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THE report of the committee which investigated the charges made against the Supervising Architect of the Treasury Department is, or at least ought to be, an interesting document to those architects who are charged with the responsibility of expending public money. Among the comments of the daily papers upon it, while we find a good deal of foolishness, and some malicious misrepresentation, there is also much that goes to show that the committee, although from the architect's point of view rather unreasonable in some respects, well expresses the idea which sensible citizens generally have of an architect's temptations and responsibilities, and is worthy on that account of unprejudiced consideration. The report, as was expected, entirely exonerates the Supervising Architect from the absurd charges of incompetency and corruption brought against him, but expresses the opinion that he permitted himself to use too great discretion in awarding public work in accordance with his own opinion of the merit of different contractors, rather than by the method, legally prescribed, of public advertisement and competition. It is not claimed that the public has not been well served, and at the lowest possible cost, but the assumption by a public officer of a greater discretion than the law allows him seems to the committee a serious grievance.

TO all architects, on the contrary, as well as to many outside the profession, this complaint of the committee will seem at first sight very ill-founded. In the matter of safes, for instance, it is shown that the Supervising Architect was able to make privately a contract much more advantageous to the public than could have been obtained by putting the work out for competition, and in ordinary business it would be ridiculous to prohibit an architect from making the best terms he could for his employer in matters so entirely within his knowledge, in any way he might see fit. In the same way a certain kind of elevator having commended itself to his judgment, and to that of a committee of experts appointed by the Government, the Supervising Architect might naturally consider himself authorized to purchase such elevators, at the most favorable price he could, whenever he needed them for the public buildings, and would be very likely to think an annual advertisement for elevators, of a kind which only one manufacturer could furnish, an absurd farce; but the committee does not sympathize with this view, and considers the annual advertisement a necessary form, even though the result of the competition might be always the same. That the result of the discretion assumed by the Supervising Architect has been on the whole advantageous to the public treasury no one, familiar with building matters, can doubt for a moment, and in private business such authority properly belongs to a professional adviser, and is necessary to his efficient service. In public affairs we have, however, to remember that official conduct cannot be too circumspect and exact, and that scandal, and even real corruption, can be best avoided by the adoption of methods, in all the details of public service, by which every step shall be definitely authorized, or in accordance with well-known precedent. If the cost of administering a public office in this way is greater, as it probably would be, than that of a private business of the same importance, there are counterbalancing advantages upon which the committee is quite justified in insisting.

THERE is another reason for limiting the discretion of the Government Architect to the strict letter of the law in regard to advertising public contracts, which seems to have escaped the notice of the newspaper correspondents, although it certainly seems to have been in the minds of those who framed the law. To illustrate this by an example, it is quite possible that immediately after the competitive trial of elevators, which resulted in the selection of a certain variety as the most suitable for the public buildings, a new variety might be invented, or an improvement made in an old one, which would render it superior even to the kind previously selected by the experts. By the public advertisement and competition prescribed in the law the inventor of the improved device would within a year, at most, be afforded an opportunity to submit his invention, and to secure its adoption if it should prove to be really superior to all others, while a system of awarding contracts quietly for an indefinite period to the maker of an elevator once officially approved would debar the author of meritorious improvements from offering them. It seems, perhaps, a little imprudent to make the public building service a field for the experiments of ingenious citizens, but the equal right of all ingenious citizens to have their inventions adopted if they deserve it is of more importance than may at first appear. On the whole, the action of the committee in calling attention to these considerations seems reasonable enough, and it certainly casts no reflection upon the present Government Architect, who is to be congratulated upon the thoroughness with which his skill and integrity are vindicated by the report.

IT would seem that the people of New England have not wholly lost that intellectual activity and fondness for innovations which were once so characteristic of them, if we may judge from the account of some industrial experiments which have been recently made in a quiet way among them. Every one knows that one of the principal industries in that portion of the country is the manufacture of shoes, and most people will remember that the operatives in the shoe factories have of late years been engaged in frequent disputes with their employers, to the injury of both. In consequence, probably, of these troubles, a movement has recently begun for manufacturing on the co-operative plan, and several establishments have already been organized in this way, and have carried on a successful business. The scheme of organization is very simple. The capital, which is fixed at a modest sum, is divided into two or three hundred shares, at one hundred dollars each, and no person is allowed to own more than ten shares. This gives a corporation composed of perhaps fifty or sixty persons, most of whom are interested in improving the value of their property by their own exertions. The membership is not restricted to the persons immediately engaged in the establishment, although these, understanding the value of the shares better than any one else, would naturally be anxious to secure as many of them as they could pay for. A certain portion of the capital, amounting to ten per cent or more, is set aside as a reserve fund for contingencies, and the remainder invested in stock and machinery under the direction of the Board of Managers. All the factories carried on in this way are said, so far, to have made good profits, one of them in Stoneham, near Boston, having paid forty per cent on its capital as a dividend for the past year.

A RATHER unexpected turn is likely to be given to the study of the so-called bacteria of the blood, if certain discoveries of Dr. Grigg, of Buffalo, should be confirmed. This gentleman announces through the Associated Press that by simply boiling healthy blood he has obtained all the forms

of bacteria, and on repeating the experiment with the washed fibrine only, he found that the threads of fibrine separated into short threads and granules precisely imitating bacteria as seen in the field of the microscope. Dr. Grigg then placed fresh healthy blood in a warm place, and allowed it to stand and decompose for two months, when again the fibrine threads were found to be separated into bacteria-like forms. Naturally the experimenter believes that these results indicate an error in the theories hitherto received on the subject of blood-ferments, and, for the general good, invites all microscopists interested in the subject to repeat his tests, diversifying them as much as possible, so that the greatest amount of evidence can be collected.

THE Technical Commission for the improvement of the sanitary condition of Paris has decided to recommend certain reforms, the description of which reads rather curiously to us, accustomed to the refinements of American and English sanitation. The first article of the "Resolutions" of the Commission advises that "in every house there shall be a water-closet for each tenement. The water-closet may, if necessary, be placed outside of the tenement, provided it is upon the same story." The second article goes on to say that "every water-closet shall be supplied, either by means of reservoirs or by a pipe, or in some other way, with a quantity of water sufficient to assure a minimum discharge of ten quarts per day for each person using it." The third article says that "every water-closet shall be furnished with a trap under the bowl." It may at least be said that these provisions are good as far as they go, but then, it must also be acknowledged that according to our ideas they do not go very far, and the Parisians have a wide field before them for the development of the plumber's art. It is gratifying to observe that the Commission considers it "necessary to pursue the suppression of the system of fixed vaults," and recommends that henceforth no vaults shall be constructed under houses except by special permission, in cases where discharge of house wastes into a sewer would be impracticable.

M. EDOUARD MARIETTE writes to *Le Génie Civil* an account of the modern practice in Egypt in the construction of the great baths which play so important a part in the daily life of the more civilized Southern nations. It seems that in Egypt the planning both of public and private baths is usually left to specialists, who have reduced their art to a fixed system. The first step, in the construction of the suite of rooms constituting the bath attached to a private house, consists in the establishment of a water-tight basin, of brick laid in a mortar of lime mixed with the fine silicious alluvium of the Nile. This mixture forms a kind of cement, and as the masonry is made from nine to twelve inches thick, the basin, after plastering the surface with mortar, is sufficiently impervious for its purpose, which is simply to prevent the infiltration of water from above into the soil beneath, and among the stones or brick of the foundation. So great is the importance attached to this protection that in the better class of buildings a sheet of lead is often laid over the surface of the brickwork, in place of the coat of mortar. Whatever may be the material of the superficial covering of the basin, the next operation is to build upon it a number of brick piers, about twenty inches high, and the same distance apart, on which are laid flat iron bars, running both directly and diagonally from pier to pier, and forming a net-work, on which are placed large, flat stones, these again being covered with a pavement of tiles or marble bedded in mortar.

IN this way a chamber is formed under the floor of the bath, accessible in all directions for sweeping out, or other purposes, into which are discharged the smoke and heated gases from a furnace placed in a room just outside. To withdraw the smoke after its heat has been transferred to the floor of the bath above, a number of flues are built in the walls of the superstructure, separated from the interior of the room only by two inches of brick, so as to allow the last remaining warmth to be utilized. Like the chamber beneath the floor, the flues are arranged so as to be readily cleaned, the fuel used in Egypt being of such bad quality as to make it necessary to sweep out all the smoke passages at least once in every six months. The chamber warmed in this manner forms the centre of the group of apartments, and is usually covered with a dome of plaster-of-Paris, made by pouring liquid plaster over a form of earth built on a wooden scaffolding. The subordinate portions of the bath generally consist, for private houses, of a dressing-room, placed near the entrance, a *salle de repos*, between the dressing-room and the bath proper, and the furnace-room. The last, besides the fireplace for heating the hypocaust of the bath, contains a large boiler, the lower part of which is made of copper, and the upper of lead. This stands over the furnace, and to assist in diffusing the warmth of the fire through the water, an upright rod of copper is fixed in the boiler, with several horizontal arms, which conduct in all directions the heat imparted to the central stem. The steam from the boiler escapes into the main bath, filling it with warm vapor as required. Benches of marble and wood are provided, both in the main hall and the smaller rooms, and either in the main hall or in alcoves opening out of it are placed basins supplied with hot and cold water. The decoration of the whole is formed by color or relief work, upon a coat of plaster, mixed with oakum or tow. Light is admitted to the central room in the daytime through openings of various shapes in the dome, filled with glass "bull's-eyes," and a feeble illumination is given at night by means of a lamp, set from the outside in a little cupboard, enclosed on the side toward the bath by a glazed sash.

THE remains of a bridge, which once crossed the Rhine from Mentz to Castel, have recently been made the subject of an antiquarian exploration, and the piles under some of the ancient piers were drawn up and carried to Berlin. They proved to be of various kinds of timber, some being oak, others elm, and others beech. The most interesting feature of the account is that as the bridge which they supported is positively known to have been in use during the wars of Julius Cæsar, B. C. 53, the piles must have been in place for more than nineteen hundred years. The inner portions of the timber were perfectly sound, so that some was immediately utilized for making pieces of furniture, and it is said that even the iron shoes with which the points were armed remained in place. We think that this is the most striking example yet observed of the duration of timber under water. The piles on which the church of St. Mark, in Venice, was built have been supposed to be the oldest in existence, but those of the Mentz bridge are more than twice as old. It is remarkable also that the timbers of beech, which is one of the woods most subject to decay in air, were preserved so perfectly that the variety could be readily distinguished, some being of white and others of the red beech.

SOME interesting statistics are given in the *Revue Industrielle* concerning the comparative durability of iron and steel rails, deduced from the accounts kept by the engineering department of the Grand Central Railway of Belgium. From these it appears that the failures of iron rails begin immediately after they are laid, usually from exfoliation, or in consequence of defects in manufacture showing themselves in some other way, so that the work of replacing them goes on continuously, the whole being renewed by the end of fifteen or twenty years. With steel rails the loss was found to be for twelve years almost nothing. Out of five hundred and twenty rails laid in 1869, only one had been renewed up to the first of January, 1882, and this one was broken by an accident; but before the year 1882 was over, two hundred and fifty-seven, or nearly half, of the rails of 1869 were condemned and replaced with new ones. The reason for discarding the old rails was that their surface had been worn away to a depth of thirteen millimetres, which is the limit of service adopted by the company; and the fact that half the rails laid thirteen years before reached this limit at about the same time is of much interest as showing the uniformity of wear in the metal. Under ordinary circumstances the life of good steel rails would be much longer than thirteen years, but in this particular case they were used upon a short piece of track, with a grade of one hundred feet to the mile, and subjected to the effect of the movement of thirty heavy freight trains a day, descending the steep grade with the brakes on. Iron rails on this section of the road had lasted generally about three months, and of the very best hammered German rails, which were tried before the steel, one-half were replaced at the end of a year, and the whole in about three years.

ARCHITECTURAL COMPETITIONS.[1]

ALTHOUGH once deemed a professional necessity, the practice of "architectural competition" is destined eventually to become the refuge of the incompetent, the inexperienced, the indolent and the unscrupulous. Like the weeds that are shipped with good seed from abroad, the bad custom came over so mixed with the good that during our more dependent and colonial years it was supposed to be a necessary element of ordinary practice. Although boldly denounced in the home of its origin by some of the foremost architects of the day, including two presidents of the British "Architectural Association," and although the great majority everywhere look upon it as more or less injurious to the best interests of all concerned, it is still justified and supported by many as a venerable public and professional necessity; an equally venerable method for the discovery and development of youthful genius; and also on the ground that its acknowledged defects can be remedied in due time by the united efforts of the people and the profession.

Mere antiquity claims little consideration unless coupled with real merit. Although the remote past furnishes the richest materials for the study of art it is no guide for the architectural practice of the present. The ancient foreign aspect of art competition has as little to say to the modern practitioner as the Greek games, or the brutal sports of the Roman amphitheatre. Just as good work was done in the elder days without the stimulus of strife and speculation. The recluse in his cloister, the household servant of pope or cardinal, worked with more than the skill of the public competitor.

In much the greater part of his relations to the world, the architect of to-day is as free from limiting antecedents as the promoter of railroads and telegraphs. The half-equipped and one-sided men are the most nearly allied to the past. The dreamer of wild and impracticable fancies traces his origin to his mythical monkish brother of mediæval days, while the builder architect travels back to the same source to find inspiration for his latter-day enormities in his descent from the brotherhood of "free masons." The well-balanced man, on the contrary, leaves the dead past to bury its dead architects, and studies not their methods of practice but their monuments.

Modern competitions abroad, especially in England, have little of good to teach us. A volume might be filled with their absurd and often disgraceful record. Our brethren of the "old home" must be a very testy body of men to judge by the criminations and recriminations of the correspondents of their professional journals. The melée which follows the announcement of the award of the "assessor" in a "competition" reminds one more of the prize-ring than of any more dignified calling. To a non-believer in such contests some of the late ones seem absurdly funny. Passing by the extended and bitter controversies of the larger tournaments, which would have afforded admirable occasion for the work of "congressional investigating committees," we find a late instance in which some church building promoters were eagerly offered designs by eighty-five architects represented by more than five hundred drawings prepared at an estimated cost of $8,000. Before the award was made it was ascertained that the projectors of this religious undertaking, in which it was intended to invest only about $30,000, were not in possession of funds sufficient to commence the work of building, so that the remote chance of a beggarly premium was the high goal for which all this loss was suffered. This was a competition with all modern improvements, including a professional "assessor." Whether the "assessor" knowingly lent his name to the sharp game of the promoters does not appear. In another instance, in order to obtain the commission for the restoration of a cathedral, an architect in good standing offered as a bribe a gratuitous design for a reredos. This offer was speedily "seen" by a provincial competitor, but another provincial "went one better" by inducing a friend to undertake to construct the reredos, providing "his man" was employed on the restoration; this offer, of course, carried the day, and the man with the heaviest backer won.

These are not extreme examples, and they abound even after half a century or more of attempted regulation and reform. In England, certainly, the competition system is rotten to the core. Like some other phases of English practice it should teach us what to avoid.

The general history of architectural competitions in America has been to the profession and to the public a record of humiliation, mortification and pecuniary loss. Little else could be expected of a custom founded on the absurd supposition that a building committee, board of trustees, or an individual client, can secure the best design, construction and administration of a building by the employment of the architect whose name is appended to certain sketches which are most admired by variously constituted and more or less qualified judges. Practices to which the members of no other profession would stoop come to be encouraged and justified as necessities, and serious work gives way to feverish speculation. All the evils which hamper the efforts of the regular architect cluster about, or originate in competitions. The want of honorable consideration and respect in some communities; the often futile efforts to obtain fair and equitable compensation for painstaking labor; the low standard of acquirement arising from the prominence given to the chance element in practice; and the growing impression that hard work is not so essential to success as influence combined with tricky design and superficial draughtsmanship. That occasionally a good building is the result of a competition is nothing to the question. It remains none the less true that to the public and the profession at large the practice has proved injurious. It is not a bad saying of the French army that "every private soldier carries a field marshal's baton in his knapsack;" but we press the principle too far when we encourage our office-boys to think that "capitol" and "state-house" commissions are within their early reach, as the awards of happy accidents rather than of patient and self-denying toil. The lack of earnest and faithful workers in the lower ranks may well be traced to this pernicious teaching. The standing of the profession with the public has been seriously lowered by the blunders of incompetent practitioners brought prematurely to the front by the competition system.

