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CONTENTS.

WE are glad to learn that a Chapter of the American Institute of Architects has been formed in Detroit, Michigan, including a number of prominent members of the profession. It is worth remarking that the repeal, at the last Convention of the Institute, of the regulation requiring the participation of a certain number of persons already Fellows of the Institute in the formation of new Chapters has within six months resulted in the foundation of three, if not four, professional associations promising the greatest usefulness both to their own members and to their colleagues in other parts of the country. In no profession are the advantages of mutual acquaintance and interchange of ideas so great as in that of architecture. Speaking of the practice of the art merely as a business, the establishment in any place of a strong professional society soon transforms the prevailing spirit among the active architects in that place from a jealous and not too magnanimous rivalry into mutual respect and support. The misunderstandings and bitternesses which degrade the profession as much as they profit the laymen wily enough to take advantage of them disappear as soon as those who suffer from them are brought together with friendly intent, jealous detraction gives place, as soon as mutual regard has put self-interest in the background, to generous appreciation, and in the frank discussion of professional topics frequent occasions arise in which each member lends more or less of his influence to protect an associate against imposition or fraud, and is supported in the same way in his turn. Even where an architect is placed by circumstances beyond the need of the assistance of his fellows in matters of business, he has still much to gain by association with them. If he cares for enduring reputation, he must gain it by compelling his professional rivals to acknowledge his superiority, and this he can only do through his acquaintance with them, and theirs with him. If this acquaintance should show his powers to be plainly greater than theirs, his fame is safe; and if not, the way will at least have been pointed out to him for renewed exertion and success. Considered from a higher standpoint, as a means for professional instruction and progress, too much cannot be said in favor of the influence of local societies. Through the discussions, the individual conferences and special debates for which such associations furnish the means, each member is put in possession of all the information available concerning the work of the day, and questions which a single person could never answer satisfactorily or with any authority, are, through consideration in common, decided with a full appreciation of their merits, and in a manner which renders the decision respected. Lastly, it should not be forgotten that associations of architects always set the example, and lead the way, for those junior associations of draughtsmen and assistants which do so much for the profession in another way. Ambition and imitation are strong in the young, and the discussions which, with the elders, turn mostly upon the matters of practice which lie nearest their thoughts, take the form, in the draughtsmen's societies, of sketch-clubs, competitions for designs adapted to a given programme, drawing-classes, lectures on technical topics, and so on, to the immense advantage of the art and of all those who devote their lives to it.

IN incidental connection with the formation of the Detroit Chapter of the American Institute of Architects we are asked for information in regard to the practice of making adherence to the schedule of charges adopted by such bodies binding upon the members. So far as we know, no strict rule as to this matter has ever been adopted by professional societies in this country or in England. In Germany, if we are not mistaken, where the usual fees are substantially the same as here, a member of a professional society who permits himself to vary in his charges from the standard is at once expelled; but among us the established, and, as should be well remembered, legal rates, are properly regarded as minimum charges, some architects demanding and obtaining much more, so that the fact of a person's offering or consenting to accept less usually serves simply to stamp him in the eyes of the public as one whose services are inferior in value to those of the great majority of the profession. Moreover, as most private owners have sense enough to argue with themselves that ninety-five dollars spent under the direction of a competent architect will secure them a more satisfactory result than ninety-seven dollars under the direction of an incompetent one, the would-be cheap architects, in places where a local society furnishes a definite standard of rates, virtually put themselves out the pale of the profession, rarely, if ever, being employed in work of any importance, but contenting themselves, by force of necessity, to the end of their lives with third-rate drudgery, if they are so fortunate as to get even that.

THE last report of the Proceedings of the Royal Institute of British Architects contains an interesting account of the official architectural examinations in Germany, which all applicants for professional employment under the Government are obliged to pass. The examination is divided into two portions; the first being intended to follow graduation from the technical school, and entitling those who pass it successfully to an appointment as Building Inspector of Government Works. Between this and the second portion, or practical examination, two years must elapse, which the candidate must spend in constant practice of his profession, one year, at least, of the time being devoted to continuous employment in the supervision of actual work, and the successful passing of this examination confers the title and employment of architect. Candidates who pass either examination with high honor are recommended to the Ministry for a grant of a travelling allowance by way of premium. Those who enter themselves for the preliminary examination are obliged to show certificates of proficiency and good conduct during the course at the public technical school, and are then examined in physics, including the properties of sound, heat, light, electricity and magnetism; in chemistry, mineralogy and geology; descriptive geometry, projections, shades and shadows, perspective, stereometry, plane, solid and analytic geometry, trigonometry, algebra, differential and integral calculus; mechanics, composition and resolution of forces, equilibrium and motion in solids, liquids and vapors; theory of elasticity as applied to building construction; theory of surveying and levelling, and use of surveying instruments; properties of materials, elementary construction, and drawing of specifications and contracts. Besides these, the candidate is examined in graphical statics, and the determination of the stability of walls, roofs, vaults and domes; in architectural history; history of construction; and the principles of heating and ventilation. The second examination relates mainly to the application of the knowledge previously gained to the solution of problems in practice; and consists in the preparation of a design, worked out into detail, from a given programme; with a supplementary oral examination in details of warming and ventilation for city and country buildings. No person is allowed to try more than twice to pass these examinations.

WITH this examination scheme, as reprinted in the Royal Institute *Proceedings*, appears also a report of a debate upon it in the German Chamber of Deputies, in which one of the members took occasion to remark that it was "enough to make one's hair stand on end" to see what was required of Government architects. In his opinion "nobody could seriously expect young men to be thoroughly proficient in all these sciences," but it was "a mystery" to him how any

could know enough of them to pass the examination. We must confess that we do not ourselves consider a moderate knowledge of all the matters referred to in the scheme as being by any means beyond human powers; and it is difficult to see how a better selection of the studies necessary for professional training could be made. No doubt there is something lacking in the portion which relates to design, that being a branch which cannot be taught from text-books, or in any other way than by long and earnest practice, but great artists are not necessary for supervising the construction of post-offices, and those who prefer the greater freedom of private practice can perhaps devote themselves, after their theoretical examination, to the necessary practice in design, without much detriment to their professional prospects.

THERE are few architects who do not have frequent occasion to use iron beams, for entire floors, for headers or trimmers, for girders, or as lintels under walls of masonry; and all those who use metal in this shape will be interested to know that beams have recently been introduced into this market rolled from Bessemer steel in place of iron. Considering the great superiority of steel rails over those of iron, it is surprising, as we have before remarked, that the application of the same material to the purposes of building should not have been made long ago; but we are none the less ready to welcome the new beams to this country. It is hardly necessary to say that the Bessemer or "mild" steel is a very different thing from the compound used for cutting tools, being, as a rule, not very greatly superior in strength to good wrought-iron, but the process of conversion employed for the steel, in which the beams or rails are rolled directly from the solid ingot, ensures a much greater degree of homogeneity than the process for wrought-iron, in which bundles of small rods are tied together, and after heating are drawn through rollers, cohesion between the rods taking place more or less perfectly, according to the care and skill with which the heating and rolling are effected; and the steel beams are found to be considerably stiffer than the old kind. All the usual sections for iron beams are said to be now furnished here in steel, and at a price little, if at all, higher than those current for the old kind.

THE business of building in Paris has for about a year been so dull and unremunerative that the contractors begin to despair of their prospects, and much discussion goes on in regard to the best way for reviving it. The editor of *La Semaine des Constructeurs*, who brings to the consideration of such questions an unusual amount of common sense, points out as a partial explanation of the discrepancy between the cost and the profit of building at present, that during the feverish speculation of 1881 and 1882 an immense number of costly and splendid mansions were erected in the new quarter of Paris, in anticipation of a demand from the wealthy foreigners who were imagined to be flocking to the city. After the houses were built, it was discovered that the increase in the population, although large, was not due to the advent of sixty thousand millionaires, but to the arrival of about fifty-nine thousand needy persons, and perhaps nine hundred and fifty respectable people, able to earn enough to keep themselves from want; with fifty persons, more or less, able to afford the cost of the luxury prepared for them; and the consequence of the misapprehension as to the character of the immigration has been that the fifty millionaire new-comers find themselves invited to choose among a bewildering diversity of palaces, furnished with all the modern luxuries, and surrounded with conservatories, stables, carriage-houses and the other superfluities which belong to great wealth. Whole streets between the Parc Monceaux and the Trocadéro are lined with these costly structures, most of them empty, some streets not having a single inhabitant; and establishments suitable for princes may be hired in the fashionable quarter of Paris for rents which would be called modest for a good dwelling-house in New York.

NOTWITHSTANDING this over-production of palaces, the market for small tenements is but scantily supplied, and those who cannot think of affording a luxurious habitation at a very low price are compelled to pay a high price for lodgings of very inferior character. The construction of the great houses, by calling to Paris thousands of workmen, has, in fact, raised the rent of small tenements, and increased the cost of living in general, while the widespread bankruptcy in which they have involved the speculators who owned them has tended still more to increase distress among the workmen. After all, as the editor of *La Semaine* remarks, out of all the dwellings in Paris but fifty-nine thousand seven hundred would rent for more than two hundred dollars a year, while six hundred and twenty-five thousand are let for less than that modest sum; so that, judging from this indication of the spending power of the Parisians, a considerable increase in the population does not necessarily involve a lively competition for the mansions with marble staircases in the Place de l'Etoile; nor does the superabundance of such buildings involve any benefit to the tenants of the two-hundred-dollar apartments. Independent of the question of rent, however, the *octroi* and other imposts, which grow yearly heavier, with the frequent interruptions of work due to strikes and other causes, have raised the cost of manufactured articles in Paris to such a point that it is found more profitable to have doors, windows and house finish made, primed and puttied in Norway, and brought to Paris needing only to be set in place and finished. In the same way much of the rough timber framing is now done in Germany, as with us in Maine and New Hampshire; and the work, if not equal in quality to that which would be executed by the highly trained Parisian carpenters, yet holds together. What the end will be it is impossible to tell, but it cannot be denied that the outlook for the workmen of the city is anything but hopeful.

WE spoke some time ago about the "prize of Sèvres," given by the French Government for the best designs for furniture, and awarded last year, in the shape of a money premium of four hundred dollars, to a set of drawings for a sofa. By a recent decree the importance of this competition, and the value of the prizes, have been considerably increased, and the manner of conducting the trial changed. Henceforth the competition will be held only once in two years, and will be, in conformity with the excellent practice which has now become common, two-fold; a certain number only, selected from the participants in a preliminary general competition, being admitted to share in the final struggle. To compensate the latter for their increased labor, six hundred dollars will be equally divided among all who take part in the second competition, and the reward of success in this is to be a money prize of one thousand dollars. There is no second prize, but the Government, if the jury so advise, will purchase the design considered second in merit, at a price to be agreed upon. The subject for the competition of 1885 has been announced, and consists of a design for a chamber mantel-piece, including, if competitors desire to incorporate them with their design, the decoration over the mantel, and the gas-brackets or candle-branches. We advise those who deplore the state of artistic taste and workmanship in this country, as compared with that universal in France, to compare the terms thus offered for the encouragement of furniture designing in the latter country with those of the competition for the Garfield monument at Cleveland, the most important work of pure art ever undertaken on this side of the Atlantic. The cost, and the proper amount of labor and talent required for the design of the American monument is intended to be about five hundred times as great as that of the French mantel-piece, and the prize is the same; or rather, taking into account the fact that the Garfield committee hopes to form "a collection worthy of preservation" by the simple process of appropriating all the designs without compensation, while the French Government pays for everything that it keeps, besides a general payment to all the participants in the second competition, the proposed reward to the American competitors should be divided by their number, say fifty in all, making twenty dollars apiece. To put it in another way, supposing the American contest to be one for the design of a piece of furniture, instead of a Presidential tomb, and the same committee to manage the affair, the ratio which their appreciation of artistic qualities bears to that of the French jury would reduce the value of the first premium from one thousand dollars to two dollars, on the supposition that all the drawings not paid for should be returned to their authors. If the fifty hypothetical drawings were, as is proposed in the Garfield case, to be confiscated by the committee, the value of the premium to be contended for would be virtually reduced in the same proportion, giving four cents as the sum for which the Garfield managers expect to secure the same amount of artistic effort and study that is officially valued and paid for in France at a thousand dollars.

THE GALLO-ROMAN ARENA IN PARIS.

FOR several months the capital of France has been engaged in digging at the roots of its genealogical tree, and it is probable that the pride which is sure to follow judicious investigations into almost any family record will be felt by this brilliant city, when it sees at last, cleared of the débris of fifteen centuries, the arena which is to remind it perpetually of the Roman occupation of ancient Lutetia and its marshy plains. A short account of the work, so far as it has progressed, may be of interest, as the public square which the amphitheatre is intended later to form will be one of the tourist's sights in that city.

Some fourteen years ago the Paris Omnibus Company, having bought a number of adjoining estates situated between Rue Monge, above Rue Navarre, and a point west of the Jardin des Plantes, obtained from the Municipal Council a right to make a road from the northern end of Rue Geoffroy-Saint-Hilaire to the point of intersection of Rue Monge with Rue Navarre. In this space is situated a part, a little more than half, of the Arena of Paris. The other part still lies under Rue Monge and an estate on a slope of the hill called Lucotituis (Le Mont Saint-Geneviève) which is covered by the buildings of the Omnibus Company. The Council took the precaution to insert a clause in the permission for the new road, reserving to itself the right to buy back, at an agreed price, the land over which it ran.

Early in April, 1870, the Company began its work by levelling a part of Rue Monge which crossed its ground, excavating to the depth of fifteen to eighteen metres (fifty to sixty feet), and while digging on the estate numbered 37 of that street the workmen for weeks uncovered with their pickaxes enormous stones belonging to some unknown structure. They were the seats of the amphitheatre, and it was only when the outer boundaries which had held up these seats were destroyed, and the grading at that place almost finished, that the circular enclosure called the podium was recognized. Instantly there was a visitation of the works by the learned societies of Paris, which may well have embarrassed the honest Omnibus Company. Wise men, members of associations with long names, walked continually about the excavations, asking questions of the workmen, until the Committee on Historical Monuments requested a stay of proceedings, which the kindly Omnibus people granted.

Upon this the Numismatic Society, under a sudden inspiration of its president and secretaries, installed itself upon the ruins and opened a subscription there, in spite of timid suggestions about legality, and with sublime disregard of negotiations. Ten thousand visitors came to write their names on the list and leave their money. The Emperor came, the Préfect of the Seine, the honorable members of the municipal body, the French ministers, the deputies, the savants; did they not all come? And every one said it would be a disgrace to France to let their ancestors' arena be lost.

This is what the ten thousand subscribers saw in 1870: about a third of the vast oval — the form of the Roman circus familiar to us from our childhood; an interior wall, called podium, upon which were placed the first seats, forming two square chambers, probably for the gladiators; two shafts sunk in the soil, from which the relics, so far as any had been discovered, were taken; and the fragment of hillock, the former garden of the convent of English nuns, shored up like a falling house, under which the other two-thirds of the arena were hidden. The interior wall was seen to be beautiful in its simplicity. The stones were of average dimensions, united with Roman cement, and without intermixture of bricks. Two of the apartments for wild beasts were visible, with passages leading to the arena. The entire construction proved to the learned that the monument belonged to the best Roman period, about the second century of our era.

