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OUR subscribers and others will be good enough to recollect that the reduced subscription-price that at present obtains remains in force only until January 1. On and after that day the regular rate will be reestablished. We desire to say, also, that it is extremely unlikely that the circumstances which led us to make a concession this year will repeat themselves next, and we hope that no subscriber will next year present the unavailing plea that as he took advantage of the reduced rate this year he should be accorded the same favor ever after.

THE project for the construction of a new building in Washington for the National Library has been set aside for the present by the refusal of Congress to consider a bill for the purchase of the land necessary for a site. Although the plans of the building have been prepared, and Mr. Smithmeyer, the architect, has been sent abroad by the Government to make some final studies of libraries in Europe, it is said that a prejudice exists in the House of Representatives in regard to the scheme, and particularly, that the owners of the tract opposite the foot of the Capitol, who are anxious to sell their land at a high price, have given offence by their pertinacious efforts to influence members in its behalf, so that a final determination has been arrived at to leave the Library where it is,—in the Capitol. In this place, however, it is in constant danger from fire, and as its destruction in this way would probably involve that of the Capitol itself, the only prudent course is to remove it at the earliest possible moment to a place of safety. That the Capitol hill is the most suitable place for it, no one, we imagine, can deny, and while it is desirable to avoid any unnecessary outlay in the purchase of the site, it is very unlikely that land in the centre of the rapidly growing city of Washington will ever be cheaper than now, while the adoption of a location on any part of the limited territory now belonging to the Government would simply mean the placing of a very important building on a poor site, with the consequent necessity for the future purchase of a costly site for some poor building.

THE *Spectator* comments on the great fire in London early in this month, which destroyed sixteen million dollars worth of property, and mentions that it was the first extensive conflagration which has occurred in the city since Captain Shaw was placed in charge of the Fire Brigade; his predecessor, Captain Braidwood, having lost his life by the fall of a wall in the great Tooley-Street fire, which was, until now, the last one of special importance. The first building burned in the succession of conflagrations which caused the present immense loss was the Alhambra Theatre, a high structure in which the flames could be reached only with difficulty. Twenty-five engines were employed all night at this place, and when some warehouses not far off took fire, there was not sufficient force at hand to deal with them. The first of these was occupied by a firm of dealers in hosiery, and the narrowness of the street in which it was situated did

much to impede the efforts of the firemen. After this and the adjoining buildings had been nearly consumed, the flames spread into the next street, seizing first upon a large building filled with millinery goods, and extending to others, until a considerable district was involved. Fortunately, the conflagration was checked just before it reached the great retail shops on Cheap-side and in the vicinity of St. Paul's Cathedral, on one side, and the Post-Office, the Bank of England, the Royal Exchange and the private banking houses of Bishopsgate and Lombard Streets on the other. The *Spectator* thinks that this event will lead to a change in certain details of the methods of fire extinction which Captain Shaw has adopted and defends so earnestly; and that his experience will convince him that the half-inch streams of water thrown from the hand-engines of the London Brigade might be advantageously replaced under such circumstances by the solid two-inch streams which our steam fire-engines deliver.

THERE is something surprising in the frequency of fires in great English mansions within a few weeks past. The ashes of Clevedon and Ingestre were hardly cold when Hampton Court was seized upon by the flames and seriously injured, and a day or two after Winnington Hall, in Yorkshire, was totally destroyed in the same way, followed immediately by another lordly seat in the West of England. The theory usually brought forward to account for these conflagrations explains them on the ground that new heating appliances have been recently introduced, and the setting has been so done as to expose the old wood-work to undue heat. This hypothesis would seem to indicate a degree of carelessness on the part of English heating engineers which we hope cannot justly be attributed to them, and we shall look for more reasonable explanations before long. It is true that the burning of Ingestre is said to have been caused by the kindling of a floor-beam upon which the hearth of one of the fireplaces was laid; but this was a portion of the original construction, and the similar cases, in which the timbers have resisted the heat of the fires of three hundred winters, to succumb to the radiation from a basket of cannel coal, must be few indeed. It is perhaps possible that oak, seasoned by the lapse of centuries, may be more liable to take fire from, for instance, the heat of a steam-pipe, than newer wood, and it may also be possible that the English engineers, like the French ones whose carelessness caused two or three fires in the Louvre last winter, may not understand the danger of placing steam or hot-air pipes in contact with wood; but a few such lessons ought to be enough to teach them wisdom.

THE loss at Hampton Court was not very important. Some twelve rooms were burned, most of which contained pictures and other works of art, but none of great value. The tapestries representing the life of Alexander the Great, from cartoons by Le Brun, were damaged by water, and a ceiling of the last century, painted by Sir James Thornhill, was ruined; but the precious pictures of Velasquez, Mantegna and Vandyck, with the less valuable but equally famous ones of Lely and Kneller, were saved. The cartoons of Raphael, which were for so many years identified with Hampton Court, where a special gallery was built for their reception, were removed some years ago to the South Kensington Museum for a temporary purpose, and have since remained there. The building itself seems not to have been seriously damaged, and the cost of making good the losses will hardly exceed thirty thousand pounds.

THE career of the elevated railway companies in New York has been marked, in many instances, by an appearance of impudent trickery which has permanently injured their credit among honorable persons, and certainly tends very much to obscure the memory of the great material advantage which the city has derived from their construction. The latest evidence which has been offered of the desire of the corporations to avoid their just obligations is contained in a letter to the Mayor of New York from the Vice-President of one of them, referring to the recent decision of the Court of Appeals, in favor of the claim of Mr. Rufus Story for compensation for the obstruction of the street in front of his place of business by the railway tracks, and notifying the Mayor that, inasmuch as a certain compensation was paid by the companies for the right to build

tracks in the streets, a virtual contract was made by which the city must assume the payment of all damages which might be recovered by any person on account of injuries received from obstructions so caused. This extraordinary inference from the permissive act by which, notwithstanding violent opposition, the elevated railways were allowed to take for their own purposes a considerable portion of the streets which the city had built and paid for is to be sustained by the corporations in the courts. No doubt great efforts will be made to establish it, as the same reasoning, if it should prevail, would saddle upon the citizens not only the cost of the injuries which the elevated roads might inflict, but also those caused by the steam and hot-water pipes which are now, or will be, laid under similar concessions.

THE commission which has charge of the national monument to King Victor Emmanuel of Italy, finding none of the plans submitted in the last great competition quite satisfactory, has opened a new one, for which a year of preparation is given, the designs not being received until December 1, 1883. Some modifications are made in the first programme, the site being now definitely fixed on the Capitoline Hill, upon the ground now occupied by the barracks of the municipal guards and the residence of the general of the Capuchins. The total height of the monument is restricted to twenty-nine metres, and an equestrian statue of the late king is to form the most important portion. Considering the magnificent dimensions contemplated in most of the designs of the previous competition, these very modest requirements are a little surprising, and it certainly seems as if the Italians had concluded that sixteen hundred thousand dollars was too much to devote to a dead man's memory; but the new plan contemplates the extension of the Corso to the foot of the Capitoline Hill, and the construction of a grand staircase leading upward to the monument, so that the cost of the whole project will at least be very considerable. What, if any, may be the stipulations as to the cost of the work and the premiums offered we do not learn, or whether the competition is to be confined to Italians, as was once proposed.

THE thirteenth of December was the day assigned for the disclosure to the stock-holders of the Keely Motor Company of the patentable character of the device upon which their money has been so liberally spent; and a meeting was called to receive the important information. As usual, the proceedings were of the most satisfactory character, and the participants separated with glowing anticipations of the prospects of the great invention, concerning the exact nature of which every one except Mr. Keely and Mr. Boekel seems to be as much in the dark as ever. It is, however, gratifying to know that "a caveat for the generator has been prepared and forwarded to the Patent Office;" and Mr. Keely assures his constituents that he "has passed the line of experiment," and "nothing is left to be done but the completion of mechanical work now in progress upon the engine." After this "mechanical work" is finished, which we trust will be soon, it is the intention of the great inventor to "bring the engine to the attention of the Pennsylvania Railroad Company," with a view to having it tested in hauling trains between Philadelphia and New York. Mr. Boekel seems to have been in as good spirits as his principal, and presented an independent report, in which he said that Mr. Keely's investigations had carried him "far beyond the experiments of such men as Professor Tyndall" and others, and he had "succeeded in exciting, harnessing and utilizing the subtle force which to them has been only a subject of scientific wonder." We hope some one will write at once to Professor Tyndall and ask what the subtle force is which has been to him a subject of scientific wonder, as there seems to be no other way of finding out, and our curiosity will not brook much further disappointment. It is remarkable that nothing was said at the meeting about further supplies of money for "harnessing" that invisible force which Mr. Keely seems to find so unruly, but there will be plenty of time for that before the caveat expires.

ABOUT two years ago Mr. Dawson, a lawyer of New York, who was living at the time in an apartment-house on Broadway, in going to his rooms at night fell through the open door of the elevator-shaft, receiving injuries which kept him to his room for three months. In addition to the suffering caused by the accident, he acquired, by the influence of the morphine prescribed him for relieving his pain, a craving for the drug, which he was only able to overcome after six weeks of

distressing effort. Although he was ultimately cured, his experiences left him so weak, and with nerves so shattered, that it was a year before he could resume his business, and by that time most of his clients had employed other professional advisers, so that his income fell off from about ten thousand dollars a year to almost nothing, while he was left with bills to pay for medical attendance. Under these circumstances he felt that compensation was due him from the one whose carelessness led to his misfortune, and he has now brought suit against Mr. Sloane, the owner of the building, to recover one hundred thousand dollars, which he thinks no more than a fair equivalent for the injury he has suffered. In reply to this claim, Mr. Sloane asserts that all Mr. Dawson's troubles have been the result of his own negligence in walking through an open door into the elevator-shaft, and that he cannot be responsible for the mishaps of those who do not look to see where they are going; a principle which, whatever the jury may think of its correctness, we hope will not be allowed to receive too wide an application.

A NEW enterprise is projected in Lancashire for the relief of the manufacturers of Manchester and other towns in the neighborhood, who consider themselves hardly used by the railways, particularly those connecting the sea at Liverpool with the manufacturing district. It is said that now, with all the facilities which modern railway management ought to be able to give, the cost of transporting freight between Liverpool and Manchester is actually greater than it was sixty years ago, before railways were thought of; and that, moreover, the speed of transportation is little, if at all increased. To the extortionate charges of the railways have to be added the cost and depreciation involved in repeated handling and transshipment between the hold of the vessel which brings raw cotton, or takes away goods, and the mill-yards, so that in many respects the change from cartage by horse-power to railway carriage has been a positive inconvenience. To remedy these troubles a Liverpool engineer, Mr. Alfred Holt, proposes to lay out through the Manchester district a system of "plate-ways," or roads furnished with a double row of iron plates, spaced so as to afford a smooth track for ordinary drays and heavy wagons, which can be drawn either by horse-power or by a traction engine. Such wagons will pass readily from the ordinary road to the plate-way, and it is intended to arrange the traffic in such a manner that cases of cloth will be loaded into them at the mills, drawn to the nearest station, taken up by the trains which pass at stated intervals, and transported to Liverpool, there to be disconnected, and drawn by a second set of horses to their destination. After unloading, they will be sent to the proper pier to receive bales of raw cotton as return freight, which will be transported in the same way back to the mill-yards. The system has some analogy with that once adopted in many ill-paved towns, of laying a double row of smooth flags among the rough cobble-stones, at the proper gauge for wheels to run on; and the first intention of the projector was to use the public highways in a similar manner; but experiment showed that some device was needed for keeping the wheels on the track, and the plates are therefore to be furnished with raised flanges, which answer their purpose, but necessitate the construction of a line quite independent of the streets.

AN attempt is to be made at Wheeling, West Virginia, to introduce the manufacture of nails made of Bessemer steel instead of the ordinary wrought-iron. It is obvious that a steel nail is, weight for weight, stronger and more serviceable than one of iron, but the cost of the plant required for Bessemer steel-making is so great that only the richest corporations can undertake it. At Wheeling, however, which is perhaps the centre of the nail manufacture, the subject is regarded as of so much importance that an association has been formed to raise the necessary capital and construct works expressly for the production of steel nail-plate, which will be delivered to the nail manufacturers represented in the association in an agreed proportion. One of the incidental results of this change in the business will be the throwing out of employment of a large number of puddlers, whose services in reducing cast to wrought iron for nails will be no longer necessary. Whether this is an advantage or not in all respects may be doubtful, but the manufacturers will be much more independent of their employes by the substitution of machinery for skilled labor in this part of the work.

WATER-CLOSETS.¹—II.

S. S. HELLYER gives a cut of a water-closet taken from Osterly House, which he considers a type of the closets used in England one hundred to one hundred and fifty years ago. Describing it he says:² "A niche in a fair-sized room was formed to receive the marble closet-pan [bowl], and a door shutting up close to the seat hid the whole arrangement from sight. A lead soil-pipe was connected with the outlet-plug (plunger) waste of the pan, and continued from it to the drain, which was brought into the house to receive it. The soil-pipe had no ventilation." (Fig. 14.)

