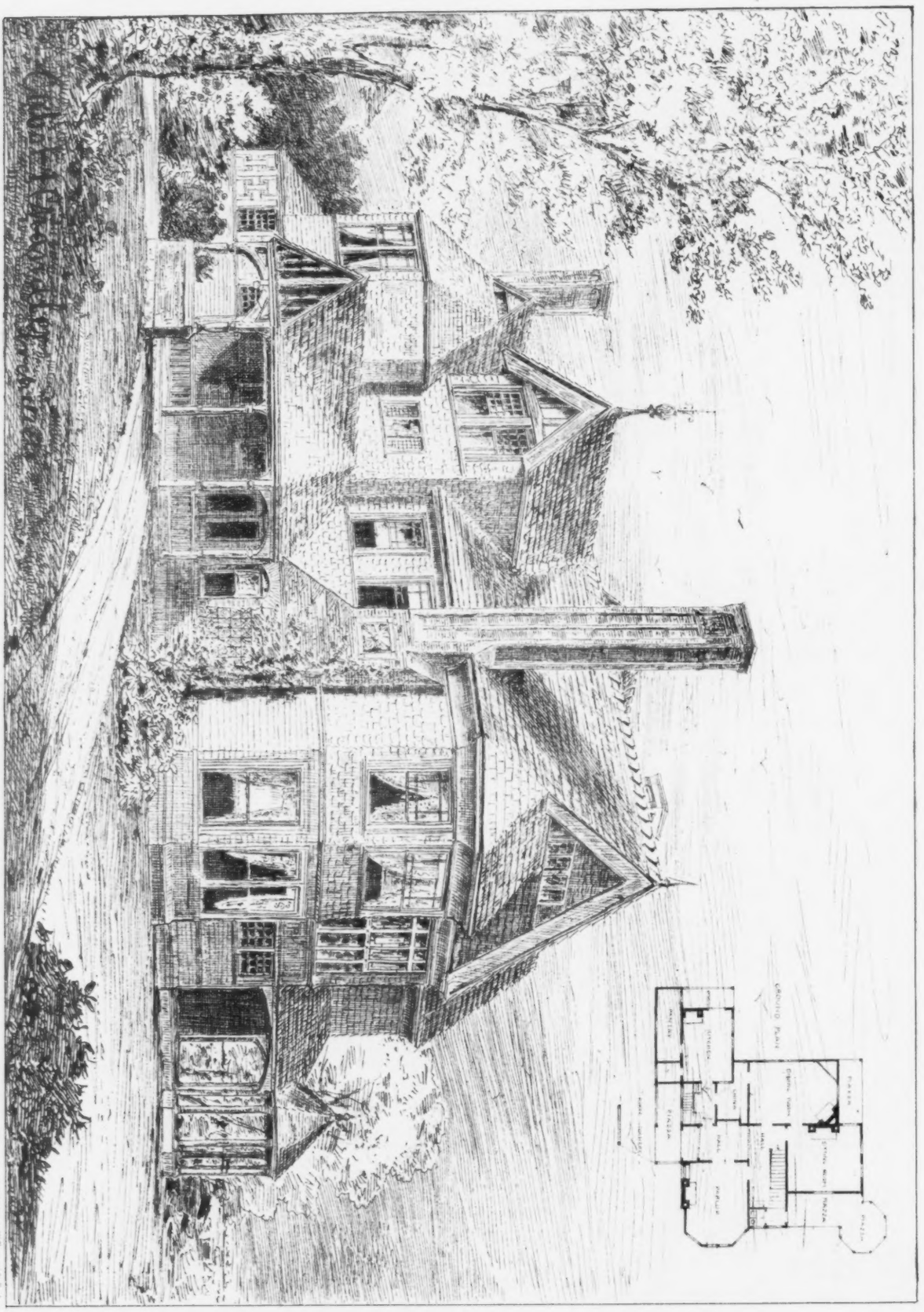
Since the beginning of 1871 to the middle of October, 1877, on the average, more than thirteen theatres have been burned down each year. With regard to the commencement of fires, Fölsch has collected the 289 fires of which such particulars are supplied into five groups, as follows: —

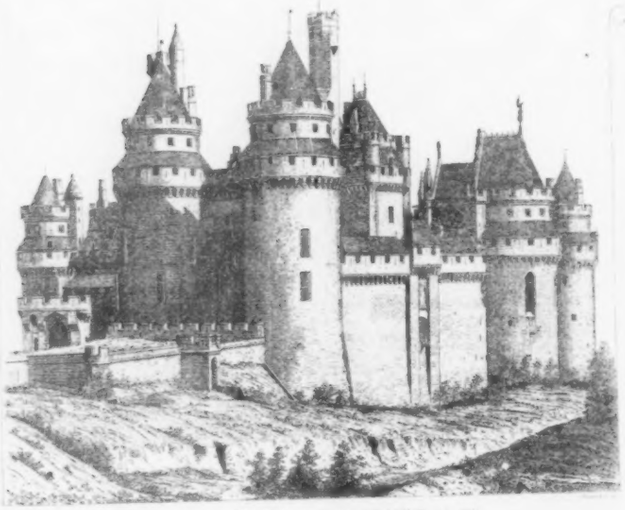
1. Begun during the day	56	fires, or 19.4	per cent.
2. Begun an hour before admitting the public	15	" 5.2	"
3. Begun during representation	36	" 12.4	"
4. Begun two hours after representation	69	" 23.9	"
5. Begun during the night	113	" 39.1	"

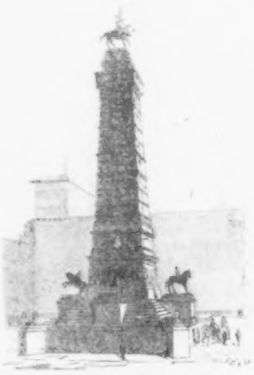
It will be seen from these figures that, fortunately, the percentage of fires during representations is a proportionately low one, which is explained by the greater care bestowed by those in charge during

[1] Report of the Committee appointed by the Austrian Society of Engineers and Architects (Vienna) to inquire into the principles to be recommended in the construction and arrangement of theatres with a view to safety, published in the *Builder*.

The cut at the head of this article shows a folding seat for audience-halls lately invented by Mr. Edward F. Underhill, of New York.



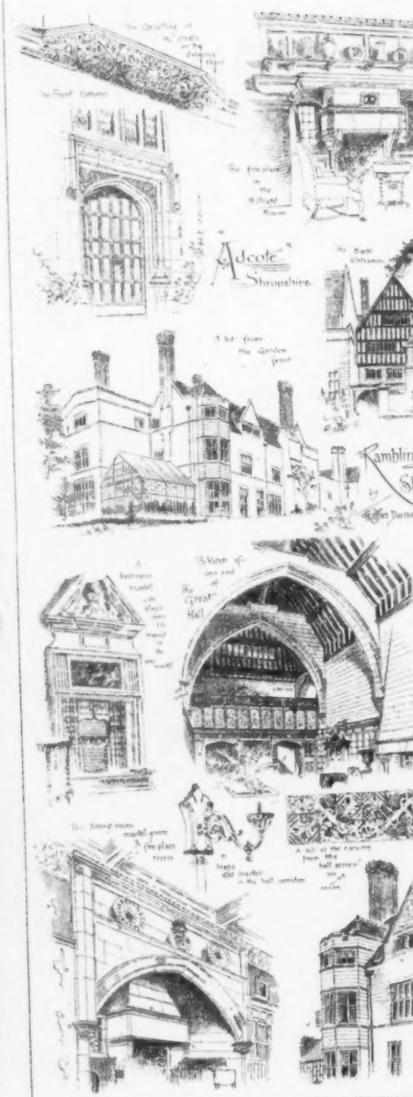




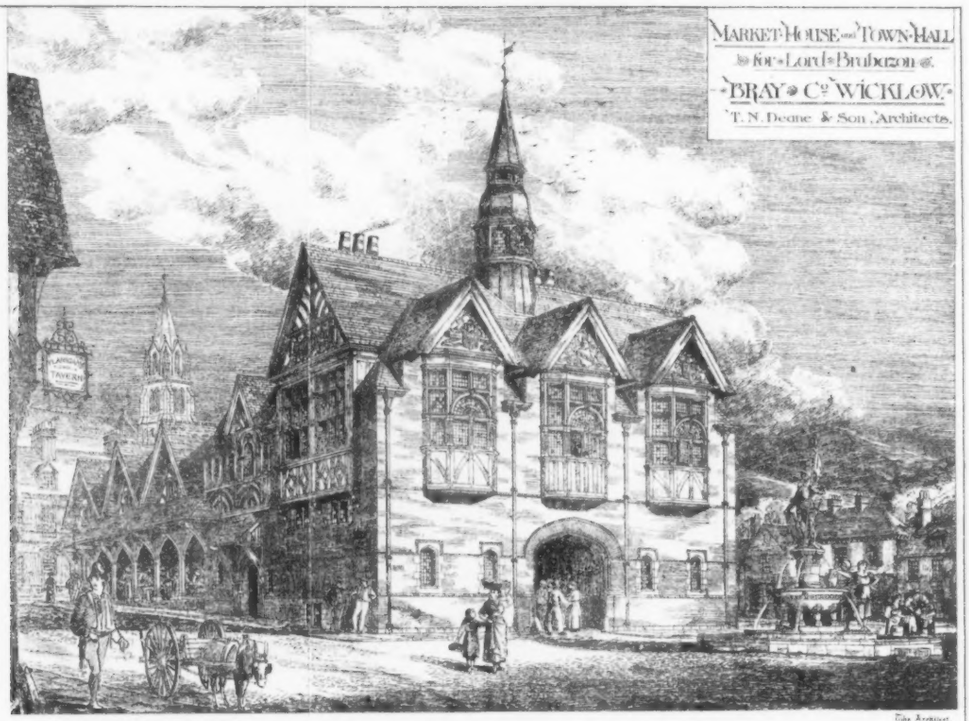
Die Konkurrenz für das National-Monument in Bern.

