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THE New York Times contains a sensible editorial upon the effects and causes of the strikes in the building trades which have been so numerous this season. In no other branch of industry has it been found practicable to increase wages to such an extent as in that of building, and the Times rightly regards the advance as excessive, and as likely to lead to a considerable reaction. There is no question that in New York, where the strikes have been most numerous and successful, building has been materially checked, and although the structures now in progress must be completed, the volume of new work is likely to be much smaller at the end of this season than it was a year ago. It was found that the great increase in prices which took place early last year attracted so many new-comers to the city that the rates of wages which the workmen regarded at the beginning of the summer as much too low to satisfy their needs were with difficulty sustained until the autumn, and a similar course of events is inevitable in the future. As the Times says, strikes are almost always the precursors of a period of stagnation and dulness in trade. So long as a business continues brisk, and with good prospects for the future, the competition among employers for good workmen insures a quiet but steady advance in the wages of such men; but when the limit of the market is reached, and the outlook begins to be unfavorable, the advance ceases, and the inferior workmen then, with characteristic imprudence, endeavor to secure by force what they find cannot be had in the natural course of events. For a time the employers, bound by their contracts, are compelled to yield, but the completion of every contract throws upon the labor market a certain number of unemployed men, and a comparatively slight diminution in the total volume of building operations leaves a residuum of workmen in each trade who must compete with their fellows for such wages as they can get.

MR. E. S. PHILBRICK has been giving some excellent advice on the subject of sewerage to the people of Concord, Mass., in a report which we wish could be distributed among the more public-spirited citizens of every place of five thousand or more inhabitants in the country. Especially in the towns which have introduced a general water-supply without making any provision for drainage, and are now suffering from the rapid deterioration in the public health which is the speedy consequence of such half-way measures, Mr. Philbrick's sensible and practical observations should be the subject of attentive study on the part of those energetic enough, or influential enough, to be able to impress upon others the convictions which result from their investigations. Concord is a village of about twenty-five hundred unusually intelligent inhabitants, who, having some suspicion of the dangers attendant upon the introduction of an abundant supply of water, determined to take in good season the advice of a thoroughly qualified expert upon the course which they should pursue to avoid them, and so such consultations are unhappily very unusual in this country, the result is particularly worthy of careful attention.

It is hardly necessary to say that Mr. Philbrick totally condemns, as a means for the disposal of waste liquids, the cesspools which are now in universal use in Concord, as in nearly every other city and town of the United States. Of their influence upon the soil, and consequently upon the air, he says, "The cesspool must be considered a bad neighbor." "If not tight, the filth saturates the soil to a depth far beyond the possibility of its absorption by vegetation, or of its decomposition by air in the soil. The abundant supply of water often leads to overflows on the surface, which are very offensive, for the fluid is always in an advanced state of decomposition, much worse than fresh sewage, and if too near the house, the fluid often flows back into the cellar through the soil." "Even if far enough away to avoid these risks," he goes on to say, "the place they occupy and defile may sooner or later be wanted to build a new house or to enlarge the old one. The soil is then found saturated with filth to such a depth that its entire removal may be quite impracticable." "In short," he continues, "the soil all around becomes hopelessly defiled and crammed with organic matter, very much like the soil in an overcrowded graveyard that has been used for some centuries in succession."

THE second part of the report, in which Mr. Philbrick describes the arrangement of sewers which he thinks most suitable for replacing cesspools in the town, is too long to give any quotation from, although experts will find it by far the most interesting portion. In brief, he would recommend a thorough carrying out of what is now known as the "separate system" of sewerage, laying main pipes of six and eight inches in diameter, with twelve flushing-tanks at suitable places, each supplied from the street-service, and discharging one hundred and twenty gallons once every twenty-four hours. For the final disposition of the liquid surface-irrigation is recommended, arranged, as is now the rule in England, so that two or three separate plots, of two acres each, can be used alternately. As parts of the village lie lower than the fields to be irrigated, pumping would have to be resorted to, but this Mr. Philbrick thinks to be preferable to a direct discharge of the sewage into the river, which, although by far the cheapest disposition, we are glad to see he does not for a moment countenance. Notwithstanding this large additional expense, the entire cost of four miles of main sewer, with five hundred branches and house-connections, forty man-holes and covers, twelve flush-tanks and fittings, storage-tank, pumping-engine and boiler, engine-house, coal-shed, and the necessary land for site, together with the iron force main, four thousand feet long, and the whole work of grading, underdraining and preparing the irrigation fields, is estimated, including the engineering work and superintendence, at less than forty-three thousand dollars, or about seventeen dollars per head of the population. The cost of pumping and maintenance is estimated at two thousand dollars per annum, which would be just about the yearly cost of cleaning out the present cesspools.

THE English and American journals contain many interesting and appreciative notices of the death of Dante G. Rossetti, the most intellectual and the most faithful to his ideal of the celebrated group of Pre-Raphaelite artists who flourished thirty years ago. The original Pre-Raphaelite Brotherhood contained but seven members, five of them, Dante Rossetti, Millais, Holman Hunt, Collinson and Stephens being painters, and one, Woolner, a sculptor, while the seventh, William Rossetti, was admitted simply as a lay-friend of the others. Inspired probably by Dante Rossetti, whose romantic disposition led him to sympathize particularly with the subjective quality of the earlier Italian paintings, the brotherhood produced a series of works in a singular archaic style, bringing upon themselves the unsparing denunciations of critics, until Mr. Ruskin published a pamphlet in their defence, which had the result of drawing to them a degree of public attention, such as falls to the lot of few artists. The effect of this upon the brotherhood varied with the character of each individual member. Millais, who was too much of a painter to endure for any long time even self-imposed bonds, soon broke them, and acquired an independent style of his own, while Hunt diverged in another direction to those studies of natural history and chemistry for which he is so famous. Rossetti alone retained to the last the peculiar manner with which he had identified himself, and which, it must be

acknowledged, sat more easily upon him that it did upon his fellows. In illustration of the character, perhaps artificially romantic, which shows itself in his few pictures as well as in his writings, it is said that on the death of his wife, of whom he was very fond, he carried to her grave and buried in it all his sonnets, as a symbol of the termination of his intellectual life. His admiring friends immediately dug them up, and after a time revealing to him that they were safe, prevailed upon him to allow them to be published.

A COMMITTEE of the New York State Legislature has been conducting an interesting inquiry into the practicability of carrying telegraph, telephone, and electric-light wires underground. Many experts have been examined, and although the testimony appears to indicate that there is no insurmountable difficulty, so far as insulation and electrical capacity are concerned, in placing the wires below the surface, the expense of doing so by any of the methods now in use would much increase the cost of telegraph and telephone service, while some of the smaller corporations which employ electric signals, such as the automatic fire and burglar alarm companies, and those furnishing instruments for calls of various kinds, would be compelled to close their business entirely, if overhead wires were forbidden by law. One of the witnesses testified that the telephone service in Paris was carried on by means of wires running above the house-tops, and that subterranean telegraph lines in that city were to be abandoned for pneumatic tubes. The same witness, however, expressed a decided opinion that electric-light wires should be placed in all cases below the surface of the ground, and in this we imagine that the public will concur.