Let us not delude ourselves by shifting the responsibility of these and kindred evils on to the broad shoulders of the public. The people of America derive much of their information on such matters from their architects, and their representative journals. There is ample evidence that the best of our clientage are willing to pay liberally for what they are led to believe is the best expert service.

If in the train of mismanaged public competitions follow worse managed private ones, and if from the lessons of these follow undignified solicitations of employment; if men not lacking in self respect under ordinary conditions are constrained to fawn and court indignities; if the feeble and inexperienced resort to competition in rates of compensation as well as in merit of design; and if these irregularities sometimes lead to the scamping of both plan and construction, and finally even to bribery and corruption, let it be remembered that we hold to a great extent the position of teachers, and that a people who take readily to speculation of all kinds are apt pupils in these matters. Already the inventive genius of the West has evolved new phases of competition. Architects have been invited, and some of the so-called have accepted invitations to take part in ventures from which even our hungry foreign brethren would recoil in dismay. There is as yet no case on record where the craft has been induced actually to build state-houses "on approval," but the practice is fast tending towards such a consummation.

It has been wrongly claimed that the interests of the junior members of the profession are served by competitions. This, like many other things that hamper us is an imported mistake. In a community where only the aid of the sign painter is requisite to constitute an "architect," where every village newspaper gladly chronicles the most crude and imperfect development of local talent, and where technical education is within easy reach of all, there is little danger that future Wrens and Le-Ducs will "be born to blush unseen, and waste their sweetness" at the carpenter's bench. There is room in America to-day for all the skilled architects that our schools and offices can furnish, and the demand is steadily increasing. If we do not occupy the field with trained men the engineers and builders will do so as best they may, and we can have but ourselves to blame for it.

There is too much of the gambling fever in our national air. Its infection to-day threatens legitimate business, and we are not exempt from the losses indirectly entailed by it. Enterprises less reputable than gambling are dignified by the name of speculation, and short roads are eagerly sought which sometimes end in fortune, but often in the felon's dock. The followers of law, of medicine, of religion and art cannot be too careful to keep clear of popular vices of the day, even avoiding the appearance of evil. Temporary success can never justify false methods.

The teachings of public competitions have encouraged the common fallacy, which has even found believers in our courts of justice, that architects are solely draughtsmen, and that drawings are their only products on which a value can be placed. Following this has naturally come the client's claim to the drawings as the only tangible results of service. The charm of design, the cleverness and method of plan, the skill and science of construction, the thousand items of excellence, the result of thought, study and experience, and more than all the slow mastery of the combination of all these, the expensive accumulation of years of arduous toil, become as nothing opposed to the clever picture that has caught the unreasoning popular fancy. If the result is conspicuous failure the obvious lesson that an architect should be judged by what he *builds* seems to make but little impression on the sufferers. In the present state of things even the representative picture may have been bought or stolen. It is a notorious fact that some of our most successful competitors are not even ordinarily competent draughtsmen and designers. It takes but little wisdom to forecast a professional future in which the clever designer and the unscrupulous manipulator shall be encouraged to push themselves to the front.

It is disheartening to reflect on the time and money that have

[1] A paper read by Mr. John A. Fox, F. A. I. A., at the late Convention of the American Institute of Architects. Mr. Fox prefaced his paper with the remark that he had never taken part in a competition, and therefore would be understood to oppose them simply on general professional grounds.

been squandered in these unsuccessful and discreditable ventures' and of the great benefits that might have accrued from the proper use of such an amount of labor.

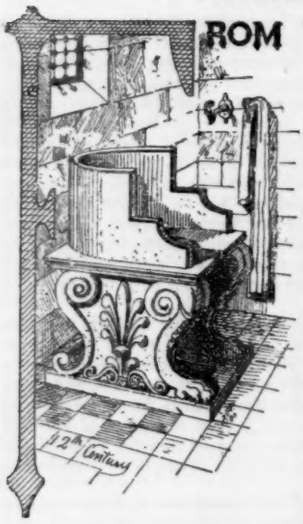
The profession of the architect with its heavy responsibilities of life and property is a wearing one at the best, and it is foolish to add to its embarrassments the anxieties and disappointments of needless strife. We are brethren laboring for common ends, and those worthy ones. The best work is of slow growth. A great project should be wrought out calmly. Bustle, hurry and rivalry of the meaner sort can only retard its proper development. The intimate and friendly relations of employer and employed, the thorough knowledge of uses, means and materials; these and many other things essential to real success are daily sacrificed to a professional craze. The fact that such methods have failed conspicuously in the arts of painting and sculpture, where their chances of success should have been tenfold greater, should carry some weight.

In the extreme West it is said that lawyers advertise, compete in rates, and resort to other disreputable devices to obtain employment. In the advance, and on the outskirts of a profession the guerrilla and free lance figure conspicuously, but they have a very demoralizing element when mingled with the main body. It is less difficult for an employer to make choice of an architect than of a doctor or lawyer. The acquirements and abilities of the former are more easily gauged and measured than those of the latter, whether it be at the beginning of a career, or in the midst of one. A profession that adopts methods foreign to all the professional practice will find it hard to maintain a high standing with the public.

The practice of competitions, borrowed from abroad, has not as yet taken a very firm hold among us. A moderate effort made at little sacrifice on the part of our leading men; an expression of disapproval by the Institute and other societies; an abstinence from such ventures by the well-established members of the profession, would go very far towards ridding the public and ourselves of such methods altogether, and the final result would be to place our work on the same basis as that of other professions, and to give sterling merit a fair opportunity to find its full reward in due time under conditions alike honorable to both architect and client. Then we could hope that the architect of the future might claim a better title to the name, and become what another has fitly said he should be, "a true artist, a skilful draughtsman, a mathematician, a person endowed with considerable scientific knowledge, a mechanician, an arithmetician, a man of probity, and a gentleman."

SANITARY PLUMBING.[1]—III.

THE WATER-CLOSET.



WHATEVER standpoint we judge it, whether from the extent and importance of the work it has to perform; from the inconvenience which would be felt by its omission; from the efforts bestowed upon its improvement by inventors; or from the number and costliness of the materials used in its construction, and in that of the apparatus required to operate it, the water-closet must be accepted as unquestionably the most important of all our plumbing fixtures, and as such will be first considered.

No article of plumbing — perhaps no article of manufacture — has within the last fifty years received more attention from inventors, and been the subject of more patent grants than the water-closet; and yet it must be admitted that even the best of those now in use have many evident and serious defects. The object of the water-closet is to furnish a convenient, simple, economical and durable vehicle for the immediate, complete, odorless and automatic removal of household wastes into the soil-pipe, without permitting a return of sewer-gas through the channels of removal.

Common defects among the most approved kinds are the ease with which their water-seal is destroyed by evaporation, siphonage and suction; imperfect flushing; the want of proper provision for making secure connection with the waste-pipe; unnecessary complication and multiplication of parts; wastefulness of water; and noisiness in operation, which often prevents their use in parts of the house where, and at times when, guests are liable to be present. Strangely enough, too, the closet which at the present day is most popular is the most defective of all, and in fact contains nearly every defect that is possible with water-closets; so that an enumeration of its defects would give us a complete list of all the evils we should guard against.

The information which will enable the public to distinguish most readily between the various fixtures they are called upon to select is best obtained from a classification of the desiderata to be sought, rather than from a detailed description of the individual closets themselves. A second classification of distinguishing types will be added, to illustrate and explain the first division; but no criticism of any individual fixture now in use will be made, such personal reference to the appliance of any special patentee or manufacturer being in the present case both unnecessary and undesirable.

[1] Continued from page 129, No. 403.

CLASSIFICATION OF REQUIREMENTS.

The ideal water-closet should possess the following characteristics relating to: 1, the method of flushing; 2, form; 3, material; 4. construction, including methods of connecting with soil and supply pipes, and provisions for ventilation; 5, cost; and 6, appearance.

1. — *The Flushing*

(*a*) Should be so contrived as to thoroughly remove all waste matter and carry it completely into the waste-pipe;

(*b*) Should begin to act instantaneously on operating the pull;

(*c*) Should pass through the closet rapidly, and concentrated in a mass or large volume so as to act powerfully in flushing the closet and drains;

(*d*) Should thoroughly scour all parts of the closet and trap;

(*e*) Should act noiselessly;

(*f*) Should be effected by a single simple movement, and require the minimum of strength or effort;

(*g*) Should come from a special supply-cistern, and not from the water-main;

(*h*) Should be effected without spattering;

(*i*) Should do its work with the minimum of water, and,

(*j*) Should regulate the quantity of water used, (one gallon properly applied being ample) allowing no more and no less to flow, however long the pull may be held.

2. — *The Form*

(*a*) Should be as simple as possible, and the extent of surface to be flushed as small as possible to facilitate the scouring, and there should be no surface, angle, or corner, which does not receive the scouring, and,

(*b*) Should be compact, allowing the closet to be set in the smallest possible space.

(*c*) The bowl should be elliptical, and not less than 12 inches on its longest axis, nor more than 10 inches on its shortest axis.

(*d*) The depth of the bowl should not exceed 6 inches from the top of the wooden seat to the level of the standing water.

(*e*) The sides of the bowl should be nearly perpendicular from the top, to near the level of the standing water.

(*f*) The form of the bowl and trap should be such that the whole interior of the former, and the deepest part of the latter may be visible and accessible from the outside.

(*g*) The form of the closet should be such as to allow of its use as a slop-hopper or urinal, as well as water-closet.

(*h*) The bowl should have at its bottom a body of standing water, at least 8 inches in diameter, and over an inch deep, to receive and deodorize the waste matters, and prevent their striking any dry surface to which they might adhere.

(*i*) The form of the closet should be such that its point of connection with the soil-pipe is several inches above the finished floor, and is independent of any possible movement thereof through expansion, contraction or jarring; and, for flexibility, a lead-pipe should be used between the closet and the soil-pipe.

3. — *The Material*

Should be tough and durable, with a perfectly smooth surface, which cannot be injuriously affected by the waste matters, changes of temperature, or any of the influences which are brought to bear upon it.

4. — *The Construction*

(*a*) Should be as simple as possible, and have no pan, valves, gates, plungers, or other unnecessary obstructions to the water-way, and,

(*b*) Should be such that the water in the trap cannot be destroyed by evaporation, siphonage or suction.

(*c*) The bowl and trap should be made of a single piece, so avoiding joints.

(*d*) The bowl and trap should be encased in iron, to give the proper strength and protection, and to admit of a perfectly tight and secure connection with the soil-pipe without the danger of fracture.

(*e*) The frame should be strong enough to sustain both the closet itself and the wooden seats, without the help of wooden or other external supports.

(*f*) The construction should be such as to reduce the labor of setting to a minimum, and to enable it to be disconnected at any time with facility, and without other tool than an ordinary screw-driver or wrench.

(*g*) The construction should provide for thorough ventilation.

5. — *The Cost*

Of material, manufacture and setting should be at a minimum.

6. — *The Appearance*

Should be neat and inoffensive, so that it will require no casing or wood-work to conceal it.

At first thought some of the above requirements appear to be incompatible. It would seem as if a flushing which should be sudden and powerful, without using valves or plungers could hardly be noiseless. Nevertheless the co-existence of these desiderata is quite possible, as will be hereafter shown.

Water-closets may be divided into four classes or types.

I. *Pan-Closets*, or those which have a movable pan or saucer below the bowl to receive the waste matters, and form, with the bowl, a water-seal.

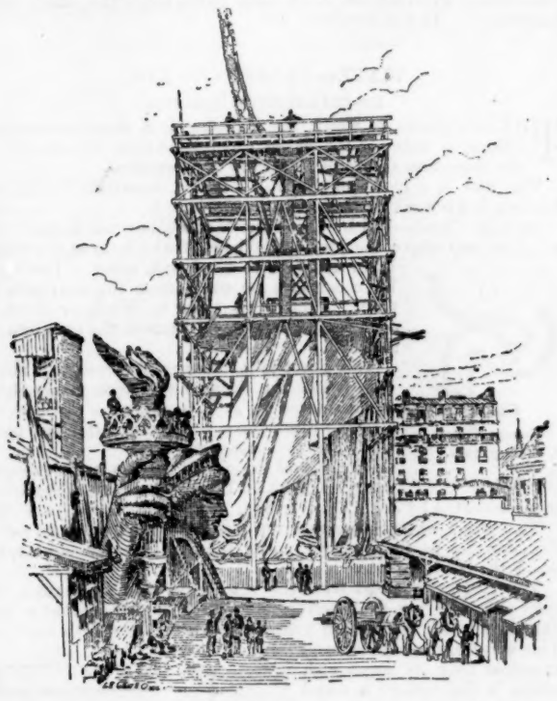
II. *Valve-Closets*, or those which have the outlet of the bowl closed by a movable valve or plate, usually held in place *under* the outlet by a crank or spring, and intended to be water-tight.

III. *Plunger-Closets*, or those which have the outlet closed by a plunger or plug fitting over or into it usually held in place by its own weight, and intended to be water-tight.

IV. *Hopper-Closets*, or those which consist of a simple bowl and water-trap, and are independent of pans, valves, plungers, or other mechanical contrivances in the water-way.

It should be remarked here, that the overflow-passages of valve and plunger-closets render them practically (so far as the dependence upon the ability of a simple water-seal to keep out sewer-gas is concerned) hopper-closets; since the overflows are usually provided with a water-trap only. The real use of the valve and plunger is not to form a security against the entrance of sewer-gas, as is commonly supposed, but to hold a certain amount of water in the bowl, so long as they can be kept water-tight.

BARTHOLDI'S STATUE OF LIBERTY.[1]—II.



IT was during a trip to the United States, in 1871, that M. Bartholdi first conceived the idea of erecting a statue of Liberty on New York Harbor, facing the ocean and looking towards France, that it might typify the glorious memory of the part which France took in the war of Independence and the foundation of the American Republic. For the realization of his project, the artist had only his own faith in his work and the support of his patrons; but he possessed the address to interest others, and the Franco-American Union was soon organized for the execution of this grand historic monument.

The one hundredth anniversary of the independence of the United States furnished, moreover, the occasion for uniting the two nations in one common manifestation. France offers the statue, the United States provides the pedestal.

M. Bartholdi set about his work and translated his idea into a design worthy of its destination, and which received all suffrages. He wished to make it large — larger than all the giants which man had yet constructed, and in fact, his work exceeds the maximum of the proportions that tradition attributes to the Colossus of Rhodes.

Conceived by the sculptor in a moment of artistic elation, the statue, of course, presented considerable difficulties as to the means of carrying it into execution, and required labor of a kind absolutely peculiar to itself. It was decided to construct it of copper *repoussé*, supported by an iron skeleton. The *repoussé* process allows of the production of pieces of large size and yet of the smallest possible weight relatively to their volume. It employs laminated plates, which have the double advantage of solidity and lightness, together with qualities of resistance and durability superior to those which the same amount of metal would have if simply cast. Besides, to construct in bronze a statue of large dimensions, it is necessary to cast it in several fragments, whence result numberless joints, which are often sufficiently imperfect because of shrinkage. The "Virgin of Puy" is only 16 metres [52 feet] high, and yet a hundred thousand kilogrammes of bronze were needed for it. The statue of Liberty is to be 46 metres [149′ 5″] high. What an enormous weight of metal would it have been necessary to devote to its casting! Copper *repoussé* presented, then, great advantages, not only from the point of view of economy, but also from the point of view of feasibility of execution. It is, besides, much more original and more artistic, since it is entirely hand-work. M. Bartholdi had, moreover, the example of the "St. Charles Borroméo" by Il Cerano, and that of the "Vercingetorix" by Millet.

He applied to MM. Gaget, Gauthier & Co., at the workshops in which this latter statue had been made. It was at this large establishment, also, that the *repoussé* copper work of the exterior of the dome of the auditorium of the new Opera-House at Paris was made, as also those of the lateral pavilions, and the large bas-relief above the gate of the Carrousel at the Louvre, the statues which ornament the *flèche* of Notre Dame and that of the Saint-Chapelle, also the "Fame" which crowns the central pavilion of the Trocadéro, and so on.

The first fragment that was made was the arm and torch, which was sent to the Centennial Exhibition at Philadelphia in 1876. Next, the head was constructed, which was shown at the Exposition Universelle of 1878. The results obtained were excellent, and from that time on the work could advance boldly. We will now explain the method of carrying this gigantic work into execution.

