THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XV. Copyright, 1884, JAMES R. OSGOOD & CO., Boston, Mass. NO. 438.

MAY 17, 1884.

Entered at the Post-Office at Boston as second-class matter.

CONTENTS.

A NOVEL insurance scheme is under consideration among the theatre-managers in New York, who, dissatisfied with the present system of insuring their buildings, under which they pay heavy premiums for very inadequate protection, have undertaken to interest their fellow-managers generally throughout the country in the establishment of a "Theatres' Mutual Fire Assurance Association." It is proposed that the subscribers to this association shall pay annually into the insurance fund the sum which they now pay for premiums, and the promoters of the scheme hope that by saving the proportion of the premiums which ordinarily goes to the maintenance of insurance officers and agents the members of the mutual company will secure, in case of loss, an indemnity more nearly equivalent to the value of the building destroyed than they can now obtain. According to the people who lead in the undertaking, there are now two thousand five hundred and fifty-two theatres in the United States, which have cost on an average forty-five thousand dollars each, or nearly one hundred and fifteen millions in all. The insurance of even a part of this great property is a serious matter, and if the theatre-managers can carry out their plan successfully they will deserve no small credit. One of the principal difficulties to be encountered will be that of the immense difference in the risk due to the manner of construction of such buildings. In New York, for instance, where, if the proposed building-act should go into effect, the theatres hereafter constructed will be protected against fire by stringent regulations, the risk will be very small in comparison with that which attaches to a country theatre, built, as most country theatres are, not only as flimsily and cheaply as possible, but upon ground which often owes its availability for the purpose to the circumstance of its being hemmed in on all sides by structures only second, in the dangerous inflammability of their construction, to the theatre itself. As the city theatres represent a far greater amount of money than the others, one average New York theatre being worth, for example, as much as ten or fifteen of the country structures, the city managers, unless a careful discrimination in rates is made, will have to pay not only the cost of insuring their own buildings, but a large part of the outside risks also, and it is hardly likely that the proportion of fires among the country theatres, which are not usually very profitable investments, would be lessened by the adoption of a system promising full, or nearly full, indemnity to the owners in case of loss. If the Theatres' Mutual Company could be so conducted as to take note of all the circumstances affecting fire risks in theatres, and to secure the adoption of regulations which would diminish those risks, as the mill-owners' insurance associations have done, its work would be in the highest degree advantageous to the public, and probably also to the managers; but a more difficult task was never set before any body of underwriters, even the most expert.

IT is always gratifying to hear of Mr. Edward Atkinson's labors in behalf of good building among those who know nothing and care nothing about the difference between combustible and incombustible architecture, although, as architects, we cannot avoid a little regret at the thought that the president of an insurance company should be able to claim the credit of having for some years exerted a greater influence upon the art of building in this country than any architect, with the exception, perhaps, of Mr. Wight, of Chicago. It is likely that Mr. Atkinson himself, having little time to follow the course of building matters, hardly comprehends the impression that the principles of construction which he advocates with such ability have made upon the public mind; but no architect needs to be told that stores, factories, and even dwelling-houses, built on the "mill system," are multiplying rapidly in and about the Eastern cities; and it will hardly be many years before the rules which the officers of the Manufacturers' Mutual Insurance Company have deduced from experience and common sense will begin to prevail among those who control the erection of more important structures. That the prospect of this new step in the accomplishment of an architectural reform is not very far off may be inferred from the fact that a few days ago Mr. Atkinson was requested to advise with several members of the State Government of Massachusetts in regard to the best mode of constructing hospital buildings.

THERE can be no doubt that this subject urgently needs attention, for, except hotels, which are usually built with a single eye to securing the greatest amount of cheap show at the smallest possible cost, the most inflammable buildings in this country, out of those making any pretense of solidity, are, as a rule, the public schoolhouses and charitable institutions. There are, of course, exceptions to this rule, where the public authorities have been wise enough to entrust such commissions to good architects, instead of to politicians or to their protégés, but these are far between, and we generally expect, in reading of the breaking out of a fire in a poor-house or asylum, to find that the destruction of the building followed so promptly as to drive the inmates pell-mell into the street, even if they escaped with their lives. The substitution, at a very small additional expense, of the "slow-burning" mill construction for the flimsy work commonly employed in such buildings would entirely change their character in this respect. So truly "slow-burning" is a building fitted with the unfurred walls and the thick plank floors, plastered on wire lath, which Mr. Atkinson's company recommends, that, as we know from experience, the inmates of the second story, instead of being summoned to fly for their lives at the first intimation of a fire in the basement, might stay tranquilly in their rooms while all the furniture and fittings of the apartments below them were destroyed, without fear that the fire could reach them. We remember, indeed, a store in New York, constructed in this way, which is advertised for rent as "fire-proof," the owners thus feeling themselves justified in guaranteeing the immunity of their tenants from damage by fire. In school-buildings, even more than in hospitals, the simple rules of "slow-burning" construction should be enforced by law. For such structures the cost would little, if at all, exceed that of the common method of building, and if such massacres of children as periodically appal our large cities can be prevented without expense or trouble to any one except the architects of school-houses, steps should be taken for that end without delay.

THE examination of candidates for the Rotch Travelling Scholarship was concluded this week in Boston, and the scholarship was awarded to Mr. Clarence H. Blackall, of Boston, who will hold it for the next two years. The second prize, a silver medal offered by the Boston Society of Architects, was awarded to Mr. Herbert L. Warren, also of Boston. The preliminary examination was held early in April, when each candidate was required to make a sketch design, in plan and elevation, to a given programme. These drawings were required to be finished in a single day, and six of the sketches were selected, whose authors were notified to complete their designs at a large scale, and submit them for final judgment on the third day of May. The examinations in architectural

theory took place on the following days, ending on Wednesday last. The total number of possible marks for all subjects amounted to one hundred and seventy-five, out of which Mr. Blackall obtained one hundred and fifty-six, and Mr. Warren one hundred and nineteen and two-thirds. All drawings and examination papers were submitted under mottoes, and the personality of the candidates was unknown to most of the examiners. The final award upon the designs was made by a committee consisting of Professor Ware and Mr. Richard M. Hunt, of New York, and Mr. W. P. P. Longfellow, of Boston. The examination in free-hand drawing was conducted by Mr. William R. Emerson, of Boston; that in French, by Professor Létang, and that in construction by Professor Clark, both of the Massachusetts Institute of Technology. The contest has excited great interest among the draughtsmen and younger architects in Boston, and indeed throughout the State, and the candidates have been unwearied in their efforts to deserve the prize, while those who hope to become candidates at some future time, as well as many who hardly look forward to this contingency, have been incited to renewed zeal and ambition in their chosen career by the example of the others. This is, of course, the object for which the prize was founded, and the generous and thoughtful family who have provided the means for it may well be pleased at the good which they have already effected.

THE recipient of the prize is expected to depart within a few weeks for Europe, where the income from the scholarship fund, of a thousand dollars a year for two years, will serve to maintain him comfortably during a long, and it is to be hoped, most fruitful period of study and investigation. The interest shown by European professional men in everything American is so great that there can be no doubt of the kindness of the reception which awaits a student holding so distinguished an honor, and the favor of architects abroad, to whom the Rotch scholar will carry a general introduction, will much facilitate his inquiries, whether his disposition leads him to prefer the artistic or the practical portion of his work. Many of our professional readers, who remember, and regret, the modesty which prevented them, during their student travels, from demanding access to works of special interest, can comprehend the value which a passport of this kind will have. We trust that the succeeding prize-men will continue to do honor to American architecture and architectural education, and will only warn those who propose to try their fortune as candidates another year that their preparation cannot commence too soon. It is a lesson not sufficiently regarded, that success in important and thorough tests of mental acquirement and ability rarely, if ever, falls to those who flatter themselves that by a few weeks of frantic urging of what they and their friends consider their exceptionally brilliant minds they can surpass the industrious "tea-and-toast" student, who begins early, and works steadily until the end. Such a man, despite his quietness, really assimilates knowledge faster, and designs more rapidly and effectually, than his "brilliant" rival, who, with his nerves unstrung by loss of sleep, and his judgment perverted by vanity, seems to himself to be making prodigious efforts, which prove, after all, to be the mere illusions of a brain struggling more with natural fatigue than with the requirements of the problem.

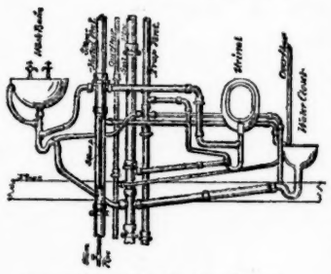
TWO pieces of artistic news, which reach us at the same time, have, although they relate to very different matters, a certain element of interest in common. The first item comes from Cleveland, where forty-three designs are said to have been received by the Garfield Monument Association for the monument to be erected there in memory of the late President. Although the designs were sent in under motto, and their authors are still unknown, some are said to have been sent from France, Italy, Germany and England, in addition to those received from the United States. In speculating as to the probable merit of these works, one is led to inquire whether, assuming the technical skill to be equal, an American sculptor would not be likely to appreciate the character and career of President Garfield much better, and to produce, therefore, a much more feeling and impressive statue than a foreigner, who would probably find considerable difficulty in distinguishing between his ideal of General Washington and Mr. Garfield, and undoubtedly, if he were called upon to make statues of each, would use the same model for both. In a somewhat similar case in England, Mr. Boehm, a very distinguished Hungarian sculptor, who has, however, lived for thirty or forty years in London, has been engaged, at the instance of the Prince of Wales, to execute a statue to be erected there, and the *Spectator*, one of the ablest English journals, has been sharply criticised for venturing to regret that the commission should not have been entrusted to a native artist, rather than a foreigner. To Mr. Boehm, who is practically an Englishman, the comments of the *Spectator* upon the preference of the royal family for foreigners do not apply with much force; but there is room for serious question whether the cultivation of national, or even of local sentiment, is not a very good thing for art. To take a rather hackneyed example, it is certain that the modernization of Japan has within a few years nearly destroyed what had grown, in a thousand years of seclusion, to be the most brilliant semi-civilized art ever seen in the world, and architecture furnishes many examples of beautiful local characteristics of design and execution, which lose their interest, and become flat and meaningless, as soon as they are modified by foreign elements, or are themselves transferred to a different atmosphere. Amongst us, it must be confessed that the importation of foreign models for imitation has not done much to promote art, and although the study of foreign technical methods has been of the greatest advantage in enabling our artists to express their ideas with ease and certainty, their greatest successes have almost always come to them by the choice of local subjects, which, until human nature is changed, they must approach, whether consciously or not, with a more inward sympathy, and greater resource of feeling and association, than any others. As artistic Barnumism and clap-trap give way in this country before advancing knowledge, the value of local inspiration will become clearer, and it is certainly worth while for those who already understand it to do what they can to communicate their appreciation to others.

A QUESTION is raised by *La Semaine des Constructeurs* which is of some importance in this country as well as in Europe. One of its correspondents in speaking of the items which should be included in the cost of a party-wall, for the purpose of determining the amount that should be paid by a person wishing to use it to support an adjoining building, remarks that, according to the decision of the courts, the owner of the wall is not entitled to include the architect's commission of five per cent as a part of the cost of the wall, half of which the adjoining owner is bound to pay in return for the privilege of using it. This seems to the correspondent, as well as to the editor of *La Semaine*, rather unreasonable, and the latter even goes so far as to say that where the party-walls had been constructed without the intervention of an architect, the owner should still be entitled to add the usual architect's commission, as compensation for the trouble which he had been at in making contracts and supervising the work. As five per cent on the value of half an ordinary city party-wall would be from fifty to a hundred dollars, or even more, it ought to be worth some one's while to settle the question definitely. Although we have heard the point discussed here, we have never seen the architect's percentage specified as an item in the account of the cost of a party-wall. If any one of our readers know of local customs or precedents favoring a different practice, we should be very glad to be informed of them.

THE great annual competition for the Prix de Rome has just opened in the Ecole des Beaux-Arts, and ten candidates have been selected for admission to the final contest. The subject assigned for the competition is a Polytechnic school, and those admitted "*en loge*" are Messrs. Maillart, pupil of M. Guadet; Devienne, pupil of Messrs. Coquart and Gerhardt; d' Espouy, pupil of M. Daumet; Debrie, pupil of M. Guadet; Messrs. André, Lafon and Marcel, pupils of M. André; M. Quatesous, pupil of M. Pascal; M. Louvet, pupil of Messrs. Louvet and Ginain; and M. Defrasse, pupil of M. André. The names are given in the order of their selection. It will be observed that out of the ten "*logistes*" four are from the atelier of M. André, one of the oldest and most renowned of the official ateliers. The competition for the Achille Leclère prize, which is decided about the same time as the preliminary trial of the Prix de Rome, has this year been awarded to M. Georges Chedanne; two honorable mentions having also been awarded to Messrs. Masqueray and Eustache.

SANITARY PLUMBING.[1]—XXII.

DIGEST OF THE EVILS OF TRAP VENTILATION.



Vent and Waste Pipes for Three Fixtures.

FROM what has already been shown, we find that trap ventilation has no advantages, but rather many serious disadvantages.

(I) *Ventilation destroys the seal by evaporation.*

If the ventilating flue connect with the trap at or near its crown, the induced air-current licks up the water very rapidly, and destroys the seal of an ordinary small S-trap in from four to ten days, according to the rapidity and dryness of the current. If the flue connect with the trap at any other point it is powerless to prevent self-siphonage.