MR. KEELY'S celebrated motor appears to have found a rival in a device invented by a Mr. Buckett of England, which he calls a "caloric engine," claiming for it, according to the Boston *Herald*, a capacity for utilizing the heat evolved from the combustion of a given quantity of fuel two or three times greater than that of the best steam-engines. There is a little uncertainty about the exact figures; one paragraph of the account giving the ratio between the effective force from a given weight of coal in the steam-engine to that in the new motor as one to three, while the next reckons it as one to five, but we prefer to be as conservative as possible in our statements. Unlike Mr. Keely, the inventor of this device is quite disposed to let the public know that the thought which occupied his brain during his experiments, was nothing less than "a means of developing power." If such great thoughts lead so rapidly in his mind to practical results, the reward which the *Herald* predicts for him, of "a fortune, to which Sir Henry Bessemer's tens of millions would be hardly a circumstance," seems none too large as a recompense of his genius.

THE Memorial Hall which formed the Centennial Art Building at Philadelphia in 1876 is rapidly falling into decay. Although the structure cost a million and a half of dollars, many parts of it were finished in a very cheap and temporary manner. Much of the work about the roof is of galvanized iron and zinc, which has already reached the end of its short term of usefulness, and must be replaced with new material. Two years ago the large statue of America, which crowned the dome, had become so corroded as to make its removal necessary, and the dome itself is now so leaky as to endanger the valuable objects collected beneath it. The building is occupied by the Pennsylvania Museum and School of Industrial Art, and shelters an extensive permanent exhibition of the minor artistic products; it would be a serious misfortune to have it abandoned, and we trust that means will be found to put it in thorough and permanent repair.

AN important rival to the Bell Telephone Company has appeared under the name of the People's Telephone Company, a corporation which originated some time ago in Pennsylvania, and claims the right to manufacture and sell or rent telephones operated by electric currents without asking license from or paying royalty to the Bell Company, whose patents it asserts to be invalid by reason of the invention and use of an apparatus similar in all essential respects to that of Professor Bell several years before a patent was granted to the latter. This prior invention is said to have been made by a Mr. Drawbaugh, of Western Pennsylvania, who employed it in a small way about the year 1874, and has since introduced many improvements,

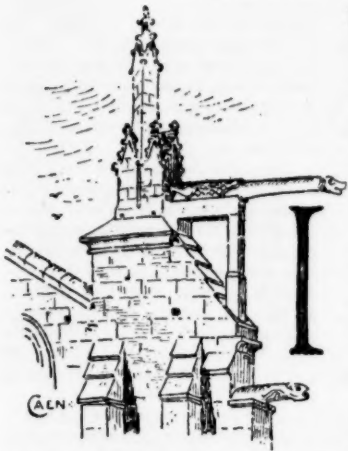
which have been adopted by the People's Company, and are now in daily use over a large territory. Until lately the two companies have carried on their separate business without interference, but a collision was perhaps inevitable sooner or later, and a suit to determine the rights of the Bell Company is now before the Courts. What the result will be it is impossible to say. Most suits in which patents are concerned are terminated by compromise, the richer party buying up the claims or inventions of the other, but in this case Mr. Drawbaugh, not having patented his original invention, as it would appear, has nothing to sell, while the fact of open and public use of such a device before Professor Bell's patent would, if established, destroy his monopoly beyond the possibility of compromise, and throw the telephone open to the whole country.

SIR WILLIAM THOMSON, who has been reported as saying that he had been disappointed in the practical efficiency of the Faure and Planté secondary batteries, writes to contradict the story, saying that since last November he has been continually engaged in experiments with these accumulators, and expects important results from his investigations. At present he has in constant use a Faure battery of forty elements, which serves as a reservoir of electricity for lighting his house, which is furnished throughout with Swan and Edison incandescent lamps. At the moment of writing the letter which we find quoted in the *Revue Industrielle*,—ten o'clock in the forenoon,—he says that he has four Swan lamps burning brilliantly with the residual force of this battery, charged the day before, and employed through the night as the sole agent in lighting the rooms, the movement of the electric generator being suspended during that time. At this season he finds the power of the accumulator to be amply sufficient to supply the burners for twenty-four hours without recharging, although some of the lamps are used in the daytime as well as through the evening. Considering that the irregularity of the light, caused by the vibrations of the generator, is one of the principal difficulties in illumination by incandescent lamps, the employment of the accumulator certainly seems likely to become, if not essential, at least of great use in that system.

M. R. SPRINGER, the president of the Society "Architectura et Amicitia," in Amsterdam, Holland, has occupied himself for some months in the assiduous collection of facts concerning the architectural and artistic societies of Europe and America. So far, his statistics of German societies only have been published, but they show a gratifying readiness on the part of the members of the profession in Germany to associate themselves for mutual improvement. The most important body in the empire is the Union of German Architects and Engineers, a kind of federation of local societies, like the American Institute of Architects. This numbers more than sixty-five hundred members; it holds every year a convention of delegates from all the affiliated Societies, and every second year a general assembly, accompanied with a technical exhibition. Of the local associations by far the most conspicuous is the Berlin Society of Architects, which has seventeen hundred members, more than half of whom, however, reside outside of the city. Each member pays an annual assessment of ten dollars, and the large income so obtained has enabled the Society to secure a handsome building, which furnishes accommodation for meetings, social reunions, and classes in technical studies, besides furnishing a surplus for annual prizes to be awarded in professional competitions, for publications, and for the maintenance of a permanent exhibition of building appliances. In other cities the custom seems to be to unite engineers and architects in the same body, and the latter are generally somewhat in the minority, although these local associations, judging by that of Cologne, which contains two hundred and twenty members, or that of Dresden, which has four hundred and ninety, seem to be in a most flourishing condition.

A NEW mode of preserving wooden posts from rotting in the ground has been mentioned in several of the daily journals, and consists simply in saturating them with ordinary coal oil, and then coating them with gas tar. It appears to be certain that posts of white pine so treated will remain sound for ten years or more in ordinary earth, and perhaps a much longer time. We need hardly say that without the application of some such substance the posts would have been destroyed in one or two seasons, so that this certainly appears to be a valuable means of securing a considerable degree of protection with little trouble or expense.

A SPLENDID TRIP.



we tramped up the hill on the side of which the little town nestles, poking into every alleyway and dirty yard, starting up bundles of rags which seemed to acquire life as we approached, craning our necks right and left, up and down, and seeing as much of the town in a couple of days as the average residents had seen in their lifetimes. What seemed to amaze these people, too, was the unaccountable way in which our sketching-stool would suddenly kick out its legs, form a sit-down, open an umbrella over itself, and enclose the nucleus of a picture before they had exactly made up their minds whether the owner were sane or insane. The results, however, were more gratifying to them, and when we included in the sketch an animated old rail of the last generation who hobbled past, their delight was only equalled by the width of their wondering smile. Two sketches of this old place will suffice before we hurry on to Vezelay, which to us was much more interesting. We found that the nearest station to it was Avellon, to which place we shaped our course and arrived late in the afternoon. Next morning going out for a ramble through the place we met with a funny little incident. It has never been clear in our minds whether the *gendarme* was a peculiarly crusty individual who had never seen a stranger, or whether we really did look like a pair of impecunious tramps, ready to burn down or carry away their houses by storm. At any rate, we had stopped to read a huge poster on a wall when suddenly this majestic mass of blue cloth, brass buttons, cocked hat, and long sword, tapped us on the shoulder and began a list of questions into our pedigree. Who were we? Whence came we? Where were we going? What were we doing? Were we married? If not, why not? and a dozen others of equal importance, ending up with the very pointed inquiry as to whether we had any money? This was a little too much: to question a man concerning his birth, education, profession, even his matrimonial proclivities, — these are all right; but to taunt one upon the length of his purse and its emptiness, this was a little too much, and like Betsey Bobbet, we "spoke right up," a proceeding which seemed to surprise this notable into a degree of satisfaction almost equal to a franc-piece. Another surprise of a different nature awaited us later; one of those which sometimes fall