When the sketch-model was finished, M. Bartholdi executed a study 2m. 11 in height from head to foot. This model was one-sixteenth the full size. Next, this model was enlarged four times. Thus was obtained a quarter-size model, which measured 8m. 50, which allowed a fresh study, since the eye could still embrace it all. To reach the scale of execution the method of "copying by squares" was employed, in this way: The quarter-size model, after having been studied and remodelled by the artist, was divided into sections. Upon a base four times as large as that upon which rested one of these fragments of the model were laid off very exactly all its salient points by means of plumb-lines. In this way a sort of imaginary solid was arrived at, formed by a multitude of vertical lines, and within which must be formed the statue, or portion of the statue, at full size. It was then possible to determine the principal points of the fragment with reference to these vertical lines by mentally determining from point to point the horizontal sections of the quarter-scale model. This is, on a very large scale, the process that is used for reproducing the model of a mountain from the contour lines drawn on a plane.

These sections were thus reproduced with mathematical exactness at four times their size. Upon these square bases, divided and properly numbered, the sculptors worked in plaster the full-size model. They determined the enlargement by measures taken by the compass from the plumb-lines. The principal points being determined in the horizontal sections, they were joined by a framework of wood and laths. They then covered with a coat of plaster the wooden form thus sketched out, verifying the measures already established; and then followed the detailing and finally the modelling of the surface. Very simple in theory, this method demands in execution a consummate ability on the part of the workman. Each nail-head, or "bench-mark," as it were, necessitates six measures, — three taken on the model and three on the enlargement, — to say nothing of the measures for verification. The finished courses or sections have an average height of 3m. 40, and in each course there are about 300 principal points and 1,200 secondary points, to determine which required about 96,000 measurements.

The modelling upon the plaster at full size having been finished, it was next necessary to construct a mould of wood on which could be hammered the sheets of copper which were to form the statue. This was a very complicated piece of wood-work, analogous to those which are met in the construction of moulds for foundry work. As in their case, these moulds must be so made that they can be easily detached from the model, and it was also necessary that they should be so made that the copper could be easily withdrawn from them.

Following the least tortuous lines of the mould, generally those in relief, like the crests of a mountain range, they laid the main pieces of the framework, properly fashioned, and connected these by transverse pieces, the intervals being filled by lattice-work more or less closely laid, according as the part to be reproduced was more or less in relief. All these pieces had to fit exactly the form of the plaster model and so constituted a rigid mould, whose appearance recalls sufficiently well the contour lines and hatching on an ordnance map. These moulds were large or small, according to the difficulties of the work. Next, several of them were fastened together to facilitate the adjustment of the plates of copper. These plates have on an average a surface of from one to three square metres. It is difficult to procure them more than 1m. 40 wide. The workmen pressed the sheets into the mould by levers or the blows of a mallet, and the work was completed by rapid strokes of smaller mallets and rammers, the whole being verified with the greatest care by means of templets of wire or sheet lead, which were carefully fitted to the original model.

[1] Translated from *Le Génie Civil*. Continued from page 127, No. 403.

When there were pieces of a complicated shape to make, the copper was heated at the forge and brazed by aid of the blow-pipe. From point to point the copper plates are provided with iron bands to give them rigidity. These bands are forged to take the shape of the copper when this has been entirely modelled, but they are to be definitely fastened to it only when the statue is erected.

The copper shell, hammered as we have just explained, is composed of about three hundred pieces, weighing altogether 80,000 kilogrammes [88 tons]. It is to be supported by a framework of iron which weighs 120,000 kilogrammes [132 tons]. For putting the statue together at the workshops, the sheets of copper are fastened together simply by means of a few screws. When it shall finally be erected in America, the plates will be fastened together by means of flush-headed copper rivets, which will be entirely invisible from the outside. These rivets are 5mm. thick and are about 25mm. apart. As the sheets will be joined with a feather-edge, it will be quite impossible to distinguish the joints even from a short distance, and the statue will appear to be constructed in one piece. The iron skeleton which is to serve as the support for the copper shell has four points of attachment to the masonry of the pedestal. Each of these points will be secured by three bolts 0m. 15 [nearly 6 inches] in diameter let into the stone-work to a depth of 15 metres [48 feet]. The shell is to be fastened to the iron skeleton by a secondary framework of flat iron 50mm. wide by 30mm. thick, which is placed on the interior surface of the copper to prevent deformation.

Two special difficulties were to be foreseen and avoided in this part of the work: in the first place, expansion; this will take place inevitably, but its action will be without inconvenience by reason of the extreme elasticity of the shell and the numberless opportunities for concealed expansion which are afforded by the folds of the drapery. Besides, in order that each metal may expand freely the bands of iron, in place of being riveted to the statue, are simply held in copper chases riveted to the shell. In the second place, galvanic action, whose effect was much to be feared. The sea wind, which always bears a large proportion of salt water held in mechanical suspension and independent of the spray, is one of the strongest agents for starting the action of a ferro-cupric element such as will result from the construction of this statue. Such galvanic action would likewise take place in the presence of rain-water strongly charged with nitrates. One can easily conceive of the intensity of the currents which would be given birth to by a battery of this unknown power. To prevent this, the builders, when the statue is finally erected, will interpose between the copper and the iron, little pieces of copper armed with rags covered with minimum, in the same way that is followed with success in sheathing ships' bottoms.

Never has a colossal statue attained such proportions. From the base to the summit of the torch Bartholdi's statue measures 46 metres [149′ 5″], that is to say, two metres [6′ 6″] more than the Vendome Column, and 34 metres [110′ 6″] from head to heel. The forefinger is 2m. 45 [8 feet] long and 1m. 44 [4′ 8″] in circumference at the second joint; the nail is 0m. 33 by 0m. 26 [10″ x 13″], the head is 4m. 40 [14′ 4″] high, the eye 0m. 65 [2′ 1″] wide, and the nose 1m. 12 [3′ 8″] long. From the crown of the head project five gilded rays. The longest is 3m. 50 [4′ 16″] in length and weighs 74 kilogrammes [163 pounds].

A large number of persons assembled inside the head at the Exposition Universelle of 1878, and quite recently twenty-six persons sat down to breakfast in one of the middle sections of the statue, and the service of the table was carried on with the greatest facility. In the interior of the arm will be arranged ladders, so that the torch may be reached above the hand. A baker's dozen of men can gather here without inconvenience.

Thus, as we have before mentioned, the total weight will be about 200,000 kilogrammes, of which 80,000 are copper and 120,000 iron. The statue, separated into more than three hundred pieces for transportation to the United States, will be set up morsel by morsel upon the pedestal. Some American technical journals have wrongly supposed that it will be erected in one piece by the aid of cranes. This method would be the only one possible if the statue had been cast, or cut out of a single stone; but here, where there is a question only of comparatively light pieces easy to handle and set in place, there will be no excuse for employing the other method, which would considerably increase the expense and the difficulty of properly securing the statue to its pedestal.

Placed on its granite pedestal 25 metres [82 feet] high, the statue of Liberty will form a light-house of exceptional power. From the diadem which crowns the head will shine powerful electric lamps, while the terrace below the torch will be reserved for the lookouts, and in the sub-basement there will be room for a large number of offices. What will be the price of this immense work? This it is still difficult to determine. Delivered at New York, the statue will probably have cost about 600,000 francs [$120,000]. Of this sum — which is merely approximate —400,000 francs [$80,000] may be charged to the construction of the metal portions. Americans estimate that the masonry will require about the same sum; and from this sufficiently vague data it will be seen that the completed monument will probably cost about 1,200,000 francs [$240,000]. The most liberal subscribers will certainly be the courageous artist, who has generously consecrated to the work his time, his labor and his trouble, and the careful workmen who have not hesitated to encounter the risk of so considerable a task and one so novel from every point of view.

THE ILLUSTRATIONS.

DESIGN FOR THE CLUB-HOUSE OF THE MILWAUKEE CLUB, MILWAUKEE, WIS. MESSRS. SILSBEE & KENT, ARCHITECTS, CHICAGO, ILL.

THIS design is intended for a corner lot, 60′ x 120′, south and west exposure; cost, $50,000. The basement and first story to be rock-faced Connecticut brownstone, and the upper stories of red pressed brick, with a tile roof and wooden bays.

The features of the design in plan are, the arrangement of dining, card, and reading rooms, in common or privately at pleasure, by the form of partition used; the treatment of the entrance and vestibule, and the space given to balconies. The distribution of rooms in the first and second stories is shown by the plans. The chief feature of the basement plan is a large billiard hall; the remainder of the space being taken up by the kitchen, store-rooms, and other rooms needed for the service of the house. In the upper story are about a dozen bedrooms and two parlors.

HOUSE FOR F. S. JAMES, ESQ., OSAGE, ILL. MR. J. J. FLANDERS, ARCHITECT, CHICAGO, ILL.

THIS house was built at a cost of $8,500.

THE BERKELEY ARMS HOTEL, BERKELEY, N. J. MR. BRADFORD L. GILBERT, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR J. E. SCHWARTZ, ESQ., NEAR PITTSBURGH, PA. MESSRS. C. W. ROMEYN & CO., ARCHITECTS, NEW YORK, N. Y.

THIS house is now being erected. The exterior walls are built of Ohio stone, Philadelphia brick, and terra-cotta; the latter being freely used. To cost $50,000.

WATER-CLOSETS.[1] — XIX.

MISCELLANEOUS CLOSETS.

THE two closets of which the following is a description, do not belong to either of the classes which have been enumerated; at the same time they appear worthy of description.

The first is a closet of German pattern, described by Baldwin Latham in his work on sewerage.

German Closet. — This closet consists of a side-outlet hopper. with a siphon trap above the floor, in the bowl of which there is a tilting-basin that can be filled with water. The inside basin conceals the outlet from the bowl into the trap. When this basin is lifted, or tilted, its contents are discharged through the trap into the soil-pipe.

Fig. 199.

German Closet.
a, Tilting-basin.
c, Trap.
e, Supply.

This closet in its manner of operation is almost exactly like the tilting wash-basins patented and manufactured by J. G. Jennings, of London, and I should think the space between the two basins was liable to become very foul.

The second closet that belongs to the miscellaneous class, which I have selected for description, is one invented by John Tylor & Son, of London, in the year 1873.

This closet has a large receiver (in every way equal to, and as objectionable as the receiver under the ordinary pan-closet), into which the bowl projects.

The projecting outlet from the bowl turns at a right angle with itself after entering the receiver, and over its outlet is fitted a horn-like valve which revolves on a short arm and has its upper end open. This valve has a rubber band stretched over its larger end, where it fits against a metal seat that is clamped to the outlet of the bowl. In this manner the water-closet bowl is kept filled with water to the height of the small end of the horn. The over-flow, which, according to Mr. E. F. Bailey-Denton, is now supplied with a ball-valve, takes place through the horn.

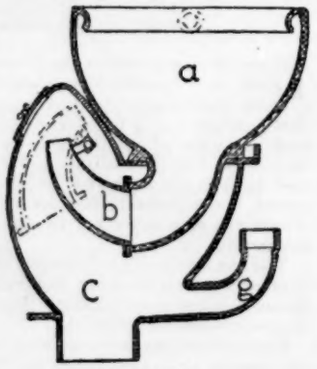


Fig. 200.

Tylor & Son's Closet.

a, Bowl. *b*, Horn-valve. *c*, Receiver. *g*, Bath-waste.

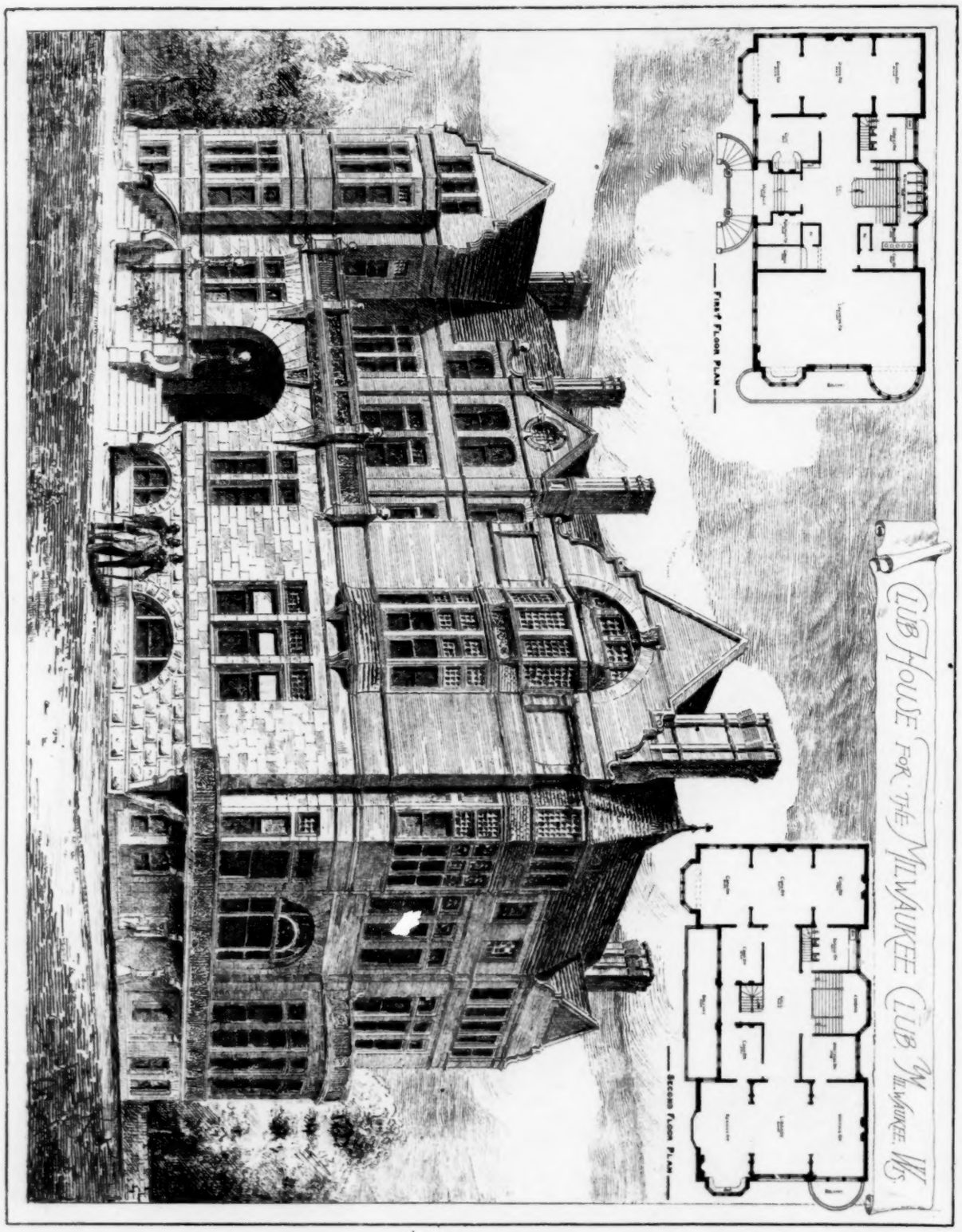
There is an inlet cast on the receiver of this closet into which bath or water-basin wastes may be caulked.

Neither of the above described closets probably will ever come into extended use, as they are inferior to most plunger and valve closets, and for this reason far inferior to the class of hopper-closets.

LATRINES.