When the trap is ventilated on both sides of its seal, as is recommended by some sanitary engineers and plumbers, and as is shown in the initial cut, evaporation may easily destroy the seal of an ordinary small S-trap, under the influence of a hot flue, in a single day. This inner vent has been unwisely recommended for the purpose of preventing the smells from the overflow-pipe from entering the apartment. A much simpler way may be employed, as will be hereafter shown.

We quote the following from a Brooklyn newspaper of late date, to show that the guardians of the Public Health have already begun to experience the inconveniences of the trap-vent law:—"The Commissioner of Health desires to direct the attention of householders to the danger of occupying houses which have been for any considerable time without occupants. It is the practice of many persons to leave their dwellings for several months in the summer, during which time the water in the traps of basins and other fixtures is liable to evaporate and thus permit the unobstructed entrance of sewer-gas into the dwelling. When the families return in the fall they are exposed to these sewer emanations, and it is believed that cases of serious if not indeed fatal, sickness have been due to this cause. Whenever houses are so left provision should be made to have *the traps filled at least every two weeks by a competent and trustworthy plumber*, and if possible to have all the windows of the house opened for twenty-four hours before its re-occupation." The italics are ours. Each house owner is advised, under peril of serious danger to health, to employ some honest and skilful plumber to stand constantly on the alert to undo the damage done by the vent-pipe. We will not calculate here the number of traps owned by the two million inhabitants of New York and Brooklyn, nor the exact size of the army of trustworthy experts which would be required to overhaul the dwellings, for the purpose of attending apparatus designed to be automatic. But, were all the traps ventilated in accordance with the law, it is certain that their refilling would consume infinitely more time than would be required to clean out the same number of unventilated pot-traps as often as their condition required it.

(II) *It does not prevent Siphonage.*

The ventilating flue, even when newly connected in the most approved manner, does not serve its purpose. It forms no reliable cure for the evil against which it was designed, inasmuch as the simple discharge of some forms of water-closet, set in the usual manner, will, under certain conditions which must frequently be met with in plumbing, destroy its power.

A plunger-closet trapped with the ordinary S-trap produces nearly as powerful a siphonic action as a trapless one, though the inertia of the water in the water-closet trap makes a perceptible diminution of force. A reservoir trapped plunger-closet discharged while a bath-tub is running, will destroy the seal of 1¼" cast-lead S-trap with a vent and vent-pipe of new lead *the full size of the bore of the trap in two discharges, even though the vent-pipe be but seven feet long, and newly and properly applied in the most approved manner. If the vent-pipe be over sixteen feet long, it will destroy the seal in a single discharge. An inch-and-a-half S-trap similarly treated will be similarly affected. The conditions under which such siphonage takes place are the simplest ones possible, and liable to occur at any time in a house.* (An illustration showing the arrangement producing it will be given hereafter.)

It has been asserted that if the vent-pipe be connected with the crown of a trap in such a manner that the water shall ascend into the pipe and falling back refill it, the trap will retain its seal under siphonic action. This is equivalent to saying that, if the trap be refilled after siphonage, its seal will be restored, which is a self-evident truth. But unfortunately, the vent-pipe cannot possibly be so placed as to refill the trap after siphonage. The few drops of water thrown up into the ventilating pocket are quickly whisked away through the outlet on their return, even though the vent-pipe be arranged so as to form a prolongation of the body of the trap and so inclined as to direct the returning drops away from the outlet. The writer has made a number of experiments to test this question, and has found such an arrangement of vent-pipe to have little or no effect in retaining or restoring the seal. There is an inward current from the vent-pipe towards the outlet, powerful in proportion to the energy of the siphonic action, and this current prevents the salutary effect so pleasantly predicted.

In the case of large pot-traps the pocket above the outlet will throw back a certain quantity of water into the trap on the side most remote from the outlet mouth where the suction is weakest, as previously described in connection with Figure 69 under the heading of the "Examination of the Action of Fluids in Traps." But with S-traps the case is obviously different, since the power of the suction is uniform throughout.

The experiments on the effects of siphonage hitherto made and published in this country, and with which we are familiar, have been made with pan and hopper closets, and in such a manner as to produce a much feebler siphonic action than is obtained by the use of valve or plunger closets. A pan-closet produces a very slight siphonic action. The pan itself holds less than a half gallon of water. The receiver breaks the force of this small body in falling to the trap. The inertia of the water in the trap largely overcomes what little remaining energy it possesses, so that the discharge produces but a feeble overflowing of the trap, and creates but a very slight disturbance of the atmospheric pressure in the soil-pipe. Even when the bowl of a pan-closet is filled to the brim and emptied, as in the experiments of Col. Waring for the National Board of Health, by means of a plug, the same obstructions to the downfall of the water offered by the sides of the receiver and the inertia of the water standing in the trap, prevent a disturbance at all comparable with that caused by the discharge of valve and plunger closets. The value of a water-closet as a flushing-tank for the drain-pipes is almost exactly proportional to its siphoning power. The investigations of Col. Waring are valuable particularly in showing the siphoning power on branch-wastes of the discharge of bath-tubs into the main soil-pipe, an arrangement extremely common, and in establishing the utmost limit of the siphoning power of the water-closet which is most widely known and used. With the basin filled to the brim and suddenly discharged with a plug, a much heavier siphonic action might have been expected than was obtained, since the action is the nearest approach to that of a plunger-closet. Every precaution seems to have been taken to obtain the strongest action possible with the kind of closet employed, in order to give a truthful statement of its maximum power.

In the very careful and instructive tests made by Messrs. Philbrick & Bowditch, a short hopper-closet, the next in general use to the pan-closet, was employed, and to secure as useful results as possible, the closet was charged with water from a two-gallon pail, in the manner usually done where it is used as a slop-hopper. Such a use of the short-hopper closet forms a far severer test than its ordinary flushing, and it was therefore rightly chosen for these experiments. Nevertheless the action must evidently be far less trying in its effect on traps than the sudden discharge of some valve or plunger-closet. Even if the same volume of water had been used, it is clear that water poured into a hopper from a pail, however adroitly it be managed, can never descend the soil-pipe in so compact a mass as that which is suddenly lowered from a basin by the quick opening of a valve or plunger at its bottom. The results of these experiments prove this to be the case. Much more powerful siphonic action is continually being produced in practice in houses than was given by these tests, and the deductions based upon them as to the efficiency of trap-ventilation must be radically changed. The experiments of Hellyer in England form a far better basis for plumbing legislation, inasmuch as his tests were made with those water-closets and other fixtures in common use in England which produce the severest effect.

(III) *It increases the unscoured area of the trap, making it a cesspool.*

The advocates of trap-ventilation are strangely inconsistent in the very foundation of their arguments. While, for the purpose of avoiding an unscoured chamber, they use a ventilated S in place of the pot-trap, they add to it in an aggravated form, the very thing they sought to avoid, a sediment chamber, which is not only greater in extent of surface, more easily fouled and less easily cleansed than that in the pot-trap, but one which is far more dangerous inasmuch as its fouling, even to a limited extent, involves the destruction of the whole system. This chamber is as certain to become inoperative after more or less use as is any reservoir or cesspool in a trap to become clogged with deposit. It is so placed and of such a form that it must inevitably receive spatterings from the filth-laden waste-water, without benefiting by its scour. The writer has found, by repeated test, that the water discharged from a wash-basin with a large outlet, and trap placed where it should be, near the floor, is thrown up from 10 to 18 inches into the vent-flue at every discharge. Thus a large sediment chamber is formed, which has an area of nearly 100 square inches. Beyond this, congelation of fatty vapor might, and does foul it to an indefinite height. The deposit of sediment may be rapid or slow, according to circumstances. Under some conditions it may be so slow as to be unappreciated for many years, but the very slowness of the process would form one of its dangerous elements. A false sense of security prevents our taking the proper precautions, either for the detection or removal of the deposit when formed. The strangulation of the vent-pipe by any means whatever would, it is true, be the best event that could happen to the unhappy house-owner, provided it involved an immediate removal of the siphonable trap; but

[1] Continued from page 202, No. 435.

unfortunately the siphonage and clogging might not be discovered until it had long been succeeded by the entrance of sewer-gas.

Up to the present time our experience with trap-vents has been very short, but it has been long enough to show us ventilation-mouths completely closed up by these gradual deposits of sediment. Even a very slight diminution of the size of the mouth is by clogging, as we have shown, often sufficient to deprive it of whatever power of resistance to siphonic action it may have possessed at the outset.

(IV) *It retards the flow of the waste-water.*

It diminishes *by one-third* the rate of discharge through the trap of the waste-water, and its consequent scouring effect on the waste-pipes.

(V) *It renders the discharge noisy.*

The air-current sucked in from the vent-pipe, coming in contact

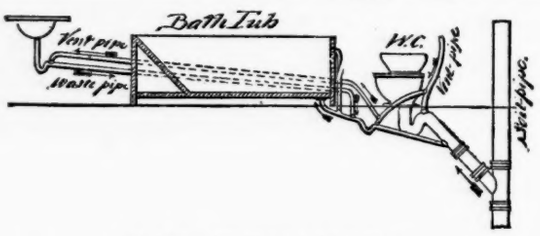


Fig. 127.—Misplacement of Vent-Pipes.

with the water, produces a roaring or loud gurgling sound, which to many forms an intolerable nuisance.

(VI) *It adds to the liability of leakage, both of water and sewer-gas.*

It increases the danger of leakage, by adding very greatly to the

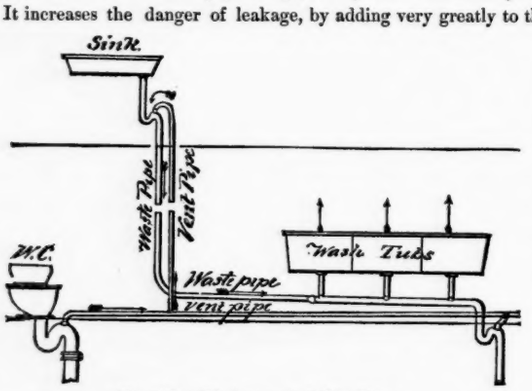


Fig. 128.—Misplacement of Vent-Pipes.

quantity of piping required, and by adding at least *two unnecessary joints* for each trap used.

(VII) *It complicates the plumbing.*

This renders it more difficult to arrange, repair or understand. The proper placing of the vent-pipes often requires considerably more skill on the part of the workmen than is expected of or found in them. The result is a very frequent misplacement of the pipes, which some-

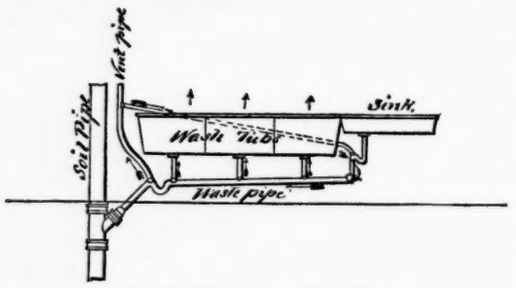


Fig. 129.—Misplacement of Vent-Pipes.

times remains undiscovered by the plumber, and even by the owner, until made known by foul odors or more serious evils.

Figures 127, 128, 129, 130 and 131 illustrate the manner in which this complication leads to evil. The vents in these cases were all put in according to the letter of the plumbing law, and seem at first sight to be correctly placed; but upon closer examination it will be discovered that they are not only themselves utterly valueless as ventilators, but that they destroy the value of all the traps. They form, by their peculiar combinations, open passageways for the entrance of sewer-gas from the soil-pipe into the house. The errors appear to have been brought, after the completion of the work, to the attention of the Board of Health.

We are indebted to the courtesy of the editor of the *Sanitary Engineer* for the permission to reproduce these illustrations. The arrows show the manner in which the sewer-gas may find its entrance by circuitous route into the dwelling. In Figure 127 three fixtures are trapped and vented. The waste-pipe of the wash-basin enters that of the bath-tub inside of the bath-tub trap. Had it entered *beyond* the trap, the difficulty would have been avoided. But inasmuch as it is not unusual, where no vent-pipes are used, to enter short branches on the house side of the trap, the error is not an unnatural one for the plumber to make. It is one which is not easily detected at a glance, and which might never be observed by the house-owner or any one who was not an expert. The warmth of the airin the house and the draught of fireplaces would often be sufficient to create a reversed current in the vent-pipe and produce the movement shown by the arrows. It will be observed that the bath-tub trap is vented on both

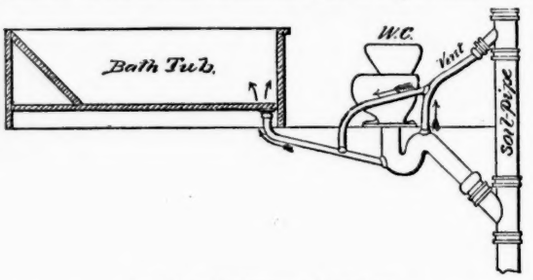


Fig. 130.—Misplacement of Vent-Pipes.

sides. The effect of this is to increase the destructive action of the ventilating current on the water-seal of the trap. An S-trap having the usual depth of seal of $1\frac{1}{2}''$ or $1\frac{3}{4}''$ would lose this seal in a few hours if the current were rapid, or within two or three days with an ordinary current. The water-closet trap being, as shown, larger than the others, a current might easily be formed over the bath trap simultaneously on both sides of the trap.

Figures 128, 129, 130 and 131 give similar examples. In all cases the mistake lay in entering the waste of one fixture on the wrong side of the trap of another. In each illustration one of the traps will be found to have a double action exercising against its water-seal.