A. J. Roubo describes a water-closet, and also gives several views to illustrate the subject in the great French book on joiners' work (*L'Art Menuisier*), published in 1770.³ We think these are the earliest illustrations of a water-closet extant. The bowl is cut

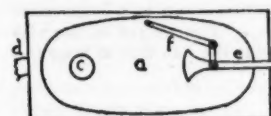


Fig. 14. a, Bowl. b, Plunger. c, Supply. d, Overflow. e, Handle.



Fig. 15.—Plan, or Top View.

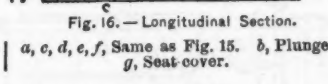


Fig. 16.—Longitudinal Section.

from a single block of stone, all the inside lines being curves so it will not retain the filth as readily, and be easier to clean than if it were in another shape. The lead supply-pipe has T-shaped handles and a nozzle spread into the form of a fan, which is evi-



Fig. 17.—Cross-Section.

Letters same as above.

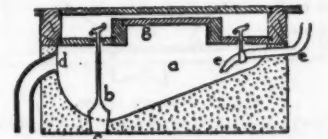


Fig. 18.—Section of Closet.

Without bidet-attachment and different arrangement of seat. Letters same as Fig. 16.

dently for the purpose of spreading the water over a larger surface of the bowl than would be the case if the nozzle was of the same shape as the pipe. The above-mentioned closet is one of the simplest forms of plunger-closets, and if we are determined to use a closet of this class, then the simpler style would be better and more cleanly than those which have concealed and foul compartments in which the plunger works, and of which only experts have cognizance.

In this closet we see a branch from the supply-pipe which could have been used only as a bidet-attachment. This has a hinge-joint so it can be folded back under the seat when not in use. The wood-work is carefully mitred, being tongued and grooved wherever it is advantageous, as is shown by the details. A lid covers the seat, and is made so it will fit as nearly air-tight as possible when it is closed. The closet described was called "a closet with a plug" (*Lieux de soupapes*), and it was in use in France a long time before it was in England, as the author informs us.

The first English patent⁴ for a water-closet was issued in 1775, A. D., to Alexander Cummings, a watch-maker in Bond Street. This closet has a sliding valve, or slider, as it is called, between the trap and bowl, and is the only patent issued with a horizontal sliding valve. The title being "a water-closet upon a new construction," proves the use, we might say the common use, of water-closets during and before this time, but of a different pattern from Cummings's closet. Here we find the first recorded instance of a siphon trap be-

ing used under and in connection with a water-closet, although we have evidence of siphons having been used in the time of the Egyptians. Below are quoted a few extracts from Cummings's specifications: "The advantages of the said water-closet depend upon the shape of the pan or bason [bowl], the manner of admitting water into it [near the bottom], and on having the stink-trap hitherto used for water-closets so constructed that its contents shall or may be totally emptied every time the closet is used. . . . The stink-trap hitherto used for water is too well known to require a description here; and although it may serve effectually to cut off all communication of smell from the drains, pipe and cesspool, it becomes in itself a magazine of fetid matter, which emits an offensive smell every time that it is disturbed by using the closet. In this water-closet the pipe which carries off the soil and water is recurved about twelve or eighteen inches below the pan or bason [bowl] so as constantly to retain a quantity of water sufficient to cut off all communication of smell from below, and this stagnated water in the recurved part of the pipe is totally emptied and succeeded by fresh every time the pan or bason is emptied. . . . The horizontal sections are circular, or nearly so." The mechanism is very clearly shown in the

¹A paper by Mr. Glenn Brown, architect, read at the Sixteenth Annual Convention of the American Institute of Architects, held at Cincinnati, October 28-29, 1882.

²Sanitary Plumbing, 1882.

³L'Art Menuisier, page 293, plate 69, Vol. II. 1770.

⁴British Patent-Reports, Vol. XIV, No. 1105.

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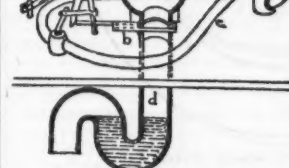


Fig. 21.—Cummings's Closet.

a, Bowl. b, Slider, or valve. d, St- | a, Bowl. b, Plunger. h, Chamber for ball-
cock. g, Balls for cock. e, Supply.

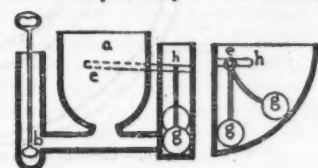


Fig. 22.—Prosser's Closet.

drawing which accompanies the specification. If the siphon-trap fulfils the duties specified, and we think it does, why complicate matters with the "slider"?

The next patent⁵ was issued in 1777 to Samuel Prosser, a plumber living in the parish of Martin-in-the-fields, for a plunger-closet with a double-ball-cock for shutting off the water when it had risen to a certain height in the bowl, and for turning on the water-supply when it had fallen below a definite point. Here we see, for the first time, the (as we consider it) pernicious practice of placing the plunger and ball-cocks in compartments separated from the bowl, as far as the sight can penetrate, but connected as far as the deposits from the water and filth are concerned. This closet is described in the specifications as "a water-closet upon an entirely new construction, which will always remain free from any offensive smell." We, at the present time, know too well the folly of such claims. Wherever concealed chambers exist connected directly with the bowl, there filth and decayed matter will accumulate, and will become not only offensive to our olfactory nerves, but hurtful to our health. The excreta, in finely divided particles, in this and all similar cases, has free access to compartments that can never be cleaned without the assistance of an expert mechanic.

In 1778 Joseph Bramah had a patent⁶ issued to him for a water-closet with a valve at the bottom of the bowl, working on a hinge. This valve was for the purpose of cutting off all connection with the

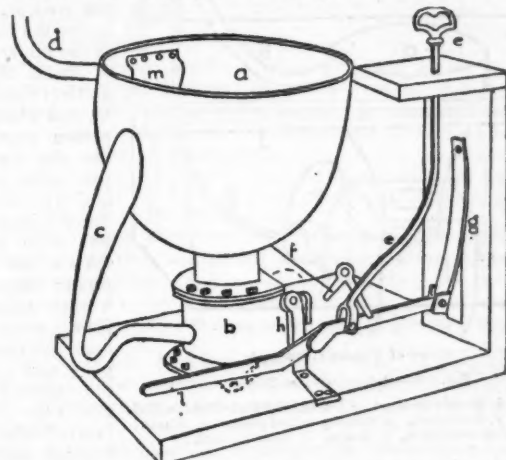


Fig. 23.—Bramah Closet.

a, Bowl. b, Valve-box. c, Overflow. d, Supply. e, Handle and pull-rod. f, Wire to tank. g, Spring. h, Valve-crank. i, Lever. m, Pan.

soil-pipe (Figs. 23, 24). It will be seen at a glance, that this closet was the forerunner of a large number of inventions, differing more or less from the original, of which the parent is certainly equal to, if not superior to, any of its offspring. All valve-closets with a horizontal valve working on a hinge, and the numerous patterns of pan-closets, are an outgrowth from the Bramah. The valve works in a

⁵British Patent-Reports, Vol. XV, No. 1160.

⁶British Patent-Reports, Vol. XV, No. 1177.

small chamber not much larger than the pipe. The mechanism is comparatively simple, and it has a simple U-trap as an overflow. We also note the flap or fan placed over the supply-pipe for spreading the water over the bowl. We quote the following from the specifications: "In this closet two valves are simultaneously acted

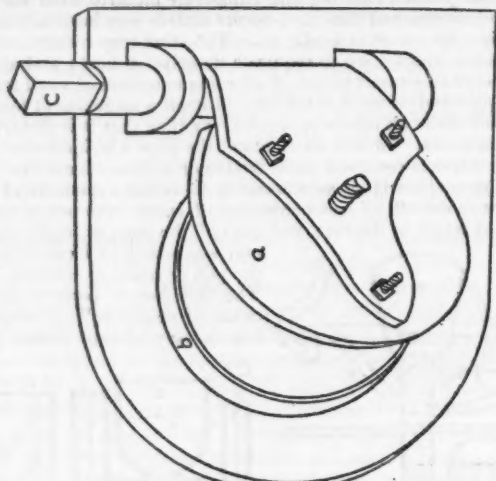
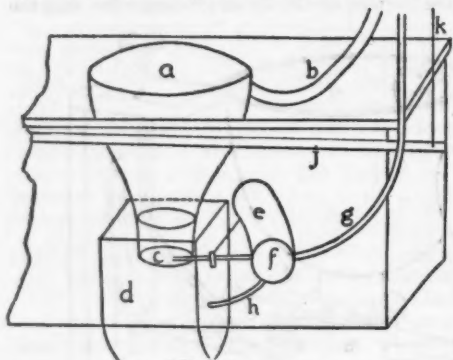


Fig. 24. — Detail of Valve in the Bramah Closet.
a, Valve. b, Valve-seat. c, Place for crank. d, Hinge.

on by the handle. The one valve is placed under the bottom of the basin [bowl] and when closed retains any water that may be therein, thus cutting off all smell that may be therein. It moves on a horizontal axis, and in such a direction that its surface is the more thoroughly washed every time the contents of the basin is discharged, both by the water falling upon it whilst opening, and by its meeting the water when shutting to again. The other valve is placed in the service-box, or the top part of the feeding-pipe; this valve opens and shuts in a similar manner, always meeting the natural currency of the water, when shutting, and falls from it when opening, and is not liable at any time to have its motion obstructed by the frost, no part of it being immersed in the water. Its movement is communicated through a lead-pipe or tube, soldered into the part where it acts, and is continued above the highest surface of the water in the reservoir." From the drawings it would appear that the bowls of the last three water-closets mentioned were made of lead, although there is no statement to that effect in the specifications.

Patents were issued to James Grease, 1782; David Riz, 1783; and Thomas Roundtree, 1789, for improvements on commodes.

In 1792 a patent was issued to John Ashley¹ for "a New Invented Self-Acting Water-Closet (Fig. 25), which constantly keeps itself sweet and clean and is upon a more simple construction than any heretofore discovered." This is a valve-closet supplied by a tank, the hopper being flushed by pressure on the seat. The specifications say: "Anyone sitting on the seat presses it down about an inch,



(Copy of Patent Drawing.)
Fig. 25. — Ashley's Water-Closet.
a, Bowl. b, Supply to bowl. c, Valve. d, Stink-trap. e, Cod-piece. f, Ball-cock. g, Supply to cod-piece. h, Waste from cod-piece. i, Beam. k, Wire to tank.

which presses on the beam, and opens the sucker in the upper part of double cistern and lets the water in, and when the person rises off the seat the upper sucker closes and opens the lower sucker and lets the water down the two pipes; the one washes the basin [bowl] while the other fills the cod-piece and causes the air-ball to rise, the closer [valve] falls and lets out soil and

water into said stink-trap, and by means of the small pipe the cod-piece is emptied of the water, the ball falls and raises the closer [valve] and prevents the effluvia ascending."

The common form of stink-trap is used under this closet, as we are told by the author, and in this way we gain as clear an insight into the form of trap used at that time as it is possible to do from such an imperfect drawing. It was probably something like our D-traps.

A patent² was issued to Thomas Binn, carpenter, 1793, for a valve water-closet (Fig. 26). It is very much like the Bramah closet,

with the exception of the way the levers are arranged in connection with a complicated tank for the purpose of flushing the closet. Binn received a patent for an improvement on his closet in 1799. The improvement consisted in joining a bidet-pan to the bowl of the closet.

William Laws received a patent³ in 1796 for an improved water-closet. He shows us a receiver and a top view of a valve which he calls a pan. He does not claim novelty for either the pan or the receiver, so it is possible that there may have been pan-closets in use before the Bramah closet was invented, and therefore it may be wrong to cast the odium of their parentage upon it. The Laws closet is intended to act on the seat being relieved from pressure. The handle is patented in connection with a self-acting closet "to put the self-acting part to rights, and may be found very useful at some time. . . . Another accommodation is a lever conveniently situated to act by the foot. . . . The weight on the axis of the pan turns back to a catch, that holds the pan fast to bear the water for the next action of the closet.

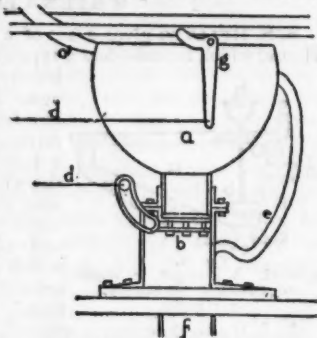


Fig. 26. — Binn's Closet,
a, Bowl. b, Valve. c, Supply. d, Wires to tank. e, Overflow. f, Soil-pipe. g, Lever, worked by seat.

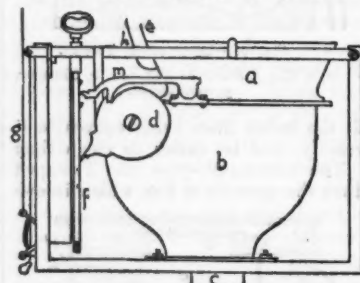


Fig. 27. — Laws's Closet.
a, Bowl. b, Receiver or cesspool. c, Soil-pipe. d, Pan-valve. e, Supply. f, Pull-rod. g, Wire to tank. m, Catch.

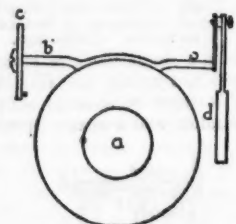


Fig. 28. — Details of Pan.
a, Pan-valve. b, Axes. c, Ratchet. d, Weight.