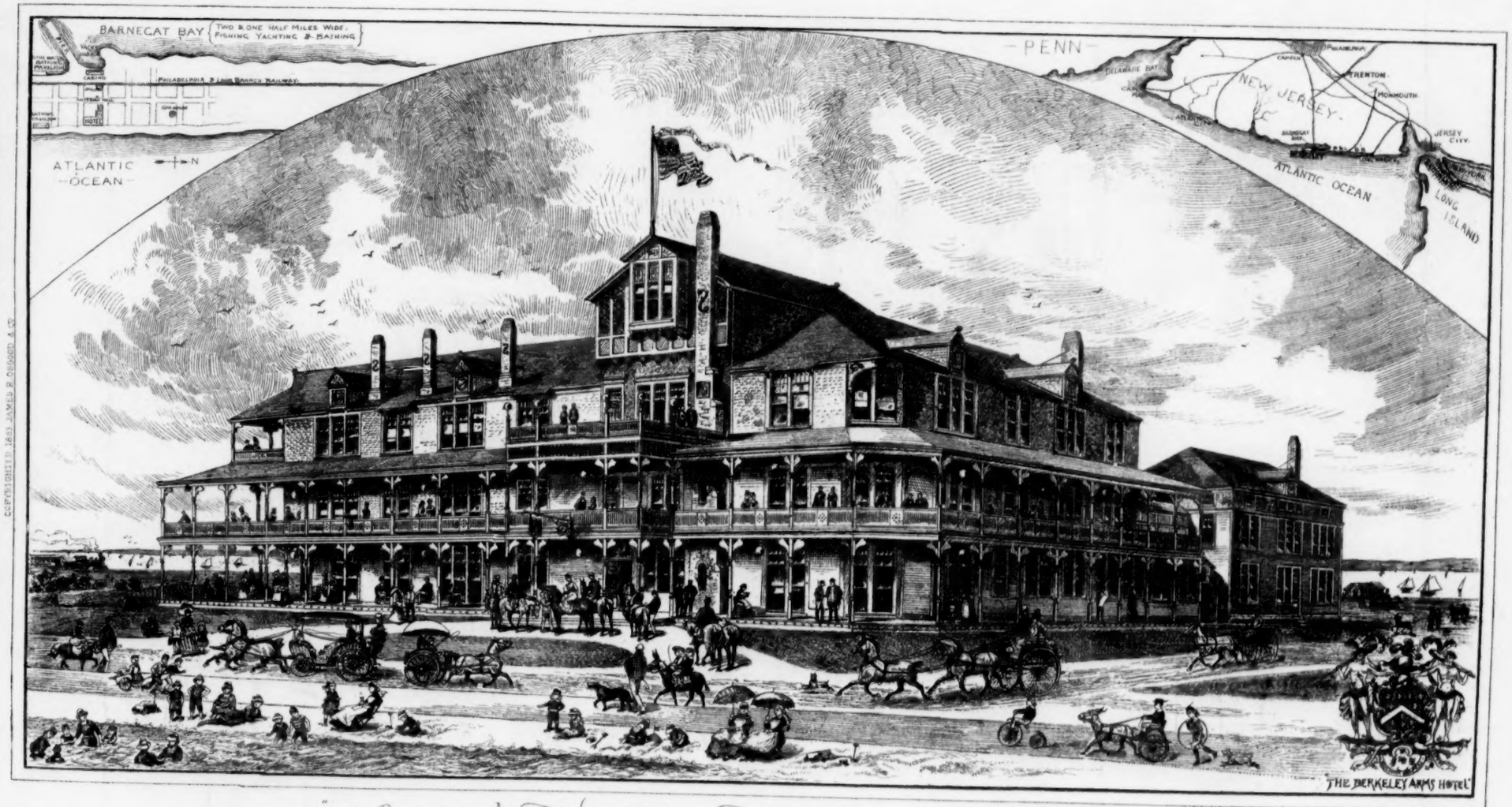
The class of which the following is a description is in reality a combination of closets, rather than a single one, and is always intended for use in public places, such as depots, schools, hospitals, barracks, asylums, or any place where the usual closet will most

[1] Continued from page 93, No. 400.



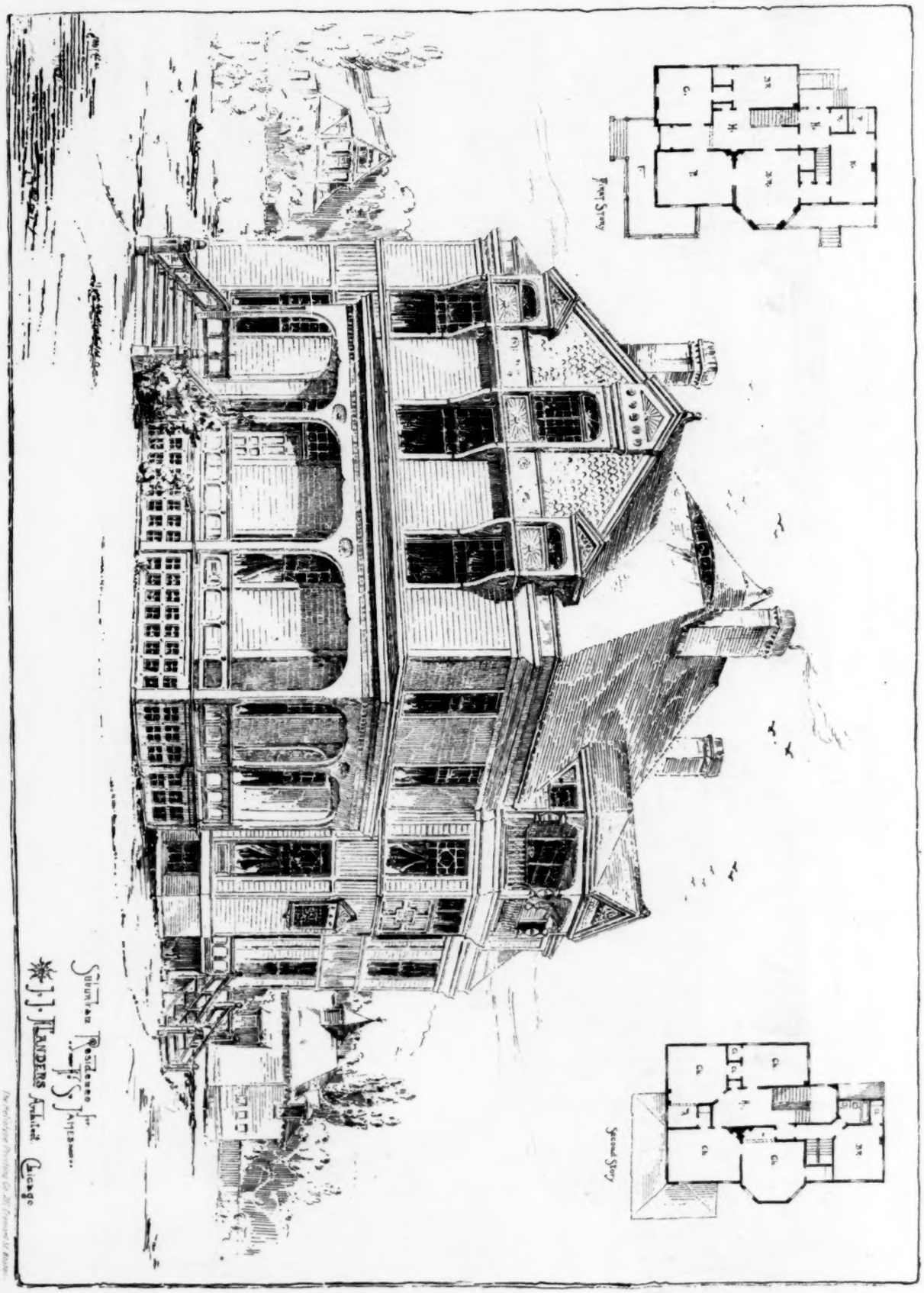
CLUB HOUSE FOR THE MILWAUKEE CLUB, MILWAUKEE, WIS.

No. 404 American Architect and Building News, Sept. 22, 1883.

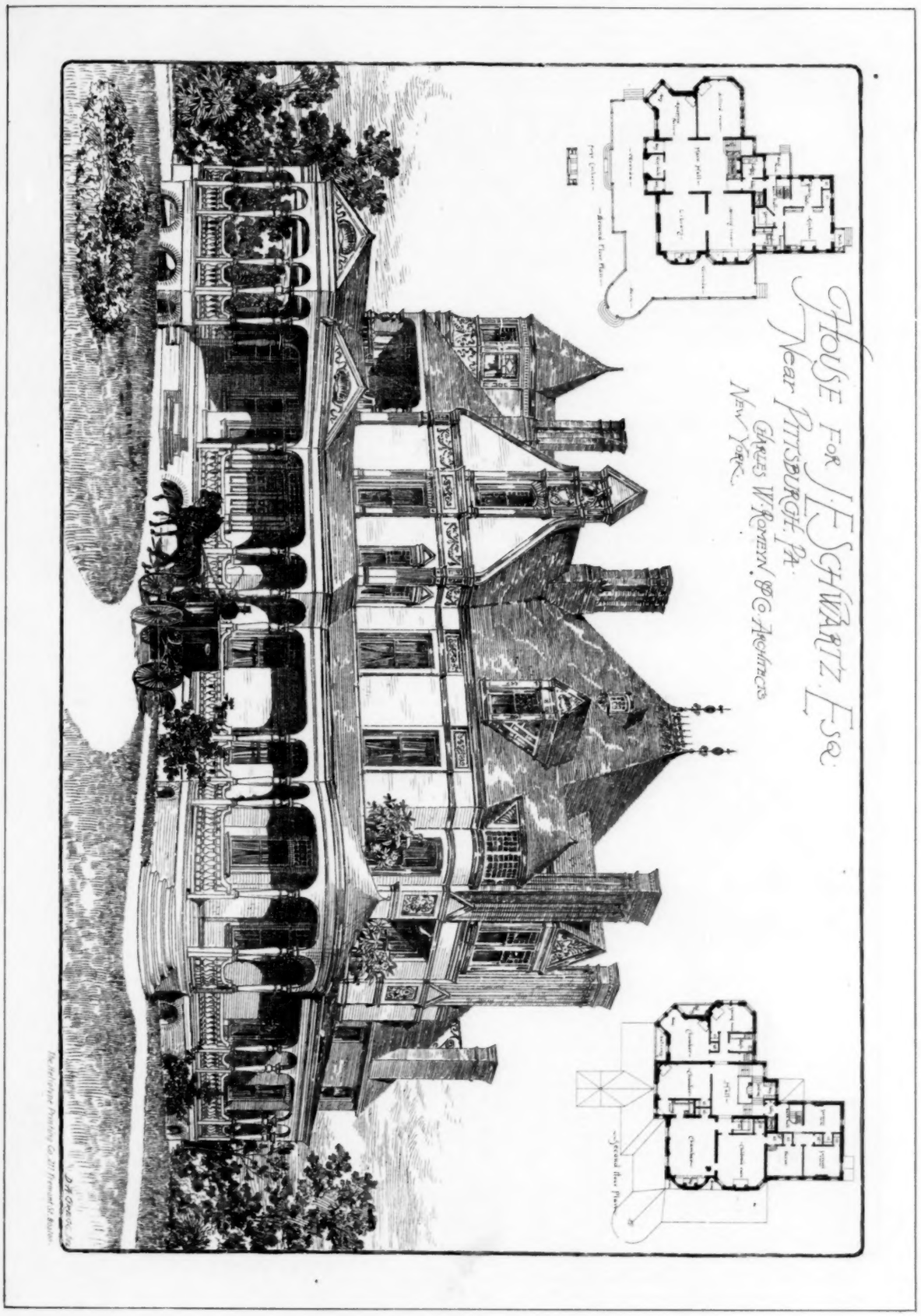


"The Berkeley Arms Hotel" · Berkeley, N.J. — Bradford L. Gilbert, Arch't. N.Y.

The Heliotype Printing Co. 211 Devonshire St. Boston.



Suburban Residence for
J. J. Flanders, Esq.
J. J. FLANDERS Architect Chicago



probably be neglected or abused, and where a janitor can take charge of flushing and emptying them; the plug, valve, or tank, which forms the mechanism of the closet are under lock and key, and accessible only to the janitor in charge of the building.

The Lambeth Improved Latrine. — Doulton & Co., of England, manufacture a latrine that consists of a series of stone-ware bowls connected with each other and the main drain by suitable stone-ware pipes. The plunger is a simple hollow one that is formed by an iron tube. The plunger forms the overflow and has a perfect seat over the siphon-trap. The plunger is lifted by a handle that is kept under lock and key by the janitor.

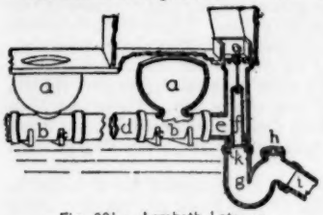


Fig. 201. — Lambeth Latrines.

a, Bowls. *b*, Connecting-pipes jointed to bowls. *d*, Connecting-pipe. *e*, Plunger-chamber. *f*, Plunger. *g*, Trap. *h*, Inspection-cover.

The bowls are filled from one cock. When it is necessary to empty the latrine, the handle is raised and the outlet pipe (5″ diameter) is opened, when the contents of the whole row of bowls and connecting-pipes will be discharged through the trap into the soil-pipe, in a few moments.

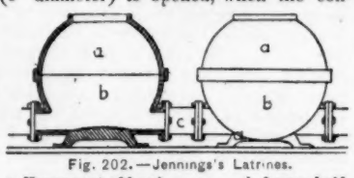


Fig. 202. — Jennings's Latrines.

a, Upper part of bowl. *b*, Lower half. *c*, Connecting-pipe. *d*, Feet.

The trap of this latrine is supplied with an inspection-hole, and it should also have, when used, an opening for a vent-pipe on the side of the trap next to the soil-pipe.

Jennings's Patent Latrines. — These latrines have been extensively used in public buildings in England. They are composed of bowls made on a special spherical pattern, connected with each other by means of short pipes, the flanges of which are bolted together. The bowls rest on short legs, so the whole system is raised above the floor. The bowl is divided in hemispherical pieces. This form and arrangement is convenient for shipping, as the upper half will set into the lower one. The bowls are furnished either in highly glazed vitrified stone-ware or enamelled iron. The plug is one of Jennings's hollow plungers opening over a simple siphon-trap. The plunger should be raised once a day, and oftener if ample water can be obtained. The water-cock as well as the plunger should be in charge of the janitor.

Tylor's Latrine. — In the year 1873, Tylor & Son, of London, received patents for a latrine of a peculiar form. The bowl is formed

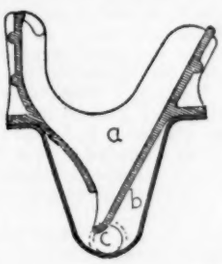


Fig. 203.

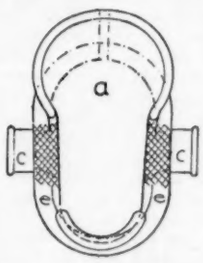


Fig. 204.

Tylor's Latrine.

a, Bowl. *b*, Receiver. *c*, Spigot ends.

so as to set into and rest upon a receiver. This receiver has on each side at the bottom a projecting spigot that could be cemented or caulked into the bell of a pipe. In this way a continuous line of latrines can be formed. The bowl, which is oblong, has foot-rests on each side, and is intended to be used by parties crouching, no seat being provided. The patentee says they were invented for the foreign market. In public parks where water-closet seats would be liable to abuse, or where they might communicate disease, latrines of this or a pattern to accomplish the same end would be found useful.

Mott's Latrines. — The J. L. Mott Iron Works, of New York, manufacture latrines in this country, of plain, zinc-coated, or enamelled iron. The bowl is formed in one piece with a section of the connecting pipe. The pipes are octagonal in section, and have flanges on the end by which they can be bolted together. The water is held at the same level in each of the bowls by means of a hollow trapped plunger. This plunger as well as the compartment in which it is placed is of the same kind as the one described in connection with Demarest's closet.

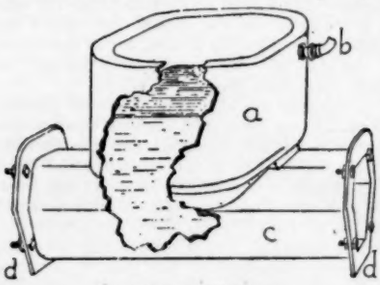


Fig. 205. — Mott's Latrine.

a, Bowl. *b*, Supply. *c*, Connecting-pipe.

(Fig. 137.) The same firm manufactures a number of trough-closets. In closets of this kind there is no bowl; but a trough long enough to receive the number of seats desired. The outlets to the trough are closed by a hollow trapped plunger according to Demarest's patent. The plunger operates in a chamber separated from the trough, and it is lifted by a combination of levers, which are clearly shown in the illustration. (Fig. 206.)

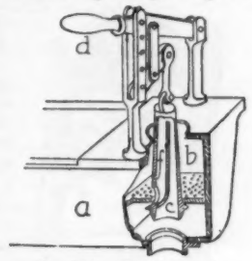


Fig. 206. — Trough-Closet.

a, Trough. *b*, Plunger-chamber. *c*, Plunger. *d*, Lever-handle. *f*, Overflow.