The initial cut shows more forcibly the absurd confusion this system leads us to when we attempt to carry it out completely to its logical consequences. We have here the vent and waste pipes for three simple fixtures. Those for the urinal and water-closet have been actually constructed in New York as they are here shown, and even appear to be exhibited with pride by their perpetrators. (See *Sanitary Engineer* for January 3, 1884.) The writer has added a wash-basin ventilated in the same manner. We have here only the waste and vent pipes. When to these we imagine added the necessary hot and cold water-supply and service pipes, we can form a pleasant idea of the condition of things our "branch-waste" ventilating engineers are bringing us to. The wash-basin has the double vent recommended by some of our sanitary engineers and plumbers. The upper vent enters a flue or pipe heated by a steam-pipe, as shown, and has for its object the prevention of smells rising from the overflow-pipe. The urinal and water-closet have similar upper vents conducted into the heated pipe, and lower vents leading to another ventilating-pipe not heated. None of these shallow traps could withstand the action of these strong air-currents more than a few days or even hours. The cold flue would then send back the odors of the soil-pipe into the house, under the influence of the warm-air column therein, and of the suction of fireplaces and heated ventilating flues.

Observe the complication of the plumbing involved by the use of

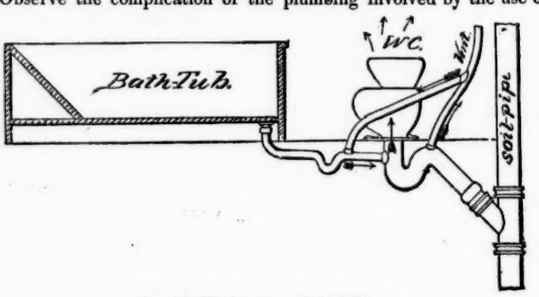


Fig. 131. Misplacement of Vent-Pipes.

these wriggling, intertwining vent-pipes, which, like venomous snakes, creep about, ready to poison the unwary house-owner who unskilfully handles them, with the deadly vapors which they are designed to carry in their bodies. In the economy of nature the serpent is found to serve certain useful purposes; but the trap-vent has none, and should suffer the serpent's curse and be crushed out of existence as soon as possible.

The public are already getting greatly alarmed at the constantly increasing complication of our plumbing. One result of this ridiculous "overdoing" of the thing is, that it throws an undeserved distrust on the whole system of water-carriage, and involves the banishment of plumbing conveniences from many places where their comforts might be enjoyed in perfect safety.

(VIII) *It increases the danger arising from capillary attraction.*

We have already sufficiently shown that the ventilating current in combination with capillary attraction may unseal a trap where the latter alone would be insufficient to do so.

(IX) *It does not prevent corrosion of the branch-wastes, as sometimes claimed, but rather increases it.*

By retarding the rapidity and scouring effect of the waste water on the pipes, sediment collects in these more rapidly than it otherwise would. So long as the mouth of the vent-pipe remains open, the gaseous products of decomposition within the branch-pipes are carried off through the vents. But at the same time, soil-pipe air, laden with still more noxious gases, is conducted through the branch and vent pipes, and exerts on them a corrosive action correspondingly greater, which might have been avoided. The presence of air or oxygen is a necessary condition of corrosion. The air-current induced by ventilation furnishes the maximum of oxygen required. Thus, branch-pipes, which, with an ample scour produced by a rapid rush of waste water through them full-bore whenever used, would contain no appreciable amount of decomposing matter, and, if unventilated, no harmful amount of noxious gas (certainly no more than could readily be absorbed and retained by the water in the trap), will, under the influence of the ventilating current, be filled with the products of decomposition of the soil-pipe itself so far as they exist. They may be small in a well-ventilated soil-pipe, but for obvious reasons they must be greater than in a well-flushed branch-waste.

So much for the condition of things while the mouth of the vent-pipe is unimpeded by sediment; but let sediment collect therein until the air-current is partially or wholly cut off, and we have a surface equally exposed to corrosive action with the unventilated pipe, but *double in quantity.*

(X) *The cost of the plumbing is seriously increased.*

Finally we come to a consideration which may be last to the sanitarian, but is generally first to the house-owner. The cost of special trap-ventilation adds from seven to ten per cent to the cost of the plumbing in new work, and *indefinitely* in repairs or additions to old work. Plumbers sometimes place a much higher estimate on the cost of trap-ventilation for new work than that here given, even estimating it in some cases as high as fifty per cent; but these estimates appear to be exaggerated or very rare, and careful calculation of the number of joints to be made and the amount of pipe used, and the cost of wiping each joint and laying and planning the pipes, will be found to place the figure much nearer those first given. In repairing old work, *i. e.*, putting vent-pipes on traps originally fixed without them, and tearing the floors and finish open to admit the vent-pipe to be carried to the proper height, and the subsequent restoration of the paper, plaster and wood-work, often involves an enormous outlay.

Thus the objections to trap-ventilation are numerous and serious, and those having the matter in charge should bestir themselves to relieve the public of the burden unfortunately imposed upon them by the present plumbing laws before further damage is sustained.

SOME NINETEENTH-CENTURY ARCHITECTS.[1] — IV.

GEORGE EDMUND STREET. — The name of George Edmund Street is one which it is quite impossible to omit, but which I feel I can only deal with in a very general and incomplete manner, so comparatively recent is the date of his decease.

Mr. Street, who was first known as assisting Sir Gilbert Scott in his work, when he began practice on his own account, owed a good deal of his early success, as has always been understood, to the friendship of the late Bishop Wilberforce, then Bishop of Oxford, who appreciated his talents and his energy. The Bishop himself gave him commissions and the post of diocesan architect, and introduced him to work in the diocese. Street soon became known both by his buildings and his draughtsmanship, and it is probable that the wonderful pen-and-ink drawings from his own hand, which he exhibited year after year at the Royal Academy, did not a little to increase his practice; they certainly extended his reputation among architects, and they were mainly instrumental in bringing about the revolution in draughtsmanship which has been witnessed during the last twenty years, and which the invention of photolithography has stimulated. Formerly an exhibition drawing was almost invariably a carefully prepared outline, colored very often by a different hand to that of the outliner, and sometimes, one must admit, tinted without too much regard either to truth or to architectural propriety. Street introduced, or if he did not introduce, he was one of the first to adopt, pen-and-ink etched drawings, outline. features and shading all done by one hand at one time; and he succeeded in imparting to this work a sweetness and evenness of tone and a charm of touch that no other artist has equalled. These drawings seemed often to have been done with a liquid writing-ink of a slightly blue tone, and on a paper with a hard surface. They all bore marks of rapid execution, sometimes of haste; but the drawing of the features was rarely, if ever, distorted, and the air of ease and perfect mastery of the subject, and of the materials, which they displayed, reflected truly enough the conditions under which they were produced.

Street was very faithful in his adherence to pointed architecture, and very successful in adapting it to simple buildings. His small parish churches and his plainer monastic buildings, built under circumstances where outlay had to be restricted, are full of genuine mediæval simplicity; and no one knew better how to raise a structure from the level of a mere barn to that of an interesting domestic building by the skilful use of a few well-designed mouldings and the addition of one or two charming pieces of tracery, introduced exactly where every touch would tell most. His more ambitious works were successful also; but so far as I have had opportunities of judging, it has seemed to me that it was in his simple buildings that he stood unapproached.

Street was an enthusiastic student of his art. The books which he published — "*The Brick and Marble Architecture of Italy*" and his volume on "*The Gothic Architecture of Spain*" — both bear witness to this. Few books exist that are better models of what an architect's note-book on a tour of study ought to be; and there is at least one excellent paper among the *Transactions* of the Institute of Architects, giving an account of the architecture of Auvergne, in Central France, which I well remember hearing him read. It gives an admirable summary of the peculiarities of that interesting region, and it was illustrated by a wonderful series of sketches, the dates on which showed that he must have been extraordinarily rapid as a sketcher.

Street was a man of great energy and unusual self-reliance. His method of working, as is well known, was to put everything in pencil himself, employing his assistants to ink-in and color, or to repeat features of which he fixed the form, and this he adhered to down to his death. The consequence of this, of course, was that all his work is marked by his own peculiarities and qualities to a greater extent than that of most men; but at the same time an amount of labor and wear-and-tear was entailed of which some might have been spared, nor is it too much to say that this method of work helped to kill him before his time.

Street is, of course, best known as the architect of the Law Courts, and in this building the powers of the architect were more severely tried, and a greater opportunity was left open for his ability, than in the case of any other architect whom we have had to mention, with the single exception of Sir Charles Barry. It is too soon yet to anticipate the verdict of the mature judgment of Englishmen generally on the Palace of Justice; but so much has been said against it in some quarters that, without attempting to pass a critical opinion on the building, I may be permitted to point out one or two matters connected with it. The general disposition, which is naturally the first thing that strikes us, is far more the child of the Commission who prepared the scheme for the concentration than of the architect. It should always be borne in mind that in no competition have the requirements been more minutely set forth than in the one which resulted in Street's design being adopted; and the system of isolation, which has been arranged so as to the utmost extent to cut off the judges, the bar, the solicitors, the witnesses, and the general public from one another, is the result of the deliberate judgment of the Commission. It has been a good deal objected to, but it is so different from the unseemly jumbling up of everybody which was witnessed in Westminster Hall that its true effect cannot be appreciated at once, and it will probably be found in the long run advantageous. A more serious ground of complaint arises from the difficulty of reaching different departments, but this is largely due to the fact that far too much accommodation is compressed on to the site for it to be possible that it should be accessible without numerous staircases. Probably the most efficient and serviceable public building in London is the Bank of England, where all the departments are on one level, and where there is hardly such a thing as a staircase or an upper floor accessible to the public. Had sufficient money been spent to enable the architect to spread the courts and their appendages over the whole of the site that has been cleared, instead of concentrating them as has been done, the most serious defects alleged against the structure for business purposes, including in places a want of light, would have to a great extent been obviated.

Of the exterior, which all of you can see for yourselves when you visit London, you are all competent to form a judgment, though I should like to point out that it invites and deserves long and patient scrutiny; but I cannot forbear reminding you, as architects, of the interior, which some of you may not visit, especially the unrivalled vaulted hall, the like of which does not exist in Europe; of the endless variety introduced into the features and roofing of the different courts; of the beauty of the lead lights, carving, metal-work and other decorative accessories; and of the great variety to be met with in the mouldings, capitals, spandrels, strings, and other such features — a variety obtained without any loss of harmony. I ought also to point out what every experienced architect may verify for himself: the economy, I had almost said parsimony, with which such finishings as can be spared — such as skirtings, linings, etc. — are avoided

[1] A paper read by Professor T Roger Smith, at a meeting of the Leed's Society of Architects, and published in the *Architect*. Continued from page 223, No. 437.

in the plain parts of the building, though good material and durable is employed throughout; and the liberality with which, in those parts intended to be rich — as, for example, the courts and the hall — both materials and workmanship are freely employed. I should like also to bespeak your attention to the staircases, picturesque and ingenious; the great *flèche*, which is by far the finest modern structure of this sort of work in England; and especially to the variety and beauty of the vaulting. This mode of roofing dignifies a building more than any other, and in vaulting this great hall Street has done more to render the whole structure monumental than anything else could have accomplished. The vaulting is not, however, confined to the hall, but in many of the corridors and lobbies fine specimens of vaulted construction are to be found, such as it is a pleasure to examine.

The architect of this great work was, as you all know, a member of the Royal Academy and President of our Institute at the time of his lamented death. Street was personally a man of commanding appearance, strongly built, and with an air of vigor and power; he was undoubtedly a leading spirit, and was lost to architecture at a time when his friends hoped that many years of active life, with all the weight of his great influence, might still be left him in which to pursue the profession he loved.

William Burges. — William Burges was one of the greatest artists and best antiquaries whom the Gothic revival produced. He had educated himself with great care and thoroughness for the practice of his profession; he had travelled far and wide; he knew probably as much of mediæval archæology as any Englishman of his day; he acquired a thorough knowledge of jewelers', goldsmiths', and metal-workers' work, of decoration, stained-glass, sculpture, and, in short, of every art or appliance that could contribute to the excellence of a building; he sketched much and measured more, and he had a fertility of invention and a power of design which few have surpassed.

His first great success was won by competitive designs which he and Mr. Clutton sent in jointly for the Cathedral at Lille. These were extremely fine, but probably might not have been successful had not pains been taken to write to them and figure them in French and in French handwriting. The competitors took them over to France, carefully removing all English marks and labels from the package, and the result of these precautions was that, till the adjudication had been made and the envelopes with the names opened, no one had a suspicion that the architect was not a Frenchman. I believe it was from this set of drawings that M. Didron selected a design by Burges to engrave and publish, as being one of the most complete and correct examples of Christian iconography which he could put before the readers of the archæological journal that he issued. Messrs. Clutton and Burges were not, however, so fortunate as Mr. Scott was at Hamburgh; they could not get the cathedral to build, and had to content themselves with the premium.

Work did not at first come in fast, though Mr. Burges's name and fame as an artist gained a great repute. He obtained the first premium in the competition for a memorial church at Constantinople, but difficulties rose about the execution of the building, and this success brought more honor than profit. He executed, however, a good deal of work of importance, such as Cork Cathedral, the Bombay School of Art, the restoration of Cardiff Castle, and of Waltham Abbey, and several churches of great beauty and fine character. The stained-glass that he did was probably the finest that has been done, as he spared no pains either to himself or the glass-painter during the execution of it. Those who know his windows at Waltham Abbey, or in the Chapel of Worcester College, can bear out these remarks. Much of his time and skill was, however, spent upon small articles, such as pastoral staves, cups, cabinets, and the like.

He was chosen, and rightly chosen, as the best known colorist, to design decorations for St. Paul's Cathedral, but the committee had not the courage to carry out his proposals when they got them, and to his great disappointment nothing was done.