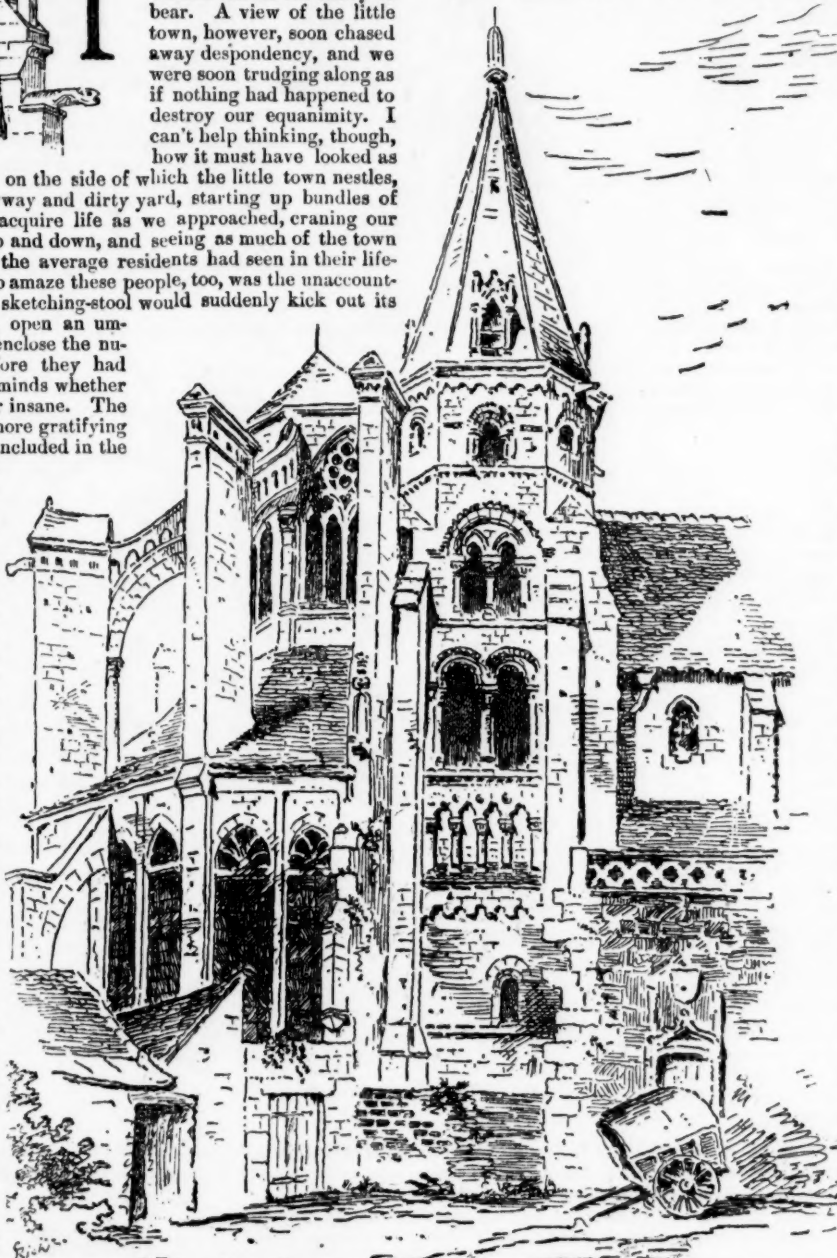
If it were not for our terrific encounter with an unnumbered army who seemed to have engaged our room before us at Auxerre I think we should be tempted to highly recommend the place; but we were fairly beaten and eaten besides, and the next morning as we dragged ourselves out from between the sand-paper sheets life seemed actually a burden almost too heavy to bear. A view of the little town, however, soon chased away despondency, and we were soon trudging along as if nothing had happened to destroy our equanimity. I can't help thinking, though, how it must have looked as

to an antiquarian, and known as "a find." Threading our way through the little streets lined with houses, black with age and almost embracing each other across the way, we stepped into a café and, after a little lunch, demanded what there was of interest to be seen. A shrug of the shoulders in that peculiarly French manner was the only answer, and comprehending by intuition its meaning, we struck out blindly for an old tower of which we only saw the very tip. And, by the way, that shrug of the shoulders is a wonderfully suggestive motion, and utterly unanswerable. Is the price of your room too high? You tell the landlord so, and ten to one a silent shrug will completely answer you. Are you displeased with any article for which you have paid down your money? Ditto, and you have only to leave in disgust. Do you roundly abuse your guide after paying him a franc for a service which was no service at all? You get a shrug, and probably pass on, he smiling, you raving. But we have

been trying to get a good glimpse of the old tower meanwhile, and only succeed after a heroic climb to the top of a ten-foot stone wall lined with those artistic broken-glass ornaments known in our own country as "cat teasers." Finding them to some extent covered with moss, we essayed a seat, but not even Darius Green with his flying machine could have been more careful as to how he alighted in the barn-yard than were we. The little exterior could then be seen pretty well, and gave us to understand that it was once a church, but now desecrated like hundreds throughout the country, and turned into a mill. We reasoned that since those aisles and nave were all intact they must be held by their original supports, and so laid siege to the old miller, who, with good nature, allowed us to investigate the whole interior. The nave and aisles had been built in with three floors, so that as we ascended the second flight we came directly upon the old capitals of the columns, covered thick with flour and often completely surrounded by grain. Still ascending, the roof-beams became visible, and in places showed what seemed to have been a painted ceiling. All this of course was extremely in-

teresting, and quite a while was spent in the roof of this old church; but our object in coming to Avellon was to visit Vezelay, which we found to be six miles away by guide-book, but fully ten miles by horse-power, a fact we found out later, however. You have seen those horses in a tread-mill whose amount of motion certainly indicated an equivalent of distance. We had just such a beast, but the equivalent of distance in this case seemed to be a lacking quantity, so that it was fully three hours before we came in sight of grand old Vezelay high on a hill, with its embattled walls, and still entered by its feudal gateway.

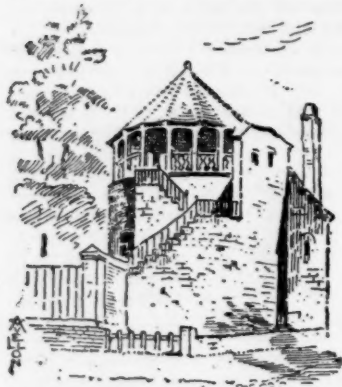
Just imagine yourself now in a little enclosed square with the



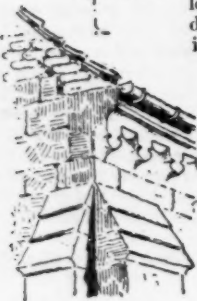
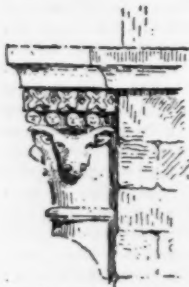
ST. EUSEBE. AUXERRE.

river on the left and a street leading straight away up hill and ending in the old church square. Hardly a person is stirring; indeed, it seems almost like the deserted village as we walk up the narrow paved way, and after examining the exterior somewhat, enter the cloisters, which are of charming design.