In the improvised museum put up by the Numismatic Society, relics found in the two shafts were laid in such order as was then possible. The sinking of these shafts was done in the presence of the above-named society. Though few, the relics were interesting. Prominent among them were a bas-relief, somewhat broken, and ten vases, more or less injured, of differing shapes, forming a ceramic series of all the centuries, from the red earth of Samos, of which there were really beautiful specimens, up to the glazed earths of the fifteenth century. Some of the vases were tripods, others of antique shapes now very familiar to us through modern reproduction. Two of the stone seats of the amphitheatre were placed among the relics, because each of them had upon the side some letters which are still unintelligible: on one was the legend M N P P, and on the other O C. Near these seats lay another unsolved mystery. It was a little more than half of a large skeleton, supposed to be that of a young man, with the lower limbs missing. It lay, when in the earth, north and south under a bed of stone slabs, and it gave a touch of living interest to the other suggestions of the Roman circus, as the artistic instinct almost invariably adds a vanishing human figure to a sketch of landscape. At the right of the skull, when found, lay a vase of white pottery with red decoration, the age of which was unknown, although some have maintained it belonged to the second Christian century. The only jewelry to be seen in the collection was a fragment of the rich necklace of some Gaulish lady. Its clasps were of gold, and its beads of turquoise or lapis-lazuli. Besides all this, there were several capitals and shafts of columns, and finally, perhaps most important of all, there was a series of Roman coins belonging to the reigns of Hadrian, Gordian III, Tetricus, Claudius II, called the Goth, Numerianus, Constantine the Great, Constantine II, Julian the Apostate, and Gratian.

The common people in their ignorance gazed at these relics, and the wise in their wisdom; but all were enthusiastic about the great square which the arena was to become if the city authorities so willed. The Academy of Inscriptions and Belles-lettres, and the President of the French Archæological Society were particularly "moved," as their countrymen say, by the excavations. They demanded "in the names of Science and History" the preservation of the ruin, and addressed a petition of similar import to the Chamber of Deputies. It is almost pathetic, and it is very strange to an American, to read the impassioned and eloquent words of these men and of some of the deputies, with which the subject of the arena was ended fourteen years ago. The country was standing then on the threshold of a terrible war, and when that was over many of its most enthusiastic scientists, who had spoken so well for the ancient Roman amphitheatre, were dead. The little collection of relics was hastily transferred to the Carnavalet Museum, and there they still remain.

In May, 1883, the Academy of Inscriptions, hearing that the garden of the convent was to be excavated, through a committee petitioned the Municipal Council to take measures to preserve the arena. The interest of the ignorant had flagged, perhaps, a trifle, but the scientific spirit returned patiently to the charge. There were more speeches, and when, early in August, the Council made known to the Academy that a great part of the ruins of the arena would be acquired by the city, there were many ceremonious thanks to the different departments. A sum was granted by the city for the undertaking, which was confided to M. Wacquer, the Chief of Works, an able man for the task. The Academy was invited to name those under whom the excavations should be made, and a committee from that society accordingly superintends them.

M. Wacquer, in October last, having decided upon the exact place where the continuation of the podium should be, sunk a shaft, and found, as he expected, the thick wall, simple, solid, elegant, which had pleased the archæologists in 1870. It will often remind the visitor in coming years of Taine's remark, that such building is of the fashion of eternity. Precisely at this point is the shortest axis of the arena, in length about forty-eight metres (one hundred and sixty feet), the greatest being considered about fifty-four metres (one hundred and eighty feet). Leaving the wall, he dug a trench, of which the curve was parallel with the podium. This trench, fifteen feet deep in some places, allowed the clearing away of débris from the podium and the lower seats. A square chamber was very soon found opening upon the arena, probably intended for the animals. About three feet beneath this a gallery was discovered filled with fine sand. It was vaulted and very well built; a man by stooping could walk through it with little difficulty. It follows the slope of the hill, and the excavators examined it for seventy-seven feet; then it was found to be obstructed by a large stone. Doubtless it was intended as a sewer to receive the water from the arena. Above the animal-cage (*carcer*) the wall of the podium is wanting, and it is being sought in a southerly direction. A little farther on the excavations show the remains of another *carcer*.

Some yards nearer Rue Monge there are walls which must have belonged to the first row of seats. Another important clearing which has been made is the great entrance, about one hundred feet long and twenty broad, which descends by a decided slope to the arena. Beside it the walls rise quite imposingly to the height of ten to thirteen feet. The entrance forms a fine passage by which the visitor can now go down to the arena itself. To his left will be the remains of the seats, rising one above another to the level of Rue Monge. In front will be the half-circle formed by the podium enclosing the amphitheatre, and at the right, toward the Jardin des Plantes, the plan of the stage will be rendered very evident to him by the substructions. Under the stage runs the subterranean canal which received the rain-water and carried it away from the arena and its dependencies. As the masses of débris are being cleared away, the workmen find almost every day the bones of sheep and oxen, the teeth of horses and wild boars, doubtless the remains of game butchered for some distant Roman holiday.

If the reader in imagination add to the great open space the fragments of columns and sculpture, brought from the Carnavalet Museum and set up within the walls, he can perhaps picture somewhat to himself the effect which half of the amphitheatre will produce while it waits for the city to purchase the seventeen thousand feet of ground, the old convent garden owned by the Omnibus Company, under which the rest lies hidden. It has at some time been estimated that the expense of the work will not be more than 287,000 francs, or about $57,400.

Some one has likened the view of the arena at Verona to looking down into an extinct crater. It cannot fail to be picturesque, this most ancient building not only of Paris but of Northern Gaul, unless it be the Porte-Mars at Rheims. It is not unknown to history. Built in the reign of Hadrian, it was used for public pageants by the

Merovingian kings long after the Cæsars had withdrawn their legions from Gaul. Gregory of Tours speaks of the circus in which Chilpéric gave the games of Paris.

Although for generations it has lain hidden under from twenty-three to twenty-seven feet of earth, the Middle Ages were not ignorant of its existence. A poem on the Wonders of Paris, by Alexandre Neckam, a monk in the Abbey of St. Victor, in the twelfth century, speaks thus of the Roman circus:

> "Indicat et circi descriptio magna theatrum
> Cypridis; illud idem vasta mina docet."

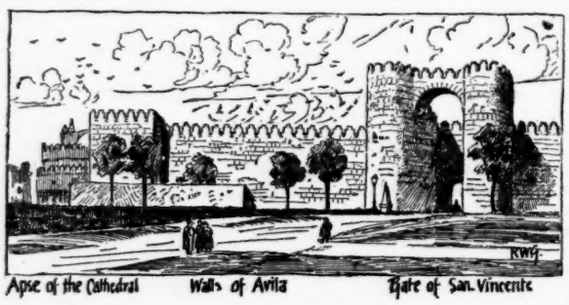
In the title-deeds of those times it held for many years the name of the Arena Close, but for generations now the historians of Paris have only suspected the reality of a buried arena, judging by occasional ancient plans of the city.

It is not so large an amphitheatre as its contemporaries at Nîmes and Arles, but it will be better known, situated as it is in the very heart of the great capital, a strange and foreign pleasure-ground, redeemed from its fierce youth, through its cloistered middle life, into a sunny and useful old age. M. G. M.

SPANISH ARCHITECTURE.[1]—X.

AVILA.

OF the few tourists who visit Avila, there are few indeed who are not impressed with the sturdy antiquity which characterizes the little city, and most are delighted with it. It is not a picturesque, decrepit senility, such as prompts veneration more than other feelings, but a strong, vigorous old age, which commands respect. If it were not for the destructive powers of explosives and engines of war, invented since its walls and gates were built, they would be as impregnable now as they ever were. They are no weaker for their eight centuries of age. Mr Street says: "Of the many fortified towns I have seen in Spain, it is, I think, the most complete. The walls are still perfect all round the city; they are perfectly plain but of great height, and are garnished with bold circular towers not far apart: and for the gateways, two of these towers are placed near together, carried up higher than the rest, and connected by a bold arch thrown from one to the other. There are no less than eighty-six in the circuit of the walls and ten gateways, and so great is their height that nothing whatever is seen of the town behind them." These defences are usually about forty feet high, and from twelve to fourteen feet thick, and the loftier gateways about sixty feet to the tops of the towers. The manner in which the cathedral is built in combination with the city walls is very singular. The circular east end protrudes through and beyond the fortifications proper, and is itself so massive and warlike, and so well garnished with battlements and galleries, that it forms the most imposing of the castles flanking the curtain walls. The little sketch showing this part and the gate of San Vincente will assist this description (it is, however,



Apse of the Cathedral — Walls of Avila — Gate of San Vincente

defective in the part between these two features). The city is situated on a slightly elevated plateau dominating a fertile plain. The mountains are not far distant, and the land is well watered by tributaries of the Duero or Douro, which flows westward to the Atlantic through Portugal. At some places, especially on the south side, the buildings of the city have spread beyond the walls a little, in picturesque, straggling blocks, but to the north there is no such growth. Strangely enough two of the oldest and most interesting churches of Avila were built very soon after the enormous fortifications, outside of them, and exposed, therefore, to all the attacks against which the city itself was so carefully strengthened. And they are not built with any particular regard to defensive strength beyond that usually attained by the massive architecture of that age. These are the churches of San Vincente and San Pedro; the former to the east, the latter to the south, both near gates bearing the same names. Perhaps the ecclesiastical authority was considered sufficient protection, for at that time war with the Moors was become a more remote contingency in this part of Spain: Toledo was retaken, A. D., 1085, and the walls of Avila were begun A. D. 1090, and the cathedral in 1091, when the fear of the hereditary enemy was fresh in Castilian minds. But it is possible that by the twelfth century, early in which San Vincente was probably built, and the thirteenth, which saw San Pedro arise, this uncertainty had in part given place to more assured peace, at least as regards those foes of antagonistic religion. Then, of San Vincente at least, it is said the church stands on a rock where the tutelar saint suffered martyrdom, which was a strong reason for its situation. But for all these surmises the fact is strange that such hardihood should have been practised. Within the city are to be found narrow, crooked streets and picturesque buildings, not like Cordova or Toledo, but of mediæval character instead of Moorish. The inhabitants are well in accord with their surroundings; it is, indeed, like going back some centuries into the past, to go and live a while among them. Except for some products of civilization in minor things which penetrate everywhere, there is little of foreign influence or even metropolitan influence in costume. The stranger can still curiously scan the *bourgeois* or peasant in his distinctive attire, and will himself be noticeable in his of this day, elsewhere commonplace. Nevertheless this population is not asleep, but alive and working in its old-fashioned way.

I remember another remarkable walled town, Carcassonne, in the south of France. It has the air of an unusually good model or reproduction, such as grace great expositions, so carefully is it restored and cared for, and so utterly has its occupation as a city of men left it for the "lower town." But Avila is very different. National commissions have had nothing to do with its conservation, and what it is is natural and unforced; so it is a charming place. To watch the peasants from the fields around bringing in their products in quaint old carts drawn by oxen yoked by the horns, just as they did, probably, when these gates were new — to see the market-places, and the dealers therein making their bargains in the old monetary terms of *reales* and *cuartos* and *ochavos*, notwithstanding the national adoption of *pesetas* and *centimos* as the proper currency; to see the manufacturers (literally "hand-workers,") making slowly and clumsily their respective wares — all this is pleasant and restful, even if it has another side to the social economist, and even he is not above instruction from such living illustrations of history.

Avila has, too, a highly attractive collection for the architect, and to this I willingly return. The cathedral already mentioned fronts upon a plaza or square, with an uninteresting façade of late rebuilding, but this is the only part to be so stigmatized. The greater part is more noteworthy than I expected. The edifice is dedicated to San Salvador, and was designed by Alvar Garcia, a native of Estella, in Navarre, at the end of the eleventh century; but its progress was slow, and the work shows that some of it was not built until early in the thirteenth century, while many alterations and additions are of course of much later dates. In the fourteenth, much was done in the nave and transepts, which quite changed their aspect to that of the period. The disposition of the plan is: a nave about thirty feet wide, of four bays, each a square, with side aisles of considerable width; terminating westward with two towers, only one of which is completed, and eastward with transepts also about thirty feet wide, and a crossing similar in plan-dimensions to one of the bays of the nave. The transepts project each one bay beyond the aisle-walls, giving a total breadth here of a little less than one hundred and fifty feet. Then one comes to a very peculiar *capilla mayor* (choir) and apse, with surrounding aisles, making the entire length about three hundred feet. I have mentioned the external appearance of this part. It seems that first the great outer wall, semicircular in shape, was built to contain the apse; later the latter was constructed up to the tops of the main lower arcades. There are two straight bays first from the crossing, then five around the semicircle, and as these bays are equal around the outer wall (where they form recessed chapels in its thickness), they are at the inner arcade much smaller upon the curved end than upon the straight sides. At this stage of the erection the architect seems to have resolved to divide the main vault of the choir so that the bays on the straight part should all equal the small ones on the circle. This was accomplished by spacing the shafts running through the upper story to support the groined vault, without regard to those below, and of course some of them do not stand over the pillars of the first story, nor do they regularly divide their intervals. The vault has flying-buttresses, and the new distribution of parts brings the massive abutments of some of them into a strange relation with the lower works. As may be seen in the illustration[2] of the aisle of apse, it is divided laterally into two unequal parts by slender single columns supporting the groined vault, and the latter has strong ribs and arches. Now the galleries in connection with the fortified parapets prevented the placing of the buttresses upon the outer walls, and they were all apparently intended to stand, as do the radiating ones, upon the inner edge only, supported by the short arches from the slender shafts to the main wall. This is a bold and clever arrangement, as the line of pressure must pass obliquely into the wall; but upon the sides, where buttresses stand apparently upon the vault, the construction is more than bold, it is hazardous, and it is astonishing that it has not failed and fallen long ago. It seems almost as if a Samson might, indeed, by a moderate

[1] By Robert W. Gibson, Travelling Student of the Royal Academy. Continued from page 67, No. 424.