William Burges was a strongly-marked personality. He was beloved by many attached friends, and probably no one came into contact with him without being interested and attracted by his strange mixture of fun and earnest, of eccentricity and genius, of work and play. He worked hard and well, but he had an innate cheerfulness that seemed never to flag, and he took and liked to show an interest in many matters which others would consider comparatively trivial. The decoration of his own rooms and furniture, and the collecting and resetting of crystals, gems, cameos, and other such curiosities, as well as armor and other antiquities, was an occupation to which he gave up much time, and in which he seemed to take the most lively interest. As a companion he was bright, cheerful, full of life; but were a matter of art or archæology started, he would pass, without a pause, from playful fun to the soundest criticism, the most enthusiastic admiration of what is excellent, the most learned, and withal, most accurate statement of the archæology of the subject. Burges was below middle height and rather sturdy in figure; he had a bright eye, a frank manner, and a hearty laugh; but no one who looked attentively at him could fail to notice the massive, well-shaped head, and the broad, powerful brow which indicated surely enough that intellectual power of which, though strangers often were not at first led to suspect it, none of his friends were unaware.

I have spoken of Burges's friends; they were numerous, and they were with reason attached. He was a man who could do the kindest acts, and would do them in the most unobtrusive fashion; and the cordial remembrance in which his genial cheerfulness is still held is still mixed with deeper feelings of regret for his loss.

Burges's work was vigorous and massive, and when it erred it was rather on the side of excess of strength and heaviness. His favorite style was twelfth-century Gothic. The best-known, and perhaps the best specimen of his powers of design, is the set of plans which he submitted for the Law Courts. The Strand front of that project exercised a remarkable influence upon the works of contemporary architects, and copies of it, or at least suggestions inspired by it, were frequently to be seen after it had been published.

His decorative work at Cardiff Castle and elsewhere can, of course, be only judged by those who have had an opportunity of seeing it; but his design for St. Paul's, which was exhibited at the Royal Academy, first unfortunately in the form of a decorated model only, and a year later in a splendid set of views, may be known to many, and showed great power and resource and vigorous handling. Burges had only just been elected an Associate of the Royal Academy at the time of his comparatively early and very unexpected decease.

In leaving this little group of personal sketches we ought, I think, to carry away a strong sense of respect for the memory of these men. No one can so well judge as the members of an architectural society like this of the amount of studious preparation for active life, and the constant, unwearied, and strenuous exertion of all a man's powers and gifts, natural or acquired, which was involved in the case of each individual who has been named, in order to enable him to reach the position he attained and worthily to discharge his duties.

Such examples are a stimulus and an encouragement to ourselves in our own work, and a glimpse at a group of them, thrown together even in this fragmentary, imperfect manner, will, I hope, send us all home proud of the profession to which we belong, and of the many distinguished men who have maintained and extended its honor.

THE ILLUSTRATIONS.

NEW APARTMENT, FIFTY-SEVENTH STREET AND MADISON AVENUE, NEW YORK CITY. MESSRS. GILBERT & THOMPSON, ARCHITECTS, NEW YORK, N. Y.

THIS building is of fire-proof construction throughout, on plot 75′ x 200′; ten stories in height; attic for extra servants' quarters; portion of attic for drying-rooms, separated by open wire-work partitions. Contains thirty-five suites of large and medium-sized apartments; two passenger and two service elevators in isolated brick shafts. Staircases of iron and stone encased by brick walls. Fronts of brick, stone and terra-cotta. Total cost, about $550,000.

HOUSE FOR R. JEFFERSON, ESQ., ST. PAUL, MINN. MR. GEORGE WIRTH, ARCHITECT, ST. PAUL, MINN.

HOUSE FOR DR. L. C. WARNER, NEW YORK, N. Y. MR. A. B. JENNINGS, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A COUNTRY HOUSE FOR H. G. DULANY, JR., UPPERVILLE, VA. MESSRS. CABOT & CHANDLER, ARCHITECTS, BOSTON, MASS.

IT is situated on an elevated plateau near Bull Run Mountain in the centre of an estate of five thousand acres. The stone used is a limestone quarried from near the site. The lower part of the house is to be of this stone, and the upper part is to be half-timbered work, with rough-cast panels.

THE STRENGTH AND ELASTICITY OF STRUCTURAL STEEL.

AT the meeting of the American Society of Civil Engineers held May 7, 1884, a paper by James Christie, M. Am. Soc. C. E., on "The Strength and Elasticity of Structural Steel and its Efficiency in the form of Beams and Struts," was read by the author. He said that the various grades of steel possess such a range of physical properties that it is impossible to consider the metal as one might treat of iron.

It is customary to denominate the grades of steel by the percentage of carbon they contain. The higher the carbon, the higher the tenacity of the steel and the lower its ductility. Steel whose carbon is below fifteen-hundredths per cent is conventionally known as *mild* or *soft* steel. The steels subjected to the tests described in this paper were of two distinct grades, *mild* and hard; both being products of the Bessemer convertor, the hard steel having thirty-six hundredths per cent of carbon, and the mild steel twelve-hundredths per cent. The tensile tests were made on strips about 24″ long, to which were clamped plates exactly 12″ apart. The compression tests were made on specimens 12″ long, inserted in a tube, and the space between the specimens and the tube filled with fine sand. The tests on transverse resistance were made on bars of 3″ or

4″ diameter, and on solid flanged beams from 3″ to 12″ deep, all being supported at the ends and loaded in the middle.

Extended tables were then presented of these various tests, and it was stated that the results showed that the elasticity of steel and iron is practically uniform; the steel may stretch less than the iron in tension, but the steel shortens most under compression. Transversely, if there is any practical difference, the advantage in stiffness probably belongs to steel, but the elasticity of both metals is so close and uncertain that further experiments may modify the average results here found. The specimens show that the elastic limits for tensile and compressive stress for the different grades of steel are practically equal per unit of section, and the transverse resistance is approximately proportionate to the longitudinal resistance, and that the strength of the material indicated on tensile stress will serve as a comparative measure of the absolute strength of iron, or of either grade of steel; but as the transverse elasticity is practically alike, beams of iron or of either grade of steel of the same length and section will deflect alike under equal loads below the elastic limits of iron.

Tables were presented of experiments on flat-ended struts of both mild and hard steel. It was stated that the experiments on direct tension and compression prove that the elastic limits of steel of any particular grade are practically equal per unit of section for either direction of stress. A similar equality is known to obtain with iron. Therefore for the short struts, in which failure results from the effects of direct compression, the tensile resistance of the material will serve as a comparative measure of strut resistance. As struts increase in length, the lateral stiffness becomes a factor of increasing importance. The transverse elasticity of steel and iron does not vary much. The tendency will be for struts of steel and iron now, approach equality of resistance as the lengths are increased. Mild steel will fall to equality with iron when the ratio of length to least radius of gyration is about 200 to 1. Hard steel would fall to practical equality at the point beyond the bounds of practice.

This paper, and the paper previously presented by Mr. Christie, giving experiments on the strength of wrought-iron struts, were then discussed.

Mr. A. P. Boller expressed the opinion that the variations in the compressive resistance of iron shown by these very careful experiments were so great that it was impracticable from them, or from any other experiments so far as had yet been made, to prepare a formula which would ever give satisfactory results, and that dependence must be placed upon experimental charts which will express extreme values for all sections progressively determined.

Mr. Onward Bates considered that the experiments developed the great importance of placing the centre line of pressure co-incident with the centre of the struts. If this could be done perfectly, a round-ended strut would be as good as a flat-ended one. In actual practice in the construction of bridges, the methods of securing the ends of such struts are so various that it is impracticable to make from such experiments a table of safe loads. The only safe practice is that of low unit strains corresponding to the lowest results of recorded tests.

Professor E. A. Fuertes considered that the areas of cross-sections should be obtained by direct measurement, instead of deriving them from the weight and length of the bars, particularly when the specific gravity of the material is not determined. The reason why an accurately-centred straight bar behaved as a flat-ended strut when hinged, is due to the friction developed by pressure on the bearing of the hinge, and the early failure of flat-ended struts was probably due to the want of parallelism between the planes at the extremities, or the one or both of these planes being warped surfaces. Since a bar very long in proportion to its radius of gyration fails with a comparatively light load without permanent injury, it would seem proper that such load should be given a name other than ultimate load, the latter being restricted to its bearing on the elastic limit.

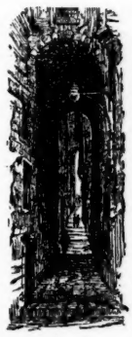
Mr. Theodore Cooper considered the experiments of Mr. Christie most valuable, particularly in carrying out a complete series with different end-connections upon the same class of materials. The paper shows that slight changes in the direction of the lines of applied forces produce great changes in the results. By interchanging different sizes of ball-and-socket joints, it shows the influence of the size upon compressive resistance of the struts. It gives a more complete knowledge of the action of struts of high ratios of length to transverse dimensions than before existed. The method of using the least radius of gyration instead of the least dimension, gives a fair comparison between the various forms.

Attention was called to the relation of the ball and sockets to the transverse dimensions of the struts, and diagrams were presented by Mr. Cooper showing the influence of the size of pins relative to the width of the struts. From the great effect of non-centering the line of applied force upon columns, and of initial, though minute bends in the materials, and the increased influence of possible side blows, it is very important not only to keep the working strains within proper limits, but also to specify a limit to the number of diameters to be used in all columns. In recent specifications this limit has been at about 45 diameters, corresponding approximately to about 120 radii of gyration for the usual forms of bridge columns. With this proviso a practical formula may be reduced to very simple forms.

Mr. E. B. Dorsey presented some comparative tests of iron and steel.

The subject was further discussed by Messrs. Bouscaren, Chas. E. Emery, Pegram, P. Roberts, Jr., Towne and Christie.

AMERICA'S STAINED-GLASS INTEREST.



THERE are about two thousand persons employed in New York and vicinity in the designing and manufacture of stained-glass windows. The glass itself, or pot-metal as it is called, is mostly made in several of the large glass-furnaces of Williamsburg. Judging from the French, German and English windows occasionally imported, the art has made much greater progress in this country than in Europe of late years. It is not here, as in England and France, a revival of the mediæval art of glass painting, but it is practically a new art in motive and effect. If the art becomes permanently established with us it will be due to the efforts of capable artists and architects, such as have created it. They will, however, have to avoid competing with oil-paintings in pictorial effect, for an occasional success by no means makes up for the percentage of failures. The worker in stained glass in the American manner can come much nearer the realization of natural form than the glass-stainer of the Middle Ages, but it will be wise for him to keep always in mind the fact that his work should be mainly decorative, not pictorial.

One of the most attractive departments of the Art Loan Exhibition at the Academy of Design, New York, in aid of the Bartholdi Pedestal Fund, was the small but unique collection of stained glass. There was, strangely enough, only one example of Classic ornamentation in the room devoted to stained glass. It is, perhaps, to be expected that American designers in their efforts to do something entirely new should overlook the obvious fact that the Classic system of ornament, the common property for all time to come of the European race, though so well adapted for mechanical reproduction, never displays all the beauty of which it is capable, unless treated with the freedom of hand-work. Now the manufacture of stained glass is one of the few into which machinery has not as yet entered; every piece of glass has to be cut to shape, and leaded up by hand; accordingly, to those who have known the Greek and Roman patterns only as moulded in plaster, or cast in iron or zinc, or stencilled on our walls, the appearance which they present in stained glass is almost as novel as if they were now for the first time invented, and where can ornamented forms as beautiful be found? Artists of European blood have never ceased to recur to them for every purpose of decoration. We certainly shall not get anything better from Japan, and Gothic ornament has no place in any but Gothic buildings.

It would have been impossible to show at the Academy of Design, even if they were obtainable, the most important windows that have been made in the United States within the last three years. Several are of great size, almost rivalling in that respect the great windows of the French and German cathedrals. The most remarkable in many ways is the window which was made for the Alumni Hall, at Harvard College, by John La Farge. This is in two portions, and represents about a score of young Greek warriors, armed with spears and shields and arrayed with the magnificence which suggests the Greeks of Asia Minor rather than of European Greece. They are led by a standard-bearer whose voluminous crimson flag floats above their heads. The action of these figures is rather exaggerated, the composition is confused, and the drawing bad in many places; as quite a number of hands were concerned in its production, very different degrees of skill are observable in the painted portions. There are also some minor but still important defects. The glass is in many places trebled or quadrupled in thickness in order to get the required depth of tone, the added pieces being leaded up separately, and soldered on to the leads forming the outline of the original piece. Experienced glaziers say that it is only a matter of time for these platings to fall off; the unsupported leads must sooner or later give way from their own weight and that of the glass, and then the window will have to be repaired. Admitting these faults, however, the Harvard window must be allowed to be a splendid piece of coloring, and a remarkable success, when it is considered that it was the first important effort in what is practically a new art.

A window but lately completed for Trinity Church in Boston has similar defects and beauties. Its composition is simple enough, but childish. A single figure of Christ, of heroic size — eleven feet high — is squeezed into a narrow light only three feet across and thirty feet high. The space not occupied by the figure is filled with conventionalized architectural forms borrowed from Byzantine originals. The figure itself is copied, with some alterations which are not improvements, from a drawing by John Bellini; but in the matter of color the window is even finer than the one in the Harvard Alumni Hall. The deepest and most powerful tones of blue, red, yellow, green and purple are brought side by side, as in old missal illuminations, without resulting in discord; indeed, they make a harmony of the grandest kind, which quite overpowers the effect of the other windows filled with French and English glass.