Parfitt's Latrines. — A. G. Myers of New York manufacture a latrine formed in the shape of a long wooden box lined with lead, the cover to this box being divided into as many seats as it is necessary to have. This box is connected by a six-inch outlet and trap to the main soil-pipe. The novel feature in this latrine is the arrangement of a tilting-tank above the end farthest from the outlet. The tank is connected with, and is to be filled from wash-basin or slop-sink wastes. The tank being balanced on journals is so arranged that one

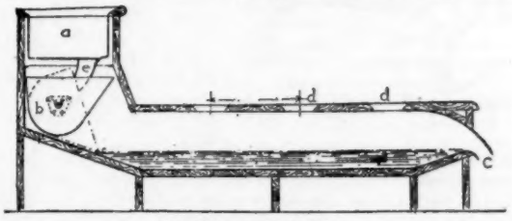


Fig. 207. — Parfitt's Latrine.

a, Sink or wash-bowl. *b*, Tilting-tank. *c*, Outlet. *d*, Seats. *f*, Lead lining.

end will be heavier than the other when it becomes filled with water. Tilting automatically it will empty its contents into the trough, and at the same time force the contents of the latrine through the trap.

Mr. E. S. Philbrick describes a curious latrine which is used, and said to work well in Liverpool. The description is taken from the English Privy Council Report. (See *American Architect*, Vol. VIII, No. 328.) In the place of latrines it is now a common, and I think the best practice, to use a row of long or short hopper-closets, either flushed by a tilting-tank, or a tank which is operated by connection with the seat or door of the water-closet room.

A tilting-tank can have its water-supply so arranged that the closet may be flushed at either short or long intervals. The time between the flushes should be regulated according to the abundance of the water-supply as well as according to the use the closet receives.

One or two arrangements for opening the supply-valve in the tank automatically will be described farther on. Where rows of either long or short hopper-closets are used in place of a latrine, each bowl has the advantage of a separate and ventilated trap between it and the soil-pipe. While with the ordinary latrine we have each bowl with its connections to become foul, and these foul surfaces will be exposed to the room whenever the latrine is emptied. When foul matter is dropped into one bowl of a latrine, there it must remain, no matter how great or offensive the stench may be.

In hospitals it is often imperative to have the fæcal matter from patients discharged directly into the soil-pipe, in which case a detached closet, one of a row, would be found most serviceable.

I do not think any case could arise in which a row of hopper-closets would not be superior to a latrine unless it were in the case of a public park, where the closet would be open to the most common forms of public use and abuse.

A TREMENDOUS IRRIGATION SCHEME. — The most gigantic irrigation enterprise ever inaugurated in the State of California has been commenced in Fresno County, the canal for which will be the largest in the state, and fed by Kings River. The water is intended to irrigate 30,000,000 acres of rich land, at present barren through lack of water. The source of supply of this canal will be higher than any other debouching from the same stream. Its dimensions are: one hundred feet in width at the bottom; levees an average of fifteen feet in height and eight feet wide at the top, broad enough for a wagon road. The depth of the water is expected to be five feet, with a fall of eighteen inches to the mile. The dam in the mountain cañon, whence the water is taken, will be a wonderful and permanent one. It is twenty-five feet high, eight hundred feet long, one hundred and forty feet wide at the base and twenty-five feet wide on top. It is rip-rapped on the inside with heavy rock, and every precaution taken to make it sufficiently strong to securely hold the great weight of water that must be supported. The water is led into the canal from a large headgate, constructed of heavy timber, one hundred feet in width and eighteen feet high. It is planked over so as to make a bridge for heavy wagons and has wings to protect it from the floods. The canal is expected to carry thirteen hundred cubic feet of water per second. — *Los Angeles Herald.*

ARTISTIC EMBROIDERY. — WORK BY THE "ASSOCIATED ARTISTS."[1] — II.

AMONG the most important works that have been executed in Mrs. Wheeler's ateliers was a suite completed last spring for a large drawing-room in a New York house. The apartment was a rather long rectangle, with a large window at one end, a smaller window and a single door at the other, and a double door in the centre of one of the longer sides. The room was wainscoted in maple and flat pilasters and cornices of the same wood framed and separated the wall panels, in which large embroideries were inserted. The wood was light in tone and by daylight was rather cold and poor in effect; but the room was intended solely for evening use and under artificial light the surface won a richer tone and a more satiny texture. It gave the key-note for a light scheme of color which was admirably harmonious throughout the textiles.

On the longer sides, on either hand of the central door and of the fireplace which faced it, were two embroidered panels, making eight in all. At each side of the end window was another, and opposite, between the smaller door and window was an eleventh of somewhat larger size. All were executed upon thick ribbed silk canvas which formed the background for the designs, only these last being elaborated by the needle. A sort of darning stitch was used — I cannot speak in technical terms — which preserved a very flat effect, simulating thus by hand the appearance of tapestry. The cartoons from which the needlewomen worked were prepared by Miss Dora Wheeler and displayed much fertility of fancy and grace of line. Each showed one or more figures, combined with flowers and other decorative elements, and were akin in feeling to the decorative work of the last century, though by no means definitely copying these in motive. The largest panel represented "The Dance" by a group of interlaced figures. Another showed a nymph rising from the water and dropping pearls from a shell held in her uplifted hand. Others typified Music and bore cherubs and musical instruments. Still another, one of the best, showed an extremely graceful figure of a Psyche breaking from a chrysalis which dissolved in a feathery wreck about her. But perhaps the most successful and individual of all were the two companion pieces at the end of the room, one personifying the "Full Moon" — a nymph sitting on a bank, her feet resting on a water lily while the moon's disk formed a background for her slender outlines, — the other the "Crescent Moon" — a winged nymph resting in the hollow of the orb. This latter was especially beautiful in line, the varied yet harmonizing curves of wings and crescent being particularly well imagined. As has been said the colors employe ' throughout were very pale and delicate. The background was of pale opalescent tints, and the embroiderers' work toned and melted into it so gently and harmoniously that the lines of contact were not to be discovered by the eye. Each panel was stretched flat upon the wall and was framed, inside the wood mouldings, by a border of pale green plush. The effect, I need hardly add, was quite different from that usually produced by modern needlework and somewhat nearly reproduced that of wall paintings executed in a pale, aquarelle-like scale.

The hangings proper — the portières and window curtains — were very different in kind and character, as rich and sumptuous as the panels were delicate and dainty. Yet the general color scheme was well kept throughout and no dissonance was the result. It was necessary that they should be somewhat more positive than the wall decoration, to give force and accent to the scheme, while not dark or heavy enough to be out of keeping with its most delicate features. Each was surrounded by a border of pale green plush, a little different in hue from those which framed the panels; and each was composed of a rich cream-colored fabric, which was not, however, identical throughout, satin having sometimes been chosen, and sometimes a heavy soft-finished silk. The first curtain executed was from the hand of Miss Carrie Townsend and the others were planned to correspond, though with variety in every case. Miss Townsend chose a satin background which she almost concealed beneath a heavy shower, as it were, of roses, falling from the top of the curtain and straying in the richest profusion over its whole extent. The design was very graceful and the color, in which the palest yellows ran into the deepest pinks, was of the most exquisite quality. Another curtain was of the soft silk fabric, covered with a sort of lattice-work pattern of rose-vines. The silk was turned in different directions in the different panels, thus adding to the play of light and color, the joinings being hidden, of course, by the interlacing pattern. Other pieces showed honeysuckles and various other flowers as their motives, but all were held in the same scheme of color — a scheme which united delicate greens and yellows and pinks and found its strongest note in a pink which approached to crimson.

The thin curtains which were also furnished for these windows were executed on white silk bolting — a fabric which combines great tenuity and transparency with the utmost solidity and evenness of texture and the most beautiful sheen of surface. The design, furnished by Mr. Louis Tiffany, showed myriads of brilliant-hued "darning-needles," massed at the bottom of the curtain into close, formal ranks, but spreading out above into the most graceful flights and spirals, getting ever thinner and lighter toward the top. These had been first painted on the fabric and were then embroidered with an intermixture of silk and metallic threads and of tiny beads to give them the necessary brilliance.

A similar set of thin curtains, recently executed for a house in Denver, Colorado, showed a design of wild roses, tied together along the borders by knots of pale blue ribbon, — the style suggesting that known in decorative art as the mode of the days of Louis Seize. They were most beautifully executed, the work being alike on the two sides of the fabric.

Among the finest things the atelier has yet turned out are two portières that were not made in answer to an especial order but simply as experiments — as studies in color and in technique, as samples to prove of what the art is capable to-day. Each of these pieces shows within a dark plush border an immense mass of roses rising from a vase. But they differ from one another both in color and in design. The manner of their production may serve as an illustration of the careful, painstaking methods to which I have already referred as so characteristic of Mrs. Wheeler's school, and also of her recognition of the fact that while nature need not be "conventionalized" for the decorator's purpose, it must be artistically adapted and fitted to the medium employed. The roses were studied from life by Mrs. Wheeler while in St. Augustine last spring, copies of fine individual flowers being made with the greatest care both as to form and as to variety and distribution of tint. Then a full-sized painting was made in which these separate studies were combined into a whole fitted for its decorative end. The vases were copied from fine Oriental originals, full-sized water-color studies being given to the workwomen for their guidance. The result is surely two of the finest essays in embroidery that have been made in any day. The background is in each case a pale, yellow-toned heavy silk. In one the vase is in blue, worked in tapestry stitch and giving with wonderful fidelity the texture and tone of the porcelain. The great mass of roses which rises from this is of a deep pink near the vase and shades off in gradual broken harmonies to paler yellow-pinks, and to yellows which melt into the background. On the other curtain the vase is dark green and its different texture — that of a coarser pottery — is given with equal skill. Dark green leaves and heavy dark roses rise from this vase, and these tones are then carried off into ever lighter ones, as in the different scale of the other example. The gorgeous mass almost covers the panel, but breaks and strays into lighter clusters as it rises higher. Nothing, I think, shows Mrs. Wheeler's artistic feeling more plainly than the way in which she thus manages her composition so that, whether it be formal or free, what the French call *pondération* is always secured, so that there is no overloading, no confusion, no disproportion between parallel parts of the subject, so that the masses which are heavier both in color and form are always toward the base of the design.

Nor can too much praise be given to the way in which the splendid roses have been used in these two curtains. The great masses of blossoms are beautifully grouped and drawn and colored, and are worked with extreme delicacy, yet always with an aim to general effect and an avoidance of undue insistence upon detail. They are so managed that an appearance of depth is secured which we rarely find in textile work. Yet the effect of painted work has not been imitated in the least, and though the eye looks deep into the rich mass of color, its primary decorative effect is not at all interfered with.

Another curtain which Mrs. Wheeler has recently completed — and which will probably be shown at the exhibition of American embroidery which she is organizing in connection with the approaching Bartholdi-Statue Loan Collection in New York — shows on a changeable silk of the most delicate bluish-yellow, a design of iris plants. The blossoms are naturalistically treated and the general growth of the plant is not falsified or "conventionalized," but the leaves are displayed in a somewhat formal manner and thus the necessary decorative result is secured. At the base of the curtain the growth is thick and the flowers deep purple in hue, but as the upper portions are approached the pattern becomes more scattered and the blossoms shade off gradually into faint lilacs and yellows.

The materials Mrs. Wheeler uses are always of the finest quality, many of them, as I have said, being made in American looms under her own direction. They will last for centuries, and the threads employed are chosen with equal care as to the substance and dyed with equal skill for the attainment of the desired hues. It may seem at first hearing as though white satin and pale-colored silks were not very practical textures to use in work the aim of which is to be useful and permanent as well as beautiful. But these are only intended, of course, for state apartments where neither dust nor rough usage will afflict them. Mrs. Wheeler has stores of less dainty materials which are quite their equals in beauty. And even in these most delicate ones the material is so carefully chosen, is so fine and smooth and heavy, and the embroidery is so firmly and solidly applied that

[1] Continued from page 128, No. 403.

dust will shake or brush off them very readily and they may prove, after all, more serviceable than fabrics of darker hue but less perfect texture.

The coming exhibition to which I have just referred will undoubtedly show Mrs. Wheeler's work in many of its different branches, and it is her desire to bring together examples of all the artistic embroidery done in this country after original designs, so that the public will be able to gain a more exact idea than hitherto of what we have accomplished in this branch of decorative art. If Mrs. Wheeler and Miss Townsend show at their best, and if their fellow workers in New York and other cities will send their finest work as well, it is certain that some surprise and much delight will be called forth by the collection; and it is likely we may be led to wish that it might be transported bodily to Paris or to London for exhibition. In neither place, I think, would it find dangerous rivalry; — in no place I am very sure would the local work be found to equal, still less to surpass it, either in excellence and variety of execution or in originality of style.

M. G. VAN RENSSELAER.

HUE, THE ANAMESE CAPITAL.

WE are told that the French propose an immediate attack on Hué, the capital of Anam. It will not be easy to succeed, for P'on-thua-thien, as the officials call it, is one of the most formidable fortified towns in Asia. It lies on the Hué River, about six miles from the sea-coast. The river is but small and only navigable for craft of light tonnage. It is no more than four hundred yards wide at its mouth; there is an awkward bar of hard sand, and this is commanded by a strong fort with a regular glacis and ditch, a rampart of stone and lime, and a large number of guns mounted *en barbette*. Outside the bar there is plenty of water, but at this season of the year there is always a heavy surf. Beyond silencing the fort, therefore, the French fleet will be able to render little assistance to the land forces. The attacking body will probably find the river the most convenient way of getting over the six miles between the sea-coast and the town. There is, indeed, a "royal road," but it is a very sorry one. It is cut up by a number of streams and gullies spanned by ruinous bridges, which it would be almost superfluous labor to destroy altogether. Hué is said to contain 100,000 inhabitants; but of these, the vast majority, as is usual in Oriental capitals, dwell without the walls. The interior or walled town is a vast citadel, square in form and measuring about five miles in perimeter. It is built *à la* Vauban, and was constructed by the great Emperor Gia Long, in the beginning of the century, from plans furnished by French engineers. The river flows under its walls on the west and south, and a canal thirty yards wide and four or five feet deep encircles the other two sides. Branches of this canal pass inside and flow round the royal palace, the arsenal, and the granaries so that the tribute from the provinces can be carried straight to the royal storehouses. The enciente is marked by a well-made glacis all round. There is a rampart of hard earth cased on the outside with bricks, a fosse thirty yards broad, and a covert way. Each angle is flanked by four bastions intended to mount thirty-six guns apiece, some of them in embrasures and some *en barbette*. There are four gates on each face, built of solid masonry. Over each of them towers a Chinese pavilion of fantastic form and about seventy feet high. Stone bridges are built over the river and the canal opposite these gateways. Drawbridges do not seem to have figured in the plans furnished to Gia Long by the Frenchmen.

The place looks very imposing from the outside. A row of magnificent trees lines the ramparts and makes a charming promenade; but the view within is very dismal, and the interior looks more like a desert than a capital city. Within the ramparts live the mandarins, the garrison, and the princes of the blood royal. The only other buildings are the public offices, the granaries, the prisons, the arsenal, besides the hovels of the few tradesmen who are allowed to come in to sell tea and tobacco and such like wares to the soldiery. These wretched shanties scarcely add to the general cheerlessness. The paved ways are all grass-grown, and the rest is a waste of uncultivated land. But within these walls there is a second line of defence — a fortress within the fortress. This occupies perhaps a quarter of the whole area. It is also quadrangular, and is the citadel properly so-called; it is styled the Thang-noï. Like the outer walls, it has its ramparts and bastions, mounted at every available point with guns, and, if resolutely defended, would be much harder to take than the gigantic outer works. Inside this is the Imperial Palace out of which his late Majesty hardly ever stirred. It is distinguished from afar by its yellow roof, that being the Anamese royal color. The princes of the blood daub their palaces red. In the Thang-noï his Majesty lives with his queens, and none but the guards and those employed in the royal service are allowed to enter it. If an artificer has displayed sufficient skill to be called in to execute repairs in the palace, he is detained there as a prisoner for life. By the side of the palace stands a temple consecrated to the ancestors of the Emperor; and there he performs what worship seems to him consistent with his magnificence. A curious rule — Oriental or un-Oriental, according to the point of view in which you regard it — provides that any woman, of whatever rank, may enter the Thang-noï unquestioned, as long as she is fairly good-looking.