Schloss Hummelshain.

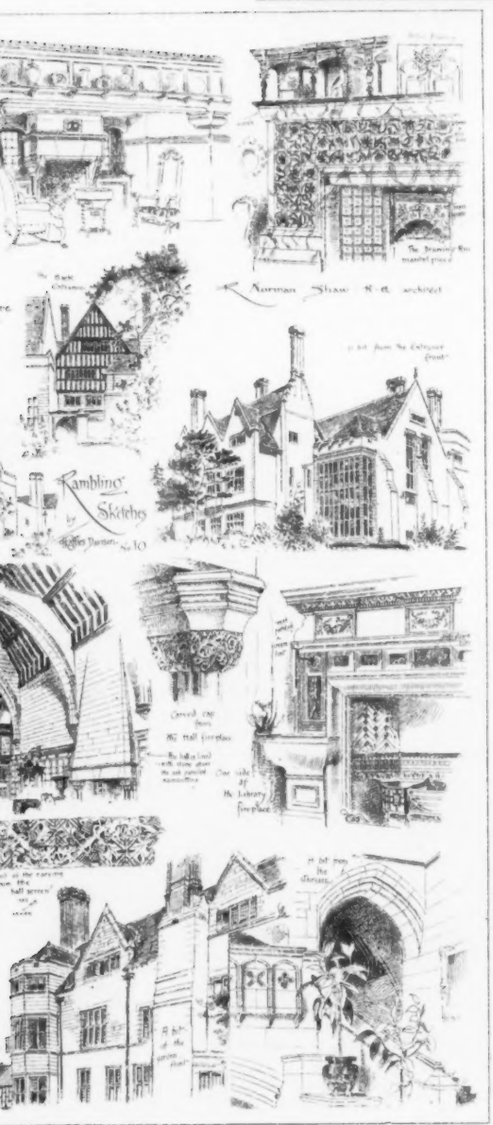
Our Foreign Exchanges. III



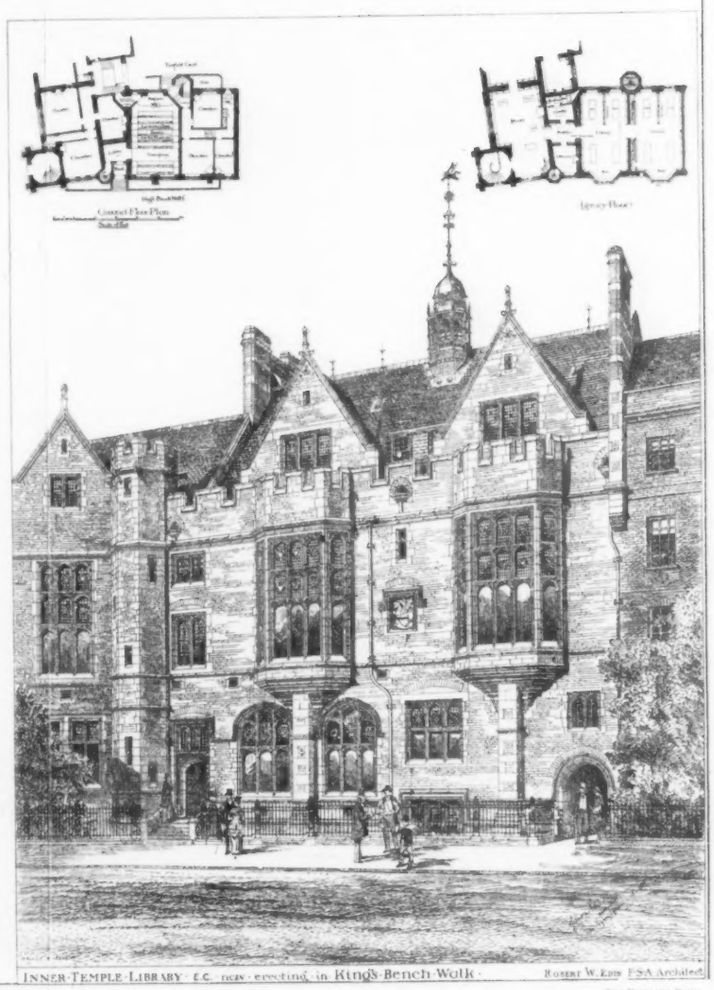
New Corn Exchange, Sheffield. For his grace the Duke of Norfolk, K.M.—Messrs. M. E. Hadfield & Son, Architects.



The Architect.

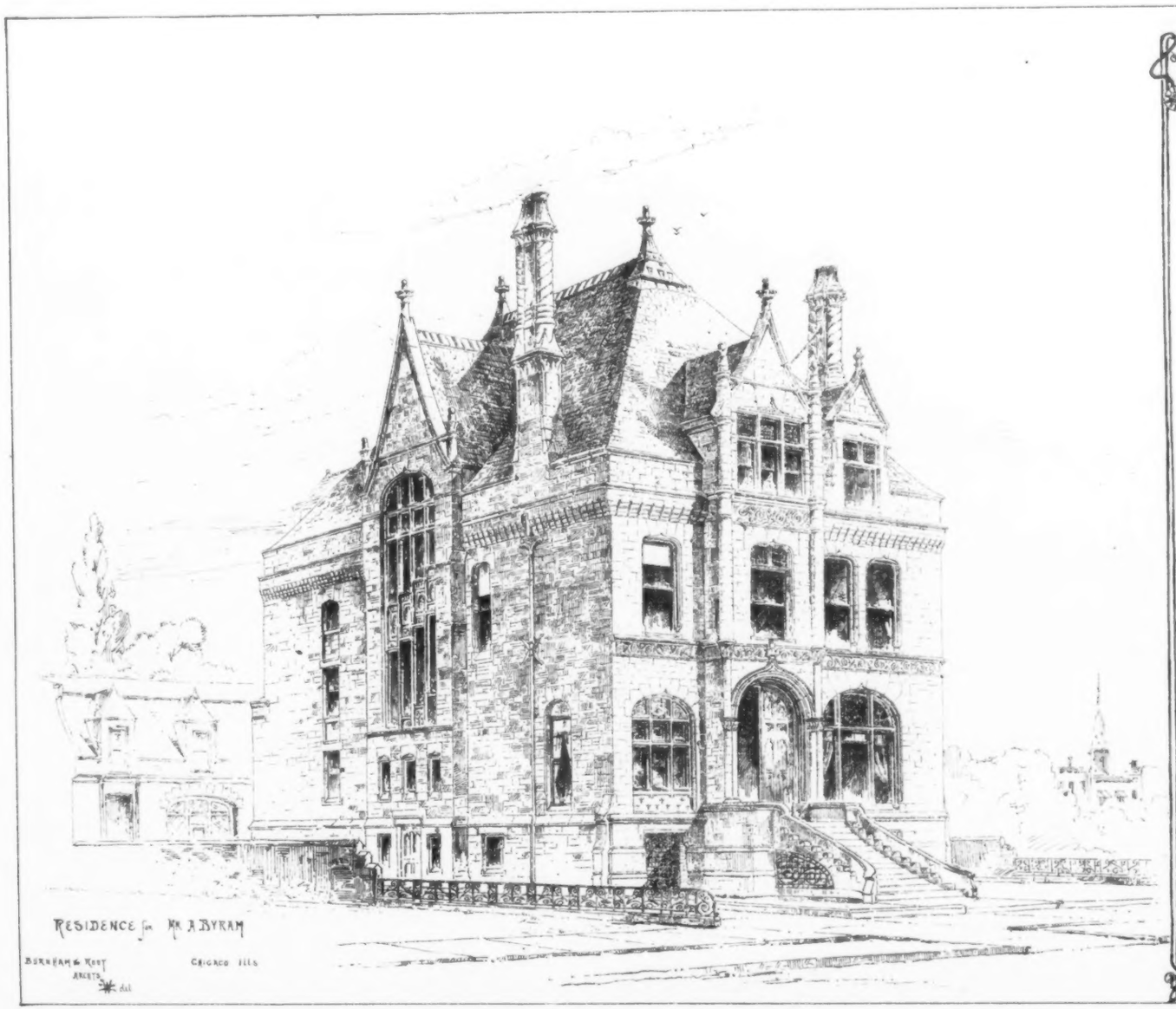


The British Architect



The Builders News

American Architect and Building News, Mar. 25, 1882. No. 326



RESIDENCE for Mr. A. BYRAM

BURNHAM & ROOT ARCHTS. CHICAGO ILLS

PLAN of HOUSE & BARN

Scale 1/8 in = 1ft

VIEW in FIRST STORY HALL

the presence of the public; while the largest percentage is that of fires during the night, at a time when, consequently, there is the least supervision, and a conflagration may most easily break out from burning materials left from the representation. A third statement gives:—

136	fires, or	34.4	per cent,	from January to March;
100	"	25.3	"	April to June;
70	"	17.6	"	July to September;
90	"	22.7	"	October to December;

from which it may be seen that fires in theatres are most frequent at the height of the theatre season, and most probably in proportion to the danger increased by warming the building.

If we inquire into the causes of the origin of such fires, and the fatalities attending them, it will be found that, with few exceptions, the fire has originated on the stage, which will give surprise to no one who has ever cast a glance at the enormous mass of combustible and easily inflammable materials there heaped together, and the dangerous manipulation of naked lights. To this must be added the manipulation of changing gas-lights effected by india-rubber pipes, of fire-works, and other explosive materials, the entirely unavoidable escapes of gas, and, finally, explosions of gas actually taking place. The danger of fire on stages is so great in consequence of existing arrangements and the habits of those engaged there that we need not wonder at the large, but rather at the comparatively small, number of really developed fires in theatres. It depends, indeed, upon the skill and the presence of mind of the persons engaged there if the nightly-recurring danger is mostly fortunately averted from the public. But if once the fire gets hold of the stage, and if the latter cannot be shut off immediately fire-proof from the auditorium, which has not at present been achieved in really developed conflagrations, the flames turn by natural laws towards the auditorium, which acts, in consequence of the ventilating-shaft over the chandelier, like a chimney, and the fate of the theatre is decided. Although the theatre is supposed to be constructed fire-proof, such constructions do not withstand the enormous intensity of the flames, and the complete destruction of theatres is a fact hitherto disproved in no single instance.