The great rose-window of the Church of the Annunciation at Lynn, Mass., and the window of Jay Gould's mausoleum, at Woodlawn, N. Y., are nearly as striking and effective as those described above. All these were made in New York and Brooklyn, and these two cities turn out three or four times as much stained glass as all the rest of the cities in the Union. There are manufactories in Boston,

Philadelphia, Cincinnati and other places, but the best work is executed in the metropolis, and is shipped thence to every part of the United States and Canada, and to Europe. Wages in all branches of the business are high, and workmen are in demand. A good glass-cutter gets about twenty dollars per week; a good designer and painter from thirty to sixty dollars. Only a superior class of careful and intelligent workmen can be employed. A careless man will waste or break more glass in a week than his wages will cover. There is constant need for the exercise of taste and judgment, and that they are not always to be had is apparent from the abundance of stained-glass windows, which are as disagreeable to the eye as they can be. E.

THE PANAMA CANAL.

THE severance of the Northern from the Southern American continents — that ambitious project by which M. de Lesseps seeks to throw into the shade the fame he so fairly earned by the construction of the Suez Canal — is a work proceeding more slowly than surely towards completion. The statements which are published from time to time in the American, English and especially in the French papers are vague and contradictory, based upon information derived from official sources, and possibly not less confused from that reason. One thing, however, is beyond question, that the difficulties in the way of the undertaking are far greater than the promotors contemplated at the beginning, or, at all events, than they admitted to the public. As the work is being prosecuted chiefly with French capital, and as M. de Lesseps naturally commands almost unlimited confidence with his countrymen, little uneasiness has up to the present time been displayed, but we believe that before very long, when fresh subscriptions are demanded for the prosecution of the work, and when it is realized that the original estimates, both as regards the time and money required for opening of the canal, fall far short of the truth, the present trustfulness of promotors will be exchanged for less easy sentiments. We do not venture to suggest for a moment that M. de Lesseps will make a wreck of his fortunes and of those of his supporters by the failure of the project, but we believe that future success is only possible by a vast expenditure in money, and, unfortunately, in life, on account of the very fatal climate through which the canal passes.

We are not in a position to give very minute details of the present state of the Panama Canal works, but we can place before our readers some of the more important facts obtained during a recent inspection of the works. The line of the canal is divided into twelve sections, and on all of these a great deal has been done in preparatory work, but there is little of actual results to show. A good deal of this preliminary labor has been expended in the construction of buildings, barracks, offices, villas, etc., for the men and staff whose comfort has been studied to the utmost; far more so probably than if an English company had the undertaking in hand.

Some ideas may be gathered of the progress made, and of what remains to be done from the following figures, which refer only to the movement of material, rock, earth-work and dredging. The total quantities to be dealt with are: —

	Cubic Metres.
Dredging	26,913,000
Rock, hard and soft	37,634,000
Earth-work	41,295,000

The amount of material actually removed up to the 1st of March, last, was as follows: —

	Cubic Metres.
Dredging	452,000
Rock, hard and soft	752,500
Earth-work	2,967,000

Thus up to that date one-sixtieth of the dredging, one-fiftieth of the rock-cutting, and one-fifteenth of the earth-work excavation had been done.

Of the six hundred million of francs subscribed for the completion of the canal three hundred have been spent in preliminaries and plant, and one hundred in purchasing and improving the railway, so that there remain two hundred millions for finishing the whole work, which is to be done, according to present expectations, in 1888. But besides the work contemplated at the commencement there are some enormous supplementary additions. The diversion of the Chagres River, and the construction of a dam in connection with this work; ten million additional metres of dredging in the port of Colon; a system of locks at Panama; and we believe a far greater amount of rock-cutting than the sections originally showed. One of the most important of these unforseen works — the regulation of the Chagres River — has not yet been decided on; it will of necessity be an undertaking of great magnitude, not only as regards the dam itself, but on account of the enormous masses of water that have to be dealt with during the rainy season.

During the past year, or rather during the dry season, there were about 12,000 men at work on the excavations, and it is expected that at the end of the year about 25,000 men will be employed, but during the wet months, when operations in many parts of the line are suspended, only from 6,000 to 8,000 men are employed. The prices paid to contractors for earth excavations have been 2*s.* per cubic yard, and the wages paid to the laborer is 5*s.* a day. Although the average work of a laborer with the assistance of the Decauville railway plant employed is from six to eight cubic metres per day of the light friable soil, of which the earth-work is composed, the greater part of the excavation is in rock, where progress is necessarily slow, and under the most favorable circumstances the canal could not be cut, even by employing the maximum number of men available, in anything like the time anticipated, to say nothing of the great supplementary works before alluded to. In reference to one of these — the dam for the Charges River—the engineers are now engaged in making a more complete survey of the Upper Chagres Valley; this will not be completed for some months, and until it is finished the height of the dam, and the sectional area of the deviation canal cannot be determined. It will be remembered that the Panama Canal Company obtained from San Francisco a monster dredger which was to raise 12,000 cubic metres a day, and finish the excavation at Colon in two years. This machine appears to have turned out badly, and we are informed that the buckets, which were too large and too weak, were easily knocked out of shape, while the boulders, roots of trees and other large objects raised, continually choked the delivery-shoot. This dredger was burnt some time ago, and another one has arrived from San Francisco to take its place. Probably the experience gained from the first machine has been put to good use in the second one; the former never raised more than 6,000 metres a day, when working under the most favorable conditions, or fifty per cent of its guaranteed performance. A peculiar feature of these dredgers is the mode in which they are anchored when at work. Two wells pass clear through the hull from the deck, one fore and one aft, and mooring piles that are raised and lowered by windlasses on deck are employed to hold the vessel in the desired position. Only one pile is lowered at a time, so that the dredger is free to swing around it as on a centre. The delivery-shoot of this machine is 150 feet long and 3 feet in diameter, the smallness of the latter dimension accounting for the frequent stoppages that took place from choking up with the stiff blue clay mixed with roots and boulders, which with gravel forms the bulk of the material to be lifted.

By far the greater part of the dredging hitherto done — 452,000 metres — has been the work of the large machine made by Messrs. Simons & Co., of Renfrew, which, with three smaller ones from France, have given great satisfaction. The former has been now steadily at work for some months without any hitch, and raises from 2,400 to 3,200 cubic metres a day. The spoil lifted is dumped into the steam-hopper barge, and deposited at sea, two miles outside the harbor. These take a load of 200 metres, and make from twelve to sixteen trips a day, according to the weather; it is interesting to know that this dredger works easily through the canal bank, with very little preliminary blasting. Along the line of the canal a number of steam navvies have been set to work, but the success attending the operation appears to be very problematical. Fuel is expensive, and repairs which, of course, must be required more or less often, are costly also. They absorb, moreover, the services of a large number of laborers, ten or a dozen to each machine, and it will probably be found that the work can be done more economically by hand. At the same time it must be borne in mind that steam excavating machinery worked under ordinary conditions, and looked after by active and intelligent men, produces very economical results. The conditions ruling the ship-canal works are, however, quite exceptional. At Panama nothing, or practically nothing, has yet been done, but at this end of the line there is a combined dredger and derrick like those which have done good service on the Continent, and were also employed in making the Welland Canal, and four more similar machines are to be started shortly. These drop the material raised at a distance of 220 feet, and as there is no discharge tube there is never any danger of choking.

The foregoing, are, it is true, somewhat scanty particulars of the present condition of the Panama Canal works, but they are sufficient to give some insight to the actual state of affairs. It was officially announced two years ago that the work of excavation had been seriously commenced, the necessary plant, or at least the greater part of it, being then on the ground, and everything in good order to proceed steadily. According to the promises of the promoters the canal is to be completed in four or five years from the present time, but as we have seen only one-sixtieth of the dredging, one-fiftieth of the rock-cutting, and one-fifteenth of the earth excavation had been completed on the 1st of March, last. Moreover, at the present time a most important supplementary work — the Chagres dam — remains unsettled even in principle. All hope then must be abandoned as to the canal being finished by the time promised and for the sum estimated. Indeed the only safe prediction is that with time enough and sufficient funds the undertaking can be accomplished. In all large works the expectations of promoters are more or less falsified by events, and perhaps if it were not for sanguine leaders and a trustful public great schemes would never be carried out at all. But in some cases the difference between anticipations and reality is more marked than

in others, and we have little doubt that the Panama Ship Canal will prove to be an exceptional illustration of this fact.—*Engineering.*

WIND-PRESSURE.

MR. JOHN HOLDEN, for ten and a half years the able and energetic honorary secretary of the Manchester Society of Architects, delivered his inaugural address as president on the 12th ult. As there are several matters referred to by Mr. Holden, of more than passing interest to the profession at large, we give the following extract: —

The Pressure of Wind on Structures.

This subject has scarcely received any attention from either architects or engineers, most of whom seem to have been content to accept the information given in the different text-books, and which is very meagre indeed. The highest pressure named in these books is, I think, 49.2 lbs. on the square foot, and the velocity 100 miles per hour, which is described as a terrible hurricane, etc. This is given in "*Elements of Natural Philosophy*," by W. Marratt, M.A. (1825), and in most of the more recent table books. The original table was, I believe, compiled by Smeaton from his own experiments, and was in use practically unaltered until very recently. Now, while there has of late years been abundant information and records at the different observatories at London, Liverpool, Glasgow, Edinburgh, etc., at which places the finest instruments in the world are to be found (very different from those which were at the disposal of Smeaton), I have been somewhat surprised that so little use seems to have been made of them.

My attention was drawn to the question by reading an article in the London *Times* of October 8, 1878, in connection with the Cleopatra Needle, which had just then been fixed. The article stated that it (the Needle) was "already calculated to bear a strain of 90 lbs. on the square foot, whereas the force of no hurricane is believed to exceed 25 lbs. to the foot." This appeared to me so erroneous that, after waiting some few days to see if any reply was given to it, I wrote a letter which appeared in the *Times* on October 19, 1878, giving records of pressures registered up to 80 lbs. on the square foot in England, and one of 117 lbs. in Australia, and stating that in calculations I had used 90 lbs. as the extreme. This letter created some little excitement for a time, and some curious letters were written in reply, to which it is not necessary to further refer here, as most of them were based upon what appears to me to be a mistaken idea of the action of the wind, which I take to be similar (to a certain extent) in its action to water — that is, the greatest effect is where there is the least resistance. Hence the greatest pressure of the wind is high up above the ground where no obstructions exist, and where, consequently, the velocity is the greatest. As, for instance, at the level of the anemometers at the different observatories where the pressures are recorded, nearer the ground the velocity is less in consequence of the many obstructions which are encountered, including even the friction on the level ground, and we may therefore not feel surprised to find that although very high pressures may be recorded at Bidston (which is very much exposed), a much less pressure is experienced in the streets of Liverpool. The instrument at Bidston is placed at a height of 56 feet above the ground, and 251 feet above the mean sea level. That at Greenwich 56 feet above ground, and 213 feet above mean sea level. At Birmingham 83 feet above ground, and 533 feet above mean sea level. At Edinburgh 30 feet from ground, and 364 feet above mean sea level, and that at Glasgow 40 feet above ground, and 218 feet above mean sea level.

Any of you gentlemen who have, in the course of your practice, found it necessary to go up to the top of a factory chimney, while a reasonably strong wind was blowing, will, I am sure, have noticed the difference between the velocity and force at the top and that at the bottom of the shaft, and it is in this that the judgment of the architect or engineer comes into operation. If you had to build a chimney or tower fifty yards high on Bidston Hill, you should certainly prepare for a pressure of the wind alone at any time exceeding 100 lbs. on the square foot. If you did not do so you would in all probability some morning find the structure down; but if it had to be built in the centre of Liverpool or Manchester, you should discount that pressure to such an extent as in your judgment was advisable.

When I wrote the letter referred to, I certainly did not expect that so much correspondence would have resulted, nor did I expect that the correctness of what I stated would within so short a time be verified in so terrible a manner. You will remember that the Tay Bridge was blown down on December 28th, 1879, and this was so serious a calamity that an inquiry was ordered by the Government, which resulted in a very strong report being made, independently, by Mr. H. C. Rothery, Wreck Commissioner.

Afterwards (July 29, 1880) a committee was appointed by the Board of Trade to consider the question of wind-pressure on railway structures, and to report to it on the subject. This report and particulars were published in a Blue Book — C 3000 — dated 1881, entitled "Report of the committee appointed to consider the question of wind-pressure on railway structures," and it gives a great deal of information collected from the different observatories, from which it appears that the following pressures, amongst others, have been recorded at the dates named: —

Bidston, Liverpool. —

1868.	Feb. 1	70 lbs.	on the square foot.
	" 22	65 lbs.	"
	Dec. 27	80 lbs.	"
1870.	Sep. 10	65 lbs.	"
	Oct. 13	65 lbs.	"
1871.	Mar. 9	90 lbs.	"
1875.	Sep. 27	70 lbs.	"
1877.	Jan. 30	63 lbs.	"
	Nov. 23	63.5 lbs.	"

Greenwich. — The instrument but recorded up to 42 lbs. on the square foot, and between January, 1872, and August, 1878, the instrument recorded the full amount on seven occasions, but of course it is not known what farther pressure had existed at the time.

Glasgow. — The highest pressure recorded is 47 lbs. on March 17, 1861.

Edinburgh. — The limit of the instrument, 25 lbs. on the square foot, was passed many times, but of course the actual pressure was not known.

London. — The instrument is fixed on the Royal Exchange, and is lower than several of the surrounding buildings; hence the full pressure is not received, but here the highest pressure recorded is on November 13, 1877, and reached 20 1-4 lbs. on the square foot.