[2] See the *American Architect* for February 9, 1884.

thrust at one of these shafts, bring down arch and buttress and choir-vault in a series of crashes. But it all stands perfect, and perhaps there is some ingenious concealed construction which makes the arrangement better than it seems. The *capilla mayor*, for the improvement of which all this was contrived, is certainly very effective. In place of a low triforium is a range of lofty, round-arched windows, one to each narrow bay, each window handsomely divided into two lights by a slender shaft carrying round arches. Above these the clerestory proper has simple single round-headed windows, rather broader in proportion. In the sketch given with the last paper all this may be seen; but the lower arcade was entirely hidden by drapery, perhaps because the want of harmony between it and the rest was felt even by the less sensitive custodians of to-day. Another unusual feature found in this church is the arch which continues the nave arcade across each of the transepts below the main arches of the crossing. This is evidently to resist the thrust of the arches of the choir and nave on either hand. Perhaps the abnormal distribution of loads upon the choir arcade increased its thrust and necessitated the addition of this arch. I did not observe whether it was part of the original building or whether it was a later reinforcement. It has an effect very similar to that of the singular-looking works in corresponding position in Wells Cathedral, England. In the regular Gothic cathedral this is perhaps the weakest point — almost the only one which is imperfectly contrived in numerous examples, and it might be that the architect anticipated and prepared for effects which must even then have been noticed. The Gothic architects habitually contrived that when the thrusting forces of an arch exceeded the amount which the abutments were able to resist, the latter should be reinforced in one of three ways: by adding a buttress which extends the base so as to include the oblique line-of-pressure; by another arch (or flying-buttress) which transmits the forces to another and often lower point; or by loading the abutment with sufficient dead weight to bring the resultant of forces nearer the perpendicular and within the base, as, for example, in pinnacles added to abutments of flying-buttresses. The first two methods were almost invariably well adapted and rarely weak, but the last system seems to have been frequently miscalculated or knowingly worked to the very minimum of stability. Particularly where the main arcades of nave, choir and transepts abut upon single pillars at the angles of crossing, does it seem that the effect of the superimposed weight to divert the arch-thrust downward was over-estimated. Sometimes, too, the same fault is shown where a lower side-aisle abuts half-way up the walls of a nave. In these parts of the greater number of old examples the perpendicular lines are more or less bulged into curves, pressed inward, notwithstanding the weight above. In some cases this has been serious. In Wells Cathedral, before mentioned, the piers would have succumbed to the strain, had it not been met by additional works. And at Leon in Spain (which I shall notice later) this weakness threatened the entire structure. But it must be allowed that the expedient adopted at Avila is not satisfactory. The great beauty of the central crossing and of the transepts is destroyed, and it is not surprising that the old architects preferred the risk to this manner of cure. In Avila Cathedral, the drapery which lines the choir or *capilla mayor* is continued across the transepts upon these unusual arches, and so the only considerable expanse of floor-space to be expected in a Spanish cathedral is broken up and obstructed as much as is that of the nave by the *coro*. It is a pity, too, for these transepts are fine. The eastern sides show a lower range of windows, the same as in the choir, and have above them handsome large traceried clerestory windows of later date. The end wall on the north side has a beautiful rose-window, which, with the building blocked as it was, could not be properly seen. There is on the north side, opening into the side aisle, a large doorway between massive buttresses. It occupies the whole width of the bay, and is richly carved with foliage and figures: a central figure of Christ, with representations of the Betrayal, the Last Supper, and the Coronation of the Virgin, in the tympanum under the pointed arches and over the doorway. On the south side of the church, in the accustomed position, is a cloister of the fourteenth century, to which I failed to get admission. It is said to have some good work, but much decayed and mutilated.

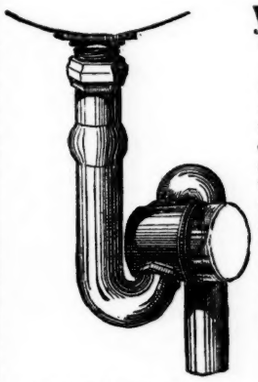
Conspicuous among the furnishings of this cathedral is a noble retable all around the five-sided apse and proportionately high. It is, however, the general design and the beauty of the paintings which make it so fine: the detail of wood-work is of no particular merit. The paintings are by Santos Cruz, Pedro Berreguette and Juan de Borgoña, A. D. 1508. The subjects are as follows: First tier, SS. Peter and Paul with four Evangelists to right and four Doctors to left; second tier, the Transfiguration in the centre with, at the sides, the Annunciation, the Nativity, the Adoration and the Presentation; third tier, the Crucifixion in the centre, and the Agony, the Scourging, the Resurrection and Descent into Hell.

Many other accessories of wood and metal work are worth observation. In the aisle of apse around the *capilla mayor* are some tombs. One in particular is notable; that of Bishop Tostado. It is of the fifteenth century and is in part, at least, the work of Berreguette, a very handsome Renaissance monument quite covered with delicately executed surface enrichments which it is impossible to fairly represent in the drawing. Such things as the texture of robes and the embroideries and laces upon them, were evidently favorite studies to these sculptors, and all that was to be attained by such means they certainly succeeded in getting. In this monument, as in many others, there is a disagreeable want of harmony with its Gothic surroundings.

The little tower of San Martino shown in the initial sketch, I note for its effective use of cheap materials — brown bricks, none moulded, with very thick joints. This building is near the small gate in the north wall of the city, the only one on that side.

SANITARY PLUMBING.[1] — XVIII.

"ANTI-SIPHON" TRAP. — DESCRIPTION.



"Anti-siphon" Trap. — Perspective View.

THE initial cut and Figures 81 and 82 represent in perspective view and in section, the "anti-siphon" trap, with couplings at the points of connection of the inlet and outlet arms with the body. These couplings take the place of the usual clean-out caps on S, and some other, traps, and serve also to disconnect the trap from the fixture. Both are below the normal level of the standing water. They are not needed as clean-out caps when the glass section is made movable. Figure 92 shows the trap made with a shallower seal; the outlet arm being here taken from the side instead of from the top of the body. This form has not the advantage of being reversible like the others, shown in Figures 78–82, which, being symmetrical as to outlet and inlet pipes, can be set either end up, thus avoiding any possibility of error on the part of careless or ignorant workmen. It is, moreover, slightly less resistant to siphonic action than they, on account of the diminished height of its water-column; but the air-space above the outlet allows, under such action, of an escape of air through the water without so much or any removal of water from the upper part of the trap-body. Hence it appears, to a casual observer, to be more resistant than the others in which the water-level has to be partially reduced before the air can escape.

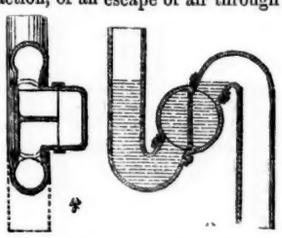


Fig. 81. — Anti-Siphon Trap. — Fig. 82. Longitudinal Section. Transverse Section.

In ordinary use the waste water passes through the trap in such a manner as to act to the best advantage in scouring it. The partition-wall in the centre of the body causes the water to scour each side in succession in the same manner that it does in the trap shown in Figure 77. Thus, while in outward appearance the body resembles a small pot-trap placed horizontally, it has, in principle, the self-scouring form of the S-trap. It must be understood, however, that like the S-trap, it is only self-scouring when properly set, namely, with a free outlet from the bowl somewhat larger than the inlet arm of the trap at its largest part, or at its point of junction with the fixture. If set under a fixture giving a clear water-way of only an inch or of half an inch, this trap will not scour itself, nor will the waste-pipes with which the trap is connected. A good-sized wash-basin holds, up to its overflow, about two gallons of water. This will escape through an average length of 1½" waste-pipe, running full-bore and having a good fall, in about three seconds. Hence, through such a pipe the water rushes at a rate of more than half a gallon a second. It would be as unreasonable for the advocates of branch-waste ventilation to expect to find a harmful sediment on a surface so scoured as it would be to look for dirt on the polished face of a boulder lying in the bed of a mountain torrent—the very granite itself is eaten away by the irresistible power of the water. How much less could soft organic deposit withstand its action. The exact degree of the scouring effect of water flowing at different velocities, and under varying conditions, will be considered in detail hereafter under the heading "Waste-pipes."

If, on the other hand, our trap is set under a fixture giving a clear water-way of only an inch or of a half an inch, this trap will not scour itself, nor will the waste-pipes with which the trap is connected. The size of the waste-pipe above the trap must be equal to that of the inlet and outlet arm of the trap at its largest point, and the waste-pipe below the trap must not be larger than the trap at its smallest point, and both must be filled full-bore whenever the fixture they serve is used; otherwise it will, like improperly used S-traps, require occasional cleansing, and until the outlets of our fixtures are constructed more rationally than they are at present, it must be taken for granted that any trap set under them will become fouled to a certain extent. Hence, convenient clean-out caps (preferably of glass) should always be provided, and regular examination and cleansing be insisted upon as often as is found necessary.

Let us examine now the action of the air and water in our trap under the influence of a very powerful siphonic action. We will suppose the trap to be placed in position under a fixture with the water standing in its normal condition up to the level of the outflow, as

[1] Continued from page 69, No. 424.

shown in Figure 82. When, through siphonic action, a partial vacuum is created in the waste-pipe below the trap, the water in the inlet arm of the trap descends under the influence of the atmospheric pressure on its surface tending to restore the equilibrium, until it reaches the dip of the trap. The air then being lighter than water passes into and through the body of the trap, and drives a portion of the water, not already driven out, before it into the waste-pipe. The water remaining in the body falls back to the position shown in Figure 79, and maintains the seal. Subsequent siphonic action cannot remove this water for the following reason: The water standing in the inlet arm after its partial removal from the body of the trap by siphonic action, as described, is again lowered by a repetition of the action to the dip. Air again rushes into the body to fill the partial vacuum, and passes into and through the water standing therein. This water, though increased in depth by that which enters from the inlet-pipe, is, nevertheless, shallow enough to give room for its passage. It projects upward a certain quantity of water in its passage, as shown in Figure 80, with greater or less violence, according to the strength of the siphonic action produced. This water strikes the under surface of the partition in the body, and is partly reflected backwards by it, as shown by the arrows in the figure, and partly follows the air current towards the opening between the end of the partition and the clean-out cap. Owing to the greater weight and momentum of the water over that of the air the water is reflected back, while the air passes on. A second reflection takes place against the surface of the clean-out cap. More water is thrown back, and a small remaining portion only succeeds in following the air into the passage above the partition. Of this small portion part again is reflected back by the upper inner curved surface of the horizontal body, and under very strong siphonic action a few drops may reach the last reflecting surface at the end of the body opposite the clean-out cap, whence it is once more arrested, and the air alone, completely free of water, escapes into the waste-pipe. The spray falling upon the partition and upon the various reflecting surfaces collects at the bottom of the body, and increases the depth of the seal. The greater cohesive and attractive force of the particles of water over that of air aids in the separation, since it causes a quantity of the former to adhere to the reflecting surfaces while the air escapes. This arrangement of the reflecting surfaces evidently also prevents loss of the water-seal by the *momentum* of the water descending from the fixture.

Although, especially in Figure 92, the seal is not excessively deep, yet the trap, owing to the considerable horizontal extension of its passages, contains a large enough body of water to protect it from the dangers of *evaporation* and *back-pressure*. The contraction of the inlet and outlet arms at their junction with the body of the trap renders it secure against *self-siphonage*. The form also renders loss of seal through *capillary attraction* impossible, as will be hereafter shown.

The trap therefore conforms with all the requirements given in our table at the beginning of these articles as necessary to constitute an *ideal* trap.

Having thus explained the theory of its construction, let us now make a practical trial of its operation under crucial tests, and compare its powers of resistance to adverse forces with those of pot-traps of various sizes, and of ventilated and unventilated S-traps.

We assume that the severest test for siphonage to which a trap could possibly be subjected in practice would be that which would be sufficient to siphon out an 8″ pot-trap, or a ventilated S-trap constructed in the usual manner. Such a test may be made by connecting the trap with a 2″ waste-pipe from a large bath-tub, emptied through an outlet large enough to fill the waste-pipe full-bore, the waste-plug being successively raised and lowered a number of times while the water is escaping. The siphonic action produced on a $1\frac{1}{2}$″ branch connected with such a waste at a point six feet below the tub, is sufficient to destroy in one second the seal of a $1\frac{1}{4}$″ S-trap of the ordinary construction, *having a vent-opening at the crown, of the same size with the bore of the trap* ($1\frac{1}{4}$″), and connected with a $1\frac{1}{4}$″ ventilating-pipe of smooth new lead, sixteen feet long. It will also destroy the seal of an ordinary S-trap, having a vent-opening at the crown, $\frac{3}{4}$″ in diameter, *without any vent-pipe attached thereto*, and it will siphon out a pot-trap [unventilated] *eight inches in diameter* having a seal four inches deep.

Figure 83 illustrates the apparatus for making the test. The tank representing the bath-tub had a capacity of 100 gallons. It was 18 inches deep, (to the overflow) 20 inches wide, and 5 feet 4 inches long (inside measure). The waste-pipe was 2 inches in inside diameter, and 6 feet long to the point of junction with the branch. The outlet plug was large enough to fill the waste-pipe full-bore. For greater convenience, a 3″ valve was used, the valve being constructed so as to measure the water passing through it, each time it was opened and closed. It was operated by a lever and chain. The 2″ waste-pipe entered the soil-pipe, at a point about 2 feet below the junction of the $1\frac{1}{2}$″ branch-pipe on which the traps were tested. The tub was emptied by opening and closing the waste-plug seven times in succession, and allowing a little less than 15 gallons to escape at each operation.

Figures 84 to 95 inclusive represent the various traps tested, and the lines upon them show the effect of siphonage. Each test was repeated a number of times, the results being each time almost absolutely identical. The S-trap was first tried with a $1\frac{3}{16}$″ vent opening (inside measure), and, as shown in the drawing, without vent-pipe. The trap was $1\frac{1}{4}$″ in diameter, inside measure. The seal was $1\frac{1}{2}$″ deep.

The emptying of the tub in the manner described drew from the seal one-fourth of an inch of water.

To the vent-opening was then attached a new, smooth lead pipe $1\frac{1}{4}$″ in inside diameter, and 25 feet long in a coil 3 feet in diameter.

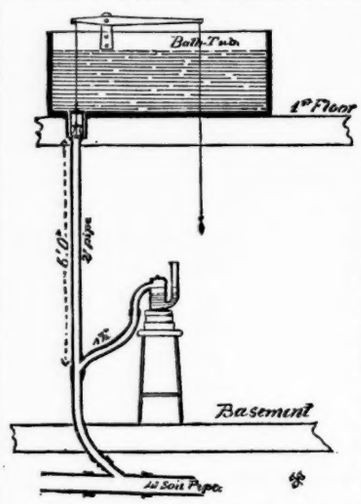


Fig. 83.
Bath-Tub and Waste with Branch for testing Traps.

A single discharge of 15 gallons completely destroyed the seal, and left only one-half an inch of water standing in the bottom of the trap. (See Fig. 84.)

The pipe was then shortened to 16 feet. With the pipe coiled up the trap was again emptied by a single discharge of 15 gallons. With the pipe uncoiled the trap was again emptied by two discharges of 15 gallons each.

The pipe was still further shortened to 9 feet, lying in a single large coil. The trap was emptied by the discharge of one tubful and 15 gallons, or by seven discharges of 15 gallons each.

A vent-pipe of $1\frac{1}{2}$″ internal diameter and 20 feet long was then attached to the opening at the crown. The seal was destroyed after three discharges of 15 gallons each.

The pipes were then removed, and the vent-opening of the trap was diminished to one inch in diameter. The seal was lowered three-eighths of an inch by the emptying of the tub. The vent was then still further diminished to seven-eighths of an inch. The seal was lowered three-fourths of an inch by the emptying of the tub.

Finally, the vent was reduced to three-fourths of an inch in diameter. A single discharge of 15 gallons completely destroyed the seal, leaving only a few drops of water in the trap.