The value thus consumed by fire, which is estimated by Fölsch for the last 100 years at £25,000,000, recedes into the background before the thousands of human lives which have been lost in such catastrophes. Up to the present there has been no fire in a theatre during a representation in which the loss of human life has not had to be deplored. This sad fact will cause no surprise if we examine more closely the condition of our theatres. The flames, fed by the masses of inflammable materials, especially as long as they do not find a way through the roof into the open air, develop enormous quantities of smoke and deadly gases, which must fill the auditorium so rapidly that, even with numerous exits, an escape of all those present in the theatre is much to be doubted. But in very many theatres the communications are in no proportion to the public which must pass through them. The least provision is made for the gallery public, who have to take the longest way before reaching the open. Very frequently one flight of stairs serves for several galleries, or several stairs give onto a common passage, where, naturally, conflicts are unavoidable when several human streams rush forward at the same rate. Although such arrangements may suffice under normal conditions, the need for ample and practically constructed communications increases materially in the hour of danger. The public, seized by panic, rush in blind haste to the exits, and if there are not a sufficient number of them and of stairs, or if they are not of such a condition as to allow the human stream to move forward undisturbed by the pressure of the masses behind, until it reaches the open, there is no chance of escape for these unfortunates. If such communications are not constructed in simple and natural curves and divisions, or if they consist of unequal and too many flights and landings, or if they are interrupted by intervening steps, they may become causes of the greatest danger. The public, pushing and rushing, falters and falls, and the masses coming up from behind soon form a coil that cannot be disentangled. While, under normal conditions, notwithstanding all obstacles caused by existing arrangements, a theatre may be emptied in five minutes, that short delay of time becomes fatal in the moment of danger. A wall of human beings thus formed prevents those behind from escaping; they look despairingly for openings, and, if they do not find them, perish miserably. The fate of all those thus arrested, if they are not crushed or trampled to death, is death by suffocation, for in the atmosphere which developes itself in the theatre under the conditions described no human being can exist long. For this reason, open flames, which cannot be fed by such air, must soon become extinguished. It has been proved that during such events the gas is frequently deliberately turned off, which increases from the first the confusion of such catastrophes and the despair of those in the theatre. When, under the conditions mentioned, no more persons were seen to come from the lobbies, the erroneous conclusion was very frequently come to that the theatre was empty, which, at Carlsruhe in 1847, gave rise to the cruel measure of firmly closing all doors, in order to shut off fresh air from the flames. The frightful phenomena of fires in theatres may consequently be very simply defined. A mass of the most inflammable materials is accumulated in theatres; gas-lights, a vital element of the modern stage, are constantly playing around them, and the thousands of human beings who are crowded together in a narrow space find in case of need very seldom those arrangements which would enable them to save their lives.

Our police building regulations are, on the whole, perhaps the most severe in existence. Notwithstanding a certain ponderousness —which restrains the liberty of the individual, and sometimes adds to the expense of building—however, they have effected much good, especially with regard to the prevention of fire. What violent contrast is presented by the permanent danger in our theatres! For simple private residences there exist severe regulations, but in our theatres at the present time, no precaution is adopted which would confine a conflagration to its several parts. The use of fire-works is strictly prohibited throughout the city: on the stage, the most dangerous place of any, it is permitted. In the smallest dwelling the construction of stairs and landings is ordered by strict, almost contemptible, regulations; in theatres, where there is often assembled the population of a small town, stairs are erected which would not be sanctioned in an ordinary dwelling. Under such conditions, we need not wonder that fires in theatres are of frequent occurrence, and that they generally end in frightful calamities. The horrors of December 8th will probably have created such an impression as to lead to effectual reforms. The recommendations here appended may serve for future guidance.

The removal of the dangers above pointed out requires strong measures, which should have the aim of diminishing the dangerous nature of theatres, and which would either prevent the breaking out of fires or serve to nip them in the bud. But it involves likewise the necessity of designing theatres in such a manner as would confine a fire, should it break out notwithstanding the measures of safety adopted, to the spot where it originated, and as would enable the public assembled to leave all the parts of the house in safety. It appears from the programme thus laid down that reforms are necessary both in the construction of theatres and in their supervision and administration. As human power and human aid in times of extraordinary panic have been shown always to fail, it is imperative that our principal efforts ought to be concentrated upon rational reforms in the construction of theatres, leaving to human agency only a minimum share of co-operation.

In entering upon the measures thus briefly sketched out, we must, in the first place, bear in mind the diminution of fire risks. In this respect the principle ought to be laid down that theatres should be erected completely isolated, and be as far as possible from other buildings. Although there may be exceptions in the case of smaller theatres, and if proper precautions are adopted, the isolated position of a dangerous object exercises a tranquilizing effect both upon those assembled in theatres and upon the neighborhood. The history of fires in theatres fully shows what ruin has been wrought by them amongst the surroundings, and how fires originating in neighboring buildings have proved fatal for theatres. By what follows it will be seen that the isolation of theatres is a necessary condition for suitable and practical communication.

The removal of all inflammable objects that may be dispensed with, or rather their diminution to a minimum, may be looked upon as another step for lessening the dangerous nature of theatres. According to this principle, the usually very large quantities of piled-up decorations or properties, the store-rooms filled with costumes and other easily inflammable materials, the painters' rooms, workshops, and other objects which carry danger with them on account of the nature of the material of which they are made up, or of their manipulation, must be removed from theatres, and the articles deposited in the latter limited to those in daily use.

It cannot, further, be denied that a great part of the building and the machinery on the stage may be constructed of iron, instead of, as hitherto, in wood. But wherever it is considered necessary that wood should be employed, it must be protected by impregnation. It is a well-known fact that this mode of protection may also be extended to the linen cloth used for decorations, as well as to all the other easily ignited materials. It is likewise known what amount of resistance this protective coating has met with on the part of painters, costumers, and experts in theatrical matters; but those precautions will have to be finally adopted; the practical man will know how to deal with the objections raised, and, for the sake of safe-guarding valuable human lives, old-established habits and scruples must be overcome.

Although, as may be expected, more use will probably be made in future of the progress made by engineers and architects in the construction and arrangement of theatres, the risk of fire will by no means be completely excluded from the stage; but the present state of technical science permits of the assertion that the auditorium may be made perfectly fire-proof in all its essential constructive parts. By other precautions, to be further discussed, that safety for the theatre-going public might at least be obtained which is based upon the principle of keeping fire out of the auditorium. As a matter of course, such additions to a theatre as might easily become the origin of fires—for instance, private residences, store-rooms, restaurants—would have to be excluded. For the practical purposes of guarding against fire, the stage and the auditorium must be considered as two entirely separate parts of a theatre. The former being supposed dangerous, the latter, on the contrary, fire-proof, a complete isolation or fire-proof separation of the stage from the auditorium would be the first step to be taken. A party-wall, therefore, which divides the building throughout its whole width and

height — which, by the bye, is the official rule for every dwelling-house — becomes a *sine quâ non* on account of its great importance in the case of a fire, forming in that instance a complete screen. Beyond the proscenium opening, it should have but few other outlets, the latter, as a matter of course, being shut by iron doors. No connection whatever ought to be permitted between the attic stories of the stage and auditorium. Experience teaches us that just in this proscenium opening is hidden the greatest danger for a theatre-going public; and the method of properly shutting it off from the auditorium, or rather the iron curtain itself, forms one of the cardinal points in the matter here treated.

(To be continued.)

THE ILLUSTRATIONS.

THE INNER TEMPLE LIBRARY, LONDON, ENGLAND. MR. R. W. EDIS, F. S. A., ARCHITECT.

[From the *Building News.*]

THIS perspective shows the principal front facing King's Bench Walk. The general arrangement of the new building, which forms an important addition to the previous library, a structure in modernized Gothic of a rather feeble type, may be seen by the plans of ground-floor and library-floor. The old library and the corner tower are united by a lobby, so that the three libraries can be brought into communication, though it will be noticed the new front is not exactly in the same line as the old building. This difficulty the architect has met in a satisfactory manner by an octagonal stair-turret at this point, which forms a pleasing break in elevation, and answers the purpose of the librarian and others. On the ground floor the porch seen in our elevation opens into a lobby entrance, which will be paved with mosaic tiles, to the right hand of which is a lecture-room for sixty students, with platform at one end. This room has a panelled plaster ceiling, and is to have a dado of oak panelling. The floor is slightly dropped at one end. From Tanfield Court there is a separate approach to set of new chambers by a second octagonal stair-turret, which forms a projection on this front, giving access to the top floor above the library, which provide for an additional two sets of chambers, with conveniences. Ascending a concrete turret stair, or the main stairs in the corner tower, the visitor enters the new library, which forms two spacious apartments, each about 37′ 9″ x 22′ 6″, having bay-windows towards the main front, and lighted also from Tanfield Court. The chief architectural features are the panelled ribbed ceiling and the bookcases. The former is of plaster, relieved by oak ribs, dividing it into large and subordinate panels. A richly-moulded oaken cornice, mitring with the ribs, surrounds the rooms, and this is enriched by some fine carving and a bottom battlemented member, while the main ribs have carved roses at the intersections. The bookcases, which are executed in oak, are in keeping with the style, and a gallery surrounds the rooms, approached by stairs, which are ingeniously contrived between the bookcase and centre wall. The lofty oriel windows have groined ceilings, and the lights are intended ultimately to be filled with armorial bearings in colored glass. The spandrels have been richly carved, and the plain sides are relieved by panelled tracery. The stone-work of these bays is internally of Beer stone. The archway between the libraries is also of stone, panelled, and double iron doors, working in grooves or cavities, are provided to insure safety from fire. We may also notice here that with the same object the main floors are constructed on the Dennett system, the iron girders being also entirely imbedded in the concrete. In the recesses of the windows gill coils are placed, with openings for fresh air in the outer walls. To assist in the ventilation, openings are introduced near the ceilings of lecture-room and libraries leading into ventilating-shafts, which are carried up the building and terminate under the turret, where a gas-cone is placed to create an upward draught. The stoves and mantels have been executed from the architect's own designs. The exterior is faced with Fareham red bricks of a particular proportion, five courses going to the foot, and the dressings are of Portland stone. It will be seen the style of architecture is that associated with buildings of this class, and the architect has grouped the features in harmony with the semi-classic surroundings of this locality.