The report of the committee which is dated May 21, 1881, and was issued in the August following, is generally as follows: —

1. That for railway bridges and viaducts a maximum wind-pressure of 56 lbs. per square foot should be assumed for the purpose of calculation.
2. That when the bridge or viaduct is formed of close girders, and the tops of such girders are as high or higher than the top of a train passing over the bridge, the total wind-pressure upon such bridge or viaduct should be ascertained by applying the full pressure of 56 lbs. per square foot to the entire vertical surface of one main girder only. But if the top of a train passing over the bridge is higher than the top of the main girder the total wind pressure upon such bridge or viaduct should be ascertained by applying the full pressure of 56 lbs. per square foot to the entire vertical surface from the bottom of the main girder to the top of the train passing over the bridge.
3. That where the bridge or viaduct is of the lattice form or of open construction, the wind-pressure upon the outward or windward girder should be ascertained by applying the full pressure of 56 lbs. per square foot, as if the girder were a close girder, from the level of the rails to the top of a train passing over such bridge or viaduct, and by applying in addition the full pressure of 56 lbs. per square foot to the ascertained vertical area of surface of the iron-work of the same girder situated below the level of the rails or above the top of a train passing over such bridge or viaduct. The wind-pressure upon the inner or leeward girder or girders should be ascertained by applying a pressure per square foot to the ascertained vertical area of surface of the iron-work of one girder only situated below the level of the rails or above the top of a train passing over the said bridge or viaduct, according to the following scale, viz.: —
   (*a*) If the surface area of the open spaces does not exceed two-thirds of the whole area included within the outline of the girder, the pressure should be taken at 28 lbs. on the square foot.
   (*b*) If the surface area of the open spaces lie between two-thirds and three-fourths of the whole area included within the outline of the girder, the pressure should be taken at 42 lbs. per square foot.
   (*c*) If the surface area of the open spaces be greater than three-fourths of the whole area included within the outline of the girder, the pressure should be taken at the full pressure of 56 lbs. per square foot.
4. That the pressure upon arches and the piers of bridges and viaducts should be ascertained as nearly as possible in conformity with the rules above stated.
5. That in order to insure a proper margin of safety for bridges and viaducts in respect of the strains caused by wind-pressure, they should be made of sufficient strength to withstand a strain of four (4) times the amount due to the pressure calculated by the foregoing rules. And that for cases where the tendency of the wind to overturn the structures is counteracted by gravity alone, a factor of safety of two will be sufficient.

The above, you will see, is equal to an amount on the square foot far beyond anything which had before been considered necessary; but, in the face of so terrible a disaster as that which gave rise to the inquiry, we must not complain if the authorities issue instructions which go to the other extreme.

This subject is of great importance, in my opinion, as on October 14, 1881, the pressure recorded at Greenwich was 58 lbs., and at Bidston 76½ lbs. on the square foot; and more recently still — on December 11th and 12th last year (1883) — the highest pressure reached at Bidston was at 2.45 A. M., on the 12th, when the instrument recorded 71 lbs. to the square foot. During this storm, you will remember, several factory and other chimneys were thrown down in this district, and other very serious damage caused, and where this was caused to buildings in course of erection a question may arise as to the liability to reinstate.

Additional information can, I am sure, at any time be obtained from those gentlemen who have charge of the different observatories, and who make a special study of the matter. I have at different times been indebted for valuable information to Mr. John Hartnup, Jun., assistant astronomer at the Liverpool Observatory, Bidston.

My object in placing before you this information, which may, however, possibly be known to many of you, is simply to direct attention to a question which must now be considered by those who have to deal with tall structures, and I hope that the time which I have occupied on the subject will not be considered wasted. — *The British Architect.*

AID FOR AERIAL NAVIGATION.— Charles F. Ritchel, of Bridgeport, who tried to invent a flying-machine, will get $100,000 to perfect the invention with from the estate of Maxwell, a millionaire brewer of Milwaukee, who left $500,000 for experiments in aerial navigation, one-fifth of it being specified as for Ritchel's machine. Ritchel will begin experiments on a large scale. — *Exchange.*

THE PLEASURES OF HOUSE BUILDING AND THE COST THEREOF.

THE following humorous lines are taken from one of a series of poetical sketches entitled "Nathan Barlow: Sketches in the Retired Life of a Lancashire Butcher," published in the *Manchester Weekly Times*. Though written in the Lancashire dialect, their meaning makes their reading clear: —

"If e'er aw spend a hawp'ny more o' brass
I' brick an' mortar stuff afore it's built,
Aw'll suffer like a fatted cawf t' be kilt.
'An honest mon's the noblest work o' God'—
So th' poet says — but dostno think it's odd
He's med so few o' th' sort, an' thoose he's med
By th' most o' folk are reckon'd soft i' th' yead?
Aw've seed sich wark, aw'm fain to think it's true,
As th' actor said, 'at 'honesty's a foo'.'

* * * *

They say there's good an' bad i' every line;
There happen is; I know there is i' mine.
If God's med any honest builders, though,
There seems a deal o' mystery wheer they go.
It seems to me they'n getten lost or strayed.
For aw've ne'er come across one yet i' th' trade.
They'n happen bin bowt up like th' china ware
'At's scrambled for becos it's owd an' rare.
Aw think it mun be so, for if aw see 'em,
It's likely t' be as mummies i' th' museum.
Sin 'aw jack'd th' contract up, an' paid mysel',
They'n bin like devils letten loose fro' hell.
There's howdfasts, nails, and screws, if aw've bowt one,
Aw'll lay my life aw've welly bowt a ton;
That plasterer's had as mony bags o' hair
As met ha' plastered six i'stead o' th' pair.
It is no pounds they'n done me on, bu' scores;
That joiner bit me gradely wi' them doors;
They're hung on hinges med to tak three screws,
An' th' dirty wastrel's nobbut put in twos.
An' as for mowlding' — nay, theau needno smile —
If he's had inches, he's had mony a mile.
Some stales your timber, some your lead, or lime;
But th' plumber licks 'em a' at fudgin' time.
He'll put his pot on th' fire to melt his lead,
An' let it stop till th' handle's welly red;
An' then he'll snatch it off — too hot to howd —
An' let it stand to cool it — till it's cowd;
An' then he'll put it on again, an' when
He's look'd o'er th' papper, taks it off again;
An' then he'll potter wi' it on to th' roof,
Bu' what he does theer nob'dy has no proof,
An' th' gaffer doesno care how lung he stays,
As lung's he charges th' time an' someb'dy pays.

* * * *

What aw've bin done on i' my gizzard sticks,
An' th' weight of a' my trespass upo' th' law
Feels asier nor my losses i' my craw.
Now th' on'y grain o' comfort aw con land
Is t' think at th' start aw'd had a bit i' hand."

THE ARCHITECT'S COMMISSION.

TO consider for a moment the principle involved in the system of commission. It is simply a payment for services in proportion to outlay. But the question at once arises: Is outlay a fair criterion of the money value of the services rendered; is it at all times a measure of the skill and labor entailed in the design and supervision of a building? The unanimous answer of the profession has always been that it is not. While it is admitted that as a general rule the five per cent commission is a fair equivalent for large works, it is grievously unequal when the work is small, intricate or difficult. When the custom was first introduced the architect's percentage was charged upon a valuation, calculated from a careful and detailed measurement of the work and materials actually supplied; the architect or his surveyor assessed this value, and it is scarcely exaggeration to say the cost of the buildings under this mode of valuation was at least from ten to twenty per cent higher than by contract tendering. The latter system of charging commissions is said by some to be decidedly more equitable to the employer. It is alleged that he pays for services in proportion to the cost or extent of the work, and that he has the advantage of knowing beforehand the charge that will be made upon so much outlay. For ourselves we have always doubted the advantage or equity of the plan, and we cannot believe that in any other profession or calling the system would be long endured.

Looking at the question either from the architect's side or the client's, the percentage system is not a satisfactory one. The employer's estimate of the architect's services is, as we have said, based on the size of a building; the larger the area covered the more is he entitled to. Cost and size are now made the criteria of the value of the ability that has been expended on the design; they are interchangeable factors. Yet neither cost nor size has any relation to the art, taste, or skill expended, or the labor entailed, for if it had, then the railway engineer would be not too highly paid at a rate of five per cent on the cost of permanent ways, cuttings, and embankments, and railway bridges per mile, in which the working drawings of one mile or one structure may be repeated for the whole length of the line. The architect of a prison or a workhouse costing £50,000 would be no better paid at five per cent than an architect who had designed and carried out for the same sum a church or a mansion at the same rate. We all know, however, the inequality of the two kinds of work. If the designer of a workhouse or a factory is entitled to a percentage of five per cent upon the outlay, the designer of the church or mansion is entitled to ten per cent. The payment by size or by outlay is, therefore, unjust to the architect. We must seek for another criterion in which the education, travel, culture, training of mind and hand, as well as practical acquirements can be brought into the account. The proposal has been made to make the charge on the area or floor-space covered, instead of on the outlay; but unless the rate per square foot, yard or square — whichever unit was adopted — varied to suit the class and intricacy of building, the same objection would hold good.

The schedule acknowledged by the Institute, which is a commission of five per cent on the total cost of the work executed, besides travelling and incidental expenses incurred, except for particular work where skilful labor is mainly concerned, as designs for fittings, furniture and decoration, though it has generally become accepted, is still open to dispute and legal difficulties. Many cases of disputed commission have clearly shown that the legal tribunals are not at all disposed to accept any rule which architects as a body have adopted for their guidance, and that, however valuable professional evidence may be upon the point, the interests of the employer cannot be entirely set aside in these *ex-parte* arrangements made by professional men. This is, however, a side issue of the main question to which we have addressed ourselves. We believe that the commission by the percentage system is in many cases open to objection, and that under the schedule disagreements have arisen and are likely to arise. It is not easy, for example, to decide when a work properly comes under the second clause, or when special circumstances arise which would entitle an architect to charge in some other way. It seems to us a graduated scale of fees for different kinds of buildings, and art design would be more satisfactory, both to the profession and to the public; the scale depending not on the amount of material used, but on that of the skill, ingenuity, art, or taste exercised. These fees could be based upon area of ground floor in ordinary buildings, or upon the actual time expended in the case of intricate designs and decorative works. Or while a graduated scale of percentages may be retained for buildings of certain classes, depending upon their intricacy, a more definite scale of fees might be adopted for designs for decoration, furniture, mosaic or stained glass, ingenious construction, or works involving alteration or intricate detail. In all these latter kinds of work the architect is painfully aware that he has no guiding rule except his own judgment; and if some bases for assessing could be fixed upon, such as time or per day, there could be no objection to architects filling in their own rates, which would, of course, be regulated according to experience or reputation. At present the rules and their exceptions are remarkably devoid of anything like a principle, and the employer is often perfectly at a loss to account in any intelligent way for the method on which his architect's charges are made out. There are, for example, two modes of reckoning commission adopted. Some charge only on all executed work; others on executed and omitted work as well. Special charges for negotiations, surveys, arrangements or interviews respecting party-walls and ancient lights, alterations of design or plan are severally made, and become generally a cause of trouble or litigation. Even the division of the five percentage into certain distinct stages is variously made; while for cases of repetition, as in a terrace of houses all planned alike, the profession and the public would be more satisfied if some better understanding could be come to. We admit the difficulty there would be in laying down a scale of charges for circumstances and conditions which are constantly varying, but there would be no difficulty in agreeing to some basis of assessment upon which all accounts should be made, and the subject is certainly one ripe for discussion that might be considered by a new society. Those who make special agreements with their clients adopt at least a satisfactory mode of charging, and often avoid the disquieting effects resulting from charges misunderstood by the employer, and made with some degree of uncertainty by the architect himself. If the new Society of Architects, about which some persons are talking, is ever formed, we commend this matter to their early consideration. We are persuaded that the public would not be slow to perceive the advantages likely to be derived from employing architects who had made up their mind to abandon a system of remuneration followed by no other body of professional men. Fancy paying lawyers, parsons, soldiers or doctors by a commission on outlay? — *The Building News.*

THE PROPOSED ARCHITECTURAL ALLIANCE.

New York, May 12, 1884.

To the Editors of the American Architect: —

Dear Sirs; — Referring to my letter published in your issue of 10th inst., and your accompanying editorial note, I think I erred in not

making myself clearer. I took for granted that I had said or distinctly implied, that I am opposed to open competitions; in fact, I never under any circumstances perform any professional work without what seems to me adequate compensation; and I consider the schedule of the American Institute of Architects as a basis only for computing the minimum. I have engaged in select paid competitions, and under proper conditions your proposed league would abolish all others. The point I wished to make is, that this must be accomplished by the individual action of architects of standing, and cannot be accomplished by the means you propose, for the very plain reasons I gave.

That you humorously made much that was unintended out of my use of "*soi disant*" hardly prevents its being taken in the sense I intended, viz.: that there are a large number of persons in the United States calling themselves architects who are not entitled to any consideration as such. That their work is not valuable, and should not be paid for. In short, could some means be devised for creating architects at least as efficacious as the legal restrictions now protecting the professions of medicine, and of law, there would be no need of such a league as you propose. There are some members of the profession who go farther than I, and do not engage in competitions of any kind, and there is much to be said in favor of such a position.

I would add that you touched the key to the whole matter in saying that the object of competing is to make money. An individual who follows a profession primarily to make money is a foregone failure. No healthy conditions can exist until the profession consider their work only incidentally as a means of livelihood. This would make adequate compensation more than ever imperative.

Yours, etc., ALEX. F. OAKEY.