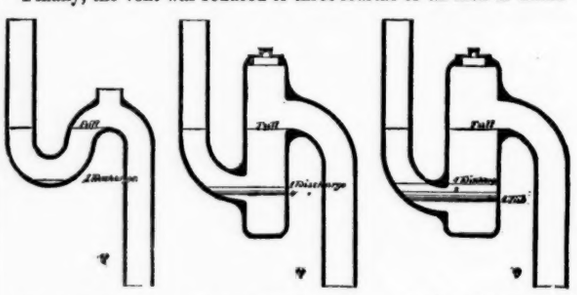


Fig. 84.— S-Trap. Fig. 85.— 2″ Pot-Trap. Fig. 86.— $2\frac{1}{2}$″ Pot-Trap.

A two-inch pot-trap, Figure 85, was then tested, and lost its seal under a single discharge of 15 gallons, the water falling five-eighths of an inch below the seal, as shown in the drawing; a second discharge still further lowered the water one-fourth of an inch. Two more discharges lowered it one-eighth and one-sixteenth of an inch respectively, thus leaving the mouth of the inlet-pipe *entirely uncovered*. This and the following traps were not vented.

A two-and-one-half-inch pot-trap, Figure 86, gave but slightly better results, as shown in the drawing, the seal being completely destroyed by the first discharge of 15 gallons, and the water standing five-eighths of an inch below the mouth of the inlet-pipe after six discharges.

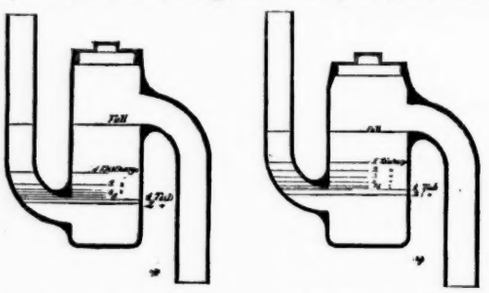


Fig. 87.— $3\frac{1}{2}$″ Pot-Trap. Fig. 88.— 4″ Pot-Trap.

A three-and-one-half-inch pot-trap, Figure 87, required four discharges of 15 gallons to destroy the seal. Two tubfuls were required to lower the water one-half inch below the mouth of the inlet-pipe.

A four-inch pot-trap, Figure 88, required six discharges or one tubful to destroy the seal.

A six-inch pot-trap, Figure 89, required four tubfuls to destroy the

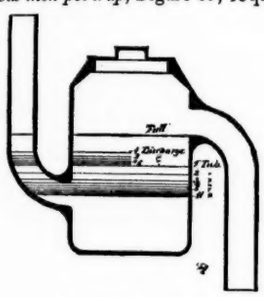


Fig. 89.—6″ Pot-Trap.

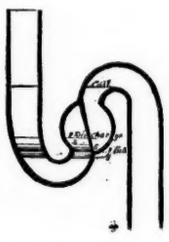


Fig. 90.—Anti-Siphon Trap.

seal. *An eight-inch pot-trap*, Figure 91, having 3¼″ seal, lost all but a quarter of an inch of its seal after the discharge of 16 tubfuls. It was not considered necessary to carry the test farther on this trap.

Figures 90, 92, 93, 94, 95 and 96 show the effect of a discharge of

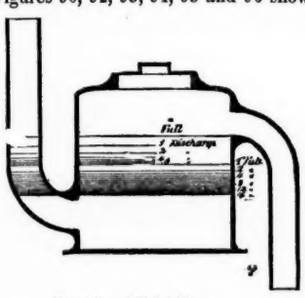


Fig. 91.—8″ Pot-Trap.

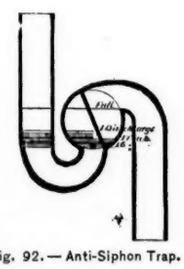


Fig. 92.—Anti-Siphon Trap.

from four to sixteen tubfuls on anti-siphon traps of various sizes and proportions. In Figure 90, the water-passages through the body of the trap are one and one-fourth inches wide. The resistance to

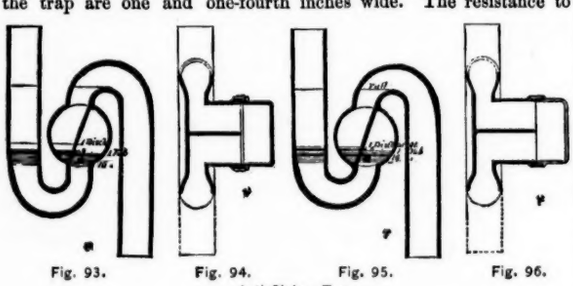


Fig. 93. Fig. 94. Fig. 95. Fig. 96.

Anti-Siphon Traps.

siphonage is seen to be in this trap considerably greater than in the six-inch pot-trap, Figure 89, standing at its side. Four discharges of the tub destroyed the seal of the latter, but left a quarter of an inch seal in the anti-siphon trap. In Figures 92 to 96 the passages are one and one-half inches wide. Sixteen discharges from the tub left from an inch to an inch and a quarter of seal; while the same number of discharges left in the 8-inch pot-trap (Fig. 91) only a quarter of an inch.

The traps shown in Figures 93 and 95 are similar in form, except in the depth of seal in the lower bends and in the length of the body, as shown in Figures 94 and 96. The contraction should be nowhere smaller than the waste-pipe below the trap. The difference in resisting power of anti-siphon traps having the arms contracted to one and one-fourth-inch, one-and-one-eighth-inch and one-inch respectively, is comparatively slight, since a sufficient quantity of air enters in bubbles to supply the partial vacuum of an ordinary siphonic action as soon as the water descends below the dip of the inlet arm. Figure 97 presents a diagram giving the results of the tests already described in a compact and convenient form. The circles indicate the inlet and outlet mouths of the trap at their highest and lowest points, so that the intervening distance or connecting line represents the depth of the water-seal. The cross lines represent the reduction of this seal at each discharge, and the heavy upright lines show the amount of seal remaining in the trap at the close of the test.

The next cuts show the relative effects of siphonage on anti-siphon traps having the inlet and outlet arms contracted to one-and-one-fourth-inch, one-and-one-eighth-inch, and one-inch respectively.

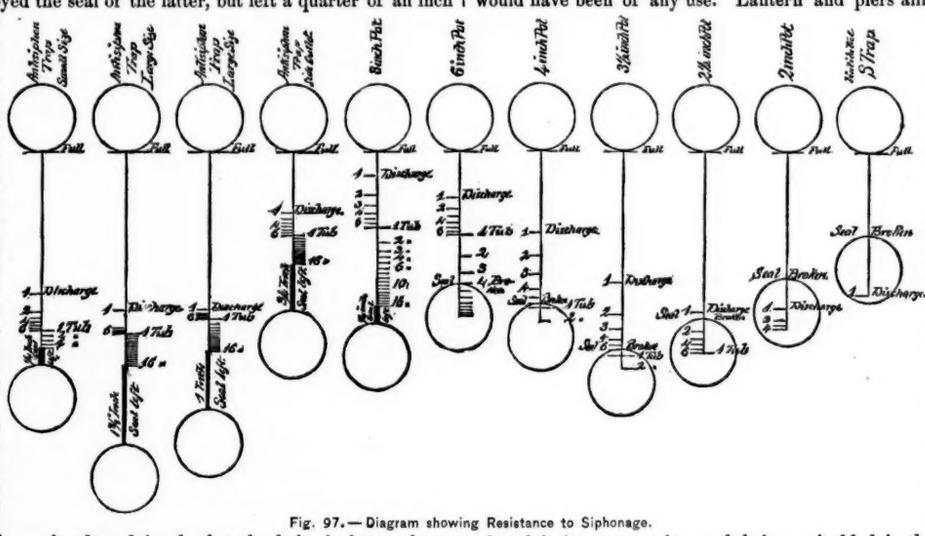


Fig. 97.—Diagram showing Resistance to Siphonage.

THE ILLUSTRATIONS.

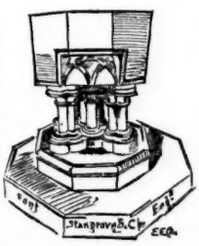
SCHOOL-HOUSE, NEW BRITAIN, CONN. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

HOUSE FOR ANTON STREIT, ESQ., CAMP WASHINGTON, CINCINNATI, O. MR. EDWIN ANDERSON, ARCHITECT, CINCINNATI, O.

CHRIST CHURCH, HARRISON, N. J. MR. CHARLES A. GILBERT, ARCHITECT, NEW YORK, N. Y.

RESULTS OF TESTS OF THE TRANSVERSE STRENGTH OF BEAMS. — PLATE VII.

PETERBOROUGH CATHEDRAL.



A YEAR having elapsed since the first steps were taken for the restoration of Peterborough Cathedral, Dean Perowne has given the following account of what has been done during that time: —

It will be remembered that towards the close of the year 1882 very considerable alarm was occasioned by the state of the great central tower. Indications of danger were evident. A rapid movement was going on in the upper portion of the lantern; the gaping and unseemly cracks by which it had long been torn and disfigured were widening, and fresh rents were visible; and Mr. Pearson, R. A., the cathedral architect, when summoned to examine and report upon it, recommended that the upper portion should immediately be taken down and that the whole of the central tower and the two eastern piers should be reconstructed.

The restoration committee, at their first meeting, on January 24, 1883, adopted the report of the architect, and a contract was entered into for the reconstruction of the tower as recommended in the report, at an estimated cost of £13,073. Preparations having been made by the removal of the screen and organ, and the nave having been fitted up temporarily for divine service, the actual work of taking down the tower commenced on April 5, 1883.

As the work proceeded it became evident that no expedients for patching up and trying to preserve the tower in its existing state would have been of any use. Lantern and piers alike were of the most wretched construction. The walls of the lantern, dating from the fourteenth century, were mainly composed of rubble and "pit mortar," with a very thin facing of Barnack stone. Two attempts had been made, it was evident, within thirty or forty years to rebuild this lantern. Very considerable fragments of the old Norman tower had been employed in its construction, and, being embedded in the rubble, their mouldings are as fresh as if they had been cut yesterday. Indeed, so much of this old Norman work has been recovered that it may be

possible to reconstruct entirely from it the Norman arcading above the arches inside the lantern.

When the piers were reached, which had been crushed and peeled off by the too great pressure of the heavy Norman tower (and one of which, that at the northeast corner of the crux, had been partially rebuilt, probably by the fourteenth-century builders), it was found that they were of no better masonry than the lantern above them. In fact, it would seem as if the fourteenth-century builders had copied but too faithfully the manner of their predecessors.

The core of these great Norman piers was nothing but dust. The pressure on the face of the southeastern pier had at one time forced out a considerable quantity of this dust, and then the device had been resorted to of turning the mouldings of the pier with their faces inward, so as to fill up the cavity, and the whole was finally strapped together with flat pieces of timber secured in the place of the original mouldings with strong iron hoops. These piers, massive as they were, and designed to carry a heavy weight above them, rested, strange to say, on the shallowest and poorest foundations. Small stones laid on loose gravel were all they had to rest upon, though if the builders had gone some three feet lower they would have touched the solid rock. The wretched construction of these piers and of the walls above the arches led to a careful examination of the two western piers, when it was ascertained that, though they had not been crushed and peeled like the others, they were in other respects little better than their eastern companions, as the following extract from Mr. Pearson's report thereon will show: —

"The openings I have had made into the piers by removing some of the facing stones show very conclusively that the construction of them is like that of the two others which have been taken down, and which consisted of a thin facing of stone for the outside facing without any bond, and within the casing the whole of these piers was filled in with small rubble-stones and sandy earth. There was scarcely a stone in them larger than a man's hand, and mortar seemed not to have been used, except where some alterations had been made at a later date. It is quite impossible to conceive a worse piece of construction, and it is equally impossible to understand how it is that these piers have stood so long; nothing but the power of the Barnack ragstone, out of which the thin outside casing is formed, to sustain the enormous weight, saved them from destruction. There are abundant evidences to show that these two western piers, like those taken down, have barely strength in them to keep up. I have, therefore, with much regret, come to the conclusion that on no account must any attempt be made to rebuild the tower on these piers."

The excavations which were made at the bases of these piers, in order to test the state of their foundations led to a very interesting discovery. At the foot of the southeastern pier were found the remains of a Saxon building, doubtless the church of the ancient monastery. First of all there was laid open, to the north of this pier, in the nave, a wall, or rather two walls with a narrow space between them, running east and west. Beyond these to the north was evidently open ground, a short wall at right-angles to the others coming there to an abrupt termination; whereas on the south side, at a depth of some six feet below the level of the present cathedral, were traces of the plaster floor of the ancient building. This was again reached in the south aisle, and extends probably to a considerable distance west and south. In the south transept the floor can be followed eastward to a plaster seat placed at the extremity of the building against the external eastern wall. Here it is plain that the limit of the Saxon building eastward has been reached, because in the open surface beyond a large stone coffin is standing, obviously of much later date. How far the remains of this Saxon building extend, and whether the lines of walling indicate the existence of one or more than one building, it is at present impossible to determine. This can only be done when the pier standing upon it and the immense shoring and scaffolding necessary for its demolition have been removed.

No Saxon ornamental stone-work has yet come to light in the western piers, but in the foundation or interior of the eastern pier a few fragments of Saxon moulded work were found, such as perforated slabs of windows, door-jambs, and lintels, and one very interesting and richly-carved fragment of a capital almost unquestionably Roman. This may have been brought from Castor; but it is curious that no other fragment of Roman work has been discovered.

The estimated cost of the additional work rendered necessary by Mr. Pearson's last report recommending the taking down and reconstruction of the two western piers was £5,779, and, in accordance with a resolution of the restoration committee, made at their last meeting, on November 7, 1883, the contract has been altered so as to provide for this work. — *The Architect.*

The Cape Cod Canal.—The company which now owns a charter for the construction of a canal across Cape Cod—the third company and the third charter since the project was first declared feasible in 1863 — has already expended so much money on the work, according to the Boston *Traveller*, as to furnish the best guaranty of its completion. A dredge costing about $100,000, with a capacity of 9,000 cubic yards in ten hours, has just been built, and will be set at work as soon as the weather becomes settled. The contractor has four years in which to complete the work, but the Company is sanguine that it will be done within two years.

TRANSVERSE STRENGTH OF TIMBER.[1] — VII.

No. 37.— Spruce, 4″ x 11¼″; span = 12′; loaded at centre.
Heart in edge.
Tested by E. F. Ely, assistant in department.
No deflections taken.
Broke by tension at 10572 pounds.
Sheared afterwards at 5572 pounds.
Modulus of rupture = 4135 lbs. per square inch.
Max. intensity of shear at neutral axis = 169 lbs. per square inch.

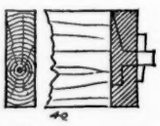
No. 38.— Header framed at ends; spruce, 6″ x 12″; span = 6′ 8″; mortised for tail-beams; load distributed at four points over the mortises.

Tail-beam mortised by tusk and tenon joint.
Heart piece.
Tested by Messrs. Paddock & Eppendorff.