THE NEW CORN EXCHANGE, SHEFFIELD, ENGLAND. MESSRS. M. E. HADFIELD & SONS, ARCHITECTS.

[From the *Builder.*]

This building, of which we give an illustration, has been in course of erection for about three years.

The new structure comprises a central hall for the use of the corn-factors, 150′ long and 75′ wide and 35′ high. The roof, which is entirely of oak, is in five spans or sections, supported by stone pillars, having arched oak principals. This arrangement has been adopted to secure the steady north light so necessary for the corn-dealers, and, in addition to the skylights, there are five three-light windows in the eastern gables. There are four entrances to the hall, and the settling-rooms, lavatories, etc., are arranged on the eastern side of the hall. There will be space for 100 desks or movable stands on the floor of the hall. The principal façade of the building is 225′ long, and the lateral elevations are each 135′ long.

A first-class commercial hotel occupies the northern front. There are thirty-two bedrooms, spacious restaurant, billiard and smoking rooms, and private sitting-room. The offices are very complete, occupying the basement, with extensive cellarage. Along the west and south fronts are spacious sale-shops, with mezzanine floors and basement, kitchen to each, the Dennett system of arched flooring being used throughout. There is extensive cellarage under the central hall. The chamber-story is occupied as the Duke of Norfolk's estate offices, and there are also suites of offices to let. The design, as shown in the illustration, is of the Tudor type, the materials being thin red bricks, with stone facings from a quarry on the estate, of a durable texture and warm color.

All the roofs are covered with brindled Broseley tiles. In the centre of the west front is a gateway for the principal entrance, which is groined in stone, having a flight of ten steps to approach the hall. In the upper story is a fire-proof room for all the muniments, plans, etc., of the estate.

It may be interesting to state that, the foundation being very unsatisfactory, it was necessary to underlay the whole with concrete, composed of five parts of broken stone and brick ballast to one part of ground Barrow lime, and the result is everything that can be desired.

The cost of the building will be about £55,000.

RAMBLING SKETCHES BY MR. T. RAFFLES DAVISON — "ADCOTE," SHROPSHIRE, ENGLAND. MR. R. NORMAN SHAW, ARCHITECT.

[From the *British Architect.*]

Coming to my sketches in detail — I have sketched chiefly the mantelpieces, for they generally form the centre of attraction in a room, or ought to. That drawing-room mantelpiece is one of the liveliest things you can imagine: a golden-veined marble framing to rich green and blue tiles, soft creamy-tinted tile cheeks, a polished brass grate, and a dark wood recessed over-mantel filled with curios. The library and bedroom mantels have the wood painted a creamy white, with glazed green tiles framed therein. The dining-room fireplace, being chiefly of stone, has rather too strong a flavor of the Middle Ages to look very inviting, but with a good fire blazing, and folk sitting around, it would no doubt have a cosier look. In this room the plaster of the ceiling is repeated in the frieze, with foliage modelled in low relief. In the fireplace sketches will be noted a variety of grates: the quaint old style of that in the bedroom, the "Chippendale cabinet" one in the library, the Gothic-fronted one in the drawing-room, and a dog grate for the hall. They show manufactures that, through "character" and "quality," have done much for the Coalbrook-dale Iron Company (a firm including the name of "Darby" for two centuries past). At "Adcote" there are numbers of fine specimens of Dutch cabinet making, with their stores of splendid naturalistic carving. Mrs. Darby is also the possessor of a large collection of stuffed birds, which, ample as is the space of her new home, it would fail to hold in anything except the manner of a museum. The master and students of the Coalbrook-dale school of art, are, therefore, by the owner's kindness, the present custodians. The charm of "Adcote" is variety, but it is a charm that has brought down the charge of pedantry on its author: for the house *is full of the knowledge* of architectural detail, from the early Gothic of the roof down through varieties of Perpendicular to the Jacobean and Renaissance carving of the screen at the other end. The whole place is a compromise between the new and the old, the long and the short, the plain and the ornamental, the great whistling fireplaces of Mediæval times and the snug firesides of the nineteenth century — a compromise which, whilst pleasing your æsthetic revivalist, keeps his sense of the "comfortable" well alive. Those who in any way value these hurried sketches of "Adcote" are indebted to its genial owner for an attention and courtesy that are amongst the pleasantest remembrances of my two-days' visit.

SCHLOSS HUMMELSHAIN. MESSRS. IHNE & STEGMULLER, ARCHITECTS.

[From the *Deutsche Bauzeitung.*]

CHATEAU DE PIERREFONDS, FRANCE, AS RESTORED BY M. VIOLLET-LE-DUC.

[From *Le Moniteur des Architectes.*]

COMPETITIVE DESIGNS FOR THE MONUMENT TO VICTOR EMMANUEL.

[From the *Deutsche Bauzeitung.*]

MARKET-HOUSE AND TOWN-HALL, BRAY, ENGLAND. MESSRS. T. N. DEANE & SON, ARCHITECTS.

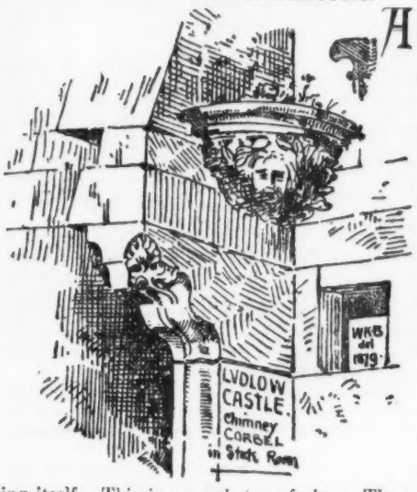
[From the *Architect.*]

HOUSE FOR MR. AUGUSTUS BYRAM, ON MICHIGAN AVENUE, NEAR TWENTY-NINTH STREET, CHICAGO, ILL. MESSRS. BURNHAM & ROOT, ARCHITECTS, CHICAGO, ILL.

The material of which this house is built is Bedford limestone, both buff and blue, laid up at random in the wall. The effect is mottled, though the buff is the predominant tone. Terra-cotta, approaching in color the buff stone, is used in a carved band across the front, and in the chimney tops.

DESIGN FOR HOUSE ON POPE'S HILL, DORCHESTER, MASS., FOR LABAN PRATT, ESQ. MESSRS. CABOT & CHANDLER, ARCHITECTS, BOSTON, MASS.

FOUNDATIONS.



A FRENCHMAN might say that when people in this country talk of foundations it is often not the foundations, but the foundation of the foundations that they refer to. In fact, this one word is applied to two if not three different things. It is used to signify the bed or bottom upon which a building is to be reared, and it is also used to signify the first course or courses of stones (termed *founds* in Scotland) of the building itself. This is somewhat confusing. The want of precision of language in using one word in two senses in the same sentence or paragraph may frequently render whole pages of a book unintelligible to the general reader or young student, and for every reason it would be better to have distinct terms for the different things.

The earth or rock in which the bed or socket of a building is formed might be termed the *site* or *bottom*, — the prepared surface upon which the first course of foundation stones is laid might be termed the *bed of the foundations*. Methods of giving consistency and stability to this bed, such as draining, piling, connecting, concreting, and asphalting, might be termed fastening, strengthening, or preparing the bed. The lowest surface to which the materials for preparing the bed are sunk might perhaps be termed the *formation level*.

It is proper, and all but necessary, that the architect make himself acquainted with the nature of the whole area of the bottom upon which he proposes to build, and some yards round about it. If the area is large he will be wise if he makes a chart of it. He must never take it for granted that any part which he has not tested is similar to that which he has tested; for to do so is often to make a fatal mistake, which will tell either against the proprietor or the contractor for the works. He should use means to obtain a record of the nature and consistency, as nearly as possible, of the whole extent of the ground.

The extent of the area of foundation varies from that of a pedestal which occupies a few yards, to that of docks and river and seawalls, which covers acres of ground. There may be great anxiety over the preparation of the bed of a foundation which is small in compass, as in the case of a seat for a large crane intended to lift many tons at a time; or that of a tall steeple which is to hold a great bell, the oscillations of which will periodically shake it from top to bottom. Such objects must have a firm seat on, and fast hold of, the earth, and must be set in a deep socket.

And here I cannot help remarking incidentally on a result of the modern usage of carrying high-level railways through the heart of cities. The passing trains set the buildings adjacent to these railways vibrating all over. Will this incessantly repeated shaking of houses loosen their joints, weaken their frames, and render them useless and uninhabitable before their time?

The resistance to sinking and spreading in bottoms of foundations varies from that of hard rock, which only transmits pressure downwards (towards the earth's surface), and which does not allow of its own substance being displaced by weight, to that of water, which transmits pressure in all directions, and allows itself to be displaced and the weight to sink in it till the forces acting over and through its whole basin come to a balance. It follows from this that the nearer the substance of the bottom on which you propose to build approaches the consistency of hard rock, the less cutting will be required to prepare the bed, and the less deep will the foundations need to be sunk into it; and the nearer the substance of the bottom approaches to the nature of water, the more cutting will be required, and the greater will the depth to which the foundations have to be sunk need to be.