[EVER since the birth of the architectural profession, properly so-called, in this country "architects of standing" have endeavored to bring under proper control by the force of *moral suasion* the conduct of public and private competitions, and they have failed more signally in this country, than has the more influential body of "architects of standing" in England. In time, moral suasion and example might effect the desired reform; but in this country where all is push and hurry, where the man — even if he be an architect of standing — who attends most closely to his own selfish objects is unquestionably the most successful, not only from a mercenary, but also from an art-point of view, there is small hope that the reform will become operative for many generations. The principle of getting the most, if not the best, for one's money is too deeply ingrained in the American nature to be uprooted by moral forces only. We believe that the time has come when moral can be re-enforced advantageously by physical agencies, and it is the establishment of such agency that we hope to effect. Mr. Oakey seems to apprehend that our endeavor is to apply discipline within the lines of the profession, whereas architects will only be affected indirectly, the discipline being laid on the shoulder of the other party, the party formulating the improper conditions of the competition.

The working of our scheme might be somewhat as follows: Suppose the proposed alliance to be formed, and that all "architects of standing" and all "*soi disant* architects" who are not absolutely "shysters" to have given their adherence to it. Then suppose a programme of competition improperly formulated falls into the hands of one of the subscribers, who reports it at once to the Secretary of the Alliance, who would probably receive many similar complaints from other subscribers. This official then would address to the offending committee a polite letter of remonstrance and instruction, enforced by the statement that the reputable architects — the bulk of the profession as shown by the accompanying printed list of names and addresses — would not take part in the competition under the original terms, and that unless they wished to knowingly put themselves at the mercy of "shysters" and improperly equipped draughtsmen, they would do well to modify their conditions. We believe it would be rarely that such quiet remonstrance would pass unheeded, and we do not see how it could offend the nicest sense of honor of any subscriber. We also believe that the ordinary committee offends through ignorance and not through malice, and would not unwillingly yield to the force of circumstances.

We must say one word about the "*soi disant* architect" as we understand Mr. Oakey's use of the term. It is regretable, for the best interests of the art, that all architects are not as capable and as highly educated as the best; but as in all other professions there must be men of many grades of proficiency, and as usual the average is but a low one; though the force of civilization and progress is constantly elevating it. The men of the lower grades are certainly not to be despised nor even pitied, but rather to be treated with unusual respect; for when their original lack of education, the adventitious force of circumstance surrounding their early years, and perhaps certain weaknesses in their artistic natures are taken into consideration, we believe that their actual performance outranks in comparative merit the work of the leading architects. We can assure our readers that when in the course of routine we find ourselves constrained to reject the offerings of such men we do so with very marked feelings of sympathetic regret, as we can always respect the product of conscientious endeavor. — EDS. AMERICAN ARCHITECT.]

EFFLORESCENCE ON BRICKWORK.

BOSTON, May 9, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In the new edition of "*Foundations and Foundation Walls*," by Geo. T. Powell, I see he attributes the incrustations or salty stains on brick exteriors to the sulphate of magnesium in the lime, and he advises that both limes and cements should be used which are free from magnesia and soda; and also, that clays from which bricks are made are liable to contain both of the above precipitates. Can you positively state what limes and cements there are which are known to commerce, that do not contain either of these salts. Respectfully, GEO. F. LORING.

[THE architect would lead a hard life who should require himself to see that no material was used in his brick walls which contained soda or magnesia, especially as the clay of which the bricks are made on the sea coast is quite as likely as the lime to contain soda. Of limes and cements which are free from those ingredients the number is very few. Probably the richest plastering limes, such as Rockland, Canaan, and the marble limes of New York State, would be practically free from them; and one brand of English Portland Cement, that known as White's, is said to be free from either soda or magnesia, while the best German sorts contain the latter only, and in very small proportion. All American and foreign natural cements contain magnesia, most of them in very large quantity, and all, or nearly all, contain a considerable amount of potash or soda, or both.

As the incrustations on walls, however, are quite as often composed of something else as of sulphate of magnesia, the avoidance of magnesia in the bricks and mortar would be by no means a certain cure for them. The best preventative is care to guard against all soakage of water into the interior of the walls, both while building and after completion; and if to this precaution is added another, that of putting a liberal dose of oil in the mortar, there will be little danger of disfigurement from efflorescence. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

DISCOVERY OF AN EGYPTIAN NECROPOLIS. — The *Times* says that Professor Maspero, the French Egyptologist, has discovered at Ekmeen the ancient Khemis (the Panapolis of the Greeks) between Assyat and Thebes, an immense necropolis, which dates from the Plamoch period. Five catacombs have so far been opened. These yielded one hundred and twenty mummies. The sites of one hundred similar catacombs are still intact. It is believed they contain as many as six hundred mummies. A large harvest of papyri, jewels and funeral treasures is expected.

DURABILITY OF ENGLISH OAK. — The durability of English oak is well illustrated in a recent discovery of an old corduroy road crossing the vale of the Ancholme at Coal Dike End, near Brigg, Lincolnshire. It has been found about seven feet below the surface of the land in excavating clay for brick-making. It consists of massive beams of oak laid transversely and fastened into the soil below by oak pins, or stakes, in the ends. The age of this work in timber is enormous, for the present surface of the land has undergone but little change since Roman times. Archæologists who have examined this roadway associate it with neolithic man, in other words, with a period beyond historical data.—*Timber Trades' Journal.*

THE PORTE ST.-DENIS, PARIS.— One of the historic monuments of Paris, the Porte St.-Denis, is at the present moment in a very bad state of repair, portions of the fine bassi-relievi and other ornamental work being literally crumbling away. It seems almost incredible, but it is nevertheless true, that the fact of the edifice being crowned with the statue of the Grand Monarque is likely to stand as an obstacle to its immediate repair. The Municipal Council objects to the outlay of money on anything monarchical, even though it be the monument of a glorious period of national history. The St.-Denis arch was erected in 1672 by the city of Paris from the designs of Blondel, and in commemoration of the conquests of Louis XIV. The only inscription is the words "Ludovico Magno" on the principal façade. It is to be hoped that a compromise may be arrived at with the Council, whereby the king's statue might be relegated to some museum as a sacrifice to the fervid republican zeal of that body, which would then give orders for the restoration of the remainder of the monument. — *The Architect.*

MOVING A BRIDGE BODILY. — A novel as well as interesting piece of engineering work has recently been accomplished at Bristol, England, which consisted in the moving of a foot-bridge 134 feet in length, bodily, down the river a considerable distance. The pontoons by means of which the bridge was floated to its new position consisted of four 80-ton barges, braced together so as to form one solid structure 64 feet in width, and were placed in position soon after the tide commenced to rise. At 6 o'clock a. m. the top of the stages, which was 24 feet above the water, touched the under part of the bridge, and in a quarter of an hour later both ends rose from their foundations. When the tide had risen four feet the stage and bridge were floated to the new position, when at 8.30 the girders dropped on to their beds. — *Iron Age.*

DISCOVERY OF A ROMAN ALTAR IN ENGLAND. — Under the church of St. Swithin, at Lincoln, England, was lately found a small stone altar, evidently belonging to a temple which had occupied the same site. Professor Hübner, of Berlin, assigns the relic to the end of the second or beginning of the third century. The inscriptions on the altar are peculiarly interesting, for the reason that they reveal the existence, in the days of the Roman occupation of England, of a religious official concerning whom there is no other information — the *curator ædiculæ* or temple warden. The altar was presented to the temple by C. Antistius Frontinus, a soldier who had thrice held that office. — *Exchange.*

LIGHTNING-CONDUCTORS.—M. A. Callaud has communicated to the French Academy of Sciences a new modification of the cable lightning-conductors, such as are made by him for the French Ministery of War. Hitherto the conductors have terminated in holes filled up with coke, but this arrangement, which is good enough if the cable is intact, is defective when oxidation attacks the copper. Doubtless the copper, coke and moisture form a voltaic combination resulting in corrosion of the metal, and hence the coke-packing of a copper lightning-rod "earth," though recommended by a recent learned commission on the subject, is not quite satisfactory. M. Callaud adopts the following plan: each wire of the cable is surrounded with hemp impregnated with white lead, or with minium. These served wires are wound or cabled round a central naked copper core or wire, which has no need to be protected. The whole cable is then wound with linen or tape impregnated with white lead or minium. This makes a protective covering for it. M. Callaud's plan is no doubt a good protective of the conductor itself from oxidation, but we fail to see how the local voltaic action is to be prevented between it and the coke, unless the minium, being a conductor, serves to shield the metal frem electric corrosion while allowing the conducting contact with the carbon or coke to be established.— *Engineering.*

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.]

297,970. Miter-Box. — Jos. Cashin, Washington, D. C.

297,971. Manufacture of Artificial Stone and Marble. — Henry Adolphus Daniels, Yonkers, N.Y.

297,972. Ventilating-Flue Cap. — Henry Lawrence Day, Minneapolis, Minn.

297,979. Dividers. — Rowland Folger, Milford, Mass.

298,018. Paint-Can. — Edwin Norton, Chicago, Ill.

298,026. Method of Manufacturing Artificial Stone. — Michael B. Randle and Benjamin E. Turner, Statesborough, Ga.

298,027. Joiner's Clamp. — Fritz Restorff, Chicago, Ill.

298,029. Tap-Wrench. — Nelson Sawyer, Hartford, Conn.

298,038. Compasses. — Wm. Stromberg, St. Louis, Mo.

298,043. Wrench. — Nathaniel W. Vandegrift, Bridgeport, Conn.

298,045. Sewer-Trap. — Thomas Watkins, Portsmouth, N. H.

298,059. Curved Pipe. — John Francis Bennett, Pittsburgh, Pa.

298,080. Electric Bell and Annunciator. — John D. Gilchrist, Ishpming, Mich.

298,091. Deodorizing and Antiseptic Water-Closet Cover. — Frederick H. Hubbard, Brooklyn, N. Y.

298,106. Sash-Fastener. — Robert McCabe, Meadville, Pa.

298,115. Saw. — Harvey W. Peace, Brooklyn, N. Y.

298,122. Sash-Cord Fastener. — S. Howland Russell, New York, N. Y.

298,129. Adjustable Shelving. — Henry Francis Stocking, Macon, Mo.

298,132. Stone-Dressing Machine. — Nelson J. Swayze, Cottonwood Falls, Kans.

298,137. Burglar-Alarm. — Robert G. Vassar, New York, N. Y.

298,138. Paint-Distributer. — Liberty Walkup, Rockford, Ill.

298,163. Fire-Escape and Water-Conductor. — Virgil W. Blanchard, New York, N. Y.

298,166. Paint-Brush. — John Francis Bowditch, Revere, Mass.

298,170. Window-Blind. — Hugh Brotherton, New York, N. Y.

298,184. Derrick. — Charles T. Day, Newark, N.J.

298,187. Elevator. — William J. M. Dobson, New York, N. Y.

298,225. Bench-Vise. — Wm. H. Northall, Bridgeport, Conn.

298,227. Fire-Proof Floor and Ceiling for Buildings. — James O'Friel, Brooklyn, N. Y.

298,242. Electric Annunciator. — Paul Seiler, San Francisco, Cal.

298,262-263. Hydraulic Ram. — Jacob Bloom Yeagley, Indianapolis, Ind.

298,266. Fire-Escape. — Charles Bingley Anderson, Maysville, Ky.

298,282. Fire and Water Proof Material for Roofing, etc. — Charles F. Brigham, Worcester, Mass.

298,292. Fire-Escape. — Charles R. S. Curtis, Quincy, Ill.

298,294. Pipe-Wrench. — James Doyle, New York, N. Y.

298,300. Flooring. — Daniel Ham, Iowa City, Ia.

298,310. Water-Closet. — Charles F. Pike, Philadelphia, Pa.

298,331. Elevator. — Charles A. Youngman, Louisville, Ky.

SUMMARY OF THE WEEK.

Baltimore.

Warehouse. — George Archer, architect, has prepared drawings for the Johns Hopkins Hospital for a four-st'y and basement warehouse with tower, 100′, to be built on the triangular lot fronting 115′ on Lombard St., 14′ on Hanover St., and 122′ on Uhler's Alley, to be built of brick with stone-finish, and to cost from $25,000 to $30,000; John Haswell, builder.

Hospital. — The Presbyterian Eye and Ear Hospital are to have built a three-st'y and mansard brick, stone, and terra-cotta hospital, 57′ x 63′, on Baltimore St., bet. Lloyd and Exeter Sts., and to cost $15,000; from designs by Chas. L. Carson, architect; Philip Walsh & Sons, builders.

Building Permits. — Since our last report forty-six permits have been granted, the more important of which are the following: —

F. J. Blake, three-st'y brick building, e s Valley St., bet. Chase and Biddle Sts.

Thos. S. Whittle, three-st'y brick building, n s Preston St., e of Harford Ave.

M. B. Bellingslea, three-st'y brick building, n s Preston St., e of Harford Ave.

Henry Schneider, three-st'y brick building, s e cor. O'Donnell and Potomac Sts.

Presbyterian Eye and Ear Hospital, four-st'y brick building and mansard, s s Baltimore St., bet. Lloyd and Exeter Sts.

L. F. Bowers, Sr., 14 three-st'y brick buildings, n s Lanvale St., bet. Greenmount Ave. and Carter Alley; and 8 three-st'y brick buildings, w s Greenmount Ave., n of Lanvale St.

John Hendman, three-st'y brick building, e s Valley St., bet. Biddle and Chase Sts.

L. German, three-st'y brick building, e s Valley St., bet. Biddle and Chase St.

C. Hesselbaugh, three st'y brick building, s w cor. Aisquith and Preston Sts.

J. Frank Buzby, 2 three-st'y brick buildings, e s Warner St., bet. Hamburg and Henrietta Sts.

J. Francis McShane, three-st'y brick building, s s Chase St., w of McKim St.

Bernard Burns, three-st'y brick building, s s Chase St., w of McKim St.