4298 lbs.	Commenced cracking and snapping and continued to do so from this point on.
10498 "	Split commenced to open at bearing of one of the upper tenons.
10798 "	Broke by splitting off at lower tenon; carried 7298 lbs. after splitting.

No. 39.— Header hung in stirrup-iron and held by joint-bolts; spruce, 6″ x 12″; span, 6′ 8″; mortised for four tail-beams by tusk and tenon joints; mortises 16″ on centres.
Load distributed at four points over the mortises.
Tested by Messrs. Paddock & Eppendorff.
No deflections taken.
Broke near centre of span at 21298 pounds.

No. 40.— Spruce tail-beam; framed at one end by tusk and tenon joint; pinned.



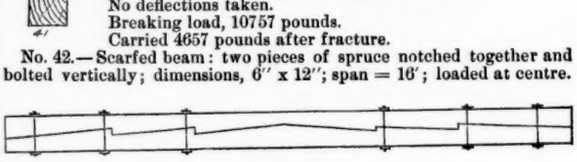
Heart piece; seasoned about a month in the building.
Loaded at centre.
Tested by Messrs. Paddock & Eppendorff.
No deflections taken.

6571 lbs.	Cracking along neutral axis; split starting at tenon.
7371 "	Deflection roughly estimated as 2½ inches.
7671 "	Crack at tenon rapidly extending, east side, 6 inches long; west side, 4 inches.
8071 "	Crack 7 inches long.
8171 "	Breaking load, primarily by splitting off at the tenon. Sheared also, almost at the same time, besides breaking by tension.

Modulus of rupture = 6071 lbs. per square inch.
Max. intensity of shear at neutral axis = 170 lbs. per square inch.

No. 41.— Header, spruce, 3.5″ x 12″; span = 6′ 8″; framed at ends by double tenon and joint bolt; mortised for tail-beams at four points, 16″ on centre; load distributed at four points over the mortises.
Tested by Messrs. Paddock & Eppendorff.
No deflections taken.
Breaking load, 10757 pounds.
Carried 4657 pounds after fracture.

No. 42.— Scarfed beam: two pieces of spruce notched together and bolted vertically; dimensions, 6″ x 12″; span = 16′; loaded at centre.



Bolts ¾″ diameter.
Tested by Messrs. Paddock & Eppendorff.
Timber considerably season-cracked.

Loads in lbs.	Deflection in inches.	Differences.	Remarks.
270	.0000		
570	.0449	.0449	
1070	.1201	.0752	
1570	.2456	.1255	
2070	.3696	.1240	
2570	.5274	.1578	
3070	.5873	.0599	
2730	.6000	.0127	9 A. M., next morning.
3070	.6645	.0645	
3570	.7734	.1089	
4070	.8773	.1039	
4570	.9923	.1150	
5070	1.0989	.1066	
5570	1.2237	.1248	
6570	1.4367	.2130	
7070	1.5662	.1295	
7070	1.6089	.0427	After 1 hour.
7570	1.7192	.1103	
8570	1.9171	.1979	
9070	2.0513	.1342	
10070	2.2816	.2303	
10570	2.4535	.1719	
11570	2.7288	.2751	
12570	3.0357	.3071	
13570	3.3515	.3158	
14470	—	—	Tension crack at bottom from bolt to bolt.
14570	—	—	Loud noise with new cracks at top.
15070	—	—	Loud cracks from shearing in spite of the resistance of bolts.

Could not hold the load, but fell to 9770.
15070 = breaking load; bolts badly bent by shear.
Modulus of rupture, calculated as if for a solid beam = 5023 lbs. per square inch.
Modulus of rupture, estimated from the quality of the spruce would be very much less.
Modulus of elasticity, calculated at 7570 lbs. by the formula for a solid beam = 724678 lbs. per square inch, a result lower than any obtained for a solid beam.
Max. intensity of shear at neutral axis = 157 lbs. per square inch.

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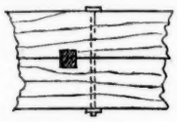
[1] By Gaetano Lanza, Professor of Applied Mechanics, Massachusetts Institute of Technology. Continued from page 70, No. 424.



No. 43.—Keyed beam; spruce; two pieces keyed together, and bolted vertically; pieces, 6″ x 6″. Whole beam, 6″ x 12″; span = 15′ 6″; 12 keys, oak, 2″ x 2″, 16″ on centres; bolts, ¾″ diameter.

The whole beam was much warped and twisted.

Bolts and keys were tightened up just before testing.

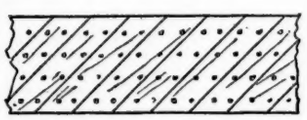
Upper beam, before breaking, cross-grained and cracked. Lower beam split horizontally.

Tested by Messrs. Paddock & Eppendorff.

Loads in lbs.	Deflection in inches.	Differences.	Remarks.
274	.0000		2.45 P. M.
574	.0238	.0238	
1074	.0865	.0627	
1574	.1732	.0867	
2074	.2675	.0943	
3074	.4693	.2018	
4074	.6936	.2243	
5074	.8810	.1874	
4290	.8820	.0020	Next morning, 9 A. M.
5074	.9871	.1051	
6074	1.1671	.1800	
7074	1.3175	.1504	
8074	1.5542	.2367	Signs of shearing at middle and on keys.
9074	1.7236	.1694	
10074	1.9814	.2578	
10574	2.1182	.1368	
11574	2.4027	.2845	Cracks on top between bolts. Keys cracked at ends.
12574	2.8987	.4960	
13074	3.0546	.1559	
15574	——	——	Tension crack at bottom.

15674 lbs. = breaking load by tension.
Keys also sheared through.
Bore 7074 lbs. after breaking.
Bolts badly bent by shearing force.
Modulus of rupture, calculated as if for a solid beam = 5061 lbs. per square inch.
Modulus of rupture, estimated from the quality of the spruce would be very much less.
Modulus of elasticity calculated at 9074 lbs. by formula for a solid beam = 792191 lbs. per square inch, a result lower than any obtained from a solid beam.
Max. intensity of shear at neutral axis = 163 lbs. per square inch.

No. 44. — Sheathed beam; spruce; two pieces, 6″ x 6″, sheathed together with 1″ spruce sheathing at angle of 45°.



Sheathing ran in opposite directions on the opposite sides of the beam; about eight nailings to a piece.

Span = 15′ 6″; loaded at centre.

Tested by Messrs. Paddock & Eppendorff.

Loads in lbs.	Deflection in inches.	Differences.	Remarks.
274	.0000		9.45 A. M.
574	.0502	.0502	
1074	.1520	.1018	
2574	.4104	.2584	
2774	.5540	.1436	
3574	.8368	.2828	
4574	1.1604	.3236	
5574	1.4894	.3290	Sheathing began to splinter.
6074	1.6690	.1796	
7074	2.0451	.3761	
7574	2.3654	.3203	
8074	2.4892	.1238	
8474	2.6420	.1528	
9474	3.0291	.3871	
9574	3.2331	.2040	
9774	3.5092	.2761	
10074	——	——	
11974	——	——	Breaking load.

Lower piece broke by tension, 5284 lbs.; after at about 6074, sheathing on the opposite side of the beam and opposite ends began to yield, producing a twist in the beam. Should have been put on as in sketch, inclination changing at centre.
Modulus of rupture, calculated as if for a solid beam = 3870 lbs. per square inch.
Modulus of elasticity, calculated at 6074 lbs. by the formula for solid beams = 534211 lbs. per square inch.
Max. intensity of shear at neutral axis = 125 lbs. per square inch.

No. 45.—Spruce joist, 3⅜″ x 11¾″; span = 16′ 4″.
Loaded at centre.
Tested by E. F. Ely, assistant.
No deflections taken.

7572 lbs. Load beginning to fall off, crack at neutral axis.
8072 " Load fell off, and on raising again the beam broke by tension of cross-grained fibres on lower edge, near centre.
7672 " Load on after tension break.
8072 " Slight compression at top, west side.
7672 " Fallen again.
8072 " Slight cracking at neutral axis. Beam crushed at bearing on jacks unequally and fell over. Set up again.
7472 " Broke again by tension. Load fell to 5072.

Breaking load = 8072 lbs.
Modulus of rupture = 4436 lbs. per square inch.
Max. intensity of shear at neutral axis = 133 lbs. per square inch.

SANITARY PLUMBING.— A REPLY.

FLATBUSH, L. I., February 18, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,—In your article headed "Sanitary Plumbing.—XV, Water-Seal Traps," there is a "first general division of water-seal traps," then a subdivision of traps which reads as follows: —

(1) "Air-vent Traps.— Figure 47 represents a trap having an air-vent provided with a valve in the inlet-pipe above the water-seal, and connecting it directly with the sewer. The exclusion of sewer-gas therefore depends upon the accuracy of fit of this valve alone without the aid of water."

It would be impossible for this trap to be a trap without the aid of water.

"We have already explained that such a valve would never be gas-tight even when new."

For such an assertion to be made by any one who has any mechanical knowledge seems unjustifiable. I had my trap on exhibition at the Manufacturers' and Mechanics' Institute, of Boston. One trap I had in practical operation with dirty water; another I had with a glass tube on top of the trap in place of the basin, and at the bottom of the trap it was connected with a stop-cock. The water was forced up from the cup by air, and the air held the water up in the tube eight inches high by the closing of the stop-cock; all could see that it was perfectly tight, showing the valve as tight as the stop-cock. The water continued up in the tube from the 29th day of October until the morning of the 3d of November, when the water lowered into the cup about three-eighths of an inch, the temperature having lowered very much, as considerable ice had formed that night. This was proof sufficient of a tight seal, without its being in use. At the American Institute Fair, held in the city of New York, in October and November, 1883, where I had my trap in practical use with dirty water, one trap was connected with illuminating gas, and the full pressure of the gas was in the trap from the 14th of November until the close of the fair on the 1st of December, 1883, 10.30 P. M., without the water being renewed in the small cup, containing one-quarter of a pint. It proved to be a perfect seal, tight as any gas-pipe in the building.

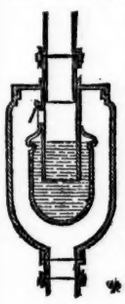


Fig. 47.— Air-Vent Trap.

Underneath the trap was a stop-cock, with a small jet, where all could see it was filled with gas by first lighting the jet, and then placing the light above the seal of water, and no ignition took place or odor came from it. This showed it to be *air-tight*, *gas-tight* and *water-tight*. Any article that is air-tight is perfectly tight. The question was put to me many times at the fair, "Don't you know gas will go through water?" I fixed on the glass tube, with perfectly tight joints, a small stop-cock with fine jet on top of the glass tube to accumulate the gas if any should pass through the water, that I might get the least particle of gas ignited, and there was none at any time. I had thousands of witnesses.

"The hinge, even if it could be thoroughly protected from contact with the waste water rushing through the trap, must ultimately be corroded by the vapor arising from the water and damp surfaces immediately surrounding it."

The only answer that this needs is for your readers and scientists to make a practical test of them. Since last April, six months' use has shown them without corrosion, apparently the same as when first put in. One at C. J. Pryers, 52 West Twenty-seventh Street; another at 191 Third Avenue, Ennever & Sons, plumbers; also, another at W. W. Thompson's, 20 West Thirty-second Street, all in New York city; and at the office of Dr. Bell, editor of the *Sanitarian*, since August, 1883.

"A very slight corrosion is sufficient to interfere with the operation of a valve so very light as is the one in this trap."

What the corrosion has to do with the operation of the valve, light or heavy, would be impossible for any one to understand who has ever seen and examined this trap.

"And the slightest imperfection would prevent a valve hung in this manner from bearing firmly against its seat."

The valve is ground to its seat, and by being flat, no matter where it falls, it is air-tight; and even if it was not ground, in practical use, the moisture would make it perfectly tight. Almost every one has sometime in their lives taken two old pennies, and by putting them together wet found them to adhere perfectly tight together. Pennies are far from having a perfect surface.

"Hence, this valve is totally unreliable."

This assertion of this writer shows ignorance, or an interested or biassed motive.

"And since it furnishes a direct communication between the sewer and the house."

This trap communicates with the sewer every time. A vacuum is formed in the pipes drawing a current of fresh air into the pipes. An extract from a letter written by Dr. Corbally, of Brooklyn, associate editor of the *Sanitarian*, says: "The slightest diminution of pressure within the outer bowl opens the valve and admits fresh air from the room into the pipes below the seal. Thus, the protection is double, water always in the seal, and air comparatively pure below it. The protection afforded is as perfect as by the safety-valve of the steam-engine."

"Such a trap must be condemned as most unscientific and dangerous."

"This trap does away with a great deal of expense and plumbing work" (extract from a letter). Were these traps placed in every waste-pipe, immediately under the fixtures, there would be no necessity of back-airing or ventilating traps by branches or vertical ventilating-pipes carried through the roof.

The only danger of this trap would be in lessening the work of two branches of trade, but benefiting the public by an efficient trap at all times and under all circumstances; and simply a trifling expense compared to what the public are now obliged to pay to make all other traps efficient.

"The object of the air-vent is to prevent siphonage; but the vent must, from its position, be much too small as compared with the size of the trap for the purpose."

This is another assumption of ignorance of construction of this particular trap.

"The friction of the air in passing through so small an opening is more than enough to offset the inertia of the light body of water in the trap, and consequently the partial vacuum caused by a strong siphonage is partly supplied by the inlet-pipe through the water, and the water-seal is destroyed in its passage."

This is another false assertion. This trap, though so small, containing only one-quarter of a pint of water, when the back-pressure is in the trap contains eight inches solid seal before it is broken, and cannot be siphoned, as houses are plumbed. It has been tested by the New York Health Department apparatus, and witnessed by Drs. E. H. James, J. T. Nagle, J. C. Collins and C. Golderman, of the New York Board of Health; and at the test of the Brooklyn apparatus the fact of not siphoning was corroborated by J. J. Powers, practical plumber, sanitary engineer and expert of the Brooklyn Health Board, and the testimony and an extract of a letter of Dr. Corbally is: — "I have three of Pietsch's self-ventilating sewer-gas traps in use in my house, two of them for the last five months. I have carefully tested them, and found it impossible to break the seal. Although an air-pipe extends to the roof, the S-trap which was formerly in use was frequently siphoned, and allowed the sewer-gas to enter the sleeping-rooms."

The suction of the Brooklyn Health Department apparatus is much greater, so that with a vent a trifle larger its operation is perfect; no such test can be had in any house built. The Brooklyn apparatus is sixty feet high, with two-inch pipe, and about forty gallons of water discharge.

The one in use at Ennever & Sons', plumbers, is situated in front of a Hellyer closet. Mr. Ennever informed me it would siphon any trap but this one.

"The interior of the trap soon collects sediment."

This trap does not collect sediment. It clears itself of all sediment perfectly, except such heavy substances as cannot be forced out of any trap by reason of their gravity.

"It is particularly faulty in having numerous joints difficult to make and keep tight."

This broad statement exhibits an entire ignorance of the construction and application of my trap. There are but two important joints; one, the coupling that connects the trap with the waste-pipe; the other, the cover on the trap. *Leaden* washers can be used, thus making them tight as the metal itself.