Sand, when homogeneous, makes a good dry bed. Rock often proves a damp bed, allowing water to work in its pores and creep up walls, and not affording the facilities for draining away that sand and gravel do. In technical books, limestone and gravel are credited with making excellent dry beds. Moss is a first-rate bottom for *roads;* whenever a skin gets on the surface, the spring of the peat causes roads, whether macadamised or rail, to wear remarkably well. Roads over moss will not cost the tenth part of the sum for repairs that those over rock, sand, or clay do. But for houses moss is a bad bottom every way you take it. It is both unstable and unhealthy. It is treacherous.

The most difficult bottom to deal with is one the parts of which are sectionally different in substance and consistency. One part being, perhaps, as hard as bell-metal, while another lying beside it is as soft as butter. And this case becomes problematical when the bottom is under water, and the line of demarcation between the hard and the soft cannot be exactly discovered and defined. There are two directions in which the sectional parts may lie. They may lie so that the line of demarcation between them is parallel with the sides of the structure about to be reared, or so that it forms an angle with them more or less acute; the latter case being the worse.

When obstructions are met with, it is an important matter that the architect should be able to decide what amount of opposition should be considered of sufficient gravity to cause him to alter his plans. Plans should not be altered for the sake of a trifle. On the other hand, man cannot work against nature, nor accomplish impossibilities.

The processes to be used in dealing with imperfect and unstable bottoms, in order to make a reliable bed for foundations in them, are to be found detailed in all comprehensive books on architecture, civil engineering, and building economy. The great error into which people are apt to fall, is not in the adoption of method, or even in choosing the best method, but in carrying out the method they have adopted to perfection. When there is deficiency in the solidity or the homogeneity of the bottom on which you are to build, whatever remedy you may appoint to make good the deficiency, you must never rest nor leave it till you have attained your purpose, and made a reliable bed for the foundation. Every new foundation he has to lay, is a new study for the architect.

Several writers have directed attention to mistakes which have been made at times in spreading layers of concrete for the strengthening of the bed. The intention in laying down *béton* or concrete is that the whole of the mixture should, when it has solidified, form one fastened mass, compacted like the leather of the sole of a shoe. To bring this about the shivers and gravel must be bound with some cementing material, such as mortar or grout (made either of lime or cement, sand and water). This cementing material should permeate the whole mass of shivers or gravel equally and thoroughly. Care must be taken that it does not run out of the mass altogether, as also that it does soon run through it, so as to desert one part and accumulate in another. This is no unnecessary injunction. I have seen the washing out of a portion of many barrels of cement from the shivers into which it was poured. It was in the case of a large iron cylinder, placed in the centre of a river to sustain a bridge, and the interior of which was to be filled with concrete. The water of the river got through the seams of the cylinder, and came out deeply colored with cement. A large sheet of water was so colored every tide. In the end it could not be known how much cement remained in the cylinder, nor how it was distributed among the shivers, nor how much of the contents attained the consistency of *béton*, nor how much remained shingle, notwithstanding the work being done at a great cost. The inspector should try to make sure that the proper quantity of cementing material is expended on the shingle and well distributed throughout it, and he can never be wrong before beginning to build upon the *béton* to cause a little grout, made with hot lime or Roman cement, to be run over the surface, to fill any interstices that might possibly remain.

In building a bridge over a river where there is already a bridge, it would be well to bear in mind that the projectors of the first bridge probably selected for it the best site that could be got, and that the site chosen for the second bridge about to be built, is most probably an inferior and less secure position, and that therefore the new structure should be better guarded and more carefully founded than the old in order to make it as secure. A wise man builds his bridge at the ford: a fool builds his at the ferry.

The heaviest part of a building should rest upon the solidest part of the foundation walls. In the handsome steeple of Free St. John's Church, Glasgow, I have observed that the key-stone of an arch has been made the foundation of a tall buttress. This is not only bad in principle, but it is displeasing to the eye.

As the foundation of a building is its base, to spread it out is not only conformable to the rules of safety, but also to the precepts of taste.

Whoever wishes to lay foundations pressing equally on their bed, and exactly and neatly, at the same time must make use of powerful implements. It may be said, in a general way, that the instruments and tools with which a builder works at foundations should be larger and stronger than those with which he works at the superstructure in proportions as the pieces of which the foundation is, or, at any rate, ought to be, composed, are greater and heavier than those of which the superstructure is composed. There can be no question as to the great advantage that suitable and powerful implements put into the service of a sensible workman give him. They invest him with extraordinary powers to carry on his job exactly and expeditiously.

Not only should the stones put in foundation walls be the largest put into the building, but if there be any difference in the specific gravity they should also be the heaviest per cubic foot, the heaviest for its size being, in most instances, the strongest too. Stones, as a general thing, are comparatively strong or weak, according as their specific gravity is high or low.

If I now propose to architects and still more to engineers, that they should make the foundations of all their structures, whether seen or unseen, handsome things, I think I hear them retort, "What do you mean? Teach your grandmother! Away, stick to your last."

The ancients had that idea, however, which they, no doubt, took

direct from Nature, that nothing is handsome which is not handsome throughout, and that if you would have anything like a perfect structure, the unseen as well as the seen should be carefully and tidily shaped. "Thorough," a word upon which Lord Macaulay threw some contempt, was their motto; and, besides, it seems not out of the way to suppose that any one who loves beautiful figures and fine forms would incline to draw all the parts of a design handsomely from bottom to top, that he would not begin at the bottom with a hideous foot when he proposed to end at the top with a graceful head, and that his foundation works would be designed to conform to the pattern of the rest of his building, nor to suppose conversely that he who was careless in producing and displayed no taste in designing his foundations would be but a slovenly architect or engineer throughout, and not much to be depended on. — *W. Y. B. in the Builder.*

THE DEATH-RATE OF MEMPHIS.

Newport, R. I., March 11, 1882.

To the Editors of the American Architect: —

It seems to be a disputed question whether the death-rate of Memphis has increased or diminished during the past year. Public comment on the subject varies one way or the other according to monthly reports.

When the new sewerage system had come fairly into use, and had been publicly described there was a general impression, among those who read with the ends of their fingers, that all the ills of this unfortunate town had taken sudden flight. Even among the more intelligent and thoughtful classes, it was assumed as a matter of course that we had seen the end of yellow fever in Memphis. Friends, congratulating me on the success of the sewerage works, often said and still say, "Well, they have had no yellow fever in Memphis since your work was done." In a general way, if the monthly record shows a high death-rate, some journal, often a medical one, calls attention to the fact that the result of the sewerage works has been disappointing. With a low monthly record, those who are urging sewer improvement in other towns may refer to this renewed evidence of the sanitary effect of sewerage.

It is proper for me to make some distinct statements on this subject because my reputation as an engineer must, to a great degree, stand or fall with the success or failure of the method of sewerage adopted in Memphis by my advice, and the use of which is extending to other towns. Its success or failure cannot be measured by the death-rate. Dr. Maury of Memphis has recently published in the *Medical News* a correct statement of the case; but it is important that knowledge concerning it should be more widely extended.

In 1878 there were nearly 5,000 deaths from yellow fever in Memphis. The disease appeared again in 1879, and, although the population was speedily reduced by removals from about 40,000 to about 13,000, many of those remaining being protected by previous attacks of the disease, the deaths amounted to about 500. There was a thorough demoralization of the population of the whole valley of the lower Mississippi. The local authorities invited the National Board of Health to appoint a special committee to advise as to what should be done. The committee consisted of Drs. Billings, Johnson and Mitchell, of the National Board. To these were joined Major Benyaurd, U. S. Engineers, Dr. Folsom, of Boston, and myself. A thorough investigation was made, including a house-to-house inspection carefully carried out, and a chemical examination of the various forms of water-supply. With the information thus obtained before us, and with a full consideration of the physical and financial condition of the city, we made the following recommendations in the order numbered:

First. That the "superintendence and subsequent care of the sanitary work" be placed in the hands of a thoroughly competent sanitary officer, independent of politics, to direct "a large amount of sanitary work to be done in Memphis, the details of which must be left to a great extent discretionary in order to secure the best results without unnecessary expense."

Second. The ventilation and chilling of all houses occupied or unoccupied, extending the process to the contents and interiors of trunks, boxes, bureau drawers, bedding, carpets, clothing, etc.; also the destruction by fire of much material accumulated in junk shops and in the hands of second-hand dealers.

Third. "That the city should have control of the water-works, at least to such an extent as to insure a change in the present source of supply, and also to insure that a sufficient amount of water for sanitary purposes shall at all times be at the disposal of the city."

Fourth. That a large number of houses, including some large buildings in the heart of the city, "should be condemned, torn down, and the material destroyed by fire."

Fifth. "That all privy-vaults now in the city should be cleaned out and filled with fresh earth, and that hereafter no system of dealing with excrement should be permitted which involves pollution of soil, water, or air. In those portions of the city so thickly settled as to warrant it, there should be introduced a system of sewerage to discharge into the Mississippi River upon a plan substantially as recommended by Colonel Waring. These recommendations include a system of subsoil drainage, discharging into the bayous and into the river."

Sixth. "That the bayous, with a sufficient strip of ground on each side to insure their control and freedom from pollution, should be made the property of the city for securing drainage and as a public park, the banks being properly grassed and a constant stream of clear water being secured. The backing up of high water from the river into the bayou should be prevented by means of a dam, in connection with which must be provided pumping machinery to dispose of the ordinary flow during such period of high water."

Seventh. A modification of building regulations, under proper control. "All uncondemned buildings whose lower floors are less than two feet from the ground should be raised to that height as early as is possible."

Eighth. This section refers to the removal of garbage, and other sanitary details and their control by the sanitary officer recommended in the first section.