The receiver or cesspool is very much like those used on pan-closets at the present day.

French Patent Law began 1791. Between 1794 and 1800 (the date which we have assumed as the date for ancient closets to merge into modern closets) the French Government issued one patent for a water-closet to De Cœur, January 5, 1796.

There was no patent issued for water-closets in America until 1833 and 1835, and those were issues for portable water-closets or commodes.

Reviewing contemporaneous literature we find that water-closets before the nineteenth century were not considered a part of the plumbers' work. There is no mention of water-closets in "Art du Plombier," by C. M. de Gardette, an exhaustive work on the subject (1761-1779), while we find a description of the one described above in "L'Art Menuisier," by A. J. Roubo. S. S. Hellyer tells us that he could find no mention of them in the "Art of Building," published in London, 1734, or in Campbell's "Compendious View of all the Trades practised in the cities of London and Westminster," published in 1847.

A point which strikes us as curious is that we do not find mentioned or shown among the earliest closets, the simplest form or hopper-closet. Was it because hopper-closets were not in use at this early date, or because they were considered too simple to put on record?

By a careful review of the subject from 1800 to the present time, which we hope to make public at some future date, we have formed the opinion that a simple short hopper-closet is the best in use, when properly connected with a tank and flushed by water from the same (through a flushing rim), having its trap vented and its bowl ventilated in the proper manner.

THE UNITED STATES LIGHT-HOUSE SERVICE.—The extent of the light-house service is not generally known even in maritime circles. According to the latest report of the Light-House Board, we have in all 723 light-houses, 38 light-ships, 64 fog-signals operated by steam or hot air, 115 fog-bells operated by machinery, 860 beacon lights on Western rivers, 845 unlighted or day beacons, 33 automatic whistling-buoys, 14 automatic bell-buoys, and 3377 buoys of other descriptions. To maintain and attend to all these light-houses, lights and buoys requires the service of 23 steam tenders, 4 steam launches, 2 sailing tenders, 1769 light-keepers, "including laborers in charge of Western river lights," and 688 other employes, "including crews of light-ships and tenders." The total annual expense of the light-house establishment and fog-signals is \$2,749,000.

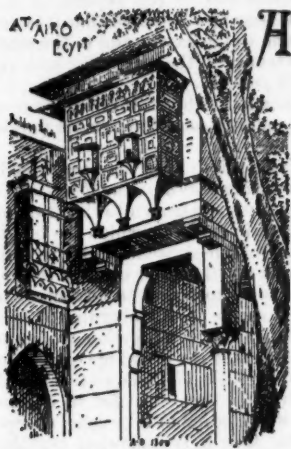
¹British Patent-Reports, Vol. XXIV, No. 1875.

²British Patent-Reports, Vols. XXV and XXXI, Nos. 1937, and 2352.

³British Patent-Reports, Vol. XXVII, No. 211.

⁴French Patent-Reports, Vol. I, page 248.

INSURING REAL-ESTATE TITLES.



A GREAT reform often comes unappreciated, and almost unnoted, until all rejoice in its benefits, thoughtless as to their cause. Existing crudities and incongruities continually evolve harmonious methods and organizations; and evidently by correct analysis of these products of necessity and inadequacy, and predication of their results, we may greatly expedite progress, and eventually bring our economics into perfect concord.

New movements then, demand our closest study, and one is now before us that is well worthy of it; one that has been evolved during the past six years, and seemingly ranks next the abolition of slavery.

The movement alluded to is the process of real-estate title insurance, which bids fair to remove all obstacles to the perfect organization of real property, and enable us to make this vast interest as ideal a form of property as stocks and bonds now are.

In 1876, some Philadelphia operators, thinking that transactions in real estate could be materially facilitated and increased by the medium of an exchange, organized one on the model of the familiar Stock Exchange. It was styled "The Philadelphia Real Estate Exchange." The experiment, however, was not successful, owing to the lack of three essential conditions, which were:—

1. The title of a corporate property is generally secure beyond peradventure: at present real-property titles are not.

2. Transactions in stocks and bonds require no searching of records, and no recording, as the fee is not transferred: in real-estate operations both these conditions are reversed.

3. A corporate property being generally of great bulk, and owned by numbers of widely scattered people who are each potent in its administration, frequent and accurate reports of its condition and earnings are demanded and forthcoming, and necessarily widely disseminated. On the contrary real estate being generally held in small parcels by individual owners, and intimately related to their private life, palpable reasons exist why its condition should be concealed; and hence, (except in cases of business property) a stated market-price can hardly be fixed as in the case of stocks and bonds, as personal examination before purchase is plainly necessary. The exchange organization provided no substitute.

Still this new movement was not abortive, for it evolved the present process which seems to meet the most essential requirements, and will naturally develop to answer all; and its universal adoption appears merely a question of time.

Wherein and how greatly real estate falls short of being an ideal property, the necessity for higher evolution, the crude barbarities of the present, and the suffering entailed thereby, may be approximately shown in the following comparison of real estate with corporate property.

CONDITION OF DEPENDENTS.

1. Of the people dependent for support upon real estate, most notably in the mechanical trades dependent upon building, a large number are underpaid; suffer severely from the inroads of machinery; have little or no work in winter; have not regular employment; frequently lose their wages, and are at best uncertain of the means of subsistence; and as these conditions leave little hope of advancement, there is not much encouragement to remain in the business: the moral tone is lowered, and the brighter minds seek more certain employment even at a much lower rate *per diem*. The estate of the remaining dependents is often pitiable, especially in times of financial disturbance. Hence result strikes, riots, and debauchery;—abnormal efforts to right the evil.

TRADE SERVICE.

2. Hence, in the trades depending upon building, etc., the order of service is generally inferior. Few superior Americans can be induced to go or stay in a field offering such uncertain and scanty rewards. As a consequence, a large proportion of journeymen are foreigners. From these causes the trade is behind all others in bearing the marks of our progressive civilization.

1. The employees of our corporate institutions are generally regularly employed; have no fears of loss of wages; are more stationary in habitation, more frugal in habits, more careful and contented, and generally make greater progress in manhood. Strikes are less frequent, and when they do occur, are caused not so much by any serious fault of the system, as by the inhumanity, or perhaps more correctly the *inaccessibility* of the employing class, who do not know or realize the hardships done in their name.

2. The service rendered by and to corporate institutions is generally as forward as man can at present advance it, both in manual execution and directing mind. Its perfectness is the boast of our civilization.

CONDITION.

3. As a rule, real-property investments are generally neglected, and often a disgrace to their location. No progress or improvement is apt to be made so long as any return on the original investment can be wrung from an ill-served tenantry.

TRANSFER.

4. Is had at arbitrary and variable prices, generally through agents, who exact from two per cent upward for their slight services.

3. Under the spur of an active and enlightened competition every possible advancement and economy is sought out and practised in the management of our corporate institutions to secure the maximum results with the minimum outlay.

4. It can be had at a market price through any banker or capitalist; if personally, without charge; or through a responsible bonded agent at nominal rates.

TITLE.

5. Titles to real estate are at best uncertain, and proved with difficulty by expensive and complicated search by trained lawyers.

5. The only risks incident to the title of a bond are forgery and false utterance, facts easily detected, and matters of general newspaper information.

CHARGE FOR SERVICE.

6. On new investments made by long-headed operators, with due regard for the demand, returns are had of from 8 to 12 per cent, and in some instances more. On old investments, returns are a variable quantity, always in excess of a fair remuneration for services rendered, only endured by tenants because of inability to do better, and pressing hardest on those least able to bear the burden—the poor, who pay, in many cases, exorbitant prices for habitations in which a humane man would be ashamed to quarter his beasts.

6. At present, any good security sells at a rate which realizes not more than 3 to 5 per cent; and new stock of enterprises offering good evidence of such returns is eagerly sought for permanent investment.

Evidently the condition of real property and the service thereof is inferior to that of corporate property; and the returns on judicious investments in the former are very much greater than in the latter; and capital and labor would go into real property from more crowded fields were it not that, when one buys real property he must act on his own judgment, besides incurring the risk and expense of proving title, transfer, etc.: and in case he wishes to dispose of his holding, must find another of his own mind as to its value, and pay probably two per cent or more to an agent for each transaction, besides losing time, etc.: whereas he can buy stocks or bonds without risk or loss of time, at a price fixed daily by shrewd operators, and dispose of them as readily to any bank or capitalist, and if through an agent, at a nominal commission and risk.

Now people are loth to incur risk and expense, and slow to trust their own unaided judgment, especially in matters with which they are not wholly conversant, preferring to follow the precedent (especially when successful) of those of better opportunities for knowledge, and larger experience than they themselves possess; and hence so long as these relative conditions of the two forms of property exist, they will continue to neglect property right under their own eyes, offering absolute control and eight to fifteen per cent per year, and invest in the ten-thousandth part of a property they have never seen, and run by men of whose character they have only hearsay evidence.

Thus we see that the real-property interest is neglected, languid, disorganized and barbaric in its conditions, all the result of:—

1. Insecurity of title after search and transfer, depending, as it may, on technicalities, or a judges' dyspepsia; the varying rulings of courts; the exact compliance with law in the matter of forms, etc., by each antecedent owner; the correctness in form and interpretation of wills, deeds, etc.; the honesty of irresponsible magistrates, commissioners and notaries; and liable, as it is, to be upset by the novel ruling of a new judge.

2. Faulty methods of keeping the records, necessitating vexatious and expensive searches by lawyers of great experience, whose best efforts cannot insure absolute safety.

3. Feudalism, and antiquated cumbrousness in the legal forms of transfer, wasting time, and giving many chances for quirks, quibbles, and technicalities.

4. Absence of any systematic appraisement.

5. The tardiness, expense, and uncertainty of justice when sought in our courts.

6. The absorption of large properties by small mortgages owing to increase of the standard of value, and the fact that the law gives no valid protection against the uncertainty of markets in cases of forced sales.

These conditions result in requiring in the real-estate market the greatest shrewdness and experience, and afford much room for trickery, cajolery, false representation, swindling, etc.,—opportunities too often availed of,—and depreciate the general character of real-estate agents, besides rendering possible the exorbitant commissions exacted by them.

Until these conditions are changed real property offers neither inducement nor facility for temporary investments, and not much to any capitalist unless armed with experience and shrewdness, and until the field is attractive to capital, a high grade of service can hardly be expected.

It is imperative to sweep away all these evils and abuses, and place real property where it of right ought to be, in the very front

and foremost rank of investments, thus meeting a great business need, by opening to idle and ill-requited capital a limitless and safe investment, where in return for necessary and now ill-performed service, good and increasing profits may be earned, and all the pulses of trade be made to throb with a new and healthier life; thus averting the wild speculations and the following panics that now attend flush money markets.

The title-insurance movement with its natural evolutions seems the key to the situation.

Of the enumerated disadvantages, the fifth and sixth are due to faults in our present financial and judicial systems, and present problems for future solution; they bear on all forms of property, but most severely on real estate, because of the more frequent transfer of the fee, and other operations. The fourth will be met by a bonded real-estate-exchange system that will naturally attend the title-insurance companies, creating a new avocation and keeping it in the hands of worthy men; and as these give it their daily attention, real property will have a market price fixed just as is that of stocks and bonds; for assuredly if these could only be disposed of by hawking them about, with commissions enough at both ends and in the middle to eat up one or two years' earnings, their attractiveness for investment would be just that of real property under present conditions. The first, second and third objections are met in the title-insurance organization itself; which with some slight modifications in the law will give perfect security of title, and easy and speedy transfer at low commissions.

These measures with the skilful rating of property by operators, will make realty attractive for both temporary and permanent investments, and hence, naturally improve the service and the grade of labor dependent upon it, and ameliorate the condition of the dependent laborers by giving them more regular employment at better rates; and will go very far (if not entirely successful) to make real estate an ideal property.

CHAUNCEY N. DUTTON.

SUNDRY WORKING-DRAWINGS.¹—I.

WHEN I was asked to read a lecture to this Association I did not like to refuse, and yet I felt that I really had but little to say beyond what I have already said at one time or another in these rooms, either with regard to the general principles or the practice of the art of architecture.

It is true that a very tempting list of subjects suitable for architectural essays was kindly submitted to me by your officers, from which I might have selected a theme whereon to discourse; but I thought that the task of working up the necessary materials for such a lecture might fairly be left to some of the rising younger men in the profession, who have both more time and ambition for such a purpose than I now have.

It struck me, however, that there must be, or at least ought to be stored in the folios and memory of one who has been so long in architectural practice as I have been, drawings and incidents which, though doomed to ultimate and speedy oblivion, might be temporarily revived for the advantage of his younger brethren upon such an occasion as this.

I chose, therefore, the title of "Sundry Working-Drawings," simply as a convenient peg whereon to hang, as it were, some gossip which might suffice to occupy one of the evenings of your session. If this should prove, as I cannot but fear it will, to be of questionable taste, as partaking somewhat too much of an egotistical nature, I still venture to hope that, though it may lay me open to censure on that account, it may not be altogether a waste of your time and attention to listen to it.