"And large surfaces which are imperfectly washed, or never washed at all."

Which is the last false statement on the "air-vent trap," Figure 47. There is no excuse for this misstatement. The only place for anything to accumulate is on the hanger, where no harm can occur either in stopping the passage of the flow of water from the basin, or in allowing anything to decompose in the trap. Even should this occur it can be readily removed, and taken out. The statements of this writer may possibly do me a great wrong. Merit and truth are the principles of success in this age.

Herman Pietsch.

NEW MEMBERS OF THE A. I. A.

American Institute of Architects,
Secretary's Office,
10 Catherine Street, Newport, R. I., March 1, 1884.

To the Editors of the American Architect: —

Gentlemen, — Since the last annual Convention of the Institute, (August, 1883) the following list of names has been added to the roll, of Fellows and Associates of the A. I. A. by promotion and election.

Fellows. (*Promoted.*)		
M. Fred. Bell, Fulton, Mo.	Elected	December 23, 1883.
W. C. Smith, Nashville, Tenn.	"	" " "
Arthur Rotch, Boston, Mass.	"	" " "
W. G. Preston, " "	"	January 30, 1884.
E. H. Kendall, New York, N. Y.	"	" " "
(*New Members.*)		
A. H. Stem, Indianapolis, Ind.	"	" " "
J. H. Stem, " "	"	" " "
E. J. Hodgson, " "	"	" " "
Associates.		
P. L. Le Brun, New York, N. Y.	"	October 23, 1883.
Leone W. Robinson, New Haven, Conn.	"	November 21, 1883.
H. W. Kirchner, St. Louis, Mo.	"	December 23, 1883.
R. V. Enos, Indianapolis, Ind.	"	January 30, 1884.
Charles G. Mueller, " "	"	" " "
W. S. Wicks, Auburn, N. Y.	"	" " "

There is a growing interest in the advancement of the Institute: several candidates are now awaiting election by the Board of Trustees and new Chapters are in process of formation.

Very truly yours,
Geo. C. Mason, Jr., Secretary A. I. A.

NOTES AND CLIPPINGS.

Freaks of Tornadoes. — The Atlanta *Constitution* tells the following tornado stories: "In the tornado of a few years since a door-hinge was buried in the body of a tree. It seems incredible that the wind could have driven so small a thing as a hinge with such terrific force; and yet in the National Museum is a section of a telegraph-pole with a shingle driven half-way through it. In Tuesday's storm a pebble was picked up by the wind and buried in a lady's back, and the sole of a shoe was torn from a man's foot. It is reported that when Mr. Darnell, of Pickens County, recovered some of his money blown away in a cyclone the edges of the bills were burned."

An Amusing Forecast. — A "Scientific Student" writing from Cambridge, Mass., to the Boston *Herald* recently, gave utterance to these views which may—possibly—have a disheartening effect on some who are not amateur photographers: "A word about architecture. When the traveller first enters one of our massive public buildings, or when the dome of the Capitol at Washington first soars out of the mists of the city before him, or when the spires of Cologne Cathedral first meet his eyes from far across the Rhenish plain, what is more natural than that he should ask himself: 'To what purpose is this waste?' In domes, and spires, and arches the barbarian imitated the open sky, and the forest, and the cave which had been his previous homes. But why should we carry on in our buildings this load of savage tradition any more than we should continue to write verse. As we speak straight to the point, so let us build straight to our needs. Where this is most perfectly done is, it seems to me, in the structures which capital has found to its interest to put up in our manufacturing towns and villages. But I must leave this and other points, and only say a word in closing to prevent a possible misunderstanding. I do not deny that skill in verse will continue to win applause, just as skill in dancing does, nor that we shall continue to admire the clever use of brush and pigments, and the architect's ingenious adaptations of irrational forms to practical uses. My point is only this—that the time has gone by when the musician, the verse writer, the painter or the architect can be considered to have a really serious part to play in our social life. In this regard, their places will be supplied by the prose-writer, the photographic artist and the practical builder. It is true, a special value can be claimed for music as an aid in united movements, like marching or children's dances. I am fully aware of the opposition which common-sense views like these will evoke, and am quite free to admit that I should hesitate to express them without the encouragement of your example.

An Enterprising Neapolitan Architect. — Adjoining one end of the royal palace of Naples, which is the future home of the Crown Prince, is the theatre of San Carlo, which has an interesting story. When Charles III was King of Naples he issued orders for the most magnificent theatre of Europe to be built in the shortest time possible. Angelo Carasole, a Neapolitan architect, offered to complete it in three months, and by great effort and energy actually did so. On the opening night the King sent for the architect to come to the royal balcony, and there publicly commended his work, adding that only one thing was lacking, and that was a private door and staircase leading from the palace into the theatre for the use of the royal family. The architect bowed low and retired that the play might begin. When the play was finished, the architect again appeared before the King, saying, "Your Majesty's wish is accomplished," and preceded the astonished monarch to a private entrance in one end of the theatre. In the three hours that the acting had engaged the king's attention, the untiring architect had collected his workmen, and by almost superhuman effort had completed his task. He had torn down partitions, and laid huge logs of wood for a stairway; but elegant velvet carpets and beautiful curtains concealed the rough floors and defaced walls, while a skilful arrangement of handsome mirrors and chandeliers produced a magical effect, and made the whole seem the work of fairy hands. Afterward, the entrance was properly finished, and last summer I walked from the palace through the private door, and stood in the royal balcony where the king had received the architect nearly one hundred and fifty years before.— *St. Nicholas.*

The House of Lords. — The correspondent of *Le Temps* describes the House of Lords: "Never into one room 500 square feet large was crammed more gold raised up in reliefs, heraldic lions, fantastic unicorns, queer shields, loud stained windows, and bric-à-brac subjected to the galvanic battery. And this hall dates from 1860! It is plain that the architect, Sir Charles Barry, was a belated romanticist who rejected nothing in the way of sham Gothic ironmongery that offered itself. One might almost ask whether his work did not conceal a satire on the institution, assuredly very Gothic, of a hereditary chamber. But, alas, it is only necessary to examine from Westminster the enormous edifice of the legislative palace, bristling with clock-towers and turrets, with details and ornamentations that escape the unaided eyesight, and even the lorgnette, to make sure of the complete simplicity of that worthy architect. The same taste that permitted him to raise in the nineteenth century, face to face with two hundred factory chimneys, that prodigious bit of mediæval candy-work, made it inevitable that he should introduce into the House of Lords a veritable cacophony of clashing colors and forms that betray a conventional pre-Raphaelitism. One feels as if one had entered a dollar-store of Bohemian glass. On great days, when the gallery of peeresses is filled with ladies in blue gowns, yellow flowers, red fans, and apple-green feathers, one is liable to fancy that the Bohemian glass-shop has been invaded by a cargo of Brazilian macaws."

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

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

BUILDING PATENTS.

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

293,551. BUILDERS' HOD. — Stanley Ashworth, New York, N. Y.

293,554. SASH-CORD FASTENER. — Henry L. Blodgett, Chicago, Ill.

293,577. WATERING-APPARATUS FOR HOT-HOUSES. Warren H. Howe, Marlborough, Mass.

293,596. BRICK-MACHINE. — Robert N. Ross, St. Louis, Mo.

293,598. DOOR-HANGER. — Joseph E. Schmid, Buffalo, N. Y.

293,612. LIGHTNING-DIFFUSER.—Leonidas G. Woolley, Indianapolis, Ind.

293,617. PROTECTING BUILDINGS FROM VERMIN, FIRE, ETC. — Frederick W. Bartlett, Buffalo, N. Y.

293,626. ELECTRIC BELL-PULL. — Augustus S. Bunker, Lawrence, Mass.

293,627. FIRE-ESCAPE.— Spencer D. Butler, Marshfield, Oreg.

293,636. ARTISTIC TILE.—Gyula de Festetics, Perth Amboy, N. J.

293,645. FILE-HOLDER. — William H. Foster, Jeffersonville, Ind.

293,646. MEANS FOR SUSTAINING DOWEL-PINS OR HINGE-PINS. — Amos F. Gerald, Fairfield, Me.

293,647. MACHINIST'S TOOL. — Fred I. Getty and Frederick Dickinson, Geneva, O.

293,651. SPOKESHAVE.—Albert D. Goodell, Miller's Falls, Mass.

293,662. HINGE-TIP. — Harvey Miller, Cincinnati, Ohio.

293,673-674. IRON FENCE.—Timothy Rogers, Springfield, O.

293,680. FIRE-ESCAPE. — Johan Steinwender, Allegheny, Pa.

293,689. FIRE-ESCAPE. — John Usborne, Arnprior, Ontario, Can.

293,696. GREENHOUSE. — Edmund Mortimer Wood, Natick, Mass.

293,707. FIRE-ESCAPE. — Robert W. Bradley, Denver, Col.

293,716. BRICK. — William E. Carleton, Boston, Mass.

293,721. FIRE-PROOF TIMBER. — William H. Dolman, New York, N. Y.

293,734. WATER-CLOSET. — Charles Harrison, New York, N. Y.

293,738. WEATHER-STRIP. — James H. Hummel, New York, N. Y.

293,752. COVERING FOR STEAM-BOILERS, PIPES, AND OTHER HEATED SURFACES. — Edward Krahenbeihl and Paul Rice, Allegheny, Pa.

293,800. BRICK. — Geo. W. Simonds, Boston, Mass.

293,804. TILE-MACHINE. — John S. Smith, Jackson, Mich.

293,820. SASH-FASTENER. — Samuel M. Tinkham, Taunton, Mass.

293,845. FIRE-ESCAPE. — George M. Bird, Boston, Mass.

293,848. PIPE-WRENCH. — Daniel S. Brown, Burdette, N. Y.

293,851. ELECTRIC SAFETY-DEVICE FOR ELEVATORS. — Jacob William DeCastro, New York, N. Y.

293,863-864. BENCH-PLANE. — Arthur T. Goldsborough, Washington, D. C.

293,935. WATER-CLOSET. — Nicholas Barry, Jr., Muscatine, Iowa.

293,951. DOOR-CHECK. — James Cleland, Wales Centre, N. Y.

293,984. ADJUSTABLE WRENCH. — Alphonso B. Smith, San Francisco, Cal.

293,987. LOCKING-LATCH. — Henning Sundquist, Chicago, Ill.

293,991. SLIDING-DOOR. — Winfield S. Voorhis and George H. Houser, Chicago, Ill.

293,997. APPARATUS FOR RAISING WATER.—Thos. Arthur, Bangor, Pa.

294,001. WOOD-PLANING MACHINE. — Edwin Benjamin, South Evanston, Ill.

294,008. ELECTRIC FIRE-ALARM AND FIRE-EXTINGUISHER SYSTEM. — Charles E. Buell, New Haven, Conn.

294,014. LEVELLING-INSTRUMENT. —Wm. T. Comstock, New York, N. Y.

294,018. DOOR-CHECK.—William B. Dager, Canton, Ohio.

294,034. CUTTING-PLIERS. — Thos. G. Hall, Brooklyn, N. Y.

294,035. HINGE. — Charles E. Hart, New Britain, Conn.

294,087. MANUFACTURE OF CEMENT. — Ludwig Roth, Wetzlar, Prussia, Germany.

294,085. HYDRAULIC RAMS ARRANGED IN SERIES. — Louis Schutte, Philadelphia, Pa.

294,108. SELF-CLOSING HATCH-COVER. — Andrew J. Ballard, Cohoes, N. Y.

294,109. FIRE-ESCAPE. — Frank A. Bone, Lebanon, Ohio.

294,137. BENCH-VISE. — Mortimer G. Lewis, Lowville, N. Y.

294,185. WATER-CLOSET. — Emil Baude, Cincinnati, O.

294,197. SPOKESHAVE. — Addison E. Chapman, Olean, N. Y.

294,201. APPARATUS FOR INDICATING TEMPERATURES OF DISTANT ROOMS. — William R. Comings, Norwalk, O.

SUMMARY OF THE WEEK.

Boston.

BUILDING PERMITS. — *Brick.* — *Weston St., No.* 67, cor. Chapel St., Ward 19, for J. J. McNamara, tenement, 50′ and 54′ x 71′, four-st'y flat; Jas. Fagan, builder.

Union St., Nos. 26 *and* 28, *Friend St., No.* 17, Ward 7, for David W. Cushing, mercantile, 24′ and 31′ x 55′ 6″ and 62′, five-st'y flat; J. H. Stevenson, builder.

Wood.—East Ninth St., rear, near N St., Ward 14, for Asa W. White, storage, 20′ x 30′, one-st'y pitch; Alden Crocker, builder.

West First St., No. 394, Ward 19, for Deming Jarvis heirs, storage, 28′ x 30′, one-st'y flat; C. E. Hall & Co., builders.

Sumner St., No. 109, rear, Ward 2, Peter McIntyre, storage, 20′ and 24′ x 50′, one-st'y pitch; E. D. Leighton, builder.

Blue Hill Ave., near Quincy St., Ward 21, for John Otto, dwell. and saloon, 13′ x 34′ and 36′ x 42′, two-st'y flat; Thos. Clune, builder.

Waumbeck St., near Wabeno St., Ward 21, for Neil McNeil, 3 dwells., 26′ x 46′, two-st'y pitch; McNeil Bros., builders.

South St., rear, near Commercial St., Ward 24, for J. D. Cutler, storage, 50′ x 110′, one-st'y pitch; Malcolm McLean, builder.

Longwood Ave., No. 104, Ward 22, for John McCormick, wagon-shed, 19′ x 62′, one-st'y pitch; barrel-shed, 34′ x 123′, two-st'y pitch; J. McNamara, builder.

Bath Ave., near Savin Hill Ave., Ward 24, for Wm. Bryan, dwell., 21′ x 32′, two-st'y pitch.

Holmes Pl., near Mill St., Ward 24, for James Bentham, dwell., 23′ x 32′, two-st'y pitch; Kennebec Framing Co., builders.

Sydney Pl., near Harvard St., Ward 24, for Martha E. Foss, 2 dwells., 20′ and 22′ x 28′, two-st'y pitch; H. C. Allen.

Unnamed St., rear, near Clifton St., Ward 20, for E. L. Kaiser, bakery and stable, 20′ x 78′, two-st'y flat; J. V. Smith, builder.

Waumbeck St., rear, near Warren St., Ward 21, for B. F. Lamb, stable, 23′ x 30′, one-st'y pitch.

Lamartine St., rear, near Boylston St., Ward 23, for Lorenz Ernst, wagon-shed and bakery, 26′ x 69′, one-st'y pitch; Jacob Luippold, builder.

Unnamed Pl., off Hyde Park Ave., near Florence St., for John Purdy, 2 dwells., 20′ x 29′, two-st'y pitch; John Purdy, builder.

Nonantum St., Ward 25, for Mrs. R. White, dwell., 20′ x 25′, two-st'y pitch; H. F. Ross, builder.

Wheatland Ave., cor. Spruce St., Ward 24, for Starvett J. Burgess, dwell., 28′ x 34′, two-st'y pitch; Burt Bros., builders.