An old monk with shaved head, his shoulders bent and covered with an old brown cloak, walks up and down in deep meditation, hardly noticing our entrance. I confess it was a solemnly impressive



little scene, and in strange contrast to the hurry and bustle of the exterior world which we had but shortly left behind us. Enter now the church, cold and solemn: not a sound save the clatter of an old woman in sabots who hobbles away over the stone floor, crossing herself and counting her beads. The huge cradle roof spans the whole width of the nave, and the extreme length of the building (404 feet), together with the simplicity of design is very impressive. Think how the old place must have resounded as Becket in 1168 cursed "by bell, book, and candle" all who maintained in England the "customs of the elders." Or how, when St. Bernard in 1145 preached the necessity of a new Crusade, the old abbot tore his red robe into pieces, and shouted, "The Cross! the Cross!" Indeed, the quiet and solemnity of the place to-day seems almost to belie the actual history of the little place, as the aged monks pace up and down the aisles.



And so we left Vezelay feeling well repaid for the visit, and after passing over what seemed a good part of France, we reached our hotel just too late to take the evening train, a trick, you see, which our old driver played upon us in order to go halves with the landlord for another night's lodging. After endeavoring to convince ourselves that swearing in French was not a sin for an American to indulge in, we were answered by the inevitable shrug of the shoulders, and seeing that we were evidently not versed in the best methods of denunciation, we sat down to a good dinner, and afterwards buried our disgust in slumber and eider-down.

WATER-COLOR EXHIBITION AT PHILADELPHIA.



WOODEN
COLUMN
IN THE
CUSTOM
HOUSE
AT
NEW
BANK
LARGE

PERHAPS there is nothing for brightening purposes like a little friction, and nowhere are its beneficent effects more apparent than in the management of these periodic exhibitions, at least in Philadelphia.

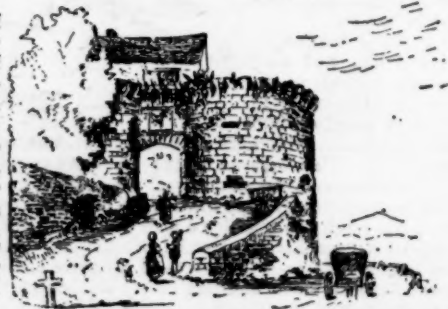
Since the Academy and the Society of Artists have agreed to disagree, and each to hold its separate exhibition, a most refreshing activity has characterized them both. The walls of the Academy are covered at present with the Belgian Exhibition, and the Society's very pleasant gallery is occupied by the first Water-Color Exhibition of any importance that has ever been held in Philadelphia.

The absence of that incentive to activity, on the part of the artists, which is furnished by enterprising and progressive publishers, — for no single influence in the growth of water-color, with us, is comparable to the practice of drawing for illustration, — as well as the extreme conservatism — a citizen of the good city hardly likes to use a harsher term — of the popular taste have hitherto discouraged pretty effectually whatever

inclination or ability the local painters have developed for the practice of this beautiful art. But with the increased interest in water-color which is everywhere apparent, it was impossible that some part of its influence should not reach Philadelphia, and the younger men have, for the most part, taken kindly to it and express themselves as readily in this as in the more familiar medium of oils. As far as local performance goes, this is about all that can be said of the present exhibition. The work is essentially the same as it would be if done in the heavier material, and there is visible throughout, an absence of appreciation of the distinguishing qualities which belong to water-color as an art by itself, and which lend it its peculiar charm. To such an extent is this true, that one has often to look quite closely to determine whether it is really water-color or not, the painter often seeming rather to enjoy than

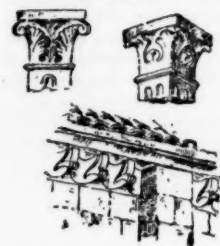
otherwise this ambiguous effect which is heightened by the practice now unfortunately general, of framing heavily in gold without using a mat.

There is, of course, a fair sprinkling of work in the exhibition to which objections like these do not apply. That of Mr. Peter Moran, for instance, if not always quite free from faults, of which lack of vigor, owing to too great respect for certain time-honored conventionalisms of drawing is undoubtedly the chief, is yet always full of the most thorough appreciation of the distinctive merits and limitations of water-color, and



the most consistent observance of their requirements. The three or four pictures which he has contributed to the present exhibition, of which *A Mountain Pasture* with sheep is the best, are instinct with genuine feeling for his subjects and marked throughout by the most refined and scholarly methods of execution.

Among the home painters, however, Mr. Charles E. Dana easily takes the lead for those qualities of freshness and luminosity which it is chiefly the province of water-color to display. This artist exhibits several works, nearly all with foreign, several of them Eastern subjects,



which are as full of crispness and sparkle as anything in the whole collection. Within certain limits, of which no one is evidently any more conscious than the painter himself, but for which no niggling attempts at patching up betray his concern,



the work is strong and free, and if in some cases the intricacies of foliage or the expression of a figure has offered difficulties for which he was not

prepared, he has wisely left it in that state of delightful suggestiveness which is always so much better than anything short of the most masterly realization can be.

Among the younger men, Mr. Prosper L. Senat sends several very pleasing marines, the larger ones, it is true, possessing no special merits that are not shown in his oil pictures and so, as wanting somewhat in depth and quality, not quite so good as they would have been if executed in that medium. An improvement, however, is noticeable in some of the smaller pictures from his hand, especially in *An Early Moonrise, Cape Ann*, which is not only very poetic in conception, but is full of very sweet and luminous color. His work always shows good feeling in the choice of subject, and when not marred by a certain dirtiness, from which the color is not always free, a good deal of grace and promise in its execution.

Mr. Hahs is too willing to repeat himself. A single figure, often a not very interesting negro boy or a humorously pathetic old man is painted, usually very well, amid rather meagre accessories, sometimes represented as not doing anything in particular, sometimes with a good deal of dramatic suggestiveness. Always clever and admirable as studies this is not the kind of performance which, to say the least, will bear much repetition, and is hardly worthy of a painter who has exhibited so much real ability and genuine feeling.

Mr. Leon Delachaux is another of the young men who, in a range of subjects somewhat similar to that which Mr. Hahs affects, shows



a good deal of appreciation of what constitutes picturesqueness, and in whom one notices a steady improvement from year to year. In his contributions to the present exhibition there is too much evidence of effort for them to be quite successful as water-colors, but the coloring is good and the subjects always well composed and well drawn. The best one, entitled *Going Home to Georgia*, represents an old darkey with capacious carpet-bag and enormous umbrella,

waiting on the platform of a railroad station for the train that shall carry him back to the sunny South. The humor of the conception is quiet and dignified, and the treatment simple and in good taste.