Should I not have been entirely mistaken as to this idea, it is possible that my effort may serve as a hint to other architects, whose stores and reminiscences are of greater value than mine, and lead them to follow my example. Then, if such could be induced to look over the contents of their shelves, and to dip into the pages of their diaries, and extract thence for the benefit of their juniors some of the details and particulars of their professional experience of greater value for instruction than mine can pretend to have, I shall feel more than rewarded for the little trouble that the preparation of this paper has cost me.

The first impression that I received upon my addressing myself to the task I had set myself was, I confess, one of considerable depression; for I found, after searching into my portfolios, that the majority of the drawings contained in them had apparently been begun, at the commencement of the several works, perhaps rather too elaborately, in an excess of zeal, but that during the progress of the buildings pressure of time and other circumstances seemed almost always to have compelled a gradual contentment with less degrees of finish. The result was that there were in fact very few of the drawings that had ever attained the character that in theory I had aimed at, or that were in a condition fit to be exhibited.

Nevertheless, by the zealous assistance of the gentlemen in my office, I have been enabled to complete a moderate number of these working-drawings: sufficient at any rate, I hope, to convey to you the principal of the points that I wish to bring before your notice. To the editors of the several professional journals, also, I owe sincere thanks for the courteous and liberal manner in which they met

my proposals that they should reproduce, on a reduced scale, some of these drawings to serve as illustrations to the reports of my lecture in their respective pages. It may also be noted that it is but recently that this could have been done to the extent and in the manner it has been, but for the great advance in the means for such reproduction that science has rendered possible.

"Working-drawings" being the nominal subject that I have now to deal with, I shall commence by making some few remarks upon their features and characteristics.

Working-drawings may be subdivided into what may be termed, for the sake of distinction, *general working-drawings* and *detail working-drawings*. The former of these are usually drawn to the scale of one-eighth of an inch to a foot, except in cases in which the buildings are very extensive, when the scale of one-sixteenth of an inch to a foot is frequently used. Neither one nor the other of these scales, however, is in my opinion the best adapted to set off to advantage a design, the detail of which is of a character at all elaborate. Then the scale of one-quarter of an inch to a foot is altogether too large for general working-drawings, and it makes the drawings quite too cumbersome in size. In my opinion the scale of three-sixteenths of an inch to a foot is the one which gives the best effect for such general drawings as it may be thought worth while to take some exceptional pains with, although it is true that it is somewhat troublesome, and is objected to by builders on account of its being unusual.

For detail working-drawings the scale of one-half inch to a foot is the one that is most suitable for brickwork and stone-work, and that of one inch to a foot for wood-work generally; but for roofs, and such like designs in wood of large size, the half-inch scale will suffice. Mouldings and the like should, however, be always drawn out full size; as it is not safe to allow workmen to enlarge them for themselves from drawings to smaller scales, there being considerable risk of the delicacy and essential features becoming more or less spoiled during the process.

The term "working-drawings" distinguishes those which are intended to direct the actual execution of the work from either probationary drawings, for which less accuracy and more artistic effect is necessary, or from drawings of executed work, such as may have to be done by students for exercise or in competition for medals and prizes. The minute and painstaking character expected in the latter cannot be maintained in ordinary actual practice.

For working-drawings, therefore, the primary essential is clearness rather than technical excellence or beauty of draughtsmanship. For this reason the representation of shadows is to be avoided in them, and I need hardly say that back-lining, once so fashionable, and which is but an affectation of proper shadowing, is quite inadmissible. Coloring to working drawings should be used simply for the purpose of distinguishing the different materials, and the same colors should always be used for the same materials. The printing and writing should be distinctly legible, though of course it is desirable that it should at the same time be somewhat characteristic.

Economy in the preparation of working-drawings is a most important point for consideration, both as regards the labor and cost, for though an architect is only supposed, according to the regulations for professional custom of the Institute of Architects, to be obliged to supply one set of drawings and one set of tracings, these fall far short of the usual demands in practice; nor is it often, according to my experience, politic, if possible, to seek or obtain additional remuneration for further copies, although fairly chargeable. My own custom in this respect is to keep my working-drawings in pencil, so that I may be able at any time to make any alterations required therein. From these pencil drawings I have tracings made, in strong black ink upon white tracing-paper, whence other copies may be taken and multiplied by means of photo-lithography. I am thus enabled, at a comparatively small expense, to supply as many sets of the working drawings as may be called for by employers, surveyors, builders, or societies. By the same means, also, especially in the case of old buildings destroyed, restored, or altered, the folios of the Institute and this Association may and should be enriched.

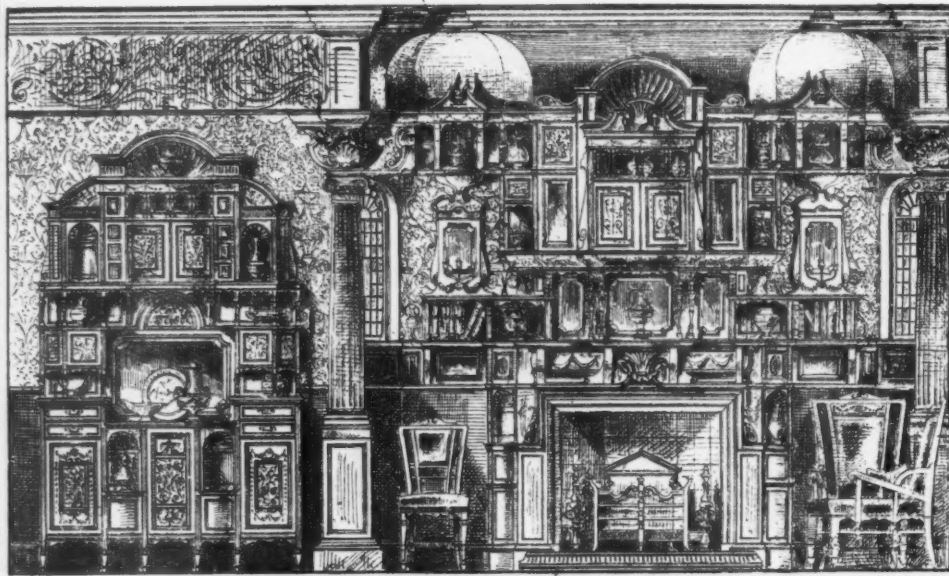
You are aware that it is upon the character of his working-drawings, rather than upon that of his preliminary sketches, valuable as an able and artistic treatment of those undoubtedly is, that the ultimate reputation of an architect depends. It is these only that actually affect the work itself. Upon the clearness and accuracy of the working-drawings alone do the employer's interests and immunity from disputes and extra charges depend, so that they require, and should receive, all the care and attention that can be bestowed upon them. Doubtless, therefore, you have often determined that, come what will, these at least should have your own personal work, and that they should represent you, as it were, and all that is in you, and that their study and completion should precede the execution of the contract. But, alas! man proposes, but fate and circumstances too often dispose otherwise, and you frequently find to your disappointment and regret that after complete and elaborate sets of both general and detail working-drawings have been prepared, it has proved that it has only been to be set aside in consequence of some change of purpose, with or without reason, on the part of your employers, and then that the whole work has to be done over again. You thus get to learn by experience that circumstances compel some compromise between the perfection of working-drawings that you would yourself desire, and such comparative imperfection as may just suffice to secure the work being properly carried out. This it need hardly be said will not reach that standard of excellence which

¹ By J. P. Seddon. Paper read at the meeting of the Architectural Association, November 24, 1882.



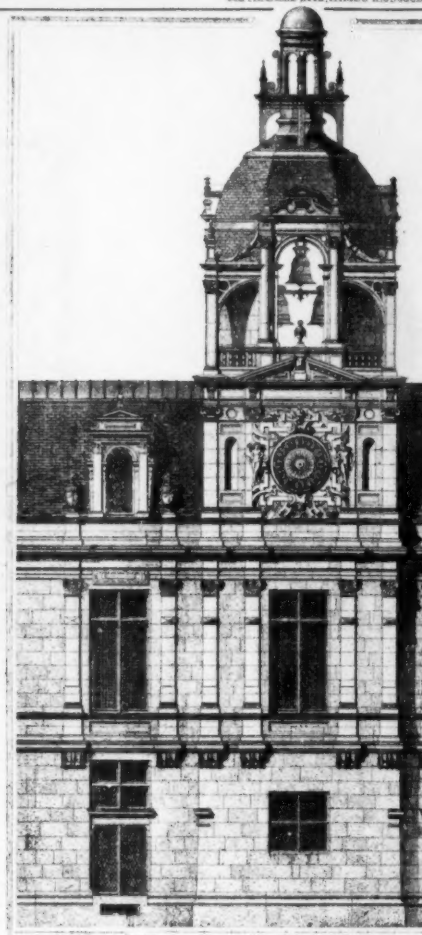
HOUSE FOR
 MR. MARCELLUS WALKER
 COLLAGES
 MASS.
 JOHN B. CLARK, ARCHT.
 Engraved by J. H. Osborn & Co.

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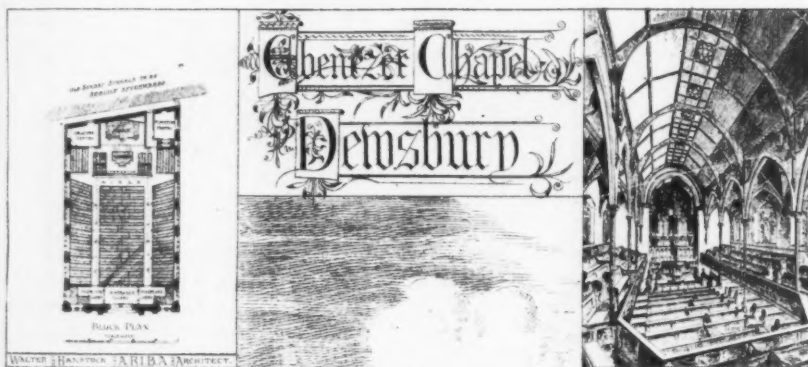


FIRST PRIZE DESIGN.—Side of Drawing Room, by C. Porter, Bath.

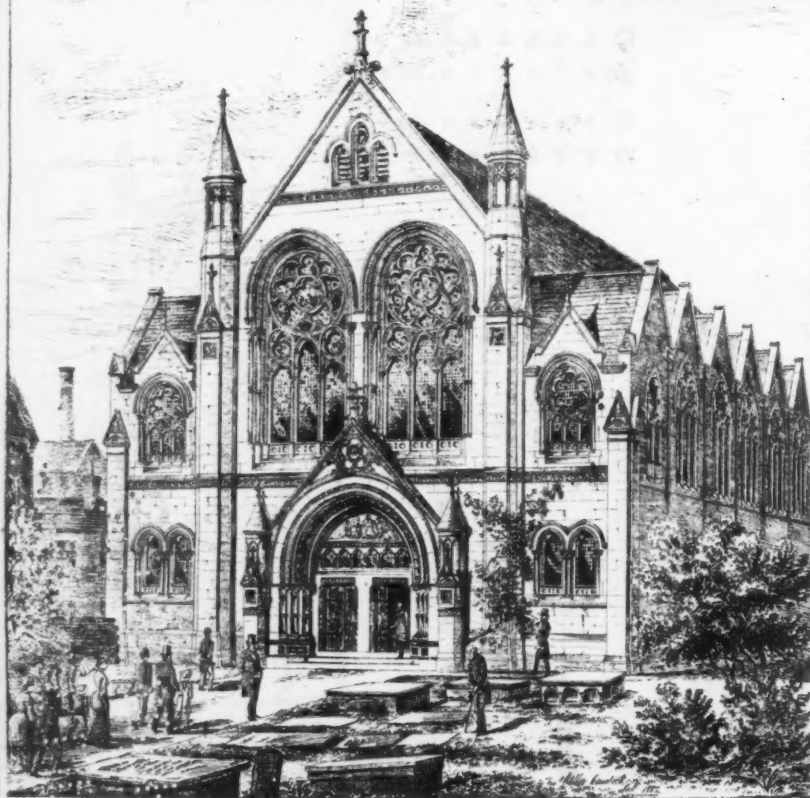
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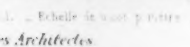
The Architect

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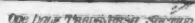
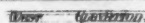