East Seventh St., No. 650, near L St., Ward 14, for H. S. W. Johnson, dwell., 14′ x 20′ and 21′ x 40′, three-st'y flat.

Brooklyn.

BUILDING PERMITS. — *Sullivan St.*, n e cor. Conover St., 8 four-st'y brick tenements, tin roofs; cost, each, $10,000; owner, Wm. H. Algie, 881 Tenth Ave., New York; architect, E. D. Howes; builders, Algie & Son.

Ellery St., s s, 100′ e Throop Ave., three-st'y frame tenement, tin roof; cost, $4,300; owner, Augustus Stolzer, De Kalb Ave., near Throop Ave.; architect, J. Piatte; builders, G. Lehrian & Sons and J. Rueger.

Withers St., No. 45, n s, 150′ w Lorimer St., four-st'y frame tenement, tin roof; cost, $5,500; owner, William Rhein, 47 Withers St.; architects, H. Vollweiler & Co.; builder, J. Schoch.

Leonard St., e s, 72′ s Meserole Ave., three-st'y brick tenement, gravel roof, wooden cornice; cost, $8,000; owner, John Wierk, 158 Eagle St.; architects, H. Vollweiler & Co.

Flushing Ave., No. 911, n s, 146′ 5″ e Bushwick Ave., three-st'y frame store and tenement, tin roof; cost, $5,000; owner, Wm. Thalen, 358 Bushwick Ave.; architect, Th. Engelhardt; builders, Jacob Schoch and J. Frisse.

Greene St., No. 203, n s, three-st'y frame tenement, tin roof; cost, $4,800; owner, M. Eberuhardt, 205 Greene St.; architects, H. Vollweiler & Co.

Myrtle Ave., No. 1524, 74′ w Magnolia St., three-st'y brick store and dwell., tin roof; cost, $6,000; owner, Geo. Schwille, 31 Scholes St.; architect, Th. Engelhardt; builders, Geo. Lehrian & Sons and Jos. Frisse.

Scholes St., n s, 225′ w Lorimer St., three-st'y frame store and tenement, tin roof; cost, $4,300; owner, J. Perrey, Scholes St., near Lorimer St.; architect, J. Platte; builders, J. Auer and F. Herte.

Troutman St., s s, 100′ e Evergreen Ave., three-st'y frame tenement, tin roof; cost, $4,200; owner, Mr. Schell, Troutman St., near Evergreen Ave.; architect, J. Platte; builders, J. Hellman and R. Scheu.

Scholes St., s s, 20′ e Bushwick Ave., one-st'y frame ice-house, tin roof; cost, $4,000; owner, C. Frese, Scholes St., near Bushwick Ave.; architect, J. Platte; builder, J. Rauth.

Broadway, n s, 50′ w Adams St., 4 three-st'y frame stores and tenements, tin roofs; cost, $4,600; owner and builder, George Loeffler; architect, J. Platte.

Willoughby Ave., w s, 80′ s Steuben St., 3 three-st'y brown-stone tenements, gravel roofs, wooden cornices; cost, each, $4,000; owner, Geo. W. Brown, 728 Fulton Ave.; builder, L. E. Brown.

Melrose St., s s, 350′ w Central Ave., three-st'y frame store and dwell., tin roof; cost, $4,000; owner and carpenter, Chasp. Gossman.

Sixth Ave., s w cor. Twelfth St., three-st'y brick store and dwell., tin roof; cost, $5,000; owner, S. P. Lincoln, 184 Hall St.; architect, C. L. Lincoln.

Clason St., Nos. 79 *and* 81, e s, 37′ s Flushing Ave., three-st'y brick store, tin roof, wooden cornice; cost, $7,500; owner, J. J. Hower, 685 Fulton St.; architect, Th. Engelhardt.

Meserole Ave., s s, 30′ e Leonard St., three-st'y brick store and tenement, gravel roof; cost, $11,000; owner, John P. Wierk, 158 Eagle St.; architect, H. Vollweiler.

Meserole Ave., s s, 56′ 6″ e Leonard St., three-st'y brick tenement, gravel roof, wooden cornice; cost, $8,000; owner and architect, same as last.

South Ninth St., No. 174, rear, two-st'y brick stable, tin roof, brick cornice; cost, $5,000; owner, Christian Friedmann, on premises; architect, C. Rentz, Jr.

Third Ave., s w cor. Baltic St., 7 four-st'y brick stores and tenements, gravel roofs; cost, each, $10,000; owner, George Beach, 467 Hicks St.; architects, Parfitt Bros.; builder, T. J. Nash.

Locust St., n s, 100′ w Beaver St., 3 three-st'y frame tenements, tin roofs; cost, each, $4,500; owner, John Kramer, 297 Floyd St.; architect, F. Weber; builders, G. Straub and J. Rueger.

Park Ave., s s, 250′ w Sumner Ave., three-st'y frame tenement, tin roof; cost; $4,200; owner, Jacob Comes, 820 Park Ave.; architects, H. J. Schwarzmann & Co.; builders, J. Armendinger and J. Rueger.

India St., n w cor. Oakland St., four-st'y frame tenement, tin roof; cost, $8,000; owners, O'Keeffe & Doyle, cor. North Sixth and Fifth Sts.; architect, A. Herbert; builders, Joseph Gatley and John Fallon.

York St., n e cor. Washington St., six-st'y brick factory, gravel roof; cost, $24,000; owners, Ketcham & McDougal, cor. York and Washington Sts.; architect, Mercein Thomas; builders, F. J. Kelly and L. W. Seaman, Jr.

Elm St., No. 128, e s, 200′ n Central Ave., three-st'y frame tenement, tin roof; cost, $3,200; owner, Ann Shanahan, on premises; architect, E. F. Gaylor; builder, Robert McArthur.

Graham Ave., No. 90, e s, 50′ s Seigel St., three-st'y frame tenement, tin roof; cost, $5,300; owner, Mary A. Kuhn, 88 Graham Ave.; architect, Th. Engelhardt; builders, Martin Kuhn and Peter Kunzweiler.

Madison St., n s, 250′ e Tompkins Ave., 5 two-and-a-half-st'y brown-stone dwells., tin roofs; cost, $5,500 each; owner, Jas. A. Thompson, 300 Lexington Ave.

Macon St., s s, 100′ w Hopkinson Ave., 4 two-st'y brick dwells., gravel roofs; cost, $2,500 each; owner and builder, Jno. G. Porter, 405 Pearl St., New York; architect, Thos. S. Godwin.

Washington Ave., No. 460, three-st'y and attic brick dwell., slate roof; cost, $35,000; owner, J. W. Hollenback, Wilkesbarre, Pa.; architect, Alfred H. Thorp; builders, Stevenson & Son and Morris & Selover.

Seventh Ave., n e cor. Fourteenth St., three-st'y brick store and tenement, tin roof, wooden cornice; cost, $8,000; owner and builder, R. F. Clayton, 471 Fifth Ave.; architect, J. D. Hall.

South First St., w s, about 150′ e Tenth St., 3 three-st'y brick tenements, tin roofs; cost, $4,000 each; owner and mason, James Rodwell, 99 Division Ave.; architect, E. F. Gaylor.

Seventh Ave., e s, 20′ n Fourteenth St., 4 three-st'y brick tenements, tin roofs; cost, $6,000 each; owner and builder, R. F. Clayton, 471 Fifth Ave.; architect, J. D. Hall.

Prospect Pl., s s, 163′ e Rogers Ave., two-st'y and basement brick dwell., tin roof, wooden cornice; cost, $3,500; owner, Edward Tuite; builders, Philip Sullivan and Edward King.

Lafayette Ave., n e cor. Steuben St., 4 four-st'y brick double flats, felt, cement and gravel roofs; cost, $20,000 each; owner, Paul C. Grening, 420 Gates Ave.; architect, Amzi Hill.

Chicago.

FREIGHT-HOUSE. — The Chicago and Grand Trunk Railroad Co. is building a freight-house on Third Ave., cor. Twelfth St. It will be two stories high, 50′ x 394′, with office-building three stories, 30′ x 50′, on Twelfth St.

BUILDING PERMITS.— W. Olson, two-st'y store and dwell., 786 West North Ave.; cost, $3,000.

Turner & Bond, 2 cottages, 512 to 514 Idaho St.; cost, $4,000.

E. A. Cook, two-st'y flats, 22 to 24 Washtenau St.; cost, $5,000; architect, A. Nelson.

A. Fachtke, two-st'y store and dwell, 529 Jefferson St.; cost, $3,500.

C. Miller three-st'y store and flats, 3527 State St.; cost, $4,500.

C. Shay, two-st'y dwell., 53 Sholto St.; cost, $3,000; architect, J. H. Moore.

Frank Norah, 4 cottages, 817 to 823 Wood St.; cost, $5,000.

J. Carlson, three-st'y store and flats, 271 West Erie St.; cost, $4,000; architect, J. Olson.

J. H. Lomax, three-st'y store and dwell., 60 North State St.; cost, $8,000; architect, G. N. Houghteling.

Wm. Gilman, two-st'y addition to warehouse, 637 to 639 Halsted St.; cost, $4,000; architect, Wm. Gilman.

A. C. Harper, three-st'y flats, 119 West Polk St.; cost, $6,000.

S. M. Roach, two-st'y dwell., 263 Fremont St.; cost, $3,000.

Conrad Seipp, two-st'y flats, 193 to 197 Van Buren St.; cost, $5,000.

M. Stende, 2 two-st'y dwells., 2420 to 2422 La Salle St.; cost, $6,000.

J. Pilat, three-st'y store and flats, 490 North Ashland St.; cost, $13,000; architect, H. Clay.

Armour, Kent & Bensley, twelve-st'y office-building, Van Buren St., cor. Pacific Ave.; cost, $1,000,000.

P. G. Murphy, three-st'y dwell., Fourteenth St., cor. Wabash Ave.; cost, $9,000.

D. S. Marsh, two-st'y dwell., Thirty-second St., cor. Lake Park Ave.; cost, $8,000.

J. Heinrich, two-st'y dwell., 141 Forqueor St.; cost, $2,600.

D. Simmons, three-st'y dwell., 298 Superior St.; cost, $7,000; architect, John Otto.

Paul Dumond, three-st'y store and dwell., 537 Blue Island Ave.; cost, $8,000; architect, P. W. Ruehl; builders, John McGrath & Co.

John Eleber, two-st'y dwell., 373 Market St.; cost, $4,000.

H. W. Martin, three-story flat, 219 Third Ave.; cost, $3,500.

H. W. Martin, 2 two-st'y dwells., 3640 to 3642 Vernon Ave.; cost, $4,000.

H. W. Martin, 3 two-st'y dwells., 141 to 145 West Seventeenth St.; cost, $4,500.

Adolph Lange, three-st'y store and flats, 618 Blue Island Ave.; cost, $10,000; architect, W. Bessler; builder, W. Walk.

Cincinnati.

BUILDING PERMITS.—Since our last report the following permits have been issued for new buildings:—

Geo. Seiser, two-st'y brick dwell., Browne St., near Jefferson St.; cost, $3,000.

F. Hemine & Co., three-st'y brick dwell., s w cor. Hughes and Schiller Sts.; cost, $10,000.

Jos. Neihaus, three-st'y brick dwell., n e cor Milton and Pond Sts.; cost, $6,000.

Geo. H. Foelich, two-st'y brick dwell., Militor St., near Eden Ave.; cost, $3,500.

Geo. Conners, 2 two-st'y brick dwells., Crown St., near State Ave.; cost, $7,000.

Lawrence Peppard, two-st'y brick dwell., Gilbert Ave., near Nassau St.; cost, $3,500.

H. V., three-st'y brick factory, s w cor. Liberty and Barton Sts.; cost, $20,000.

A. Lugermann, two-st'y brick dwell., Queen City Ave.; cost, $3,500.

N. Mullier, three-st'y brick dwell., n w cor. Race and Findlay Sts.; cost, $6,500.

C. Lumbert, 3 two-st'y brick dwells., Betts St., bet. Linn and Baymiller Sts.; cost, $7,500.

W. H. Forwood, two-st'y brick dwell., Ashland St., Walnut Hills; Chas. Crapsey, architect; cost, $8,000.

Jas. Averhill, two-st'y frame dwell., Wayne Ave., near Copland St.; cost, $3,600.

C. Grueninger, three-st'y brick dwell., Freeman Ave., near Court St.; cost, $6,000.

John Hauck, four-st'y brick dwell., s e cor. Fourth and Mill Sts.; cost, $26,000.

L. Podesta, four-st'y brick dwell., 108 Central Ave.; cost. $7,000.

Louis Harnser, two-st'y brick dwell., McMillan St.; cost, $4,000.

John Ruppert, two-st'y brick dwell., s w cor. Warsaw and Hawthorne Aves.; cost, $8,000.

Henry Feltman, four-st'y brick tobacco warehouse, 96 West Front St.; E. Anderson, architect; cost, $22,000.

H. Boberg, three-st'y brick dwell., Dandridge St., near Frank St.; cost, $5,000.

N. H. Streit, three-st'y brick dwell., s w cor. Liberty and Barton Sts.; cost, $6,000.

H. Welber, three-st'y brick dwell., Findlay St., near Baymiller St.; cost, $6,000.

Fifteen permits for repairs; cost, $16,200.

Total permits, 38; total cost, $193,300.

Total permits to date, 62.

Total cost to date, $292,350.

Cleveland.

BUILDING on Central Place, for A. Montpelier; cost, $30,000; Dave Robinson, contractor; Walter Blythe, architect.

ALTERATIONS to Chamberlain Block, on Bond St.; cost, $3,500; Walter Blythe, architect.

BRICK FLAT on Willson Ave., for Caroline S. Meyer and Jacob J. Meyer; cost, $15,500; Matthes & Wherry, carpenters; Co-operative Building Co., masons; F. H. Norton, architect.

DWELLING on Willson Ave., for Harry Dorner; cost, $3,000; F. C. Bate, architect.

STABLE, on Willson Ave., for O. B. Skinner, Esq.; cost, $3,800, frame.

New York.

FLATS.—For Mr. M. Bergman a double brick and stone flat, 50′ x 96′, is to be built on the s w cor. of Boulevard and Ninety-ninth St., at a cost of about $75,000, from designs of Messrs. D. & J. Jardine.

HOUSES.—For I. H. Schiff, Esq., a four-st'y house, of brick, stone and terra-cotta, 25′ x 140′, is to be built on Fifth Ave., between Seventy-fourth and Seventy-fifth Sts., at a cost of about $125,000, from designs of Messrs. Schwarzmann & Buchmann.

Mr. Wm. Henderson will have 35 three-st'y private dwells. built on One Hundred and One Hundred and First Sts., between Lexington and Third Aves., at a cost of about $500,000, from designs of Mr. John C. Burne.

Messrs. Chas. Buek & Co. will build 7 first-class four-st'y and basement brick and stone residences, on the n e cor. of Madison Ave. and Sixty-fifth St.; cost, $225,000.

It is proposed to have built, on the e s of Madison Ave., between Seventy-sixth and Seventy-seventh Sts., 6 three-st'y and attic brick and brown-stone houses; Messrs. Lamb & Rich are preparing preliminary sketches.