John Kuper, 12 two-st'y brick buildings (sq.), n s McHenry St., bet. Carey St. and Woodyear Alley.

Fred'k Burger, 12 two-st'y brick buildings, n s Federal St., bet. Barclay St. and Falls Alley; and 12 two-st'y brick buildings, s s Federal St., bet. Barclay St. and Falls Alley.

Stephen Little, 6 three-st'y brick buildings (sq.), n s Wilson St., bet. Pennsylvania Ave. and Boulder Alley.

Boston.

Building Permits. — *Brick.* — *Huntingdon Ave.*, cor Rogers Ave., Ward 22, for Chas. Haynes, heirs, tenement, 56′ x 90′, five-st'y; John W. Rollins, builder.

Tremont St., Nos. 848-858 cor. Northfield St., for T. J. Eldridge and N. Bradlee, armory and stores, 60′ x 81′ and 92′, two-st'y flat; D. E. Potter, builder.

East Fifth St., near H St., Ward 14, for Perkins Institution and Massachusetts School for Blind, 5 dwells., 20′ 6″ x 33′, two-st'y flat; Lyman Locke, builder.

West Newton St., Nos. 254-258, Ward 11, for T. J. Whidden & Co., 4 dwells., 24′ x 47′, two-st'y mansard; T. J. Whidden & Co., builders.

Florence St., near Brown Ave., Ward 23, for Boston & Providence R. R. Co., passenger-station, 30′ x 70′, one-st'y pitch.

Commonwealth Ave., No. 291, Ward 11, for W. H. Allen, dwell., 22′ x 65′, three-st'y mansard; D. Connery & Co., builders.

Columbus Ave., Nos. 237-241, cor. Morgan St., Ward 11, and *Columbus Ave., Nos.* 243-247, for James S. Stone, 2 dwells., 50′ x 80′, four-st'y flat; G. W. Pope, builder.

Commonwealth Ave., No. 282, Ward 11, for Alexander Moseley, dwell., 27′ 2″ x 62′, three-st'y flat; L. P. Soule, builder.

Newbury St., No. 247, Ward 11, for A. J. Webster, dwell., 25′ x 58′, three-st'y flat; Vinal & Dodge, builders.

Boylston St., Nos. 415-425, Ward 11, for George Wheatland, Jr., & C. A. Dodge, 6 dwells., 22′ x 42′, two-st'y mansard; Vinal & Dodge, builders.

Wood. — New Heath St., No. 42, cor. Bromley St., Ward 22, for Peter Tobin, dwell. and store, 30′ x 38′, three-st'y pitch; Peter Hutchinson, builder.

Bromley St., No. 6, Ward 22, for Peter Tobin, dwell. and store, 23′ x 30′, three-st'y pitch; Peter Hutchinion, builder.

Cambridge St., opposite Lincoln St., Ward 25, for Rufus Prescott, blacksmith-shop, 24′ x 30′, one-st'y pitch; D. O'Connell, builder.

Foundry St., rear Old Colony Yard, Ward 13, for Old Colony Railroad Co., offices, 36′ x 37′, two-st'y flat.

Waumbeck St., near Wabon St., Ward 21, for Neil McNeil, dwell., 26′ and 29′ x 43′, two-st'y pitch; McNeil Bros., builders.

Poplar St., near Washington St., Ward 23, for Stephen Bearse, dwell., 28′ x 32′, two-st'y pitch; Stephen Carter, builder.

Parker St., Nos. 596 *and* 598, Ward 22, for Ernan Nathan, 2 dwells., 30′ x 35′, three-st'y flat; Gottlieb Merz, builder.

Prentiss St., No. 79, Ward 22, for Ernan Nathan, dwell., 30′ x 35′, three-st'y flat; Gottleib Merz, builder.

Custer St., cor. Woodman St., Ward 23, for James Mahan, dwell., 12′ x 18′, and 22′ and 26′ x 30′, two-st'y pitch.

Bowen St., No. 167, Ward 13, for Hugh Giblin, dwell., 22′ x 32′, three-st'y flat; H. J. Hutchinson, builder.

Gilbert St., near Centre St., Ward 23, for J. A. Marchbank, dwell., 12′ x 14′ and 17′ x 28′, two-st'y flat.

Washington St., rear, w of Tone St., Hills Station, Ward 23, for Theresa Colman, dwell., 21′ x 25′, one-st'y pitch; Thomas J. Tobin, builder.

Rutledge St., near Wren St., Ward 23, for H. Farrington, dwell., 30′ x 38′, two-st'y pitch; W. S. Mitchell, builder.

Wabon St., No. 17, rear, Ward 21, for Mrs. L. C. Williams, stable, 20′ x 25′, one-st'y pitch.

Edgewood St., No. 57, cor. Blue Hill Ave., for Daniel A. Johnson, stable, 16′ x 20′, two-st'y flat; H. J. Bartlett, builder.

Rutherford Ave., nearly opposite Furbush Court, Ward 4, for Henry E. Wright, stable and mechanical building, 30′ and 40′ x 50′, two-st'y pitch.

Walk Hill St., near Walk Hill Ave., Ward 23, for John C. Conway, dwell., 21′ x 31′, two-st'y pitch; T. J. Tobin, builder.

Central Ave., rear, cor. Orange St., Ward 23, for Adam Schuster, stable, 10′ x 14′, one-st'y pitch.

East Sixth St., near H St., Ward 14, for Boston Cordage Co., storage, 40′ x 80′, two-st'y flat; P. F. McGaragle, builder.

Main St., No. 387, Ward 4, for Andrew Cullen, store, 28′ x 30′, one-st'y flat; John Hayes, builder.

East Fifth St., No. 525, rear, Ward 14, for James V. Devine, stable, 23′ x 25′, two-st'y flat; James V. Devine, builder.

Columbia St., No. 17, Ward 4, for John Fisher, cooper-shop, 18′ x 35′, one-st'y pitch.

Westminster Ave., rear, near Washington St., for Elizabeth M. Surell, stable, 24′ x 24′, one-st'y pitch; Geo. W. Adams, builder.

Shamrock St., near Dorchester Ave., Ward 24, for Lawrence Gilligan, dwell., 18′ and 23′ x 25′ 6″, two-st'y pitch.

Worthington St., Ward 22, for J. J. Kennedy, dwell., 20′ x 53′, two-st'y flat; McDonald & Tobin, builders.

Colony St., Nos. 24 *and* 26, Ward 13, for Frank Campbell, 2 dwells., 20′ x 35′, three-st'y flat; Michael Driscoll, builder.

Pratt St., near Linden St., for Isaac Pratt, Jr., dwell., 20′ and 26′ x 30′, one-st'y pitch; W. B. Cameron, builder.

Longwood Ave., No. 16, Ward 22, for M. & M. Kearns, storage, 21′ x 30′, one-st'y pitch; Madder & O'Brien, builders.

Fuller St., near Dorchester Ave., Ward 24, for J. E. Gallagher, dwell., 17′ and 23′ x 31′, two-st'y pitch; J. E. Gallagher, builder.

Cottage St., No. 13, Ward 3, for Claus Jensen, dwell., 18′ 6″ x 20′ 10″, two-st'y flat; Phillip E. Cassidy, builder.

Longwood Ave., No. 73, rear, Ward 22, for L. Moran, dwell., 25′ x 35′, three-st'y flat.

Lyndeboro St., No. 25, Ward 5, for Silas W. Bralay, dwell., 19′ 10″ x 53′, three-st'y flat; Chas. E. Ricker, builder.

School St., near Taft's Pl., Ward 23, for M. M. Hurbert, dwell., 16′ x 17′ and 22′ x 28′, two-st'y pitch; E. A. Carter, builder.

Kensington St., near Parsons St., Ward 25, for C. A. & D. S. Philbrick, 2 dwells., 14′ and 20′ x 41′, two-st'y pitch; Pierce Quirk, builder.

Caroline Ave., near Lee St., Ward 23, for Joseph Rowe, 3 dwells., 20′ x 28′, two-st'y pitch; M. H. Fossett, builder.

Milville Ave., near Unnamed St., Ward 24, for G. M. Mansfield, dwell., 28′ 3″ x 35′ 9″, two-st'y hip; Willard A. Goodwin, builder.

Wheatland Ave., near Washington St., Ward 24, for A. W. Burrell, dwell., 24′ and 27′ x 34′, two-st'y pitch; A. H. Pierce, builder.

Chickatawbut St., near Plain St., Ward 24, for G. D. Hayward, dwell., 12′ 6″ x 23′ and 16′ x 26′, two-st'y pitch.

Gilbert St., cor. Wyman St., Ward 23, for Ernest Reganstein, dwell., 34′ 3″ x 39′ 10″, two-st'y pitch.

Smith St., nearly opposite Walter St., Ward 23, for John Pearce, dwell., 30′ x 34′, two-st'y pitch; W. S. Mitchell, builder.

Alger St., near Dorchester St., Ward 15, for John Thompson, mechanical-building, 20′ x 23′, one-st'y flat; John Thompson, builder.

Woodward Park, near Howard Ave., Ward 20, for Robert F. Piper, stable, 23′ x 40′, one-st'y pitch; Thos. C. Piper, builder.

Kensington St., rear, near Parsons St., Ward 25, for C. A. & D. S. Philbrick, stable, 10′ x 28′ and 20′ x 28′, one-st'y pitch; Pierce Quirk, builder.

Harbor View St., near Newport St., Ward 24, for Jas. A. Young, stable, 16′ x 18′ and 16′ x 20′, one-st'y pitch; D. W. Cray, builder.

Pearl St., No. 100, Ward 4, for Catherine Barnes, dwell., 19′ 6″ x 24′, three-st'y flat; G. W. Starbird, builder.

Medford St., cor. Pearl St., Ward 4, for Catherine Barnes, dwell., 24′ and 29′ 6″ x 36′ 4″, three-st'y flat; G. W. Starbird, builder.

Brooklyn.

Society Building. — The Union for Christian Work has under consideration a plan to raise $50,000 to erect a building of its own.

Building Permits. — *Hoyt St.*, s e cor. Carroll St., four-st'y brick store and tenement, tin roof; cost, $9,500; owner, Henry Menken, West St., s e cor. Vestry St., New York; architect, Charles Rentz, Jr.

Myrtle Ave., n e cor. Marcy Ave., four-st'y brick store and tenement, tin roof; cost, $11,000; owner, John H. Lubber, on premises; architect, A. Hill; builder, James A. Thompson.

Warren St., s s, 75′ w Smith St., two-st'y brick store and tenement, tin roof; cost, $4,975; owner, Jos. Perduzi, Avenue C, New York; architects and builders, M. Freeman's Sons.

Eleventh St., s s, 325′ e Fifth Ave., 3 two-st'y and basement brick dwells., gravel roofs; cost, each, $4,000; owner and mason, Wm. Corrigan, 223 Eleventh St.; architect and carpenter, Thomas Corrigan.

Hoyt St., e s, 19′ s Carroll St., four-st'y brick tenement, tin roof; cost, $8,600; owner, H. D. Eastman, 1292 Dean St.; architect and carpenter, J. T. Mills; mason, H. O'Brien.

North Eighth St., n e s, 100′ s e Third St., four-st'y frame tenement, tin roof; cost, $6,000; owner, Wm. Kemple, 341 First St.; architect, F. Weber, builder, J. Fallon.

Harmon St., Nos. 21-27, n s, 100′ w Evergreen Ave., 4 two-st'y frame dwells., tin roof; cost, each, $3,000; owner and builder, Conrad Guthardt, 25 Elm St.; architect, Th. Engelhardt.

Harrison St., s e cor. Van Brunt St., two-st'y brick dwell., tin roof; cost, $3,200; owner, R. Costello, 108 Woodhull St.; builders, M. Gibbons & Son.

Walcott St., s s, 225′ e Conover St., 2 four-st'y brick tenements, tin roof; cost, each, $8,500; owner, Meyer Rosenstalk, Van Brunt cor. Walcott St.; architect, M. S. Morrill; builders, P. R. Kelly, and W. Zang.

Eleventh St., w s, about 100′ n South Third St., four-st'y brick tenement, tin roof; cost, $10,000; owners, John and Wm. G. Murphy, Union Ave. cor. Stagg St.; architect, E. F. Gaylor.

Newell St., No. 111, w s, 95′ s Norman Ave., four-st'y frame tenement, tin roof; cost, $6,000; owner, Balthasar Drexel, 146 Norman Ave.; builder, Thos. Engelhardt.

Nassau Ave., No. 157, n s, 75′ w Diamond St., four-st'y frame tenement, tin roof; cost, $6,000; owner, Balthasar Drexel, 146 Norman Ave.; architect, Th. Engelhardt.

Greenpoint Ave., n s, 85′ e Franklin St., four-st'y brick tenement, tin roof; cost, $9,000; owner, John Bopp, Greenpoint Ave.; architect, James Mulhaull; builders, James Rooney, and James Doig, Jr.

Chauncey St., No. 166, s s, 350′ w Patchen Ave., two-st'y frame tenement, tin roof; cost, $2,500; owner and carpenter, F. Sahm, 164 Chauncey St.; architect, J. Dhuy; mason, A. Sutterline.

Putnam Ave., n s, 195′ e Tompkins Ave., 3 three-st'y brown-stone dwells., tin roof; cost, $9,000 each; owner, Buckley & Hornby, 501 Quincy St.; architect, M. Walsh.

Broadway, No. 887, e s, 25′ n Suydam St., three-st'y brick store and tenement, tin roof; cost, $7,000; owner, R. B. Aube, 451 Pulaski St.; architect, Th. Engelhardt; builder, Fred'k Herr.