SKETCH IN ROUEN. CHURCH OF ST. LAURENT

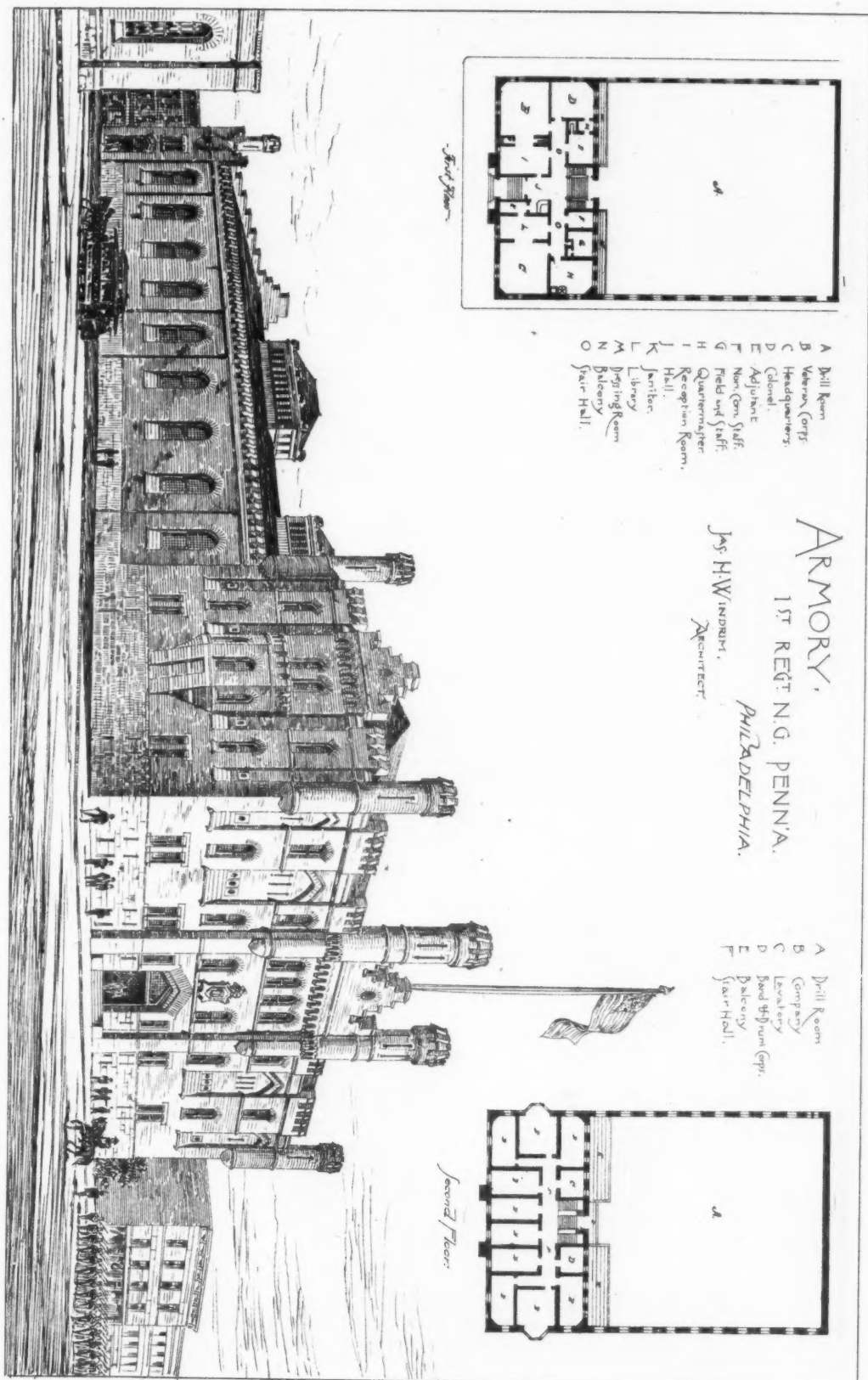
The Builder



The Builder



The Building News





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Helotype Printing Co. 211 Tremont St. Boston.

PUERTA DE DOCE CANTOS, TOLEDO, SPAIN.
(Gateway of the Twelve Pebble-Stones.)

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CHAPMAN

1912

is so often attained by the student competitors for the medals and prizes of the Institute and this Association.

Sometimes, instead of letting the preparation of the detail working-drawings follow that of the general ones, so as to be simply explanatory thereof, I reverse the process, making my designs at once, after mere preliminary sketches, to the scale of a half-inch to a foot. This plan reduces the working-out of the smaller-scale general drawings completely to a mere mechanical operation, so that it can be done without any personal supervision on my part, and yet with certainty that the character intended for the detail will be preserved throughout. By this means my own time and attention is able to be concentrated upon those parts of the work which alone demand thought and design; the rest being left to be done entirely by others. I was able by this means, in the case of the competition for the Law Courts, to dispense with any increase of my staff, and not to disarrange at all my ordinary practice; whereas I remember to have heard almost all my competitors complain of having suffered severely in both those respects.

It is time now to descend from generalities and to speak of particulars, and I think that the most convenient way of arranging the matters I propose to bring before you will be in what may be termed brief, isolated, autobiographical passages, placed in chronological order, which will admit of occasional divergence as subjects appear to suggest themselves. My excuse for these must be that in reality an architect's life is represented in his works, and his works constitute all that in his life is worth any record at all.

Most of my early professional experience was obtained in the diocese of Llandaff, in connection with its diocesan work. In the year 1851, the period of my apprenticeship to Professor Donaldson having expired, I spent three months in a rapid sketching tour upon the Continent, in companionship with the late Mr. Thomas Hill. Immediately after my return I was fortunate enough to receive a commission to build a hotel at Southerndown, a small watering-place on the coast of South Wales, near Bridgend in Glamorganshire. After my first visit to that neighborhood to inspect the site, I stopped on my way homewards to see the cathedral at Llandaff, which was just then emerging from the condition of ruin and spoliation in which it had lain, in picturesque confusion, ever since Mr. Wood's unfortunate effort to convert it into the semblance of one of his favorite assembly-rooms of his own town of Bath had happily been but partially carried out. I was then courteously shown over the works in progress by Mr. John Prichard, the diocesan architect, under whose immediate charge they were. Shortly afterwards I received an invitation from that gentleman to join him in partnership, an offer which I accepted, and this led to my going down to reside with him at Llandaff.

The cathedral of that little city (which is in fact only a suburban village in the neighborhood of the town of Cardiff), with its lovely and refined Early English proportions and detail, thus became my constant study and source of inspiration. Its beautiful western front in particular, the exterior and interior of which form two distinct compositions in perfect harmony the one with the other, roofless and festooned with ivy when I first knew it, seemed, as it still seems, to me to be a model for graceful proportion and refined treatment of mouldings. I quite revelled in its loveliness, thinking it to be one of the choicest examples of that style which England has made specially its own, and of which it may be fairly more proud than of any of the others which it shares in common with other countries of Christendom. The carved foliage of the interior of the cathedral was to me a continual source of delight. It is most sparingly used, as if it were jewel-work; and indeed it is as precious as if it were so. It is of the finest type of Early English foliage, the flow of the lines of which have remarkable grace and freedom; the stems are clear and vigorous, and the trefoil-shaped leaves are excellent in outline and surface modelling. I sent up a collection of casts taken from them to the Architectural Museum, and there is nothing to my mind among their treasures to surpass or even to equal them. This carved foliage of Llandaff is, in my opinion, the perfection of that particular class of work which is seen in its very earliest stage, budding out as it were of the simple Norman cushion-work of the capitals of St. David's Cathedral, and which is to be found revelling in its richest and wildest profusion in that of Wells, but nowhere with such developed fulness and power, and yet with refinement and restraint, as at Llandaff. Very noticeable, also, are the simple but noble piers of the main arches, with their alternately wide chamfers and groups of triple shafts. The effect of these piers is not improved by the access of richness that is seen in those which have been imported into the church of Llanidloes, in Montgomeryshire, which has just been restored by Mr. Street. They were removed from the now destroyed but once marvellous abbey of Cwrn Hir, in the same county, the number of arches in the main arcades of which are said to have reached the unprecedented number of twenty in succession. In these piers the triple group of shafts occur on each face of their octagonal piers, and their capitals are all united in one rich band of foliage of the character of which we are speaking, but of inferior excellence to that at Llandaff.

The ordinary diocesan work, in which I became at once fully occupied, consisted largely of church restorations, and to my share fell principally those works which were situated in the archdeaconry of Monmouth, under the able and vigorous direction of its energetic archdeacon, whose habit it was to map out his district, and to appoint a visitation to various churches, the dilapidated condition of

which required immediate attention, and to take me with him on those occasions. Upon our reaching one of these, possibly some few minutes later than it had been intended, he would first ask me to note its deplorable state, which I could not but admit was tolerably obvious. He would then inquire of me what could be done with it, premising, however, that there was no money to be found. To this problem I would reply that its solution and the course to be pursued was far less clear. Nothing daunted, he would then explain to the assembled vicar and church-wardens that he had brought me there simply in my capacity of diocesan architect, which meant that they might set their minds at ease, for the present at any rate, on the subject of fees; but that, as I happened to be there I might as well take the plans and particulars of the church, so that in case I should be sent for upon some future occasion I might be prepared. He would then allot me about half an hour, proffering me his own assistance, when wanted, as a tape-holder. Under such pressure I soon learned to systematize proceedings, first sketching in succession the plans, elevations, sections, and details, and then noting down the necessary dimensions; this having done, we proceeded to perform the same task at the next church upon our list. On my return home I plotted out these several sketches, and though of course, when actual work was contemplated at any of these places it became necessary perhaps to make another and more careful survey, much time had been saved, and the opportunity given for preliminary consultations.

AVALLON AND VEZELAY.

THOSE of our readers who remember the sketches, both verbal and graphic, of Avallon and Vézelay published in the *American Architect* some time ago, will probably derive further pleasure in reading the following impressions of a correspondent of the *New York World*: Any one who arrives at Avallon by rail will find very little at first sight to attract his notice. There is a right way and a wrong way of approaching every town, but no place that I have ever seen suffers so much as Avallon from being seen first from the railroad. No one who views it from that point alone can form the least idea of the magnificent position which the town occupies, or of the grand range of picturesque hills and valleys and forests which stretch away for many miles below it. The little-known Morvan region so often referred to by French novelists and writers, and so seldom visited by French travellers, extends to the south for many miles, and considering its great attractions and the very slight difficulties which the tourist is likely to encounter in passing through it, it is astonishing how much it is neglected, even by artists. The people have the reputation of being quick-tempered and passionate, but my own experience is that civility here, as everywhere else, is met with civility, and that the stranger is not likely to encounter any disagreeable incident if he does not wantonly provoke it. It is true that the accommodation is not magnificent, even in the towns. There is a very fair inn at Avallon, but beyond that nothing is to be looked for but the humblest fare, in the meanest sort of roadside *auberges*. There is one peculiarity of French inns everywhere which it takes a little time to get accustomed to, and that is the incessant din which goes on all day and nearly all night. Nothing can be done without a great deal of shouting and noise. At Auxerre, the soldiers with whom the town was crowded were singing and shouting until a very late hour, and after they were gone, the hotel servants appeared to be indulging themselves in a wild carousal. Towards one o'clock in the morning, just as it began to be possible to think of going to sleep, I noticed a strong smell in my room of something burning. I thought that the smoke was coming in from an open window, and paid little attention to it, but gradually it increased, and presently I heard wild scurrying of feet in the passage and a number of excited voices all shouting away at the same time as hard as they could go. I opened the door and found the corridor and staircase full of smoke, while a number of Frenchmen were running hither and thither in a high state of excitement. Clearly there was a fire somewhere or other, but every room was searched without leading to its discovery. Two or three of us went up to the next floor and opened every door, the landlady following, wringing her hands and crying, the cook bringing up the rear in his night-shirt, but with his white cap on his head in readiness for any emergency: a French cook, apparently, never takes off his white cap, even when he goes to bed. By following up the scent we at last came to the room where all the mischief was going on. It was full of smoke, but the occupant was calmly asleep, and when we burst in he sat up in his bed with a stupid look of surprise, neither smoke nor noise having in the least degree disturbed him. He was one of the waiters and had gone to bed with a lighted candle, without a candle-stick, by his side. In due time that had set fire to the chair and the clothes which were lying upon it, and the smouldering mass was sending forth a volume of smoke which almost blinded one, — but the *garçon* did not mind. He would have slept through a bombardment of the house. Who would not envy so great a gift of sleep? A commercial traveller to whom I spoke as I was going off at seven o'clock told me that he had heard nothing, and yet the hubbub near his door was loud enough to rouse all the Seven Sleepers before their appointed hour had come.

Between Auxerre and Avallon, the scenery begins to assume a little of the true Morvan character; the flat plains, monotonous and dreary, melt away into hills, and tracts of forest become visible in the distance. The vineyards are extensive, but the green and healthy appearance which they ought to present will be looked for in vain

this year, for there has been no summer in France and the grapes will not ripen.

A long gray street at Avallon leads to a little market-place, with a short double avenue of limes at one corner of it, and at another corner stands a house with the familiar sign of "*Au pauvre diable*" over the door. There are some interesting old houses here and there, and while wandering about in search of more, the traveller will come suddenly upon a terrace from which there opens up a view such as few towns in France or anywhere else can boast of. We stand on the edge of a cliff, at the foot of which, five hundred feet beneath, a beautiful river, the Cousin, winds in and out among tree-covered hills, with an old bridge across it, and quaint little houses dotted about its borders. A vast panorama of exquisite hills and valleys unfolds itself beyond the river, and the dark forests of the Morvan compose such a background as must fill even the most ambitious and most accomplished artist with despair. Every hillside is covered with a lovely wood, and when the sun lights up the scene, as it does every now and then even in this weather, no pen or pencil could give the faintest idea of its charm and beauty. It would be almost impossible to be placed in front of so enchanting a landscape without being seized with a desire to penetrate a little farther into it, and if weeks, or even days, are not at one's disposal, the best thing to be done is to make good use of a few hours, which ought to be left open in the most hurried of journeys for Avallon. The traveller would cover himself with disgrace if he came as far as this without making his way at least to the capital of Le Morvan, the ancient town of Vézelay, with its glorious abbey church standing on the very summit of a noble hill in the midst of wild crags and forests through which there wanders another beautiful stream called the Cure.