OFFICE-BUILDING.—No. 47 Broadway is to be altered and improved, at an expense of about $40,000; Col. Jas. H. Jones, owner; Messrs. D. & J. Jardine, architects.

BUILDING PERMITS.—*Forty-sixth St.*, n s, 285′ w Eighth Ave., 9 three-st'y and basement brown-stone dwells., tin roofs; cost, each, $11,500; owner, John Livingston, 981 Lexington Ave.; architect, F. T. Camp.

West Thirty-third St., No. 435, four-st'y brown-stone tenement, tin roof; cost, $12,000; owner and architect, John Coyle, on premises; builder, J. C. Lyons.

Worth St., No. 118, three-st'y brick shop, tin roof; cost, $3,500; owner, Joshua Dyson, 45 Elm St.; architects and carpenters, Bardsley Bros.; mason, P. Doyle.

Ninth Ave., Nos. 237 *and* 239, w s, 50′ s Twenty-fifth St., 2 five-st'y brick stores and tenements, tin roofs; total cost, $25,000; owner, Marks Rinaldo, 220 East Thirty-third St.; architect, O. B. Ogden.

West End Ave., w s, 25′ 11″ s One Hundred and Second St., two-st'y brick and Scotch sandstone dwell., tin roof; owner and architect, Ralph S. Townsend, 337 West Fifty-fifth St.; mason, J. A. Hopper.

Tenth Ave., s e cor. One Hundred and Fifth St., four st'y brick apartment-house; cost, $40,000; owner, David H. Knapp, One Hundred and Fifth St., between Ninth and Tenth Aves.; architect, R. S. Townsend.

One Hundred and Fifth St., s s, 40′ e Tenth Ave., four-st'y brick apartment house, tin roof; cost, $35,000; owner, etc., same as last.

One Hundred and Forty-fifth St., n s, 175′ e Tenth Ave., 3 three-st'y brick dwells., slate and tin roofs; built by days' work; owner and builder, John Donnellon, foot of West Thirtieth St.; architects, Lamb & Rich.

East Sixty-eighth St., No. 608, two-st'y brick stable, tin roof; cost, $3,000; owner, Chas. Clark, 612 East Seventeenth St.; architect, James Barrett.

Monroe St., s w cor. Corlears St., two-st'y brick car-house, gravel roof; owner, Dry Dock, East Broadway & Battery R. R. Co., Wm. White, President, White Plains, N. Y.; architect, M. C. Merritt.

One Hundred and Sixty-fifth St., s e cor. Tenth Ave., two-st'y brick dwell. and store, gravel roof; cost, $8,000; owner, Geo. S. Lespinasse, 9 Pine St.; architect, Wm. Pistor.

One Hundred and Second St., s e cor. Fourth Ave., five-st'y brick flat and store, tin roof; cost, $17,000; owner, S. Haberman, East Ninety-seventh St.; architect, H. J. Dudley.

One Hundred and Second St., s s, 27′ e Fourth Ave., five-st'y brown-stone front flat and store, tin roof; cost, $17,500; owner and architect, same as last.

One Hundred and Second St., s s, 55′ e Fourth Ave., 5 five-st'y brown-stone front flats and stores, tin roofs; cost, each, $15,000; owner and architect, same as last.

Fourth Ave., e s, 74′ s One Hundred and Second St., five-st'y brick flat, tin roof; cost, $19,000; owner and architect, same as last.

Sixty-fifth St., s s, 90′ w First Ave., 5 five-st'y brown-stone front flats, tin roofs; cost, each, $20,000; owner, John C. Umberfield, 216 East Sixty-first St.; architect, A. B. Ogden.

One Hundred and Forty-fifth St., s w cor. Third Ave., two-st'y frame dwell., tin roof; cost, $3,500; lessee, Abraham Piser, 121 West One Hundred and Twenty-fourth St.; architect, Bart. Walther.

One Hundred and Fifth St., n s, 500′ e First Ave., one-st'y brick lumber-room, gravel roof; cost, $4,000; lessee, Wm. Hall's Sons, 522 East Twentieth St.; architect, Bart. Walther.

Varick St., Nos. 20 *and* 22, 2 five-st'y brick warehouses, tin roof; cost, each, $30,000; lessee, Bernhard Mohand, 87 Fulton St., Brooklyn; architect, M. C. Merritt.

West Fiftieth St., Nos. 544, 546 *and* 548, 3 five-st'y brown-stone front tenements, tin roofs; cost, each, $14,000; owner, Martha A. Lawson, 524 West Forty-ninth St.; architect and builder, Judson Lawson.

One Hundred and Fifty-sixth St., n e cor. Mesorole Ave., 2 frame buildings, tin roofs; cost, $4,000 and $180; owner, Louis Demminger, 537 East One Hundred and Fifty-fourth St.; architect, A. Pfeiffer.

West Forty-seventh St., Nos. 432 *and* 434, 2 five-st'y brick and stone flats, tin roofs; cost, each, $18,000; owner, Robert Auld, 425 West Forty-seventh St.; architect, Wm. J. Merritt.

Eighth Ave., s e cor. One Hundred and Twenty-eighth St., 6 four-st'y brick tenements, tin roofs; cost, each, $15,000; owner, Lorenz Weiher, New Rochelle, N. Y.; architect, John Brandt.

East Seventy-seventh St., No. 445, four-st'y brick and brown-stone tenement, tin roof; cost, $15,000; owner, John E. Staedler, 445 East Seventy-sixth St.; architect, John Brandt.

Division St., No. 144, cor. Canal and Ludlow Sts., five-st'y brick tenement and store, tin roof; cost, $7,000; owner, Chas. Hasselmeyer, 30 Canal St.; architect, Fred. Jenth.

ALTERATIONS.—*Broadway*, cor. Fiftieth St. and Seventh Ave., second story on Seventh Ave. fitted up with stalls for horses; cost, $4,000; lessees, American Horse Exchange, Frederic Bronson; architects, D. & J. Jardine; builder, J. F. Moore.

West Fifty-seventh St., No. 407, five-st'y brick extension, tin roof; cost, $6,000; agent, Thos. O'Callaghan, 407 West Fifty-seventh St.; architect, J. M. Dunn.

East One Hundred and Twentieth St., No. 207, four-st'y brick extension, tin roof and interior alterations; cost, $5,000; owner, John F. Wallace, 327 West Fifty-seventh St.; architects, Cleverdon & Putzel; builder, M. Mulrein.

Broadway, No. 1546, four-st'y brick extension, tin roof; cost, $3,000 to $5,000; owner, Geo. W. Helme, Jersey City; builders, J. Masten and S. M. Dean.

Broadway, No. 857, four-st'y brick extension, tin roof; rebuild lower front and second story floor; cost, day's work; owners, Robert Goelet, 591 Fifth Ave., and O. Goelet, 608 Fifth Ave.; architect, Jos. M. Dunn; mason, M. Reid.

Washington Market, Fulton St., cor. Washington, West and Vesey Sts., iron sheds; cost, $20,000; owner, City of New York; architect, Douglas Smyth.

Broadway, No. 115, extend sub-basement; cost, $3,000; owner, Sarah Boreel; architect, Stephen D. Hatch; builders, R. L. Darragh & Co.

One Hundred and Seventh St., n s, 150′ w Ninth Ave., raise one story and internal alterations; cost, $10,000; owners, Bernheimer & Schmid, One Hundred and Eighth St., cor. Ninth Ave.; architects, Lederle & Co.; builders, J. & L. Weber and Henry Schiffer.

Cherry St., No. 65, attic raised to full story and internal alterations; cost, $6,000; owner, Elizabeth D. De Lancey; architect, Jas. E. Ware.

Philadelphia.

EXHIBITION BUILDING.—The Franklin Institute Electrical Exhibition buildings have been contracted for; will extend 292′ on Thirty-second St. and 312′ on Lancaster Ave.; to be of frame and glass; cost, about $30,000; J. K. Garber, contractor; plans by Wilson Bros. & Co., architects.

BUILDING PERMITS.—*Coral St.*, s Somerset St., 2 two-st'y dwells., 15′ x 40′; Dickson Bros.

Venango St., n w cor. Richmond St., two-st'y store and dwell., 18′ x 54′; Jno. W. Bright, contractor.

Seventh St., s Cumberland St., 5 two-st'y and 1 three-st'y dwells., 16′ x 45′; Amos D. Kennedy, owner.

Filbert St., w Thirty-third St., 3 two-st'y brick dwells., 14′ x 28′; R. G. Black, contractor.

Eighth St., s Oak Lane., three-st'y dwells., 35′ x 38′; Mary E. Willard, owner.

Tioga St., No. 1011, two-st'y store and dwell., 16′ x 42′; Geo. W. Weiss, owner.

Sprague Ave., w Armat St. (Germantown), three-st'y dwell., 16′ x 32′; McLaughlin & McNamara, contractors.

Fernon St., Nos. 914 *and* 916, 2 three-st'y dwells., 16′ x 28′; Joseph Stukey, owner.

McKean St., w of Eighth St., 2 two-st'y dwells., 16′ x 28′; Joseph Stukey, owner.

McKean St., w Ninth St., 3 two-st'y dwells., 16′ x 28′; Joseph Stukey, owner.

Dorrance St., s Wharton St, 4 two-st'y dwells., 16′ x 26′; Thos. Marshall, owner.

Eleventh St., No. 102, interior alterations and two-st'y back building, 16′ x 26′; Guebert & Kiefer, contractors.

Reese St., n Lehigh Ave., 3 two-st'y dwells., 13′ x 40′; W. Bartholomew, contractor.

Division St., w Jefferson St., 3 two-st'y dwells., 14′ x 35′; Patrick Farley, owner.

Armingo St., No. 621, three-st'y addition to factory, 35′ x 38′; Haiback & Auchter, contractors.

Wharton St., No. 3309, two-st'y dwell., 18′ x 42′; Nicholas Jenigen, owner.

Everly St., bet. Godfrey and Spencer Aves., 2 three-st'y dwells., 15′ x 30′; Michael McCullough, owner.

Church St., s Main St., one-st'y store, 16′ x 20′; Martin Hetzel, contractor.

Washington St., bet. Penn and Fountain Sts., 3 three-st'y dwells., 17′ x 44′; Jas. Mackey, owner.

Twenty second St., cor. Washington Ave., two-st'y stable, 16′ x 30′; shop, 16′ x 42′; David Andrews, owner.

Quince St., n Lombard st., three-st'y dwell., 18′ x 21′; Geo. A. Fry, contractor.

General Notes.

ALBERT LEA, MINN.—Wholesale store for Ransom Bros., 44′ x 122′, two stories and basement; cost, $12,000; C. G. Maybury & Son, Winona, architects.

ATLANTA, GA.—The plan of Messrs. Edbrooke & Burnham, of Chicago, Ill., was adopted by the Commission for the new State Capitol of Georgia.

BEVERLY, N. J.—Country house for Mr. Jno. Hamer; Hazlehurst & Huckel, architects, Philadelphia, Pa.

BINGHAMTON, N. Y.—Messrs. Hartwell & Richardson, of Boston, Mass., are architects of a house for S. M. Johnson, now building. It is a two-and-one-half-st'y frame building, measuring about 37′ x 50′.

BRYN MAWR, PA.—Boiler-house for the Bryn Mawr College, 25′ x 50′, to include laundry and engine-room; also, a gymnasium-building, 40′ x 80′, of brick; Addison Hutton, of Philadelphia, architect.

On Haverford Road, a country house, 34′ x 50′, of stone; cost, about $8,000; Hazlehurst & Huckel, architects, Philadelphia.

EYOTA, MINN.—Brick house for J. T. Price, two and one-half stories; cost, $3,000; C. G. Maybury & Son, architects, Winona.

FAR ROCKAWAY, L. I.—The building of a new Roman Catholic church has been begun at Clarke Ave., cor. Catharine St.; the cost of the church is to be $20,000.

A three-st'y dwell. is building, opposite the home of Judge Donohue, at Norton St. and the Rockaway turnpike; it is the property of P. Dollard.

GALESVILLE, WIS.—Brick store for Gilbertson & Myhre, 40′ x 65′, two-st'y; cost, $7,000; C. G. Maybury & Son, architects, Winona, Minn.

GRAFTON, DAK. TER.—Plans have been made for a city building, to cost $10,000.

HURON, D. T.—House for F. E. Stevens; cost, $2,000; C. G. Maybury & Son, architects, Winona, Minn.

KANSAS CITY, MO.—Morrison Munford, repairing and erecting printing establishment at the Diamond Block: erecting one-story, and extending and building five stories, $15,000; Emily K. Brown, five frame residences on Lydia Ave., $1,500 each. Julia J. Marks, residence and barn at 1309 Troost Ave., $8,000. A. M. Sills, three brick residences, 1325 Summit St., and 1322 and 1324 Jefferson St., $7,000.

Bids and Contracts.

CINCINNATI, O.—Bids for the sidewalk about the Government Buildings were as follows:—

Granite.—The Belknap & Dumesnil Stone Company, $17,200, five months.

Ph. W. Schneider & Co., $30,250, six months.

Alfred White, of Cincinnati, Ohio, and M. Gault & Son, of Baltimore, Md., $31,000, eight months.

Gill & McMahon, $37,796, eight months.

Indiana Limestone.—Belknap & Dumesnil Stone Company, $11,750, five months; also, $15,950, five months.

Behan & McDonald, limestone, $11,316, five months; freestone, $8,400, five months.

Ashman & Glasgow, $11,700, four months.

P. Conkling & Co., $11,900, September 1, 1884.

Baltz & Krebs, $13,133, ninety working days.

David Hummel, $13,425, two months, bush hammered; $14,150, two months, pricked work; $14,825; two months, tool-dressed.

Hallowell Granite Company, $13,747.

Granolithic.—L. S. Filbert, $8,970, forty-five days.

H. L. Cranford, $9,100, sixty days.

Artificial Stone.—Burns & Creecy, $5,168.16, thirty working days, crushed granite and Portland cement.

George W. Cook. $5,490.

The Charles Kuhl Artificial Stone Company, $6,500, five weeks (granolithic).

MINNEAPOLIS, MINN.—The Board of Education received the following bids for rebuilding the Irving school in South Minneapolis, recently destroyed by fire. The bids were as follows:—

L. C. Bisbee (with material from the old building), $16,800.

O. Dickinson, $21,447.

B. Brown, $17,350.

R. N. Brittain, $16,700.

Mr. Brittain having presented the lowest bid, the contract was awarded to him by the Committee.

QUINCY, ILL.—Bids for the stone-work of the Government Building were as follows:—

Indiana Oolitic Limestone Co., $37,997, Oolitic limestone, 450 days.

W. D. Collingwood, $42,346, Bedford, ten months.

Baltz & Krebs, $50,572, Bedford, 225 days.

Larkworthy & Menke, $54,350, Bedford, Quincy steps.

Same firm, $63,580, Quincy, Bedford steps.

Scott Webber, $54,464, Bedford, September, 1884.

M. A. McGowan, $55,101, Quincy limestone, twenty months.