The granaries of Hué within the ramparts are one of the chief sights of the place. They stretch over an enormous area, and two or three fresh buildings are added every year, as the tribute comes in from the provinces. They contain supplies sufficient to support fifty thousand men for a dozen years. The treasury is a building of which wonderful stories are told. It is a vast reservoir or tank, with high blank walls and only one opening — a window high up in the side toward the palace. Through this window is thrown annually — so the tale goes — a log of wood hollowed out and stuffed with ingots of gold and rouleaus of money. What goes in never comes out again. No wonder the French want to possess themselves of Hué. The guardians that watch over this fabulous treasure are vigilant and incorruptible. They are crocodiles.

The arsenal of Hué is as vast as the granaries. In 1828 when Dr. Crawfurd went there as ambassador from the Governor-General of India, he saw in this arsenal a great number of old ship-guns — English, French, Dutch and Portuguese. But there were also whole parks of brass ordnance made in Cochin-China from metal dug in Tong-king mines. The models were French guns and they were mostly howitzers and mortars. Crawfurd saw nine 93-pounders with Gia Long's name cast on them. The gun-carriages were neatly painted and contrary to Oriental habit the guns themselves were kept in good working order. This statement is borne out by the letters of many missionaries in the "Annales de Propagation de la Foi," one enthusiastic father declaring that the pieces were so highly polished that they shone in the sun like silver. Whether the Anamese gunners are able to work their guns as well as keep them in order remains to be seen. They are not wanting in pluck; in fact a great part of the Anamese soldier's drill consists in tests of his courage.

Hué is undoubtedly a place that may offer a stout resistance but it has many weak points. The chief of these is its vast size. At least fifty thousand men are required to garrison it. That number will be forthcoming without doubt; but they may not be able to resist a concentrated attack. The height of the ramparts is another source of danger. Modern field artillery would probably be sufficient to batter them down notwithstanding their enormous thickness; and the débris would serve to fill the ditch and so remove another difficulty. Finally it is almost certain that the Anamese will be unable to find sufficient men capable of working the eight hundred guns mounted round the fortress. Their great ally at this season of the year is the unhealthiness of the climate. If a prolonged resistance can be offered it is not unlikely that the French will have to retire baffled. Indeed it seems probable that the sudden resolve to attack Hué is prompted as much by a desire to combat disease by active operations as by a notion that the fall of the capital will terminate the war. — *St. James's Gazette.*

CATCH-WATER RESERVOIRS.

HIS artificial storage of rain-water for summer use is of the greatest importance in many rural districts where wells and springs are not found, a few remarks on the construction of reservoirs may be of service. The amount of rainfall can only be determined by the measurement of the drainage area comprised within the watershed lines, though this area cannot always be relied upon, as when an impervious stratum underlies a porous soil. Various geological features may alter the quantity of water, such as the nature of the soil, its porosity, the inclination of the ground, and other causes; and it is necessary, therefore, before deciding upon a site for a reservoir, to survey the gathering-ground, the underlying soil, and other natural features. It is the available rainfall only that can be estimated, or

that portion of the total rainfall of the district that can be stored. The losses by evaporation, absorption by soil and plants, must be taken into the account. Having obtained the amount of annual rainfall of the district, certain deductions have to be made. One authority states that upon average drainage areas the available quantity may be taken at fifty per cent of the total annual rainfall. Taking the average fall of thirty-two inches per annum, an available rainfall of 15 or 16 inches may be depended upon. In districts where the rainfall is great, as in Lancashire, the reservoir need not be made so large as in the eastern parts of England. The most economical site for a reservoir, other things being favorable, is that of a natural valley, where, at a small cost, an embankment may be formed across at one end; but even such a position may be disadvantageous compared with one in which an impermeable clay soil is found. Such a soil saves the cost of puddling, while the more naturally suitable position, as regards form, may allow of only a small proportion of the rainfall being stored for use. It would be a mistake also to select a site so distant from the place of consumption as to require a great length of pipes, as in such a case the object of a reservoir for storage is defeated. Wherever a natural depression exists, a little excavation may be sufficient to form a reservoir; but on level ground the cost of construction, raising dams and puddling may be out of proportion to the advantages to be derived. It is generally possible, however, to form the reservoir by a partial excavation, the material being thrown up to raise the sides or embankments, and thus the cost of embanking the whole depth all round may be considerably reduced. Concrete is now largely employed for underground tanks and embankments, and for small reservoirs is admirably adapted. It may be made of common lime properly slaked and mixed with sand, the face cemented with Portland cement half an inch thick.

With regard to capacity, it is much better to increase the depth than the surface. A large surface of water presents more for the action of evaporation, and water so exposed is more likely to become deteriorated; nearly vertical sides are preferred, and a covering is an advantage, though the cost of it often precludes its adoption. One writer observes that silicious sandstones, hard-burnt bricks, bedded in powerfully hydraulic limes or cements, are the most advisable materials to be used in forming the faces in contact with the water. In constructing the dams of reservoirs upon soils of a doubtful nature, all loose material should be removed. A puddle wall or core, made of tough impervious clay, is necessary, and this should be sunk into a trench which is excavated for it. The puddle wall is carried up to top of reservoir, and is made to batter at the sides. Its width at the base is generally about one-third the depth of water to be sustained. These puddle walls are supported by banks composed of a retentive material, selected with care, and resting on puddle seating very carefully formed, while the outer banks are made to slopes of three and four to one, with harder material, protected by stone pitching on the inner slope. There is a kind of excavating scoop now made which greatly facilitates the construction of reservoirs. The scoop is worked by drawing it backward and forward between two steam plowing engines. Any area can be scooped out, the depth being according to the number of times the ploughing and scooping operations are performed.— *The Building News.*

THE VENTILATION OF PUBLIC BUILDINGS.

Philadelphia, September 13, 1883.

To the Editors of the American Architect: —

Dear Sirs,— Would you kindly inform me, if you can spare time and space in your valuable paper, what is the best treatise on the approved methods of ventilation, especially for public buildings. By doing so you would greatly oblige, Yours, etc., S. C.

[The most recent treatise on the subject is the "Ventilation of Public Buildings," by Robert Briggs, C. E., published in the *Journal of the Franklin Institute;* it has also probably been published in separate form by some Philadelphia publisher. Dr. John S. Billings, U. S. A., is the author of a lengthy series of articles on heating and ventilation which have been published during the past two years in the *Sanitary Engineer.*— Eds. American Architect.]

ARCHITECTURAL SCHOOLS.

Kansas City, Mo., September 7, 1883.

To the Editors of the American Architect: —

Gentlemen,— Can you inform me as to the architectural schools in Boston, New York and Chicago, their terms of admission, etc. I understand tuition to be free in New York. I have a son who wants to pursue architectural studies.

Yours truly, H. L. Johnson.

Leavenworth, Kan., September, 1883.

To the Editors of the American Architect: —

Dear Sirs,— Please inform me of some good architectural schools or colleges, and to whom I must address for a catalogue or information. Are there any good ones in Illinois or Missouri? Also, please tell me the best course for a student who cannot attend school, to be a good draughtsman I have been at work in an architect's office nearly two years, and would like to attend an architectural school if possible. Hoping to receive an answer, I am,

Yours respectfully, William P. Feth.

[The principal architectural schools in this country, so far as we know, are the Architectural Departments of the School of Mines in Columbia College, New York City, Cornell University, at Ithaca, N. Y., the Illinois Industrial University, at Champaign, Illinois, and the Massachusetts Institute of Technology, at Boston. The College of the City of New York, Princeton College in New Jersey, and the Michigan State University, at Ann Arbor, at one time, we think, maintained architectural departments, and one college in Georgia, and another in the far Northwest, have recently established similar ones. The requisites for admission and the terms of tuition probably vary considerably, but can be ascertained by communicating with the Secretaries of the respective institutions.—Eds. American Architect.]

WROUGHT-IRON CHIMNEY-SHAFTS.

London, England, September 4, 1883.
501 Caledonian Road, Holloway.

To the Editors of the American Architect: —

Sirs, — Will you kindly allow me to ask through your paper, whether many wrought-iron chimneys have been erected in America or Canada, and if so, how they answer? Do they require many repairs, and compared with brick or stone chimney-shafts are they cheaper?

I should also like to ask if some of your correspondents will please give the name and dimensions of some half-dozen of the tallest chimneys built in America or Canada.

Yours respectfully, R. M. Bancroft.

[As we sometimes feel that we discourage others from contributing their mite for the common benefit, we refrain from answering this question at present.— Eds. American Architect.]

NOTES AND CLIPPINGS.

Testing Fortifications with an Eighty-ton Gun. — An experiment, with the object of testing the effect of the fire of the eighty-ton gun on fortifications, was carried out on August 22 at Shoeburyness. A representation of one of the most impregnable forts at Spithead, sixty feet long by twenty feet wide, has been built up on the Marshes and divided into four sections, the whole constructed of blocks of granite, with backing of teak and concrete. In front of the two inner sections two iron targets, each nine inches thick, separated by a layer of teak, were placed, and it was against one of these that yesterday's first experiment was carried out. The gun, on an experimental carriage, was placed in position on a line of rails, at about two hundred yards from the target, and the preliminary operations were commenced. The gun was loaded with 450 pounds of pebble powder and a shot weighing 1,700 pounds, including gas check. The gun was fired by electricity, and following the discharge came the crash on the target. Examination showed that the projectile, with an initial velocity of 15.88, struck the target exactly in the centre, cut through both iron slabs and facings of granite, and was embedded about six feet in concrete behind. The result of the experiment appeared to give great satisfaction. This representation of a fort has cost some thousands of pounds. — *London Standard.*

The Bartholdi Statue. — The following from the Boston *Herald* may be of interest in connection with the paper on the Statue of Liberty to be found elsewhere in this issue. "For the past fortnight there has been an unusual activity on Bedloe's Island caused by a number of workmen who are excavating a foundation for the pedestal of the Bartholdi Statue. This foundation, which occupies a space of about one hundred feet, lies in that part of the island which is generally known as the parade. The excavators have already reached a depth of sixteen feet. The concrete, which is to be used for the base of the pedestal, is composed of trap rock, which is broken near Weehawken and brought to the island from the Palisades. American cement will be used, and it is calculated that two hundred cubic yards will be placed each day. The workmen will be quartered on the island. For carrying the material, a trestle of heavy timber has been constructed. Mr. Francis H. Smith, the constructing engineer employed on the work, said to a reporter yesterday; 'As this work must be finished as quickly as possible, we have formed a plan to have steam elevators at the end of the trestle, and then to unload the boats by dump tubs into a railroad car, which will descend by its own gravity about six hundred feet over the high parapet wall of the fort and into the excavation. On the opposite side of the island there will be another trestle five hundred and fifty feet long, piled out through the shoal water till it reaches a depth of six feet. All the cement, of which about 18,000 barrels will be required, will be landed over this trestle. A steam pump has been set up on the shore, in order to force over the parapet of the fort the water that will be used in mixing the concrete. Salt water will be entirely employed for that purpose. The concrete base, together with the masonry, will weigh about 48,000 tons. This is exclusive of the weight of the statue, which is 180 tons. The entire statue is 126 feet in length, and the pedestal is 159 feet high from high water. In order to obviate any danger of lightning, we have five iron tables, three inches in diameter, running through the entire base of the pedestal and foundation into the earth and inclosing in the middle a copper wire. We will begin work at the concrete next Monday. The height of the concrete portion of the pedestal will be 48 feet, while that of the granite portion will be 112 feet. We hope to have the work finished on the 15th of November. This will be the largest quantity of concrete that has been laid together in one mass in this country. So far as my experience has gone, concrete, when mixed in due proportions, has never yet failed to answer all reasonable demands made upon it. Masonry would undoubtedly have been preferable, but the cost would have been much greater. The chief employment of the men will be to mix the concrete.'"

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.]

284,588. WINDOW-SCREEN.— William G. Anderson, Boston, Mass.

284,598. WRENCH.—Carl A. Blomquist and Theodore Buskirk, Toledo, O.

284,602. WEATHER-STRIP. — Martin L. Bramhall, La Porte, Ind.

284,627. FIRE-ESCAPE. — Hiram E. Goble, Kalamazoo, Mich.

284,653. COMPOUND FOR PRESERVING WOOD AND METAL. — Lorenzo D. Mott, Jr., Marshalltown, Io.

284,654. ALARM FOR ELEVATORS. — Amos Nickerson, Somerville, Mass.

284,666. PEN-BEAM STANDARD FOR RULING-MACHINES. — Edwin J. Piper, Springfield, Mass.

284,684. FIRE-ESCAPE. — Charles H. Tweed, Allegheny, Pa.

284,722. SHUTTER-WORKER. — Hiram M. Chamberlin, Reading, Vt.

284,725. COMPOUND FOR ROOFING BUILDINGS. — Wm. Detrick, Indianapolis, Ind.

284,732. BENCH-PLANE. — Arthur T. Goldsborough, Washington, D. C.

284,739. SAW-HANDLE.—Harrison P. Hood, Indianapolis, Ind.

284,740. FIRE-ESCAPE.— William H. Isley, Jersey City, N. J.

284,747. FLOOR-CLAMP. — Henry D. Margot, Mountain View, Cal.

284,761. APPARATUS FOR VENTILATING SEWERS AND DRAINS. — Thomas Rowan, London, Eng.

284,763. FIRE-ESCAPE. — Michael Scholl, San Francisco, Cal.

284,808. FIRE-ESCAPE. — E. Herman Brown, Baltimore, Md.

284,824. STRAINING-BEAM. — Benjamin F. Davis, Dallas, Tex.

284,845. SCAFFOLD-BRACKET. — Amos D. Hart, Elmira, N. Y.

284,871. FIRE-ESCAPE. — Charles Maliphant, New Brighton, N. Y.

284,872. AWNING. — Frank B. Mallory, New York, N. Y.

284,873. PORTABLE TRESTLE. — Wesley F. Marsh, North Platte, Neb.

284,878. ELECTRICAL ANNUNCIATOR. — David A. McCormick, Detroit, Mich.

284,882. AWNING. — Joseph Moynan, Brooklyn, N. Y.

284,893. DOOR-KNOB ATTACHMENT. — Edward L. Phipps, Milford, Mich.

284,895. APPARATUS EMPLOYED IN SINKING PITS OR SHAFTS. — Ildephonse Quinet and Arthur Denis, Denain, France.

284,919. BENCH-PLANE. — William Steers, Sherbrooke, Quebec, Can.

284,941. RABBET-PLANE.— John M. Bennett, Green Island, N. Y.

284,944. WOOD-CUTTER. — John Burge, Westfield, Mass.

284,961. DOOR-BOLT. — William S. Hill, Cutler, Ill.

284,963. VAULT OR COMBINATION SKYLIGHT REFLECTOR ROOF. — Thaddeus Hyatt, New York, N. Y.

284,976. LATRINE AND WATER-CLOSET. — Walter E. Parfitt, Brooklyn, N. Y.

284,980. BURGLAR-ALARM. — William H. Reiff, Philadelphia, Pa.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty-two permits have been granted, the more important of which are the following:—

Mrs. M. Koenig, two-st'y brick stable, in rear of No. 203, s s Orleans St., bet. Bond and Bethel Sts.

L. H. Robinson, 7 three-st'y brick buildings, e s Fulton Ave., com. n e cor. Lanvale St.; and 7 two-st'y brick buildings, e s Fremont St., s of Sewell St.; and 7 two-st'y brick buildings, w s Argyle Ave., s of Sewell St.; and a two-st'y brick building in rear of e s Bruce Alley, s of Lanvale St.

Benj. Howard, two-st'y brick stable, in rear n w cor. John and McMechen Sts.

Geo. A. Von Lingen, 2 three-st'y brick buildings s s Baltimore St., bet. High and Exeter Sts.

Charles H. Nickelman, 4 three-st'y brick buildings, w s Patterson Park Ave., bet. Pratt and Gough Sts.; and 5 two-st'y brick buildings, e s Madeira Alley, bet. Pratt and Gough Sts., in rear of above.

Wm. J. E. Diven, 5 two-st'y brick buildings, e s Gilmor St., bet. Baker and Presstman Sts.

J. M. Cone, 10 two-st'y brick buildings, e s Schroeder St., bet. Edmondson and Harlem Aves.

Emil Hershman, three-st'y brick building, s w cor. Pratt and Caroline St.