There was no great difficulty in getting what is called a "bréach," or break—in reality an old wagonette—close by the Hôtel de la Poste at Avallon. We had come on breakfastless from Auxerre, but the traveller who arrives anywhere near mid-day at a French inn may be tolerably sure of finding something good to eat. The *déjeuner à la fourchette* is an elastic meal; it ordinarily begins at eleven and goes on as long as anybody drops in to partake of it. At Avallon, within five minutes of our arrival, a very fair soup was handed to us, followed by a dish of pike, another of rabbit, *à la chasseur* (very good), and that again by a tender *poulet* with fried potatoes. May the friendly reader never have to sit down to a worse breakfast than that!

The coachman in his blue blouse was waiting for us at the door, with a pair of white horses which he declared he had bought recently in Paris. Their appearance would not have warranted him in giving a very high price for them, but they did their work very well, and hard work it was, for the roads to Vézelay, from whatever side it is approached, run chiefly up-hill. A very striking view of the town is gained at a distance of a mile or so, set in a framework of vine-covered hills, with the spire of the old church towering high above the sloping roofs of the picturesque houses. The first village which we pass through is called Pontaubert, and it is very much like all the other villages along the road—a collection of miserable-looking cottages, most of them in decay, with old crones sitting at the door, gazing vacantly down the street, or perhaps knitting woollen stockings for the winter, which in this district is very severe. We were still at a great distance from Vézelay when the towers of the abbey church came fully into view, standing proudly on the top of what the Morvan people call a mountain, just as Gilbert White described his favorite Southdowns as "that majestic chain of mountains." Hither, in the middle ages, came crowds of pilgrims to pay homage to the sacred relics of St. Marie Madeleine, to whom the church is dedicated. St. Louis and other kings of France made the pilgrimage to Vézelay for this purpose; but in 1569 the Huguenots seized these relics and burnt them in the market-place. It is clear, indeed, from the immense size of the church that Vézelay must have been a place of great importance, and it is upon record that in 1145 St. Bernard preached a crusade here to an immense concourse of persons, and that in 1190, Richard Cœur de Lion joined his forces with those of Philip the Second and that 100,000 men were assembled on the plains of Vézelay. But none of the ancient glories of Vézelay remain except its church, the streets are silent and deserted, and a small local guide, which I bought at a wretched little general store sorrowfully confesses that it will not be long before "Vézelay will become a deserted town, having nothing but its ruins to offer to the contemplation of the philosopher and the historian." But the artist will always seek out Vézelay as one of the most attractive spots in all France, for almost every inch of the country has a peculiar beauty of its own. At a turn of the road, a couple of miles or so from the church, I noticed a little field-path which appeared to be worth pursuing. The driver told me that the *sentier* would lead across to the main road again, and therefore I speedily jumped out and followed it. It led among beautiful wild flowers and over rocks to the very edge of a high cliff, beneath which flowed the River Cure, dancing and sparkling in the sun like a stream of silver. It was not unlike some of the prettiest dales in Derbyshire. From this point the road winds round and round until we reach another squalid village at the foot of the hill on which Vézelay stands, where there is a very curious old church called St. Père-sous-Vézelay. Time has imparted to the exterior all sorts of rich colors, and the porch once sumptuously decorated is now fast crumbling away. Everything within and without is fallen to decay, but the church is still a

grand edifice, worthy of a better fate than to be left stranded and forsaken amid a scanty population of old men and women bent double with age and infirmities. Such a collection of withered and wrinkled human beings I never saw in any one place before. Then one ascends by a steep road to Vézelay, and at last the long roof of the church with its grand towers stand before us—an object of the deepest interest to any man who has the slightest appreciation of architectural triumphs or any reverence for the associations connected with the early Christian churches of France.

Fancy a church 404 feet in length and 70 feet in height placed at the summit of a lonely hill in the heart of a forest district, where the people, according to French authorities, are to-day but a few steps removed from barbarism! It would be difficult to bring a hundred men now within the walls which would contain at least 5,000. The building is of exquisite proportions, but it has been restored by M. Viollet-le-Duc, and he was a gentleman who went about the work of restoration with no gentle hand. He made all things that were old look as if they were new. The Norman arches have all been refaced, and the mortar has been picked out with a dark color, so that the edifice looks as if it might have been built last week. The "narthex," which has helped to make the church so celebrated, dates back to the eleventh century, and is adorned with some beautiful twisted pillars and a variety of rich carvings in stone. From a gallery above this there is a superb view of the whole interior—a sight not soon to be forgotten. I mounted up to the top of the tower, and from the outside, there was the whole of the Morvan spread before one, and many a league of wild and beautiful country, the blue hills in the distance completing a picture which no one can ever forget who has had the good fortune to gaze upon it. The grandeur of the position of Vézelay can only be fully realized by those who have taken the trouble to climb up the ladders which lead to the outside of its highest tower.

Full of wonder and admiration we bade adieu to this marvellous structure and sought some modest refreshment in the *auberge* of the village. We asked only for bread and butter, and that was soon obtained, together with a bottle of the sourest wine I have ever yet come across. The thirstiest of travellers would find a little of it go a long way. But one does not come to such a place as this to think about eating and drinking. It is not possible to live upon scenery alone, but the charms of Vézelay are enough to subdue the meaner appetites for at least two or three hours. And less than that time sufficed to carry us back to Avallon, whose spires and houses were shining in the rays of the setting sun like the celestial city which Bunyan saw in his dreams. A day spent in scenes such as these is not likely to pass from the memory until all other things fade away from it.

THE ILLUSTRATIONS.

PUERTA DE DOCE CANTOS, TOLEDO, SPAIN.

[Chromo-lithograph.]

THE Moorish gateway here shown is situated at the left of the Bridge of Alcantara. The gateway in front, ornamented with the arms of Charles V, was built in 1575, by Philip II. Several persons have asked for more particulars concerning these German prints than were given in our issue for November 25; this, we regret to say, we are unable to give. The only further information we possess is that they were obtained, quite by chance, in Europe some fifteen years ago.

SKETCH IN ROUEN: CHURCH OF ST. LAURENT. BY ANDREW T. TAYLOR.

[From the Builder.]

The Cathedrals, St. Ouen and St. Maclou, Rouen, are pretty well known to all travellers, but the church, with its interesting tower of St. Laurent, most of which dates from the fifteenth century, standing in the Rue de l'Hôtel de Ville, is not so well known, and is often overlooked by the hurried visitor; but it will well repay a visit. The church is desecrated and abandoned to ignominious uses, and it is but the wreck of its former self, but the tower still rears its head, shorn, indeed, of its tiara crown, but beautiful still in its bold, open tracery and pinnacle work; airy, yet strong in its construction, and full of a subtle play of light and shade.

EBENEZER CHAPEL, DEWSBURY, ENGLAND. MR. W. HANSTOCK, ARCHITECT.

[From the Architect.]

The new building will be 87 feet long and 54 feet wide. The plan of the chapel is a simple oblong, without any projections in the shape of transepts, etc., whatever. The entrance is in the centre of the front gable, consisting of two doors 4 feet wide, each opening into a corridor 8 feet wide; the corridors are divided with swing doors so arranged that all persons must pass through three swing doors before entering the chapel proper. The internal dimensions of the chapel are 69 feet long and 47 feet 6 inches wide, exclusive of organ chamber. There will be two aisles in body of chapel, the seats in centre being straight and those at the sides splayed. The organ chamber is recessed from centre of end of chapel, and is 20 feet wide and 13 feet deep, the ground floor vestries being on each side of organ chamber. The rostrum pulpit is directly in the centre of the organ chamber, and the choir-stalls are treated in an original manner for chapel work by placing them on each side the rostrum, and forming the sides of communion, so that they will

sit face to face, similar to the choir-stalls in the chancel of a church. Galleries will continue along each side of the chapel quite straight, and the gallery over entrances will be much deeper for children's seats. The chapel floor falls from front entrance to rostrum slightly. The roof is all in one span, but divided internally into nave and side aisles, and the clerestory arches are supported by ornamental cast-iron columns. The height from floor-level to eaves of roof is 27 feet, and from floor-level to apex of roof 51 feet. The style of architecture adopted throughout is Decorated Gothic of the thirteenth century. The whole of the front gable is out of the best white Holmfirth ashlar, and wallstones clean boasted. The slating will be the best Westmoreland with dressed stone ridges. The wood-work throughout will be of the best quality of pitch-pine, which is intended to be varnished. The accommodation in all is for 836 persons, allowing 20 inches for each in length, being 436 in the body of the chapel and 400 in the galleries.

ST. NICHOLAS, FAMAGUSTA, CYPRUS.

[From the *Building News*.]

The letter from Cyprus published in our last issue will lend an interest to the Cathedral of St. Nicholas, which was greatly injured by the Venetians but still retains much beauty. The style is a somewhat late type of Decorated, some portions being almost Flamboyant in character. It consists of a nave, with aisles, of seven bays, having four-light side windows of two stories, and at the west end low towers on either side, rising one stage above the roofs, and three doorways. At the east end both nave and aisles end in semi-octagonal chevet-chapels, and on either side two chapels project from the eastern portion of the building.

SKETCHES FOR THE INTERIOR OF THE NEW CLUB-HOUSE, GLASGOW. BY MR. T. RAFFLES DAVISON.

[From the *British Architect*.]

CAMPANILE OF AN HOTEL DE VILLE. M. RONDIER, ARCHITECT.

[From *Le Moniteur des Architectes*.]

DESIGN FOR THE SIDE OF A DRAWING-ROOM. — FIRST PRIZE.

[From the *Cabinet Maker and Art Furnisher*.]

HOUSE FOR MARCELLUS WALKER, ESQ., COHASSET, MASS. MR. W. E. CHAMBERLAIN, ARCHITECT, NEW YORK, N. Y.

ARMORY OF THE FIRST REGIMENT NATIONAL GUARDS, PHILADELPHIA, PA. MR. J. H. WINDRIM, ARCHITECT, PHILADELPHIA, PA.



AN ANNIVERSARY: DECEMBER 9, 1881.

THE CURSE ON THE RING THEATRE.

"A curious incident happened to me to-day as I was passing the spot. I saw an old man, with a white beard, constantly trying to break the ranks of the soldiers and police before the theatre. I heard him call out, 'I knew my curse would some day be fulfilled.' This he repeated constantly. I followed him through the crowd, and asked him why he said this. He exclaimed, 'Don't you know that this very spot, now a great grave, was the scene where, in 1848, nine revolutionary martyrs were shot. My son amongst them stood where now we stand. On the spot where later the theatre was, there was a ditch before the barracks, and earth-walls called the Glacis, now the Ring-Strasse. There I stood while my son in the ditch with eight others was shot by the soldiers. Many other people were shot. Some time later, during the assault of Vienna, I saw some falling and cursed the spot, and knew I should not die before my curse was fulfilled.' On leaving him I inquired further. I find his story was true. There really was a spot before the barracks where many were shot and hanged, and it was thought by many when the Square and Ring Theatre were first built that the spot was

¹ From the *Fortnightly Review*.

unlucky." — *Standard Correspondent writing from Vienna, on the evening of December 11, 1881.*

SENEX loquitur.

I.

This is my hour; it has come, it has come; and, at last, I can say, Vengeance is mine for the hell, for the horrible hell of that day: The balance has swung to my hand, I am paid for the travail of years:

This is my hour; I have lived for it, watched for it, sought it with tears.

II.

Who are you that have come, without calling, to pry and to hear what I speak?

Magyar you are not, I know, and you scarce look like Austrian sneak;

Englishman? What would you have, sir? The meaning of words that I raved?

Nay; you endure not denial. It matters not; surely I've braved Fate-buffets oft; shall I crouch to you now, shrink my secret, I quail Now, when to-day my life-longing is crowned? No; I'll tell you my tale.

III.

Look at the flames that leap yonder, upraised, and in mirth storm the sky.

Who made that death-dance? I'll whisper your ear: it was I! it was I!

Music, the throngs, and the theatre; sudden the blaze, the hot rush; One breath of silence; then scarcely the strongest escapes from the crush.

Weak, all alone, I have feasted these revellers; I am the bell Startling the dissolute city from sleep with a clamorous knell.

Hark to the shrieks, and the terror, the mourner's moan; little they know

I have decreed them this doomsday, or how my heart warms with their woe.

None of those red-hearted fellows, that roar and rejoice as you see, Thrills with the tempest of gladness this day's deed has shed upon me.

Truly they joy in their liberty, whistle their freedom-song shrill; My rare delight is more perfect; I've gained my desire; got my will.

Look, how they laugh to me, calling, "You gave to us life;" do you hear?

Hark how they talk to each other, each telling my tale to his peer.

IV.

No, I am not mad, though you deem so, I see, by your pitiful smile: (Well! if I am, I have trod the same way for a desolate while:

Years upon years; oh, so weary of waiting! for thirty and more; Ever the pain at my heart, and the patience, and hungering sore)

No, sir, no dotard am I: this, my work of the night-watches, few Others who ever have dwelt on our earth, or shall ever, could do.

Never a brand have I borne to light up the funeral pyre; Never a match struck, nor cast on the ground; no, nor fanned at the fire.

Nothing of these have I done, and yet no one has wrought this but I. Listen, and know Fate is fast to the hours, while ages roll by.

V.