Ninth. "With the exception of those devoted to heavy traffic, it is advised that all streets should be constructed of Paducah gravel, laid on a properly shaped road-bed, after the subsoil drains have been established, and that the gutters and curbs should be made of concrete."

Tenth. "Few places possess greater natural advantages than the city of Memphis for drainage, removal of excrement, garbage, etc., to secure that healthfulness so necessary to commercial prosperity."

The report closed with these words: "We believe that by carrying out the above recommendations, and by availing itself fully of what is now known as to the causes of disease and the methods of avoiding or destroying these causes, Memphis may soon become one of the healthiest cities in the valley of the Mississippi."

Thus it will be seen that the conditions prescribed for sanitary improvement were numerous and varied, and that the construction of sewers was only one item of them. I know only in a general way the extent to which the recommendations have been carried out; but the following are the substantial facts: The chief sanitary officer is not so independent of control as the committee intended that he should be. The chilling of houses, etc., was either reasonably well performed, or its effects have been secured by lapse of time. The city has not obtained control of the water-works, which are still in the hands of a private company, which still supplies a muddy water drawn from Wolf River dangerously near to the temporary outfall of the sewers and to the filthy Bayou Gayoso and to the drainage of slaughter-houses and other sources of infection in its immediate vicinity. Wells have been closed, cisterns have been largely dispensed with, and this vile water is furnished for the domestic use of the citizens. It has been pointed out from time to time that it is subject to probable contamination from all the sources above named. The destruction of houses reported by the health officer as unsafe has been very partially carried out, the authorities having allowed many of them to be repaired with less thoroughness than the spirit of the recommendations would have required. The filling of privy-vaults and the improvement of the system of dealing with excrement has been carried out substantially as recommended. The system of sewerage except as to the outlet has been carried out in substantial accordance with the recommendations so far as the failure to improve the bayou left it possible for this to be done. One of the most important features of the sewerage as recommended was the delivery of the whole outflow into the Mississippi River well below the mouth of Wolf River. For immediate purposes during construction and for use during high water, the main sewer was connected with an existing outlet into Wolf River, but the plan included and was based upon the Mississippi outlet. The iron pipe for its construction was ordered and the location of the line was established. This outlet has never been constructed and the disposition that has since been made of the land through which it was to pass indicates that the intention has been given up. The subsoil drainage has been carried out practically to one third the extent recommended; the recommendation was for one drain in the trench with the sewers (in alleys), and another at each side of the street, — in very few cases have these street drains been constructed. The drainage of houses and their connection with the sewers has been admirably carried out under strict regulations faithfully executed. The bayous are mainly unimproved except for the removal of the privies which used to overhang them. They are most foul and dangerous. Their banks are not under proper control, their water-way is entirely unimproved and they are still subject to the invasion of the high water of the Mississippi River with its many attendant evils. This condition renders it impossible to extend the system of sewerage and house-drainage to one of the worst sections of the city, almost in its heart, which is to-day as serious a menace to the health of the town as it has ever been. There has been no general compliance with the recommendation that low buildings should be raised,

and free ventilation furnished under them. The removal of garbage, etc., has been reasonably well done when the weather permitted; — continued rains soon put most of the streets in the city into such a condition that the transportation of refuse matter is practically impossible. These then impregnate the soil to a greater or less degree, and establish a condition which must be regarded as seriously bad. Except in a few special cases there has been no improvement of the road-ways, save in those streets used for the transportation of merchandise. Sometimes for many weeks together nine-tenths of the thoroughfares of the city are sloughs of mud and mire.

I make the above statements without consultation with my associates of the committee, and entirely on my own responsibility. I make them because the repute of my own work is likely to suffer from the failure to supplement the sewerage with other work equally important and from the failure to make even the sewerage complete. Whether or not the government of Memphis can afford to carry out the full recommendations, I do not know. They probably will carry them out after another epidemic of yellow fever, and they will probably have another epidemic if the disease again invades the Mississippi valley before they have carried them out. The work yet remaining undone is as important for the general health of the community as it is for the prevention of an epidemic of yellow fever, and until it is executed it is fair to suppose that, with the growth of population and with the growing indifference that immunity from epidemics will foster, the general sanitary conditions of the town will gradually grow worse, and that its death-rate will gradually increase. Even had it been possible to sewer the low district near the bayou, and had the whole outflow been delivered to the Mississippi River, the unfavorable conditions would only be mitigated. Sewers are an essential element of municipal sanitary work, but they are only an element: they cannot take the place of other necessary things. There are in Memphis and everywhere else a number of causes of ill-health which are not affected by sewerage and house-drainage.

So far as the system of sewerage adopted at Memphis is concerned, it has been an entire engineering success, *as a system*. The capacity of its main lines have proved to be too little for the duty imposed upon them. The basis on which the capacity of the sewers was calculated was a consumption of 40 gallons per head per day for the whole population; this would be on an average about 250 gallons per day per house.

The Wolf River water supplied by a private company owning the works is so foul that pipes can be kept clean only by the water being left to run. It has been intimated that the company is not popular among the people, and that many leave their taps running in order to increase the cost of pumping. Be this as it may, recent investigations have shown a daily consumption in the houses connected with the water-works of about 2,300 *gallons per house*. With this immense flow the main sewers (never the six-inch laterals) sometimes run full, and several relief discharges into the bayou have been found necessary. GEORGE E. WARING, JR.

EFFECT OF CEMENT-MORTAR ON IRON.

PITTSBURGH, PA., March 7, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—I beg to get an answer to the following questions. Is it true that iron beams and girders built into walls with cement-mortar, are liable to be destroyed by any action from the cement? What kind of a chemical action is it? Is cast-iron laid in concrete also subject to that influence, or to destruction? Supposing these questions are of general importance, I am very respectfully yours,

C. LEO STAUB.

[THE articles on this subject printed in our issue of March 11 present a rational explanation of the circumstances under which iron embedded in mortar is likely to corrode, the substance of them being that neither mortar nor cement act upon iron, but the dampness of the masonry in which the metal is imbedded may oxidize it, independently of any action of the mortar. To this we might add one other observation: that as lime-mortar in the interior of a mass of masonry always retains something of its soluble character, as a mere hydrate, the action of the carbonic acid of the air upon the wall not extending far from the surface, any water which soaked into such a mass would become strongly alkaline by solution of the lime, and any iron exposed to it would be in some degree protected from corrosion, since iron does not rust readily in alkaline solutions. The complex hydrate of lime, silica, alumina and magnesia which is formed by the setting of cement is on the contrary nearly or quite insoluble in water, and iron imbedded in it, although the cement is itself inert, does not enjoy the protection against the action of free moisture which is afforded by lime. — EDS. AMERICAN ARCHITECT.]

A STUDENT'S QUERY.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you please inform me by what geometrical process (if any) the centre may be determined for inscribing a circle in a space similar to that shown in the accompanying sketch [A spandrel included between the lines of a square-headed window and the enclosed pointed arch].

A reply will greatly oblige A STUDENT.

[THE simplest process is to draw a line from the corner, bisecting the angle, and take the centre of the circle by trial at the required point. Probably there are more scientific ways of determining the position of the centre, if any one wished to study them out.—EDS. AMERICAN ARCHITECT.]

THE SALTPETRING OF BRICKWORK.

CHICAGO, March 6, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Do you know of any wash that would prevent the saltpetre efflorescence that appears on the surface of brick walls? Either on account of the peculiar quality of the clay, or something in the manufacture of the bricks, it is now impossible to plaster on interior brick walls here without furring. I have a building in progress in which the salts are now hanging in some places one and a half inches in thickness. Yours respectfully, ARCHITECT.

[THE efflorescence of brick walls, if once begun, cannot be cured by any superficial wash now in use, although something may be done by oiling the wall, to prevent its appearance. The cause of the efflorescence is very obscure. It usually consists mainly of sulphate of magnesia, and may come either from the bricks or from the mortar, if the latter contains magnesia, as all natural cements and many mortars do. One theory is that bricks burned with coal are subject to efflorescence, on account of their saturation with sulphur fumes from the coal, while those burned with wood are free from danger; but it is found that walls laid with cement-mortar are more affected than those built with lime, so that there is some reason for supposing that the magnesia of the cement plays a part in the reaction. Another hypothesis is that clay deposited from salt water contains soluble matters, which find their way to the surface of bricks made from such clay; and this is supported by the observation that the disfigurement of walls is much more common on the sea-coast than in inland towns, but "Architect's" experience indicates that this explanation is not wholly satisfactory. Walls which are left uncovered so that rain soaks down into the interior, suffer most, the water gradually finding its way to the surface, bringing the salts with it. For face walls the precaution is sometimes taken of mixing oil with the mortar, which will prevent efflorescence if the top of the brickwork is kept protected from rain; but this would perhaps be too expensive for interior walls, although any kind of cheap animal or vegetable oil or grease may be used.—EDS. AMERICAN ARCHITECT.]

"DOVETAIL."

March 10, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — The inferences of the writer in Notes and Queries, quoted in your last issue, as to the derivation of the words dovetail and rabbet are not fortunate.

Rabbet or rebate may and probably does come from the French "*rabat*" having much the same signification as the English word rebate or reduction, for which reason I always use the second mode of spelling above given. The French term, however, is "*feuillure*," viz.: "making into leaves" or leaf.

But for "dovetail" it seems natural to take simply as a good English word, the French for which is "*queue d'arronde*" (obsolete for *hirondelle*, a swallow) translated in an old dictionary which I picked up at random, by swallow or dovetail.

In the same manner I have known the word cornelian, written carneleon, and made to derive from Latin "*Carne leonis*," for being "meat" red; instead of from *cornaline* (French) and *corniola* (Italian), a horny substance. Yours etc., J. F.

NOTES AND CLIPPINGS.