Of the landscapes of Mr. Carl Weber and Mr. Thomas Craig, of Mr. Sword and Mr. De Berg Richards, of Mr. Trotter's animals and the figures of Mr. Cariss, Mr. James and Mr. Dunk, it is enough to say that they are quite as good as their work in oil, but contain nothing that calls for any special cataloguing here.

Of Mr. Eakins's contributions, that of a girl at a spinning-wheel, entitled "*Homespun*," is certainly much the best, though this is not saying as much as one would like to of the work of a man who has made so many friends by the seriousness of his purpose and singular faithfulness to his own ideals. The picture is small and quite innocent of color, but it is pervaded by the same atmosphere of quiet concentration and simplicity which characterized his Benjamin Rush at the last Academy exhibition. Both of the other subjects are taken from the shad fisheries on the Delaware; the pictures are not disappointing because he has done precisely the same thing a good many times, but they are certainly as depressingly commonplace as they could possibly be made. These hard, photographic little figures will have to be accepted as "conscientious," I suppose, since all the kindly critics will have it so, but in their labored feebleness of execution, as well as their singularly inartistic conception, one wonders what relation they can possibly bear to art.

I have spoken first and at such length of Philadelphia's part of the exhibition because the rest of the collection has, for the most part, been seen before at New York. Among the New York contributors, Mr. F. S. Church in his *A Lesson in Wisdom*, is easily first as far as imaginative quality and artistic sensibility is concerned, while both his own work and that of Mr. Harry Fenn will serve to remind us that the most charming qualities of water-color painting are not inconsistent with the use of body-color.

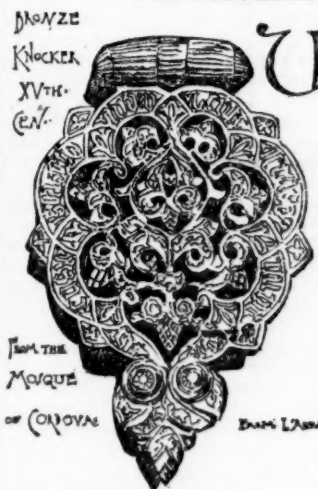
Mr. Henry P. Smith's *On Govey Sands* and *On the River* are somewhat conventional and not conspicuously true to Nature, but they are very beautiful in color, and the careful finish which they have received is less tiresome than that bestowed upon his works in oil.

Mr. C. D. Weldon's *The Old Home* possesses plenty of dramatic interest and contains a good deal of good painting, but the theme is literary rather than artistic and the treatment is rather bald.

Mr. Bunner's three Venetian subjects are as rich and warm as they always are, and the landscapes of Mr. Coleman, Arthur Par-ton and Henry Muhrman are fresh and strong, but nothing among them all is quite so choice, considered as a bit of color, as the little interior—*A Corner*, it is called—by Frederick Guengling.

L. W. MILLER.

THE ELEMENTS OF ETCHING.



UPON this subject an interesting lecture was delivered March 13 by Mr. F. Seymour Haden in the theatre of the London Institution, Finsbury-circus. The lecturer observed that three years ago he delivered at the Royal Institution of Great Britain three lectures upon etching. Those lectures, like the present one, were unwritten, but they were so far thought out as to cover the whole of the ground legitimately appertaining to the subject. Those lectures were purely of a technical character, and addressed for the most part to engravers and experts, as well as to all who had engaged themselves in the practice of etching, or who took an interest in the subject. The present lecture, however, would only deal with the elements of etching, and would be, he hoped, acceptable to those who had not as yet given much attention to the subject. He proposed to divide the lecture under three or four heads. He would, in the first instance, speak of the principles of etching, more particularly upon the capital principle of etching, and would show the difference between etching and engraving. In the second place, he would describe the mode of practising the art of etching. Thirdly, he proposed to say a few words upon the printing of etchings, more particularly with regard to two practices in connection therewith known as *retroussage* and *acierage*. In conclusion, he would speak of the value of a collection of etchings, and would say something as to the disabilities under which etchers labored at the present time.

Before speaking as to the principles which should govern the art of the etcher, he would first of all give his definition of what he meant by an "art." The French say "*arts et métiers*," the English saying "arts and manufacturers," neither nation, however, using the terms very exactly. "*Métier*" meant the mastery of some craft or trade; "manufacture" clearly meant, or should mean, something made by hand; but it was the rule, in speaking of "manufactures," to mean goods made by machinery. In that way the term was misap-

plied to those who had not as yet given much attention to the subject. He proposed to divide the lecture under three or four heads. He would, in the first instance, speak of the principles of etching, more particularly upon the capital principle of etching, and would show the difference between etching and engraving. In the second place, he would describe the mode of practising the art of etching. Thirdly, he proposed to say a few words upon the printing of etchings, more particularly with regard to two practices in connection therewith known as *retroussage* and *acierage*. In conclusion, he would speak of the value of a collection of etchings, and would say something as to the disabilities under which etchers labored at the present time.

plied. He wanted to define the difference between an art and a *métier*, and between an art and a manufacture. An art differed from a *métier* in that, though it depended upon certain material agencies for its final expression, yet those agencies, like the brush of the painter, were of the simplest kind, and were wholly directed to their end by the impulse originating in the brain of the artist. On the other hand, to invest any of those simple agencies,—the brush of the painter, the needle of the etcher, the pencil of the designer, the knife of the surgeon, the chisel of the sculptor, the pen of the author,—with any of the attributes of a machine, or, in other words, to render them in any degree automatic, was to make brain-power or impulse unnecessary, or to put it into abeyance, with the result of producing, not an art, but a manufacture. Now, there were many general principles relating to art. Some of these principles were common to all branches of art, but there was one capital principle which was pre-eminently essential to etching, viz.: personality, originality, ideality. That was, in fact, the initiative faculty required by the etcher, who must, if he would succeed, be imbued with poetry, imagination, sensibility, and all the qualities that went to constitute the genius of the artist. Now the work of the engraver did not call for the possession or the exercise of any of those qualities; for if he was not a mere copyist, he was at any rate only a translator of other people's ideas. Very ingenious, very respectable, no doubt, was the *métier* of the engraver, but it was, after all, only a *métier*. The engraver not only copied what he had before him, but he had to work in accordance with a whole gamut of formulæ (dictated by practical conditions) concerning the production and distribution of curves and lines. It was the use of these formulæ which made all engravings more or less alike; and it was the absence of such formulæ, and, indeed, of any formulæ, which accounted for the fact that no two etchings were alike. All methods of engraving on metal, whether by the burin or by the etching-needle, whether mezzotint or aquatint, were included in the term "painter-etching." The artist was not to be confined to the etching-needle, but if he used the burin he must use it as a means of original art expression, just in the same way as the etching-needle had (of necessity) to be used. Albert Dürer, as we know, preferred the burin, and used it with wonderful effect, but all his engravings were made by him from drawings previously made by him, every line of the drawings being reproduced. Therefore, Dürer, in engraving from his own drawings, used the burin as a means of original art expression. Rembrandt, on the other hand, preferred to use the etching-needle.