Look you around on this place, as you can through the gloom where we stand;

Here, years ago, there was brought, in the gray of the morning, a band,

Fettered, but free in their chains; as the day dawned with joy-bringing breath,

Here, as the warm world was pulsing to life, they were driven to death,

Nine to be shot; and their sin? They had wrestled for liberty; one, Bravest of all, and best prize for the hunters, a hero — my son.

Ay! you may scorn the pale jackets; but spare the worst hate that you have

For a curse on the strength of that stench in the nostrils of Europe, the Slav.

Faugh! To be choked by those buzzards, whose ravin is red o'er the world —

We, who have highest descent of all peoples, who else had unfurled High on the ramparts of Hungary's cities, the standard her own;

Beat down the Austrian Eagle, and tottered the Austrian throne. O that all Europe would band, to cast forth from its borders that race —

Muscovite, Servian, Bosnian, all to blot out by God's grace!

VI.

Pardon — I'm old, and my talk runs away from my keep, and grows wild.

Back to my story; how say what I must? Quick — they slaughtered my child.

None had I other ('tis age that unmans me), his mother was dead; There he lay life-lorn, with face, oh, so white, and with vestment so red!

I—how it hisses, the fire—shadow-sheltered from spies, saw the crime;
 Stayed, having seen it, as swooned, with no count of the passing of time;
 Till, creeping forth in the dusk, I shivered, as fronting me lay
 Blood from the corse on the ground—a black blot in a silver moon-ray;
 Outstretched my arms, and, with voice loud and long, pealed a prayer to the sky,
 Sobbing and gasping on God to grant to me, ere I should die—
 Ere I should die and go down to the grave and the dust of my boy—
 One hour of vengeance unmeasured, revenge without let or alloy;
 Set then my gaze toward the rampart, ghost-haunted, and—dumb
 for a space,
 Passion-throttled—found speech, and, with hand held aloft, craved
 a curse on this place.
 Still shone the stars, and the dim rack of night sped through
 heaven, and no sign
 Came, bringing word that my plaint had found way to the dwellings
 divine.
 Nay, but I knew all the while it was sealed; nor have once been
 afraid
 That the high God had not heard in His house, and would grant
 what I prayed.
 He has helped in the wail of these mothers and widows who grovel
 on earth
 For the cinders and wrecks of the fury that fell on the midst of
 their mirth.
 Look! the red demon outlying, the ruin, and say if I lied
 Then, when I told you this death-dance was tuned to my music, who
 cried
 Loud to the God who has heard me, and made for my answer this
 fire.
 Praise to the God who has heard me, and bodied my dream, my
 desire.

VII.

Ask you, aghast, "Do I dare to declare this destruction from God?"
 This He can work who can mantle the firmament o'er by His nod;
 Tear up heaven's face with the clash of His clouds, rouse the ship-
 shattering sea;
 Rend the wide earth, till it yawn and devour. He has done this
 for me.
 See you: they slaughtered my son, shot him down like a dog; shall
 not I
 Reckon Him righteous and just who gave heed to my masterful cry?
 Nay; you are wroth. I but mock you with arrogant words, and
 blaspheme,
 Crying, "This ransom from God; this my recompense?" Think you
 I dream,
 Knowing this furnace was kindled and blazed for the death of my
 son?
 Hundreds of souls shrivelled, say you, no equal atonement for one?
 Lo! the meet measure is full to the brim, and is bounteous as late.
 Year upon year, for this day, with my hope I was suffered to wait
 Till that the hour that is come should be here, and my prayer should
 be blest.
 Now it has come, even now; I have seen it, and go to my rest.
 Talk not to me from your book-lore; I'm naught of a scholar; these
 eyes
 Read but the earth, and the day, and the darkness, and look of the
 skies.
 God never fashioned this fire, so you say; but however it be,
 He who has sent me revenge is my God, and a good God to me.
 Now from the dust I am lifted; day breaks, and all seems to me
 right.
 Faintly the flames flicker down. My story is told you; good-night.

PROGRESS OF THE STREET STEAM-SUPPLY IN NEW YORK CITY.



cantile community is well-nigh exhausted. The spirit of rivalry between the companies has been carried to the reckless extent of doubling the lines of pipes in many streets, to the detriment of all other

franchises and interests without giving satisfaction to the takers of steam.

Although there may be competition wherever there are rival lines as well as the cutting of rates, the gain is not equal to the nuisance of the continued disturbance of the streets and increased temperature of the water-supply from the proximity of so many steam-pipes.

Is there not room enough for the expansion of two live steam companies in our great city without doubling up their lines of steam-pipes under our streets to the detriment of all other interests?

The blockade of the streets alone by one company is a nuisance, and what must it be when the rival company repeats it; but when packings blow out to such an extent as to fill the streets with steam and jeopardize life, it becomes time to suspend the extension of the lines, and endeavor to perfect the work already done.

The general plans of distribution of the two steam companies are nearly the same, but the details of the laying of the street mains vary somewhat. The flange packings of the New York Company are corrugated copper gaskets or washers. These have so far proved the best that have been tried, but the paper-gaskets upon the valve-bonnets have been the cause of several blow-outs. The expansion joints of this company are disks of copper fastened by their inner edge to the end of a line of pipe, and by their outer edge to a short flanged cast-iron cylinder, making a flexible joint upon the same principle as has been so long in use upon the main steam-pipes of our large steamers; the same arrangement in principle being also in use for accommodating the unequal expansion in the steam and exhaust connections of large cylinders.

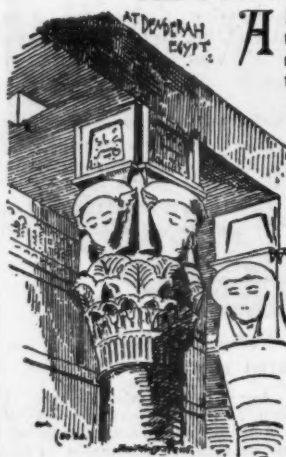
This class of expansion joints have had a long trial, and have been found faultless for small variations, but having so little range they are hardly a criterion by which to judge of the success of the copper ones, which are subjected to much strain and flexure. The line-pipe is felted or covered by a thickness of about two inches with mineral wool, the whole being inclosed in a case of wood, made by boring out large logs and splitting for the convenience of inclosing the pipe and inserting the felting; the whole being made as nearly impervious to water from the outside as possible by asphalt felting.

The flange packings of the American Company, as we hear, were at first made with gaskets of compounds of rubber, plumbago, and other materials, a variety of which are made under various patents. They are too plastic, and are liable to give way under pressure and heat before they become set or vulcanized, and therefore require setting up by the screws or bolts for some time previous to closing the trenches. A few hours' testing with an inadequate supply of steam upon small sections is entirely insufficient for perfecting the joints. We understand that asbestos is being tried as a packing, but we fear that it is too frail a fabric to stand the continued pressure and the flexure from large and rigid pipes.

The line-pipe of this company rides upon friction rollers within a box of heavy plank, which is thoroughly treated with coal-tar, the top and bottom of the box being laid crosswise and filled in with pulverized charcoal.

The expansion joints are of the sliding type, made of brass or composition, with brass bearings. They have a great range, and therefore require a less number in a given distance than those of the other company, but the packings require frequent attention. — *Scientific American*.

THE DURABILITY OF BRICKS.



A REPORT on the general question of the properties which glazed bricks should possess was lately issued by the Hanover Architects' Society, and touching as it does upon many points more distinctly affecting the manufacture of such bricks than their use in building, it is not surprising that the subject has been taken up in a practical manner by a leading organ of the German plastic industry.

In a somewhat elaborate treatise on the question in the *Thonindustrie Zeitung*, Herr Kühne disputes the assumption that no progress had been made in this class of work until the fourteenth century, and brings forward many interesting facts to prove the diversity of the processes now in use in the manufacture of glazed bricks; also elucidating from the point of view of the brick manufacturer some of the questions raised as to the most suitable and economical method of applying the glaze.

He brings forward some arguments of weight in order to disprove the theory that the work of the Middle Ages in this particular branch was more free from crazing, and consequently more durable, than the productions of our own times. He is quite ready to admit that such specimens as have been preserved are models of careful workmanship, but asks whether any positive proof exists that all the work contemporaneous with that which has come down to our day, was equally perfect.

In his remarks on the subject, Herr Rühne goes farther than the Hanover Architects' Society, and discusses at some length the question as to what are the influences which a brick is expected to withstand during a long series of years, or even during the lapse of centuries. He records the fact that weather usually affects bricks in consequence of the changes of temperature which occur, and the formation of ice which is thus induced; as also by the influences of rain-water and of gases which may habitually or accidentally be found in the atmosphere. These attacks are thus of a chemical as well as of a physical nature. The chemical influences are such as are connected with decomposition through the action of carbonic acid and other gases in the atmosphere, and by the dissolving or removal of particles of stone by rain-water. The crystalline salts which sometimes appear upon the surface are, it is remarked, mostly produced under circumstances which are injurious to the durability of the material on account of the increase of volume which takes place. The danger is all the more real because, at the next fall of rain, these crystals return into the material in a state of solution, and when dry again become crystallized, thereby producing a splintering effect. Although scarcely noticeable in the first instance, yet the continued repetition of the process which is induced by every shower of rain constitutes a destructive agency which, according to Herr Rühne's theory, is capable of causing the decomposition of a brick when a sufficient quantity of these salts are present in it.

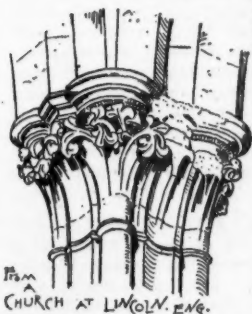
The effects of frost, though of a similar tendency are, he remarks, more of a mechanical character, as the extension of the volume of water through freezing operates towards the destruction of the brick. In spring and autumn the extension and contraction of bulk, caused by the wide range of temperature comprised in the daily thermometric variations, are specially calculated to affect the portion of the brick nearest the surface. These various influences of a more or less destructive character are rendered specially effective by any irregularity in the resisting properties of the substance of the brick, which should be homogeneous and free from stones, lime, or similar foreign substances. Homogeneity further implies an equal tension throughout the brick. In machine-made bricks it is remarked that it is by no means unusual to find on the outer surface a layer of finer-grained material than in the other portions. In fact, it is urged, that for purposes of a monumental character machine-made bricks should not be used, more particularly as glazed bricks. Hand-made bricks, it is considered, should be moulded and heated in general with due observance of special measures of precaution when durability for a period of several centuries is expected from them.

When frost sets in, such congelation as may exist within a brick that is glazed, is by that fact prevented from following out its natural course of extension in the only direction in which it is not closed in. Thus, it is argued that a glazed brick is exposed to a more severe test than an unglazed one, with the result of the forcible destruction of the glaze in some instances. The inference is drawn from this fact that the position of glazed bricks in a building has a certain influence upon their durability, and various facts are quoted with a view of proving that too much must not be expected from them.

In conclusion, Herr Rühne draws from the foregoing explanations the following theoretical and practical inferences:—

1. Weather-proof bricks must not contain any soluble salts; and their formation, as well as their baking, must be carried out so as to ensure this result.
2. They must resist the attacks of carbonic acid in a fluid state. Their porosity must not be too great, and the disposition of the pores must be uniform, the bricks being thus rendered homogeneous. The porosity of glazed bricks must in particular be as small as practicable.
3. The baking must be of such a thorough nature as to resist the extension which may result from congelation. The substance of the brick must be as tough as possible, and not brittle or glassy in its character.
4. The co-efficient of extension must be low, in order that a change of temperature may have as little influence as possible on the interior of the brick. — *The Builder*.

A FIRE-PROOF STRUCTURE.



THE fire-resisting properties of brick, concrete, iron, and asphalt, although acknowledged, are not always employed to the best advantage, and it is in the judicious combination of those materials that success is to be achieved. A new building has just been erected in the rear of the Natural History Museum at South Kensington, intended as a spirit laboratory or store, which is worth notice for the manner in which the materials have been used, and the means employed to check fire. The very inflammable nature of the spirits employed in preserving specimens rendered it necessary to construct an insulated building with the appliances requisite for an immediate subjection of flames. We may explain this new building or store as a plain parallelogram-shaped

structure, with a basement about 154 feet in length, by 53 feet in width, built of white brick with terra-cotta dressings. The principal area is divided by two rows of cast-iron columns which support the girders carrying the roof. Round the walls are arranged cases, and the floor is perforated by a number of openings with iron gratings above the basement, the object of which is to drain off the water and diluted spirit which may be poured into the building in the event of a fire. The walls are pierced on both sides by numerous windows of rectangular shape placed high up, and below these the cases will be placed. Around the walls, at intervals, hydrants will be fixed outside, with nozzles below the windows and above the cases; so that, in the event of conflagration, water may be turned on, and the whole building flooded. The surplus water will be drained off through the gratings in the floor, and a thick layer of ballast in the basement will absorb the water and spirit, and so extinguish the flames.