THE PNEUMATIC FIRE-EXTINGUISHER.—Apropos of the discussion on fire-extinguishers in late issues of this paper, the *Fireman's Journal* says: "The machine was introduced here some three years ago by a Canadian, who gave some experiments that were fairly successful. A company was organized to manufacture them, but they have never yet been able to perfect them so as to put them on the market successfully. Indeed, the company failed over a year ago, and the receiver has sought in vain ever since for a purchaser for the old material. The machine is constructed with an air-chamber on top, into which a large volume of air is pumped; the extinguisher is then filled with water, and the expansion of the air, when released from the air-chamber, is sufficient to project a small stream of water thirty or forty feet. But the difficulty lies in the almost utter impossibility of confining the air in the chamber so as to have it ready for use when required; any device thus far tried will permit the air to escape, so that when the machine stands for a time the compressed air has disappeared, and there is nothing to give the required pressure. That the machine was never developed into a success, we attribute rather to a lack of intelligence and enterprise on the part of the company controlling it than to mechanical difficulties — the former might be overcome, but the latter never. As to the French compound alluded to, that was in the market long before the pneumatic extinguisher appeared, Mr. Skinner, inventor of the ladder bearing his name, being agent for it. It was used in several other extinguishers, notably in the one which is simply a large tin bucket having a Johnson pump as the projecting power. It was supplanted, however, by other compounds quite as effective and much cheaper. That the compounds referred to have greater extinguishing power than water has been repeatedly certified to by government and other officials who have reported upon tests made under their supervision If a compressed-air machine can be successfully made to use these compounds it would, unquestionably, be of value, but up to the present time nothing has been discovered, in the way of a portable machine, that will get a small stream of water on a fire so quickly and so effectively as a chemical extinguisher."

THE Boston *Transcript* says that an East Boston lady was recently requested by the Board of Health to have traps placed under the sinks and basins in her house, and when an inspector a few days later examined the premises it was found that she had placed there several rat-traps.

IN purchasing a house, the buyer should be sure the seller is not too deep for him. — *Boston Commercial Bulletin.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

254,861. Tool-Handle. — Thomas Bolton, San Francisco, Cal.

254,862. Chain-Wrench. — William H. Brock, Corona, N. Y.

254,868. Adjustable Mantel. — Robert H. Gudgeon, Winchester, County of Hants, England.

254,884. Ventilator. — James G. Pennycuick, Boston, Mass.

254,954. Machine for Sawing Off and Tenoning Piles. — Andrus L. Gilbert, Albany, N. Y.

254,955. Pile-Driver. — Andrus L. Gilbert, Albany, N. Y.

254,965. Window-Screen. — Henry C. Hart, Detroit, Mich.

254,981. Air-Cooling Apparatus. — Ralph S. Jennings, Baltimore, Md.

255,003. Sash-Fastener. — Ephraim S. Morton, Brockton, Mass.

255,016. Metallic Chimney-Cap. — Walter J. Pettingell, Lowell, Mass.

255,019. Apparatus for Disinfecting Waste-Pipes. — Abram G. W. Rankin, Jersey City, N. J.

255,023. Method of Uniting Wood for Floor-Coverings, &c. — Charles E. Rider, Rochester, N. Y.

255,025. Sash-Holder. — James V. Risk, Point Pleasant, W. Va.

255,047. Fire-Extinguisher. — Charles W. Talcott, Woonsocket, R. I.

255,049. Elevator. — George C. Tewksbury, Lynn, Mass.

255,092. Tubular Well. — Ransom E. Strait, Galesburg, Mich.

SUMMARY OF THE WEEK.

Baltimore.

Building Permits. — Since our last report twenty-four permits have been granted, the more important being as follows: —

Peter Jensen, three-st'y brick building, s e cor. Patterson Park Ave. and Orleans St.

F. C. Fossett, 2 three-st'y brick buildings, s w cor. Belair Ave. and Washington St.

Henry Heatterick, two-st'y brick stable, in rear of s e corner Washington and Orleans Sts.

Leander Foreman, 4 three-st'y brick buildings, Argyle Ave., commencing at n e cor. of Townsend St.

Leander Foreman, 4 three-st'y brick buildings, Mosher St., bet. Pennsylvania Ave. and Division St.

Geo. C. Hershman, 9 two-st'y brick buildings, Madeira Alley, bet. Gough and Bank Sts.

C. F. Richter, 2 three-st'y brick buildings, Lanvale St., commencing 90' w of Carey St.

John F. Raabe, three-st'y brick bank building, in rear of s w cor. Gay and Saratoga Sts., fronting on Saratoga St.

E. C. Jones, 4 three-st'y brick buildings, Fairmount Ave., commencing at n w cor. of Ann St.

Jacob Saum, 4 three-st'y brick buildings, Gilmor St. w of Pressman St.

Jacob Saum, 4 two-st'y brick buildings, Cole St., commencing at the corner of Vincent Alley.

J. B. Irvine, 6 three-st'y brick buildings, Mount St., bet. Harlem and Edmonson Aves.

George Pausch, three-st'y front building, 934 Baltimore St., bet. Gilmor and Mount Sts.

Louis Karlling, three-st'y brick building, Parkin St., bet. Lombard and Pratt Sts.

Boston.

February Report.—During the month of February, the following permits were granted at the office of Inspector of Buildings. Brick, 4; wood, 32; wood special, 3; alterations, repairs, etc., 90; boilers and engines, 48; heating apparatus, 47.

Building Permits. — *Brick.* — 45 *to* 53 *Hereford St.*, Ward 11, for Geo. Wheatland, Jr., 5 dwells., 22' 3" x 42', three-st'y, mansard; Vinal & Dodge, builders.

Clarendon St., cor. Newbury, Ward 11, for Frank M. and Albert G. Frost, apartment-house, 30' x 90', six-st'y; Laming & Drisco, builders.

Wood. — 697-699 *Dudley St.*, Ward 20, for Fred. W. Webster, store, 24' x 32'; Fred. W. Webster, builder.

Erie Ave., cor. Elmo St., for David Simonds, 2 dwells., 20' x 44', three st'y.

Terrace Ave., near Sheridan Ave., Ward 23, for Daniel Seaverns, dwell., 20' x 30'; ell, 15' x 18', two-st'y; J. Sullivan, builder.

Dale St., near Walnut Ave., Ward 21, for Wm. Donaldson, dwell., 21' x 30', two-st'y; ell, 14' x 16'; William Donaldson, builder.

West First St., rear, near Dorchester St., Ward 14, for New England Felt Roofing Company, storage building, 30' x 60'.

Bellevue St., near Trull St., Ward 24, for Wm. L. Harris, dwell., 25' and 31' x 34' 6"; ell, 17' x 20' 9", two-st'y, hip; J. French, builder.

Delle Ave., near Burney St., Ward 22, for Ellen Whelton, dwell., 22' x 31'; ell, 17' x 21', three-st'y; C. M. Ward, builder.

Grove St., near German St., Ward 23, for Jos. Kern, dwell., 21' x 28', two-st'y; John String, builder.

East Seventh St., near M St., Ward 14, for Wm. F. Eaton, 2 dwells., 19' x 32', two-st'y mansard; Wm. F. Eaton, builder.

West Cottage St., rear, near Blue Hill Ave., Ward 20, for Amos D. Gould, stable, 26' x 28'; Amos D. Gould, builder.

East Ninth St., 593 *and* 595, Ward 14, for Alfred L. Bailey, 2 dwells., 19' 6" x 32', two-st'y mansard; ell, 14' x 18'; A. L. Bailey, builder.

West Sixth St., 42 *and* 44, Ward 13, for Michael Hickey, 2 dwells., 20' x 30', three-st'y; Wm. T. Eaton.

Centre St., cor. Burroughs St., Ward 23, for Benj. May, 2d, dwell. and store, 42' and 58' x 41' 6" and 36', three-st'y hip; John D. Rendall, builder.

Austin St., opposite Front St., Ward 5, for Fitchburg Railroad Co., lumber freight office, 15' and 55' 6" x 38', two-st'y; John T. Bagley, builder.

Marcella St., junction Centre St., Ward 21, for Horace R. Batchelder, dwell., 14' x 28', two-st'y; Henry F. Pierce, builder.

Brooklyn.

Building Permits.—*Hart St.*, s e cor. Stuyvesant Ave., two-st'y frame dwell.; cost, $6,000; owner and builder, John Rueger, 498 Broadway.

North Eighth St., n s, 100' from Second St., bet. First and Second Sts., three-st'y frame tenement; cost, $5,000; owner, P. Dailey, 8 North Sixth St.; architect, A. Herbert; builder, not selected.

Grand St., Nos. 651, 653, *and* 655, being 75' from Waterbury St., 4 two-st'y tenements; cost, total, $7,800; owner, Chester D. Burrows, 319 Ainslie St.; architect, O. H. Doolittle; builder, I. E. Burrows.

Sumner Ave., n w cor. Halsey St., 2 three-st'y brick stores and dwells.; cost, total, $16,500; owner, Henry Wessels, 12 First St.; architect, A. Herbert; builder, not selected.

Second St., n w corner North Eighth St., four st'y brick store and tenement; cost, $10,000; owner, John Brady, North Eighth St.; architect, A. Herbert.

Roger Ave., n e cor. Park Pl., 7 three-st'y frame (corner) stores and dwells. and other dwells.; cost, $3,500; owners and builders, Peter McDonough and John Reilly, 130 Rogers Ave.

Ainslie St., No. 129, n s, 50' w Lorimer St., three-st'y frame tenement; cost, $2,700; owner, F. Grasmuck, 129 Ainslie St.; architect and carpenter, O. H. Doolittle; mason, I. E. Burrows.

Hamburgh St., n w cor. Magnolia St., 2 three-st'y frame stores and tenements; cost, each, $4,500; owner, architect, and mason, Albert Palmay, 402 Central Ave.; carpenter, A. Hofgesang.

Clason Ave., w s, 100' s Atlantic Ave., 2 two-st'y frame dwells.; cost, $2,500; owner, Jackson S. Schultz, 111 Cliff St., New York; architect and builder, James McKee.