Proceeding to speak of the practice of etching, the lecturer said that etching, in the common sense of the word, was engraving by corrosion. The word was, he understood, derived from a Scandinavian word signifying "to eat," and corroborative of that etymology was the fact that the etcher spoke of "biting" his plate. In the common process, the plate of copper or zinc was first coated with a protective varnish. The picture was then drawn with the etching-needle, which removed the varnish down to the surface of the metal. The plate was then immersed, and allowed to remain for an amount of time dependent on circumstances, in a bath consisting of a solution of nitric acid or chlorate of potash. The parts of the plate unprotected by the varnish, or, in other words, the parts which the etching-needle had traversed, were rapidly acted upon by the acid. There were, as a matter of fact, two processes of etching, the first known as the "interrupted" process, and the other known as the "continuous" process. The interrupted process was that in which the gradations of shade in the plane of the picture were obtained by alternate "bitings" and "stoppings." When it was thought that certain lines in the picture had been sufficiently bitten in, the plate was taken out of the bath, and those lines stopped with the wax. By the continuous process, which the lecturer himself practised, the same results were obtained without the removal of the plate from the bath. In this process,—for which the lecturer said he had the credit, although he did not believe he originated it, but was firmly convinced that Rembrandt employed it,—the plate was put into a shallow bath, and the etching-needle was used on the surface of the plate while the latter was covered with the fluid. Under these circumstances the first scratch made by the needle would be the strongest in the picture, and the last one the faintest, and these were considerations which the etcher using the continuous or "synchronous" process, as it had been called, had to bear in mind. Writers on the subject of etching had described that process as very difficult, but he had not found it so. If the etcher knew what he was about, the continuous process was really the easier of the two. The lecturer then proceeded to point out the difference between the engraved line, as made by the burin, and the etched line. The engraved line was in section like the letter V, and consequently, as the surface of the plate was worn down by printing from it, the groove became shallower, consequently retained less ink, and, consequent on that again, the more worn the plate became the grayer were the prints obtained from it. Notwithstanding this disadvantage, however, the engraved plate had the advantage of great durability, for a very large number of impressions could be obtained from it. On the other hand, an engraved plate could not be, in an artistic sense, what an etched plate was, and for this reason an etching was the work of the artist himself, and the process not being a laborious or mechanical one (as the etching-needle was used with the same freedom as a pen or pencil), the artist had full play for his fancy, and hence an etching must show the individuality of the artist. Thus it was that no two etchings were or could be alike. The use of the burin, on the contrary, was necessarily laborious and

mechanical, rendering it impossible for the user to "invent" as he proceeded with his work. It was true, that as he had said, Albert Dürer had made good use of the burin, but even he had found it necessary, owing to the technical limitations of engraving, to make careful drawings beforehand of what he intended to engrave, and those drawings were copied by him, line for line, in his engravings. While, however, an etching was far superior to an engraving from an artistic point of view, compared with an engraving it possessed a very low degree of durability. The acid or mordant, entering the lines scratched by the needle on the surface of the plate, undermined, so to speak, the substance of the copper, so that in section each line in an etched plate resembled, roughly speaking, the letter O with an opening at the top (the line traversed by the needle), thus U. It would thus readily be understood that each of the channels thus eaten away by the acid had a sort of overhanging roof in two halves, unconnected in the centre, and of course the roof thus formed got more or less broken in after a very few impressions had been taken, and the plate thus lost its sharpness, and the proofs their clearness. Having described the process of *acierage*, or steeling over the surface of an etched plate from which it was desired to take a large number of impressions (the effect of which, however, was to give the prints a dry and hard appearance), the lecturer referred to what he called the vicious practice of *retroussage*, which consisted in dexterous manipulation on the part of the printer (by direction, of course, of publishers and others) so as to hide the defects of an imperfectly-etched plate. Where a plate was found to print too light or too dark in parts, it was possible, by means of retouching or rewiping, to so distribute the ink as to make a passable print from an artistically defective plate; but this, although it called for the exercise of much cleverness on the part of the printer, was not a commendable practice. In conclusion, the lecturer referred to the disabilities under which painter-etchers labored at the present time. These consisted of the frauds practised by some unprincipled print-sellers, to the detriment of the public and to the loss of the artists, and in the inexplicable refusal of the Royal Academy to hang on its walls a single original etching, although it had no hesitation in admitting engravings copied from pictures, and some of which engravings had been published for months past, and exhibited in the shop-windows. As President of the Society of Painter-Etchers, he felt bound to publicly protest against the continuance of this state of things.—*The Builder*.

THE ILLUSTRATIONS.

HOUSE FOR F. M. COLSTON, ESQ., BALTIMORE, MD. MESSRS. J. A. & W. T. WILSON, ARCHITECTS, BALTIMORE, MD.

HOUSE FOR PETER B. BUSH, ESQ., MONROE, N. Y. MR. HOWARD S. BUSH, ARCHITECT, NEW YORK, N. Y.

SCOTTISH SKETCHES, BY MR. J. W. SMALL, F. S. A. SCOT. — TOWN HOUSE OF THE KELLYS OF KELLY CASTLE, PITTENWEEN, FIFE-SHIRE; TOWN HOUSE OF THE MARQUIS OF HUNTLEY, CANONGATE, EDINBURGH.

WORTHINGTON MEMORIAL CHAPEL, IRVINGTON-ON-HUDSON, N. Y. MESSRS. ROSSITER & WRIGHT, ARCHITECTS, NEW YORK, N. Y.

THIS chapel is now being built of local granite, rough ashlar work, at a cost of \$12,000. The memorial window is to be designed and made by Mr. Louis Tiffany.

PARSHALL MEMORIAL OPERA-HOUSE, LYONS, N. Y. MESSRS. KIRBY & BATES, ARCHITECTS, SYRACUSE, N. Y.

LEGAL NOTES AND CASES.