The construction of the building is worthy of remark. The columns, as we have said, are of iron, and these are hollow, and surrounded by wire netting, fixed on wooden fillets, to form a "key" for the plaster and fire-proof cement with which they are encased. The iron columns will thus be protected from the action of the flames and the air-space and cement will keep them comparatively cool in the hottest flames. The columns have capitals of good design, and carry iron girders which are similarly encased with wire netting and cement below the bottom flanges. The roof, which is quite flat, is constructed on iron rolled I-girders, placed 5 feet apart. Between these, flat, segmental cement-concrete arching is constructed, turned upon centres, allowing a thickness of about 5 inches at the crown of each arch, and formed to a curve of about 1 inch in 6 feet. Gutters are formed all round, and a parapet of brick surrounds the flat. To insure a thoroughly water-tight and fire-proof roof, the authorities have laid it with Claridge's Pyramont asphalt, a material which has been found to be as impenetrable by flame as it is impervious to wet. We find, from an examination, the whole roof is covered with an inch layer of Claridge's asphalt, laid in two thicknesses to a fall of about 3 or 4 inches from the centre each way. The gutter, about 12 inches wide, is lined by the same material, with outlets, and the flashing is formed also by asphalt plates 1 inch in thickness, with angle fillets where it joins the gutter, and weathered at the top edge, where it is made to enter a groove or cut sinking in the brickwork as a check to the entrance of wet. The chimney-stalks are flashed in the same manner, and throatings are formed wherever necessary. The whole surface presents a firm, clean appearance, the top coat being covered by a layer of sea-beach grit, which gives a finished and pleasant foothold to the mastic. About 8,000 feet superficial of roof has been covered by the Claridge's patent asphalt. We were pleased with the capital surface and neatness of finish of the gutters and flashings, which surpass lead-work and afford another instance of the successful adaptation of the asphalt of this firm. The work has been well executed by the company's men, under Mr. Farrell's superintendence. Architecturally, there is not much to notice: the windows are finished with terra-cotta dressings and flat heads formed of blocks with radiating joints, joggled together. The plinth has a course of terra-cotta with a simple splay below a roll; a string-course of the same material gives a little relief below the windows, while above them there is an effectively designed terra-cotta cornice or corbel-table, with copings of terra-cotta on the parapets. When the Natural History Museum was commenced there were misgivings as to the success that would attend the use of terra-cotta on a large scale. It is satisfactory to find a considerable improvement in the manufacture, and the cornice and string-courses of the building we have described are evenly burnt and truthful in line. Mr. Alfred Waterhouse, A. R. A., is the architect, Mr. G. Shaw, the builder, and the building has been carried out under the supervision of Mr. Alflatt, foreman. — *The Building News*.

THE \$3,000-HOUSE COMPETITION.

NEW YORK, N. Y., December 14, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—In your competition for a small cottage, do I understand that the architect is to sign his name or cipher; also, what is the arrangement in regard to returning drawings.

Yours respectfully,

H. HUDSON HOLLY.

[As usual in these competitions, drawings are expected to be signed in cipher. All drawings are returned after criticism and publication of the most noteworthy.]

As it is some time since we have published in full the regulations governing these competitions, we here repeat them:—

REGULATIONS.

1. Every competitor, by taking part in the competition, signifies his willingness that his design be published in the *American Architect and Building News*, if the editors desire to publish it.
2. Each competitor is to submit two drawings, each measuring 14" x 22" within the inner framing line, the drawings being executed in pen and ink, on smooth white paper, in a manner suitable for reproduction in this journal.
3. The authors of the successful designs surrender to the publishers all property right to their respective drawings and designs.
4. In awarding the prizes heed will be taken of the manner in which the programme has been followed, the excellence and appropriateness of the design, and the execution of the drawing.
5. Each competitor is requested to sign his drawing with some motto or simple device, which can be recognized from its verbal description, and to

enclose to the editors, together with his *nom de plume*, his real name and address.

6. The drawings are to be received at the office of the *American Architect and Building News*, 211 Tremont St., Boston, Mass., on or before Saturday, January 13, 1883.

7. Drawings which are received after the day named will be excluded from competition, but not necessarily from criticism and publication.

A CORRECTION.

WEST GRANVILLE, N. Y., December 11, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—In the last number, No. 363, p. 283, under the heading of *Monthly Chronicle*, it says, "November 10, a magazine near Troy, N. Y., containing four tons of powder explodes. No one hurt." I think this is a complete misstatement: it should read, "A magazine attached to the lime quarries, at Smith's Basin, Washington Co., N. Y., containing four tons of giant powder explodes. Two men killed." Without a shadow of a doubt this was the accident referred to, as the place is not very far from Troy, N. Y. Of the two men killed, a hand and shin-bone only have been found.

Why was no mention made of a "House near Philadelphia," p. 267, No. 362. It is a gem, and I eagerly looked for some description.

Yours in haste,

H. F. CONE.

A PROBLEM IN HOUSE DRAINAGE.

48 GILFILLAN BLOCK, ST. PAUL, MINN., December 14, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—A problem in drainage is puzzling me, which I would like your opinion upon:

I have to put in the foundations for a large house here that will unfortunately come directly in a clay stratum of indefinite depth, underlying the entire site of the house as well as the surrounding neighborhood. There is no sewer to drain to, and the ground is quite level, affording no opportunities for drainage anywhere.

The problem with me now is: How am I to obtain a dry cellar, and what shall I do with my house sewage?

If you will kindly answer the queries in your next issue, you will greatly oblige,

Yours very truly,

C. C. C.

[We should set the house as high as possible, say four and a half or five feet above the present ground level, and bank up around it with all the material excavated from the cellar, leaving about two feet of underpinning exposed, and giving the grade a long slope away from the house. If the cellar is eight feet deep in the clear, this will bring the floor of it three or three and a half feet below present grade. The foundation should extend two feet below this. For a wooden house, the lower eighteen inches of the foundation walls should be laid dry, either in stone or very hard brick, beginning the cement or mortar wall about six inches below cellar-floor. A reservoir will thus be formed beneath the foundations, which will keep the cellar-floor dry under ordinary circumstances. Cross-drains of tile or "French drains" may be laid across the cellar to connect with this main reservoir, if the house is very large. Outside the wall it will be necessary, to avoid dislocation by frost, as well as to keep moisture from contact with the wall, to fill in a few inches of gravel or cinders; but the surface of this should be covered with clay or loam, well rammed, and sodded or concreted, so as to throw the water which will run down the sides of the house in heavy rains away from the wall at the foot, as otherwise it will collect in the narrow pocket of gravel or cinder filling, and burst through the wall or overflow the reservoir beneath the foundation.

These precautions will probably be sufficient, even in a very heavy clay, unless the excavations should cut through a spring, or a vein which might become a spring in rainy weather. In this case the spring or vein must be traced to some distance from the house, and intercepted by a trench, sufficiently long and deep to dispose of all the water running into it. The trench may then be filled nearly to the top with gravel or rubbish, and covered over with loam.

For disposing of the house sewage, the most satisfactory device in such a soil is the subsoil irrigation now much practised. For this purpose C. C. C. must remember to have no plumbing below the first story, as the fall must be continuous from the lowest trap to the irrigation pipes, ten inches below the surface. A flush-tank should be placed in some part of the line, with a grease-trap between it and the kitchen sink, and a collecting reservoir of brickwork in cement will be necessary.

Further details of this system may be found in former numbers of this journal. For such a house as C. C. C. mentions, about 1,000 feet of 2-inch sole tile will be needed for outlet-pipe. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

REAL-ESTATE SALE IN CINCINNATI. — St. Paul Episcopal Church, located on Fourth Street, east of Walnut Street, was sold at an auction, on 14th inst., to Thomas Emery's Sons, for \$85,586, being \$1,301 per front foot. This sale was a voluntary one on the part of trustees of the church, and being the only piece of property sold on the principal street of Cincinnati for several years the price obtained may be set down as a fair average value of real estate here. On the next two squares west, property is probably held at a higher price; but whether it could be obtained under the hammer is difficult to say. The church lot was 66 feet 5 inches front, and 100 feet deep. The church-building is one of the landmarks of the city. Originally it was a classic structure, but was remodelled in 1864 by Mr. William Tinsley, architect, under whose pencil it was turned into a fine Early English structure. The church-building was certainly worth \$60,000, and went for nothing. What the Emerys will do with the property has not yet been developed.

ALUM WATER AS A FIRE-EXTINGUISHER. — It has been found by M. I. B. Dumas that water saturated with alum is remarkably efficient in extinguishing fires. This property is supposed to be due to the coating it gives to objects wet with it, which prevents contact with the oxygen of the air, and thus retards combustion. It is reported that, as an experiment, French firemen are to be quite extensively supplied with instruments for throwing such solutions of alum.

A NEW IDEA. — A paper was recently read before the Franklin Institute, Philadelphia, on the use of the microscope in testing timber, and it was decided that if the microscope condemns the sample further delay in testing is not worth the while. The larger the specimens requiring to be tested the greater will be the gain the microscope will effect in avoiding the cost of further proof or the risks of using without such proof. Samples and micro-photographs were exhibited of bridge timbers which had proved faulty, but which a preliminary examination with the microscope would have promptly thrown out. The timber from which these poor specimens were taken was a fragment from a railway bridge wrecked in 1879. The timber was so excessively poor that, on mounting a specimen on the plate of the microscope, its weak and porous nature was at once apparent. The annular rings appeared about three times as far apart as they would be in good wood of similar kind. The medullary rays were few in number and short in length, whilst in good wood, on the contrary, they are of considerable length and so numerous that tangential sections present the appearance of a series of tubes seen endwise, or a number of parallel chains. After once seeing and comparing samples of good and bad wood, it is easy to recognize the difference with a pocket magnifying glass. The trunks and limbs of exogenous trees, as is well known, are built up of concentric rings or layers of woody fibre, which are held together by radial plates acting like treenails in a boat's side. The rings, representing successive years' growths, are composed of tubes, the interstices of which are filled with cellulose. The slower the growth of the tree, the thinner these yearly rings, and the denser and harder the wood — other things being equal. Not only is the closeness of texture an indication of the hardness and strength of the timber, but the size, frequency, and distribution of the radial plates which bind the annular layers together may be taken as a very close illustration or sign of the character of the wood and its ability to resist strains, especially a breaking stress. The micro-photographs of good and bad timber show that in the strong kinds the concentric layers are close in texture and narrow in width, and the radial plates numerous, wide, long, and stout, while in poor stuff the opposite characteristics prevail. The practical application consists in having such enlarged photographic sections, longitudinal and transverse, of standard pieces of timber, bearing a certain known maximum or minimum strain, and rejecting any piece which the assisted eye detects to have fewer rings per inch of tree diameter, fewer fibres, or fewer radial plates per square inch of section, or to use such pieces with a greater factor of safety. The advantage of the method is that it allows every stick in a bridge or other structure to be tested before use. — *Northwestern Lumberman.*

THE IRON MOUNTAIN OF AUSTRIA. — A correspondent of one of our English exchanges, in dwelling upon the trip of the British Iron and Steel Institute through Styria, gives a very interesting account of the Erzberg, a mountain of iron ore of a very rich nature, which is bounded on the south by the valley known as the Munichthal, and on the north by the Untererzberg. The Erzberg has a very peculiar history as an iron mountain. It is about 4870 feet above the sea level, and the richest ore is found near the summit, the stone being actually quarried from the face, instead of mined. Ironstone is also found in the lower portions, but it is not so rich, and the supply at the top is so unbounded that attention is chiefly directed to the high-grade ore. No exact data are in existence as to the length of time during which the mountain has been worked. From all appearances it was well known to the Romans, and is mentioned by Pliny, Tacitus, Ovid and Horace. The exact period at which it is known that operations in search of iron were resumed was in the year 712, and ever since then, as necessity required, it has been drawn upon to meet the requirements of the time. How long it may yet last it is difficult to say, but, at the present rate of consumption, it is thought that the supply will not fail for a number of years to come. In former days the mountain was divided between a number of individuals, who carried on independent operations, but their efforts were so unsuccessful that the Emperor Ferdinand II., in 1625 managed to effect an amalgamation. Little progress was made, however, as the workmen had neither the tools nor the means at their disposal which we now have, and what ore they took out was by means of drifts, many of which are still to be seen. In later times the folly of so many different interests became apparent, and finally a large company was formed to carry on operations. Their labors have been crowned with considerable success, and the output of ore is now about 1200 tons per day. Owing to the unfavorable weather during the winter, operations are carried on only from about May to August, and the winter supply is stored in sheds in the valley below. — *Iron Age.*

SECURITY FROM FIRE IN CHURCHES. — According to the *National Zeitung* of Berlin, the Government authorities have been giving attention to the above question. It has been recommended that in all new churches the entrance and exit doors should open outwards, where there is no special obstacle to such an arrangement. When from architectural or ornamental grounds this is not found practicable, it is suggested that doors to exclude draught should be provided, which would open outwards, and that the main doors should be kept open during service time. This arrangement would be equally applicable to existing structures. The matter is being brought before the various local and ecclesiastical authorities, and instructions have been issued for any refusal of compliance on the part of the latter to be reported to the Government.

THE BRONZE STATUE OF GERMANIA AT NEIDERWALD. — Considerable progress is reported from Munich in the work of casting the colossal national statue of Germany that is to be erected at Neiderwald, near the Rhine, to commemorate the victory of Germany in the last war with France. Several of the smaller parts, including the head, have already been completed, and recently was cast the largest single portion of the work — the throne with cloak lying on it, which weighs some fifteen tons. The weight of the entire work will be not less than forty-five tons.