H. D. A. Henning, three-st'y brick building, n s Hollins St., w of Monroe St.

Hogg & Brown, 5 three-st'y brick buildings, n s Lexington St., bet. Pine and Chatsworth Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Commonwealth Ave., No.* 267, Ward 11, for Winthrop Sargent, dwell., 26′ x 6 ′, five-st'y flat.

Commonwealth Ave., Nos. 209 *and* 211, Ward 11, for W. Powell Mason, dwell., 50′ x 52′, three-st'y flat; Geo. G. Nichols, builder.

Washington St., Nos. 409-417, Ward 17, for Est. Barney Corey, apartment-house, 76′ x 76′, five-st'y flat; J. J. McNutt, builder.

Wood. — *Boylston Ave.*, near Porter St., Ward 20, for Henry Dickhaut, 2 dwells., 22′ 6″ x 36′; R. D. Ward & Co., builders.

Dunstable St., cor. Williams St., Ward 5, for Wm. P. Winchester Estate, manufactory, 50′ x 100′, four-st'y flat.

Lake St., near Kendrick St., Ward 25, for Massachusetts Society for Prevention of Cruelty to Animals, sheltering home, 33′ 6″ x 57′, two-st'y pitch; Conley & Co., builders.

Perrin St., rear, cor. Waverly St., Ward 21, for Francis N. White, stable, 10′ x 32′ and 32′ x 44′, one-st'y hip; Amos D. Gould, builder.

Pratt St., near Linden St., Ward 25, for Isaac Pratt, Jr., dwell., 20′ and 26′ x 30′, two-st'y pitch; W. B. Cameron, builder.

Centre St., cor. Centre Pl., Ward 23, for Wm. C. Starbuck, dwell., 33′ x 36′, two-st'y pitch; Chas. G. Lynch, builder.

Templeton St., near Adams St., Ward 24, for Eugene D. Brooks, dwell., 15′ x 15′ and 20′ x 30′, two-st'y pitch; Geo. Driscoll, builder.

Albany St., rear, near Chester Park, Ward 20, for E. A. Rimick, stable, 22′ x 50′, one-st'y pitch.

Shelton St., near Adams St. Ward 24, for Dennis B. Flynn, dwell., 22′ x 29′, two-st'y pitch.

Wyoming St., near Warren St., Ward 21, for Samuel M. Shapleigh, 2 dwells., 18′ x 20′ and 23′ x 34′, two-st'y pitch; Samuel M. Shapleigh, builder.

Templeton St., near Adams St., Ward 24, for Eugene D. Brooks, 2 dwells., 14′ x 15′ and 14′ x 30′, two-st'y pitch; Geo. Driscoll, builder.

Savin Hill Ave., cor. Sagamore St., Ward 24, for G. R. Richards, dwell., 23′ x 34′, two-st'y pitch; McDonald & Tobin, builders.

Highland St., near High St., Ward 24, for Samuel H. Buck, carriage-house, 25′ x 35′, one-st'y pitch.

George St., cor. Hampden St., Ward 20, for E. S. Hoffman, bakery, 26′ and 34′ x 47′ and 69′, one-st'y flat; Lord & Young, builders.

Spectacle Island, Ward 2, for N. Ward & Co., glue manufactory, 10′ 9″ x 55′ 6″ and 20′ x 20′, two-st'y pitch; Christopher Tilden, Jr., builder.

East Fifth St., near Pickering St., Ward 14, for Lyman Lock, 4 dwells., 13′ x 19′ and 20′ x 32′, two-st'y flat; Lyman Lock, builder.

East Sixth St., near K St., Ward 14, for M. E. Evans, dwell., 22′ x 32′ and 18′ x 25′ 5″, two-st'y mansard; James O. Evans, builder.

Brooklyn.

BUILDING PERMITS. — *Johnson St., Nos.* 70-74, s s, 34′ w Jay St., 3 four-st'y brick tenements, tin roofs; cost, each, $4,000; owner and builder, Wm. Gorden, 76 Johnson St.; mason, J. Magee.

Ross St., No. 86, s s, 189′ e Wythe Ave., two-st'y and basement brick tenement, felt, cement, and gravel roof; cost, $5,500; owner, Jno. Given, 95 Milton St.; architect, H. E. O'Neil; builder, M. Smith.

Grand Ave., s e cor. Clifton Pl., three-st'y brick store tenement, felt and gravel roof; cost, $3,500; owner and builder, E. L. Donnellon, President St., near Henry St.; architect, R. Dixon.

Van Brunt St., No. 147, e s, 95′ s Union St., four-st'y brick stores and tenement, tin roof; cost, $9,000; owner Edward Sheridan, 180 Fourteenth St.; architect, P. Leibbrand; builders, P. Kelly & Son, and Gibson & Leibbrand.

Fayette St., Nos. 25 *and* 27, n s, 2 three-st'y frame tenements, tin roofs; cost, each, $3,000; owner, S. Sheffel, 10 Thornton St.; architect, T. Engelhardt; builders, M. Kuhn and M. Schmidt.

Cook St., Nos. 7 *and* 9, n s, 75′ e Ewen St., three-st'y frame storage building, tin roof; cost, $2,500; owners, Fraas & Son, on premises; architect, T. Engelhardt.

Ellery St., No. 231, s s, 200′ e Throop Ave., three-st'y frame double tenement, tin roof; cost, $4,200; owner, R. Waldeman, 810 Flushing Ave.; architect, T. Engelhardt; builders, J. Rauth and J. Rueger.

Park St., Nos. 21 *and* 23, about 200′ e Broadway, three-st'y frame store and double tenement, tin roofs; cost, each, $4,200; owner and builder, George Straub, 704 Broadway; architect, T. Engelhardt.

Bushwick Ave., w s, 60′ n Duryea St., two-st'y and basement brownstone front dwell., tin roof; cost, $6,000; owner, R. E. McCafferty, 930 Gates Ave.; architect, F. Weber; builders, M. J. Reynolds & Son and McKee Bros.

Floyd St., No. 104, s s, 225′ e Marcy Ave., three-st'y frame tenement, tin roof; cost, $3,500; owner, Jacob Ludwig, 106 Floyd St.; architect, T. Engelhardt.

Myrtle Ave., s s, 200′ e Throop Ave., 6 three-st'y brownstone front tenements, tin roofs; cost, total, $42,000; owner, D. R. James, 954 Myrtle Ave.; architect, A. F. D'Oench.

Seventh Ave., s e cor. Carroll St., 8 three-st'y and basement brownstone front dwells., tin roofs; cost, each, $7,500; owner, Henry Lansdell, Ninth St., cor. Seventh Ave.; architect, C. B. Sheldon; mason, J. M. Brown.

Jefferson St., w s, 310′ e Marcy Ave., 3 three-st'y and basement brick dwells., tin roofs, iron cornices; cost, each, $9,000; owner and builder, Geo. H. Stone, 301 Jefferson St.; architect, G. A. Schellenger.

Fourteenth St., s s, 357′ 10″ w Fourth Ave., 2 three-st'y frame tenements, tin, or gravel and felt roofs; cost, each, $3,000; owner and architect, F. L. Corwin; builder, J. H. Herbert.

Elizabeth St., No. 167, s s, 175′ e Conover St., three-st'y brick tenement, tin roof; cost, $3,900; owner, Wm. Gilbride, 347 Van Brunt St.; architect, J. J. Kelly; builders, P. Kelly & Son.

Central Ave., Nos. 95-99, e s, 25′ n Troutman St., 2 three-st'y brick double tenements and three-st'y brick store and double tenement, tin roofs; cost, each, $5,000; owner, Leob Eppig, 58 Central Ave.; architect, G. Hillenbrand.

Park Ave., n s, 50′ w Kent Ave., 2 four-st'y brick stores and tenements, tin roofs; cost, each, $6,000; owner, A. Phillips, 225 East One Hundred and Twenty-fifth St., New York city; architect, S. B. Vreeland.

ALTERATIONS. — *Elm Pl., Nos.* 10 *and* 12, one-st'y brick extension, peak roof tinned, cost, $8,000; owner, George Zipp, on premises; architect, C. D. Eisenach.

Sidney Pl., No. 52, three-st'y brick extension on rear, tin roof; cost, $4,500; owner, Mary L. Miner, on premises; architects, Parfitt Bros.

Chicago.

CHURCH. — J. H. Huber is architect for the German Baptist Church, to be built on Willow St.; cost, $10,000.

HOUSES. — Martin McNulty will build 5 three-st'y dwells., with store below on Rush St.; cost, $20,000; Lehman & Co. are the builders.

C. B. Holmes is architect for three-st'y dwell. on Prairie Ave.; cost, $15,000.

H. R. Wilson is architect of 3 three-st'y dwells. on Adams St., for Wm. Regan; cost, $12,000; builders, Geo. Lehman & Co.

C. P. Thomas, architect, made the plans for 4 two-st'y dwells., for Miss M. Kelly, to be built on Centre Ave., at cost of $12,000; H. Himard, builder.

D. McCarthy will build two-st'y dwell. on Oak St.; cost, $9,000; the architects are Frommen & Jepsen; builder, D. Wrenn.

Burnham & Root are architects for two-st'y dwell. on Washington Boulevard, for H. A. Christie, to cost $7,000; the builders are J. M. Dunphy & Co.

F. L. Charnley, architect, made the plans for 4 two-st'y dwells., with stores underneath, for S. P. Parmly on West Van Buren St.; cost, $10,000.

P. Humiston is building 3 three-st'y dwells., with stores below on West Lake St.; cost, $12,000; planned by O. H. Placey, architect.

The same architect planned three-st'y dwell. and store on Western Ave., for M. G. Collson; cost, $6,000; Oliver & Hill, builders.

H. Kley, architect, made plans for three-st'y dwell. on Rumsey St., for Dreffein Bros.; cost, $6,000.

John Otto, architect, has completed plans for two-st'y dwell. on Sedgwick St., for Albert Ness; cost, $6,000.

The same architects planned three-st'y dwell. and store, for G. Kennally on Milton Ave.; cost, $5,000.

Burling & Whitehouse are architects for 2 three-st'y dwells. and stores to be built on Indiana and Hoyne Sts., for H. J. Winslow, to cost $12,000; the builders are J. M. Dunphy & Co.

There will be erected on Wabash Ave. a block of 16 three-st'y dwells., for E. B. Hosmer, Son & Keeney, to cost $136,000; the architect is Wm. Thomas; Geo. Lehman & Co. are the builders.

STORE AND FLATS. — Furst & Rudolph, architects, planned the store and flats to be built on Archer Ave., for D. E. Healy; cost, $12,000.

STORES. — F. L. Charnley is architect for the 2 stores on Third Ave., being built for L. G. Fisher, to cost $10,000.

WAREHOUSES. — Burling & Whitehouse, architects, planned the four-st'y warehouse building, cor. of Fulton and Clinton Sts., for the National Warehouse Co.; cost, $30,000.

Mr. Huntington will build a five-st'y warehouse on North Water St., to cost $25,000.

BUILDING PERMITS. — Miss M. Kelly, 4 two-st'y dwells., 318-322 Centre Ave.; cost, $12,000; architect, P. Thomas; builder, H. Himard.

D. McCarthy, two-st'y dwell., 174 Oak St.; cost, $9,000; architects, Frommen & Jepsen; builder, D. Wrenn.

Chas. Willoughby, two-st'y barn, 11-13 Eldredge St.; cost, $3,000.

Martin McNulty, 5 three-st'y stores and dwells., 18-26 Rush St.; cost, $20,000; builders, Lehman & Co.

Wm. Recker, two-st'y dwell., 352 Twenty-second St.; cost, $3,000.

M. Small, two-st'y livery stable, 490-92 Van Buren St.; cost, $8,000; architect and builder, G. Heuston.

Jno. Tierney, cottage, Nineteenth and Johnson Sts.; cost, $2,600.

M. Skala, three-st'y store and dwell., 165 West Twelfth St.; cost, $7,000.

John Messerer, two-st'y dwell., 126 Ambrose St.; cost, $3,000.

Catherine Figo, two-st'y dwell., 587 Holt St.; cost, $3,000.

Indiana Club, bowling alley, 3349 Indiana Ave.; cost, $2,900.

H. A. Christie, two-st'y dwell., 755-757 Washington Boulevard; cost, $7,000; architects, Burnham & Root; builders, J. M. Dunphy & Co.

J. S. Jones, two-st'y dwell., 928 Jackson St.; cost, $3,000; architect, Thomas.

E. D. Landis, two-st'y dwell., 175 Howe St.; cost, $4,000.

John Workmeister, two-st'y dwell., 3200 Vernon St.; cost, $6,000.

Wm. Rogan, 3 three-st'y dwells., 689-691 Adams St.; cost, $12,000; architect, H. R. Wilson; builders, Geo. Lehman & Co.

Fred. Malcolm, two-st'y and basement store and dwell., 736 Clybourne Ave.; cost, $6,000.

C. B. Holmes, three-st'y dwell., Prairie Ave. and Thirtieth Sts.; cost, $15,000; architect, C. B. Holmes; builder, A. B. Cooke.

F. L. Wilson, two-st'y dwell., 128 Fourth Ave.; cost, $2,800.

Mr. Huntington, five-st'y warehouse, 169 North Water St.; cost, $25,000.

C. & N. W. R. R. Co., freight-house, West Water and Dunn Sts.; cost, $15,000.

M. Burbach, two-st'y dwell., 2803 Fifth Ave.; cost, $3,500.

H. J. Winslow, 2 three-st'y stores and dwells., Indiana and Hoyne Sts.; cost, $12,000; architects, Burling & Whitehouse; builders, J. M. Dunphy & Co.

Sarah B. Turner, two-st'y dwell., near Rush St.; cost, $3,000.

National Warehouse Co., four-st'y warehouse,

Fulton and Clinton Sts.; cost, $30,000; architects, Burling & Whitehouse.

S. Tragorth, two-st'y dwell., 187 Wesson St.; cost, $5,500; architect, A. G. Halberg.

F. Heiden, two-st'y flats, 463 Dayton St.; cost, $5,000; builder, Peter Ott.

P. A. Thompson, 2 two-st'y dwells., 815-817 Tallman St.; cost, $3,000.

Sedgwick St. Chapel, one-st'y chapel, 388-390 Sedgwick St.; cost, $6,000.

E. B. Hosmer, Son & Keeney, 16 three-st'y dwells., 2412-2444 Wabash Ave.; cost, $136,000; architect, Wm. Thomas; builders, Geo. Lehman & Co.

H. Zimmermann, two-st'y flats, 504 North Ashland Ave.; cost, $3,000.

D. E. Healy, three-st'y store and flats, Archer Ave. and Fuller St.; cost, $12,000; architects, Furst & Rudolph.

German Baptist Church, -church building, 65-67 Willow St.; cost, $10,000; architect, J. H. Huber; builders, D. Lane & Co.

Cincinnati.

STABLE. — Mr. Geo. W. Rapp, architect, has prepared plans for the Gerke Brewing Co.'s brick stable, three-st'y and basement, 50′ x 85′, on Court St., near Plum St.; cost, $15,000.

STOREHOUSE. — The Herancourt Brewing Co. is building a storage-house, 46′ x 140′, four-st'y high; cost, $65,000; Geo. W. Rapp, architect.

HOUSES. — F. or H. Enneking, 3 brick dwells. on Myrtle Ave., each to be 28′ x 55′, and three-st'y high; cost, $18,000; Geo. W. Rapp, architect.

BUILDING PERMITS.— V. Moser, two-st'y brick dwell., Bates Ave.; cost, $2,800.

E. A. Townly, 2 three-st'y brick dwells., Mansfield St., near Liberty St.; cost, $12,000.

J. Molloy, two-st'y brick dwell., Clark St., near Baymiller St.; cost, $4,000.

Mrs. Renisager, two-st'y brick dwell., Milton St., near Sycamore St.; cost, $3,000.

Herman Kune, two-st'y brick dwell., Milton St.; near Sycamore St.; cost, $4,000.

John B. Hyatt, three-st'y brick building, Summit Ave., Price Hill; cost, $7,000.

Christ. Ahrens, two-st'y brick dwell.; cost, $5,000.

J. H. Turrell, two-st'y brick dwell., Chase Ave.; cost, $5,000.

Denver, Col.

DWELLINGS. — Miss Mary Thomas, two-st'y brick dwell., 28′ x 42′, Grant Ave.; cost, $8,000; Mr. Nichols, architect.

Henry Collins, 8 two st'y brick tenements; cost, $13,000.