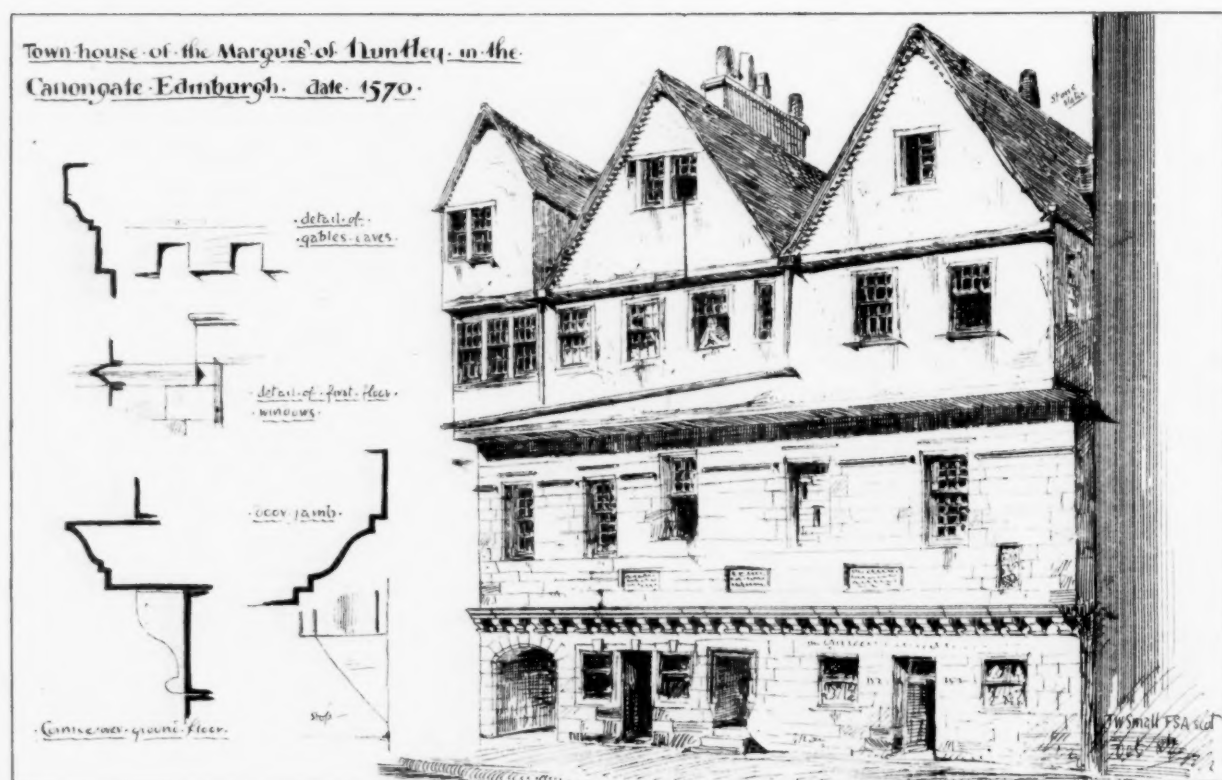
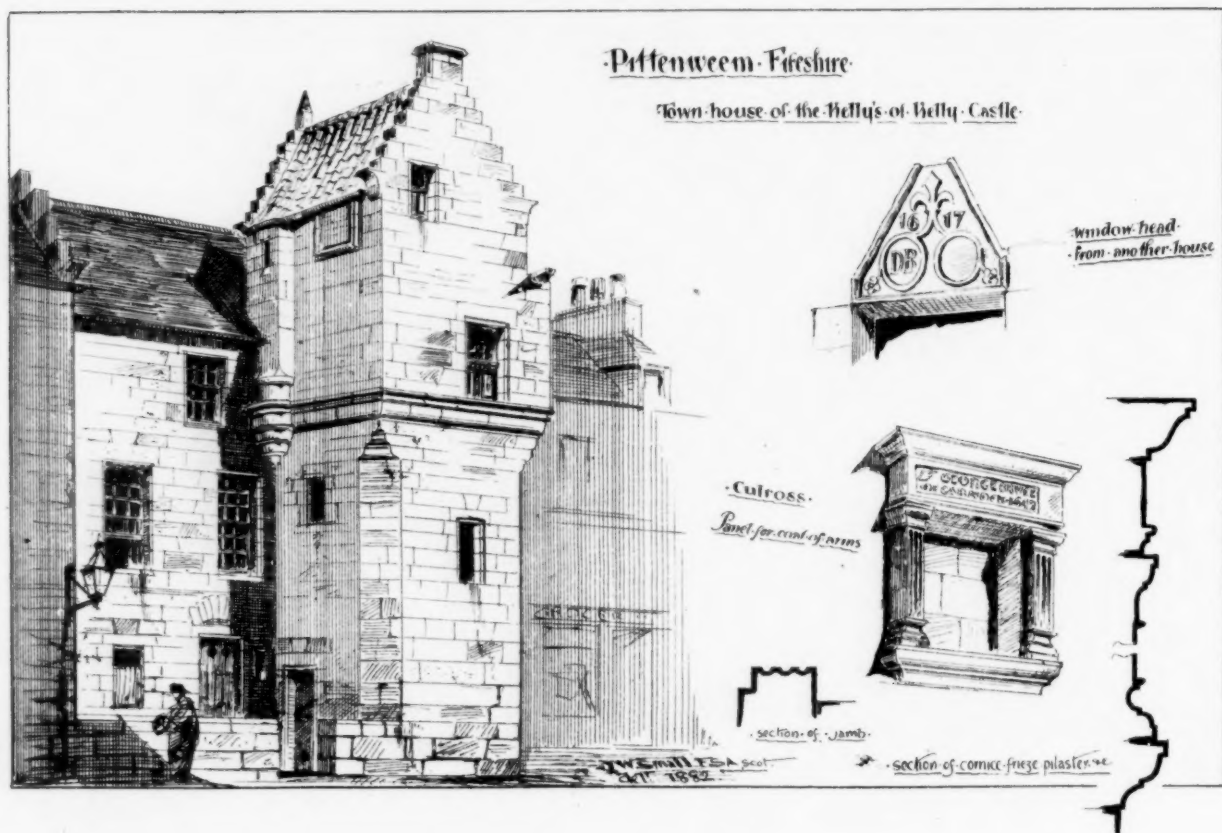
Malicious Erection of Structure. — Injunction.

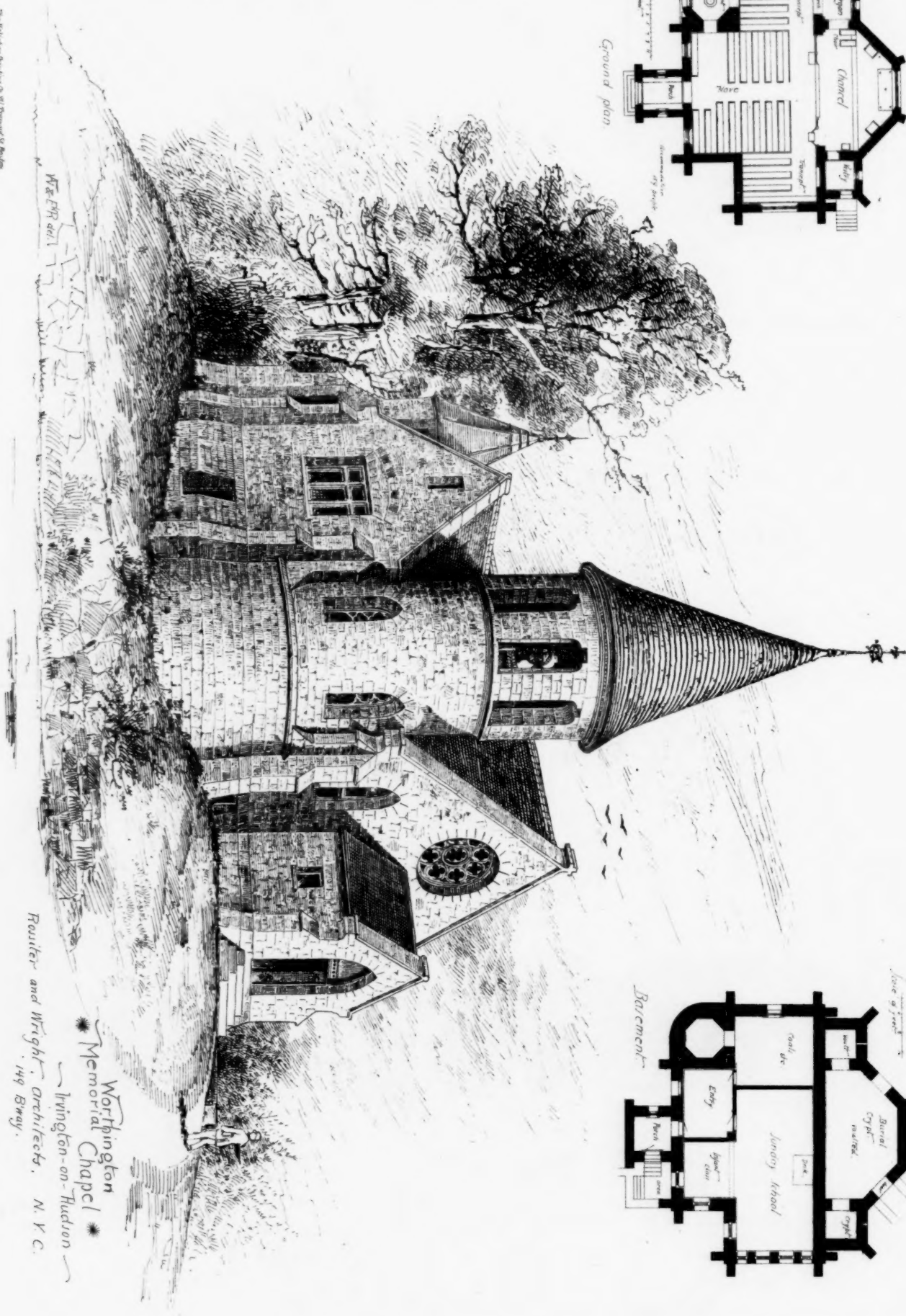
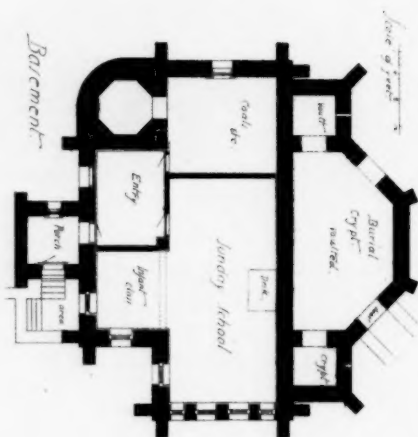
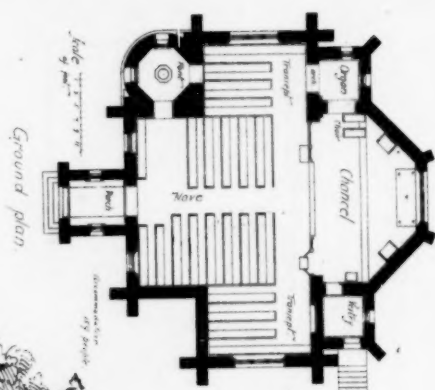