Myrtle Ave., s s, junction Magnolia St., three-st'y brick store and tenement; cost, $9,000; owners, John Deterling and William Paulson, De Kalb and Tompkins Aves.; architect, S. W. Osman; builders, P. Carlin & Sons, and A. A. Reeve.

Hooper St., s s, 157' e Bedford Ave., 7 three-st'y brownstone dwells.; cost, total, $50,000; owner and carpenter, C. L. Sammis, 138 Penn St.

Van Dyke St., s e cor. Richard St., 2 three-st'y brick stores and dwells.; cost, each, $5,300; owner, Mrs. Ellen J. Robinson, Partition St., cor. Richard St.; architect and carpenter, George Damen; mason, P. McGuire.

First St., w s, bet. South Third and South Fourth Sts., two-st'y brick shop; cost, $5,000; owners, Havemeyer & Elder; architect, T. A. Havemeyer; builders, T. Winslow and J. E. James.

Clason Ave., e s, 145' n Lafayette Ave., three-st'y brick factory; cost, $6,000; owner, G. M. Eddy, Clason and Lafayette Aves.; architect, J. V. Smith.

Second St., w s, 25' s North Eleventh St., two-and-a-half-st'y frame glass house; cost, $2,400; owner, Andrew Strenger, 58 Troutman St.; architect, John Platte.

Fifth Ave., w s, 25' s Sixteenth St., 2 two-st'y frame stores and dwells.; cost, $3,000 for both; owner and carpenter, James Carty, 578 Fifth Ave.

Huron St., n s, 175' e Manhattan Ave., two-st'y frame store-room, office and dwell.; cost, $2,200; owner, J. Van Iderstine, Blissville, L. I.; architect, Fred Weber; builders, D. H. Hulse and S. F. Bartlett.

Chicago.

Wages. — A general meeting of carpenters was held March 19, and it was decided to demand an advance in wages after the first of April from $2.75 to $3.00 per day.

Houses.—A residence for A. J. Kirkwood, on Oak and La Salle Sts., 78' x 60'. The entire front is of Indiana pressed and moulded brick with stone basement; Messrs. Burnham & Root, architects.

On Dearborn Ave., facing Lincoln Park are three houses, each different in design, but forming a harmonious and picturesque whole, 111' front, by 80' deep, for S. E. Egan, Wm. Egan and H. H. Shufeldt, to be built of Philadelphia green stone throughout; the cost is $100,000; Messrs. Burnham & Root, architects.

Apartment-Houses. — On the cor. of Jackson and Paulina Sts., are to be built 18 apartment-houses, 100' x 112', for Mrs. E. H. Talbott, four-st'y Chicago pressed brick front and Berlin stone with stone basement, very elaborate: the cost will be $60,000.

Also 2 apartment-houses on Erie St., near Dearborn Ave., four-st'y, 51' x 63', for Mr. Levi W. Yaggy; cost, $60,000; Baltimore pressed brick and terra-cotta; Mr. L. G. Hallberg, architect.

Houses —On the cor. of Warren Ave. and Oakley St. is to be erected a fine residence for Mr. John A. Roach, three-st'y, 28' x 72', very ornate front of Philadelphia brick and brownstone, to be finished throughout in hard wood; cost, $18,000. Also at 271 Huron St., 3 flats, for Mr. Chas. A. Winchell, 25' x 74', finished in hard wood; cost, $12,000; both from designs by Mr. Wm. Thomas, architect.

Building Permits. — S. J. Mellen, three-st'y factory, 36' x 60', 233 North May St.; cost, $4,500.

Fieldhouse, Dutcher & Co., three-st'y factory, 40' x 60', 30 and 32 West Monroe St.; cost, $5,000.

A. J. Kirkwood, two-st'y dwell., 28' x 60', 334 La Salle St.; cost, $10,000.

Geo. A. Seaverns, three-st'y flats, 60' x 100', 2200 Wabash Ave.; cost, $25,000.

M. E. Sands, 3 two-st'y dwells., 53' x 60', 987 and 991 Jackson St.; cost, $11,000.

College of Physicians and Surgeons, stone basement, 70' x 100', cor. Harrison and Honore Sts.; cost, $2,600.

G. F. Hinckley & Co., one-st'y engine-room, 36' x 40', cor. Ullman and Thirty-seventh St.; cost, $3,000.

J. L. Beckwith, two-st'y flats, 26' x 31', 248 Park Ave.; cost, $6,000.

Van Higging, Furber & Co., 2 additional stories, 60' x 80', cor. Randolph and La Salle Sts.; cost, $25,000.

S. Caldwell, two-st'y dwell., 22' x 40', 196 Walnut St.; cost, $2,500.

Mrs. W. Collins, two st'y addition to dwell., 20' x 30', 398 Webster St.; cost, $2,500.

W. H. McMurray, two-st'y barn, 28' x 36', 1919 Prairie Ave.; cost, $6,500.

Geo. Cramer, two-st'y dwell., 22' x 60', 703 South Ashland Ave.; cost, $4,700.

A. E. Risser, three-st'y dwell. and barn, 30' x 60', 3250 South Park Ave.; cost, $40,000.

Theodore Sheldon, three-st'y flats, 24' x 70', 178 Cass St.; cost, $8,000.

Peter Alhmendinger, three-st'y dwell., 25' x 68', cor. Oak and Pine Sts.; cost, $4,700.

D. W. Evrart, one-st'y foundry, 50' x 100', 11 to 13 Jefferson St.; cost, $5,000.

John Krassman, two-st'y dwell., 21' x 52', 414 Sedgwick St.; cost, $3,500.

New York.

Store. — On Sixth Ave., between Twentieth and Twenty-first St., Mr. Hugh O'Neill proposes to extend his store so as to have a frontage on the whole block; Mr. N. F. Barrett is the architect.

Brewery. — Messrs. Flanagan, Nay & Co. are to have an addition 50' x 112' built on their premises on Tenth Ave., between Twenty-fifth and Twenty-sixth Sts., at a cost of about $15,000. The front is to be of Collabaugh face brick with granite trimmings; Mr. Jos. M. Dunn is the architect.

Panorama-Building. — On the s e cor. of Fifty-ninth St. and Madison Ave. a panorama-building, 65' 10" in diameter, 25' 8" high is to be built for the Société du Panorama Nationale des Etats-Unis, at a cost of about $40,000; Mons. Humblet has come from Paris to superintend the construction.

Houses. — On the cor. of Seventy-second St. and Madison Ave. two residences are to be built for Mr. Chas. L. Tiffany, to cost about $240,000. The buildings will be of bluestone, 100' x 125', four-st'y with attic, and the architecture will be picturesque and unique. Messrs. McKim, Mead & White are the architects.

On Seventy-third St., between Ninth and Tenth Aves., 28 houses about 25' x 60' each, of brick with stone trimmings, four-st'y, are to be erected for Mr. Edward Clark, from designs of Mr. H. J. Hardenburgh.

On Eighty-seventh St. several dwells., 18' frontage, are to be built for the Rhinelander estate. They will be three and four-st'y, of brick with stone finish; Mr. Geo. M. Huss is the architect.

Alterations. — Messrs. Warren Fuller & Co.'s factory on Forty-second St. is to be materially enlarged at a cost of about $25,000, from designs of Messrs. D. & J. Jardine.

East Thirtieth St., No. 331, is to be altered from a residence to a flat, at a cost of about $5,000, from designs of Mr. Jos. M. Dunn, who has also prepared the plans for altering the building on the n e cor. of Third Ave. and Forty-seventh St., which with an addition will cost $6,000.

Labor Market. — The labor market is in an unsettled condition, and higher wages will be demanded. Masons talk of asking $4.50 per day, and some even mention $5. Carpenters, painters and plasterers are also uneasy.

Building Materials are firmly held at quotations. After May 1, a new exchange to be called the Building Material Exchange of the City of New York will be opened at No. 12 Dey St. The exchange has been organized under favorable auspices, and has already a large and influential membership.

The New Opera-House. — In consequence of the great rise in the price of labor and materials, the directors of the New Metropolitan Opera-House Company, at their latest meeting, resolved to issue a circular to the stockholders asking them to choose one of three plans as follows: To sell the land acquired between Thirty-ninth and Fortieth Streets and Broadway and Seventh Avenue, and divide the loss, if any; to hold the land and let it lie unimproved until a more favorable time for building, or to push forward the work of building, and meet the increased cost by mortgaging the superfluous land at the corners of Broadway and Thirty-ninth and Fortieth Streets. Only one lot in the centre of the Broadway front is needed for the entrance of the opera-house. As it was not a part of the original plan to build upon the land on either side, this is available for mortgaging as suggested in the third proposition. A meeting of the stockholders will be held on the 27th instant, and definite action will be taken on the subject.

Painters' Wages.—A movement is making to bring about an increase of wages for painters, who at present receive $2.50 for eight hours' and $3.00 for ten hours' work. The increase demanded is 50 cents.

Building Permits.—*Third Ave.*, s e cor. One Hundred and Forty-sixth St., four-st'y brick store, tenement, and lodge-room; cost, $13,000; owner and builder, George Mand, Third Ave., s e cor. One Hundred and Forty-sixth St.; architect, Henry Pierling.

One Hundred and Twenty-ninth St., n s, 330' e Eighth Ave., 4 three-st'y brownstone dwells.; cost, each, $12,000; owner, Richard H. Treacy, 1716 Madison Ave.; architect, J. H. Valentine; builder, R. H. Treacy.

One Hundred and Thirtieth St., n s, 300' w Sixth Ave., 2 four-st'y Connecticut brownstone apartment-houses; cost, each, $25,000; owner, Charles H. Fenton, 154 East One Hundred and Twenty-fourth St.; architect, Chas. Baxter.

Mangin St., No. 134, four-st'y brick saw-mill and