A. C. Rumble, two-st'y brick dwell., 35′ x 57′, Penn St.; cost, $8,000.

D. C. Roberts, 2 two-st'y brick dwells., Waverly St.; cost, $9,000.

Carlos Gove, three-st'y brick double dwell., 40′ x 49′, Stout St.; cost, $8,000.

L. J. Laws, two-st'y brick dwell., 34′ x 60′, Grant Ave.; cost, $8,000.

R. C. Pierce, two-st'y brick dwell., 23′ x 55′, Lincoln St.; cost, $4,000.

STORES. — Wm. Meikle, one-st'y stores, 50′ x 125′, Champa St.; cost, $6,000.

John Dixon, 2 two-st'y stores, 50′ x 75′, Champa St.; cost, $10,000.

STREET RAILWAY DEPOT. — Four-st'y brick stable and depot, 100′ x 125′; cost, $50,000; J. W. Roberts, architect.

RE DIVIVIS REDUCTION WORKS. — Brick building, 80′ x 100′, Blake St.; cost, $30,000.

REPAIRS to residence of T. M. Patterson, Welton St.; cost, $6,000; R. S. Roeschlaub, architect.

Grand Rapids, Mich.

CHURCHES. — The Westminster Presbyterian Church Society have commenced the erection of their church, cor. of Island and Lagrave Sts.; cost, $20,000; D. S. Hopkins, architect.

Ground has been broken for the enlargement of the Chapel of the Good Shepherd, cor. of College Ave. and Bridge St.; cost, $3,000.

SCHOOL-HOUSE. — The Society of St. James Catholic Church intend shortly to erect a large brick parochial school, West Bridge St., cor. Michigan St.; cost, $10,000.

STORES. — Mr. Henry Spring is about to build a brick block, two-st'y and basement, 40′ x 164′; cost, $10,000.

Mr. P. Steketee & Sons are excavating for a new wholesale block on Fountain St.; cost, $10,000.

Mr. John Delancy is building a two-st'y block at West Bridge St., to cost about $8,000.

Hon. Thomas Gilbert has begun a new block at the cor. of Louis and Ottawa Sts., 66′ x 132′; cost, about $15,000.

Mr. H. S. Pressburg has begun a large building on the cor. of East and Logan Sts.

Mr. D. H. Waters is preparing to build a finer block than any now in the city, on the cor. of Ottawa and Pearl Sts.; probable cost, $100,000.

HOUSES. — Walter E. Withy is building a dwell. on Union St.; cost, $10,000.

Mr. H. B. Fairchild and Mr. H. B. Crookston are each building houses on s s Wealthy Ave., costing $2,000 each.

Mr. Lester Wilcox is preparing to build a dwell. on Third Ave., to cost $2,500.

Mr. James L. Wheeler is to build a house on North Prospect St.; cost, $3,000.

Mr. Jno. Smittzler is preparing to build a house, cor. of Lyon St.; cost, $3,000.

Mr. L. Buss is building a house on Summit-street Hill, at a cost of $3,000.

Dr. Williams is building a house on South Division St.; cost, about $2,000.

Mr. R. Van Ness is about to build a cottage on Wealthy Ave., costing $2,000.

Mrs. Eliza Walbridge is building a small cottage on Paris Ave.; cost, $1,500.

Mr. D. S. Hopkins is building a cottage on Paris Ave., costing $2,500.

Mr. James Holt is building a colonial cottage, costing $2,000, on Paris Ave.

The building boom has excelled all expectations. The prospect of cold weather is cooling the building ardor somewhat.

New York.

HALL. — The Young Men's Christian Association of Harlem proposes to erect a building on One Hundred and Twenty-fifth St., between Fifth and Sixth Aves.

HOUSES. — Six three-st'y and basement brownstone front houses, 17′ x 55′ each, are to be built on the s w cor. of Lexington Ave. and Seventy-sixth St., for Mr. Patrick McQuade, at an estimated cost of $100,000; Messrs. Thom & Wilson, architects.

BUILDING PERMITS. — *Centre St., No.* 58, six-st'y brick warehouse, tin roof; cost, $16,000; owner, Edward B. Swift, 115 Lee Ave., Brooklyn; builders, J. & L. Weber.

East One Hundred and Twelfth St. No. 336, one-st'y brick stable, gravel roof; cost, $2,000; owner, Ratje Bunke, 319 e One Hundred and Eleventh St.; architects and builders, Wm. Fernschild & Son.

One Hundred and Twenty-third St., s s, Eighth and St. Nicholas Aves., nine-st'y brick flat, fireproof roof; cost, $532,875; owner, H. Josephine Wilson, 157 e Seventy-second St.; architect, D. E. Atwood.

One Hundred and Ninth St., n s, 225′ e Second Ave., five-st'y brick tenement, tin roof; cost, $16,500; owner, Emil Haenschen, 116 e One Hundred and Seventeenth St.; architect, John Brandt.

West Seventeenth St. No. 331, five-st'y brick tenement, tin roof; cost, $10,000; owner, Jas. H. Butler, 225 Garden St., Hoboken; architect, Bart Wather.

Greenwich St. Nos. 490 *to* 506, six-st'y brick warehouse, tin roof; cost, $78,000; owner, Ambrose K. Ely, 103 Gold St.; architect, John McIntyre; builders, Robinson & Wallace and Wm. J. O'Connor.

Third Ave., w s, 25′ n One Hundred and Fifty-sixth St., three-st'y frame tenement and store, tin roof; cost, $4,000; owner, Thos. B. Holland, 347 East Eighty-fifth St.; architect, W. A. Haight; builders, Wm. Byloe and Marshall & Haight.

Fifth Ave., e s, 75′ s Fourteenth St., five-st'y brick store, tin roof; cost, $50,000; owner, Estate of Mary Teliston, Wm. Brice, executor, 29 Chambers St.; architect, Robert Mook.

One Hundred and Forty-eighth St., s s, 100′ w Third Ave., three-st'y frame dwell., tin roof; cost, $3,000; owner, Selig Hecht, cor. Third Ave. and One Hundred and Forty-eighth St.; architect, Rudolph Pfeiffer.

Christopher St., No. 167, four-st'y brick factory, tin roof; cost, $9,000; owners, H. C. and J. H. Calkin, cor. Beach and West Sts.; architect, W. J. Tryer, Jr.; builder, Richard Shafter.

Second St., Nos. 172, 177 *and* 179, rear, one-st'y brick stable and dwell., tin roof; cost, $3,000; owner, Peter Lyding, 215 Second St., architect, F. W. Klemt.

Van Cortlandt Estate, Twenty-fourth Ward, frame barn, shingle roof; cost, $4,000; owner, A. Van Cortlandt, Kingsbridge; builder and architect, Antony Imhoff.

One Hundred and Twenty-fourth St., w s, 80′ 6″ w Second Ave., five-st'y brownstone front tenement, tin roof; cost, $18,000; owner and builder, Michael Fay, 416 East One Hundred and Twentieth St.; architect, J. H. Valentine.

One Hundred and Twenty-fourth St., n s, 108′ 6″ w Second Ave., five-st'y brick tenement; cost, $17,000; owner, Thos. J. O'Kane, 144 Alexander Ave.; architect, J. H. Valentine.

Amity St., No. 95, five-st'y brick tenement and store, tin roof; cost, $16,000, owner, Josephine H. Jenny, 407 East One Hundred and Seventeenth St.; architect, J. H. Valentine.

One Hundred and Twenty-first St., n s, 100′ w Pleasant Ave., four-st'y brick tenement, tin roof; cost, $10,000; owner, John B. Haskin, Fordham; architect, W. W. Gardiner.

One Hundred and Twenty-eighth St., n s, 200′ e Tenth Ave., two-st'y brick storage building, gravel roof; cost, $10,000; owner, D. G. Yuengling, Tenth Ave., cor. One Hundred and Twenty-eighth St.; architect, Paul F. Schoen.

Clark St., No. 20, four-st'y brick workshop, tin roof; cost, $10,000; owner, Lewis Moore, 25 Vandam St.; architect, C. F. Kidder, Jr.

Hester St., No. 102, five-st'y brick tenement and store, tin roof; cost, $12,000; owner, August Berbert, 88 Hester St.; architect, Fred. Jenth.

Tenth Ave., n w cor. Thirty-fourth St., 4 five-st'y brick tenements and stores, tin roofs; cost, total, $80,000; owner and architect, Henry Gledhill, 521 West Thirty-fourth St.; builder, J. C. Lyons.

Courtlandt Ave., n w cor. One Hundred and Fiftieth St., 2 three-st'y brick tenements and stores, tin roof; cost, $15,000; owner and builder, John Frees, One Hundred and Fifty-sixth St., near Courtlandt Ave.; architect, Wm. Kirsche.

Washington Ave., w s, 150′ s One Hundred and Seventy-seventh St., three-st'y frame dwell., tin roof; cost, $4,000; owners, Fannie and Kate Weiner, Third Ave., between One Hundred and Seventy-eighth and One Hundred and Seventy-ninth Sts.; architect, J. E. Kerby.

Franklin Ave., e s, 700′ n One Hundred and Sixty-ninth St., two-st'y frame dwell., slate roof; cost, $4,200; owner, Annie J. Stroud, 610 East One Hundred and Thirty-fifth St., architect, James Stroud; builder, L. Daly.

Fifth Ave., s e cor. Sixty-third St., four-st'y brick dwell., tin, slate and fire-proof roofing; cost, $85,000; owner, Chas. T. Barney, 82 Broadway; architect, R. H. Robertson; builders, L. N. Crow and Smith & Bell.

ALTERATIONS. — Important alterations are to be made in the Broadway entrance of the Hoffman House, from designs of Mr. Geo. Edward Harding.

One Hundred and Eighth St., n s, 350′ w Ninth Ave., three-st'y brick extension; cost, $7,000; owner, Aug. Schmid, on premises; architects, Lederle & Co.; builders, J. & L. Weber and Henry Schiffer.

Cedar St., s e cor. Church St., floor, raise roof on front, rebuild wall on Church St., etc.; cost, $4,000; owner, J. H. Meyer, on premises; architect, H. J. Heath.

Third Ave., w s, 75′ 7″ w One Hundred and Tenth St., raise one st'y; cost, $2,800; owner, Robert Bergman, 2010 Third Ave.; architect and builder, John C. Stickler.

Kingsbridge Road, s s, 500′ e Hudson Railroad, Spuyten Duyvel, raise one st'y, also a three-st'y brick extension, slate roof; cost, $3,000; owners, Isaac G. Johnston & Co., Spuyten Duyvel; architects, Kimball & Wisedell; builder, not selected.

Fifth Ave., n w cor. Twenty-seventh St., two and part four st'y extension, one st'y and basement altered for business purposes; cost, $35,000; lessee, John R. Franklin, 15 East Fifty-sixth St.; architect, Stephen D. Hatch.

Tenth Ave., cor. Grand Boulevard, One Hundred and Forty-third and One Hundred and Forty-fourth Sts., two-st'y brick extension, slate and tin roof; cost, $28,000; owners, Trustees of Colored Orphan Asylum, Aug. Faber, Chairman Building Committee, on premises; architect, Ralph S. Townsend; builders, J. A. Hopper and R. Townsend.

Ave. D, Nos. 155 *to* 173, deepen cellar, build new wall to support girder posts, brick piers, etc., cut opening in cellar-wall for windows; cost, $5,000; owner, D. H. McAlpin, 148 Ave. D; builder, Guy Culgin.

Philadelphia.

BUILDING PERMITS.— *Ontario St.*, bet. Seventeenth and Eighteenth Sts., 2 three-st'y dwells., 18′ x 48′; H. A. Miller.

Sepviva St., e s, 60′ n Butler St., three-st'y dwell., 15′ x 30′; J. F. Fagely, owner.

Leiper St., cor. Foulkrod St., 2 three-st'y dwell., 21′ x 58′; Wm. Keas.

Day St., e s, s Girard Ave., three-st'y dwell., 20′ x 30′; Jno. Eichel, contractor.

Martha St., n e cor. Huntington St., 3 two-st'y dwells., 14′ x 44′; Thos. Kelly.

Clearfield St., No. 510, two-st'y dwell., 16′ x 44′; Geo. Blood.

Twenty-seventh St., s e cor. Oxford St., 5 two-st'y dwells., 16′ x 44′; Catterell & Johnson, contractors.

Front St., n Master St., three-st'y dwell.; Shegog & Quigley, contractors.

Nineteenth St., cor. Allegheny Ave., 2 two-st'y dwells., with stores, 20′ x 57′ and 18′ x 57′; J. N. Patterson.

Bethlehem St., s s, e Venango St., 4 two-st'y dwells., 13′ 6″ x 28′; Geo. Gillback.

Berks St., n s, e Hancock St., building, 74′ x 80′; Valentine Lint.

Aramingo St., e Frankford Ave., two-st'y building, 20′ x 40′; Liggett & Watson.

Frankford Ave., n s, w James St., two-st'y dwell., 16′ x 28′.

Lehigh Ave., s e cor. Oriana St., 3 two-st'y dwells., 14′ x 36′; Michael Fox, owner.

Wolf St., n s, bet. Sixth and Seventh Sts., two-st'y dwell., 16′ x 30′; W. J. Smith.

Portland, Oregon.

ALTERATION.— Woodard & Smith are putting a new front and a third story on their brick store, at a cost of $2,500; W. B. Todd, contractor; R. C. Ball, architect.

W. B. Honeyman is building a two-st'y house costing $6,000; T. Walker, contractor; he is also building for renting, cost $4,000.

BANKS.— J. Krumbein is preparing plans for a two-st'y brick bank building, 50′ x 107′, for Messrs. Scott & Vollmer, Lewiston, I. T.; cost, about $25,000.

Neer & Laromer have prepared plans for a two-st'y brick bank building, 25′ frontage, for Breymen & Summerville, East Portland; cost, about $15,000.

HOTEL. — Nicolai Brothers have commenced their three-st'y brick hotel; cost, $30,000; M. Owens is contractor for brickwork; J. Krumbein, architect.

HOUSES.— Mrs. Judge J. F. Watson is putting up a two-st'y house costing $15,000; W. B. Todd, contractor; R. C. Ball, architect.

Mr. Ellerson is building a two-st'y house; cost, $3,000; F. T. Merrill, contractor.

Carmichael & Stuart are building a house for Tyler Woodward costing $5,000.

N. J. Graham, architect, has prepared plans for a house for D. Childs; A. W. Powers, contractor; cost, $8,000.

L. Lichtensten is putting up a three-st'y house costing $30,000; Wm. Stokes, architect.

Mrs. Dr. Owens is building a house costing $4,000.

STABLE.— L. B. Magoun is building a two-st'y brick stable, 100′ x 100′; Anderson & Houghton, contractors; cost, $13,000.

TENEMENT-HOUSE. — Mr. Foote is putting up a double two-st'y tenement costing about $12,000.

St. Louis.

BUILDING PERMITS. — Sixty-five permits have been issued since our last report, twenty-one of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Schickle, Harrison & Howard Iron Company, one-st'y brick pipe-foundry; cost, $20,000; contract sublet.

T. Ryan, two-st'y brick dwell.; cost, $2,500; J. C. Ralston, contractor.

Daniel W. McAllister, three-st'y brick warehouse; cost, $5,000; W. Merrill, contractor.

Emile Spohr, two-st'y brick dwell.; cost, $2,700; J. Siedhoff, contractor.

F. H. Aufderheide, two-st'y brick dwell.; cost, $3,200; C. L. Aufderheide, contractor.

J. A. Staunton, two-st'y brick dwell.; cost, $2,500; J. A. Staunton, contractor.

George Lange, 3 adjacent two-st'y brick dwells.; cost, $10,000; A. Beinke, architect; D. Fengmann, contractor.

J. Padbery, two-st'y brick dwell.; cost, $3,500; J. Rolfes, contractor.

Mrs. A. D. Rosevelt, two-st'y brick dwell.; cost, $4,500; T. Furlong, architect; J. J. Rosevelt, contractor.

J. Lehnbenter, three-st'y brick dwell.; cost, $5,800; Helm Bros., contractors.

Wm. Blaettemann, two-st'y brick dwell.; cost, $2,700; J. C. Ralstod, contractor.

J. G. Prather, three-st'y brick dwell.; cost, $4,900; Renick, architect; Rude & Luke, contractors.

W. L. Taulby, two-st'y brick dwell.; cost, $4,500; W. L. Taulby, contractor.

Collier White Lead Company, one-st'y brick