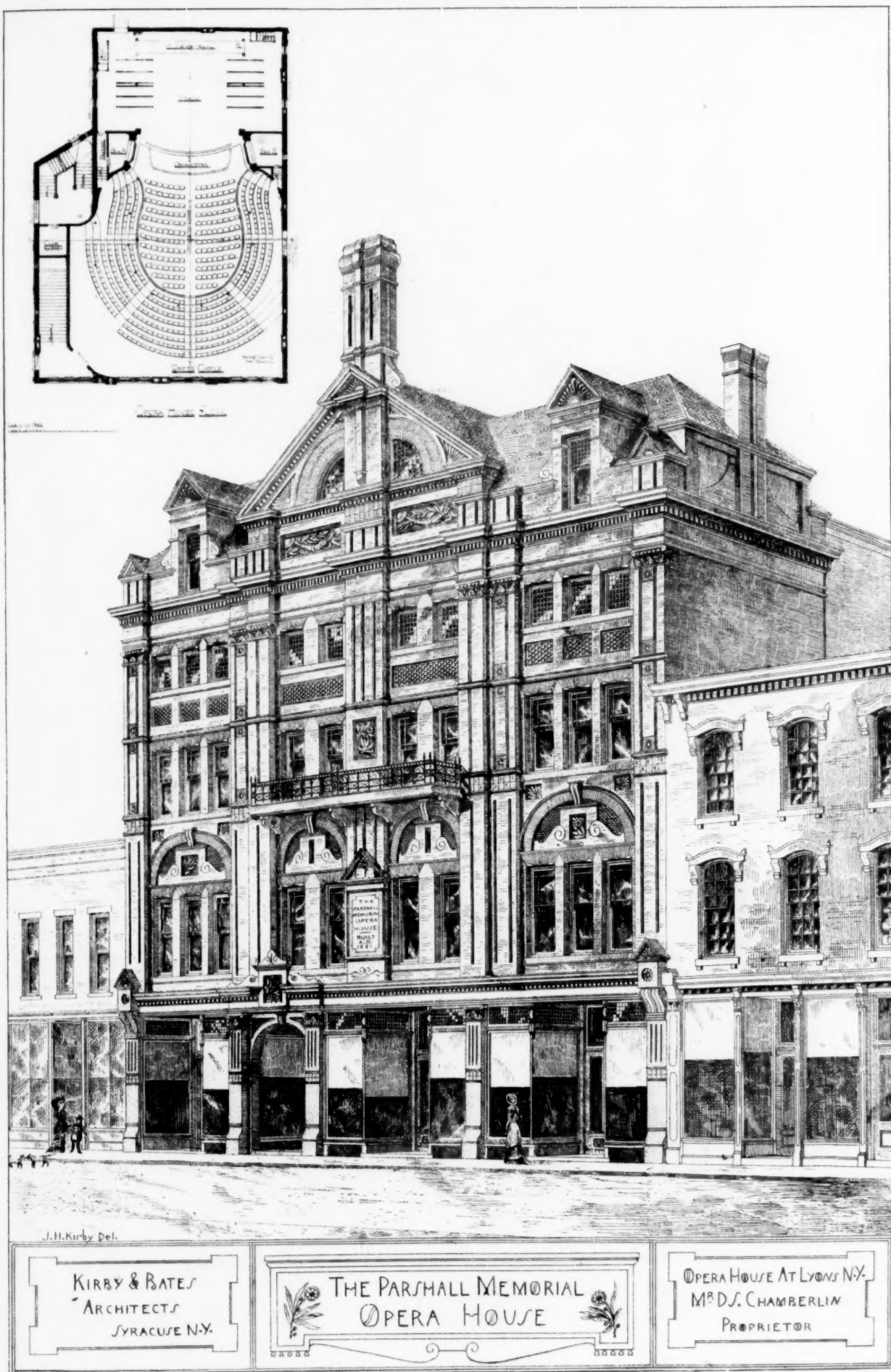
IN the Supreme Court of Errors of Connecticut, in *Gallagher vs. Dodge*, decided in December last, the question of malice in erecting a structure on land was considered.

A petition was made for an injunction under the statute (Connecticut General Statutes, page 477, sec. 4,) which provides that "An injunction may be granted against the malicious erection, by an owner or lessee of land, of any structure upon it intended to annoy or injure any proprietor of adjacent land in respect to his use or disposition of the same."

The structure which it is sought to enjoin the defendants against erecting, is a show-case in front of their store and upon their own premises, but to be so placed as to obstruct a side window in the plaintiff's store, which store projects several feet beyond that occupied by the defendants, and thus has space for a side window looking out upon the platform constructed from the front of the defendants' store to the street line. This side window is upon the line between the premises of the two parties, and serves the occupant of the plaintiff's store both for light and for the display of his goods. It was found that the object of the defendants in procuring the show-case was two-fold — first to display their own goods to the best advantage; and, second, to prevent the public from seeing the goods of the occupant of the plaintiff's store through his side window. The finding below was for the defendants, and plaintiff brought the record up by motion in error.



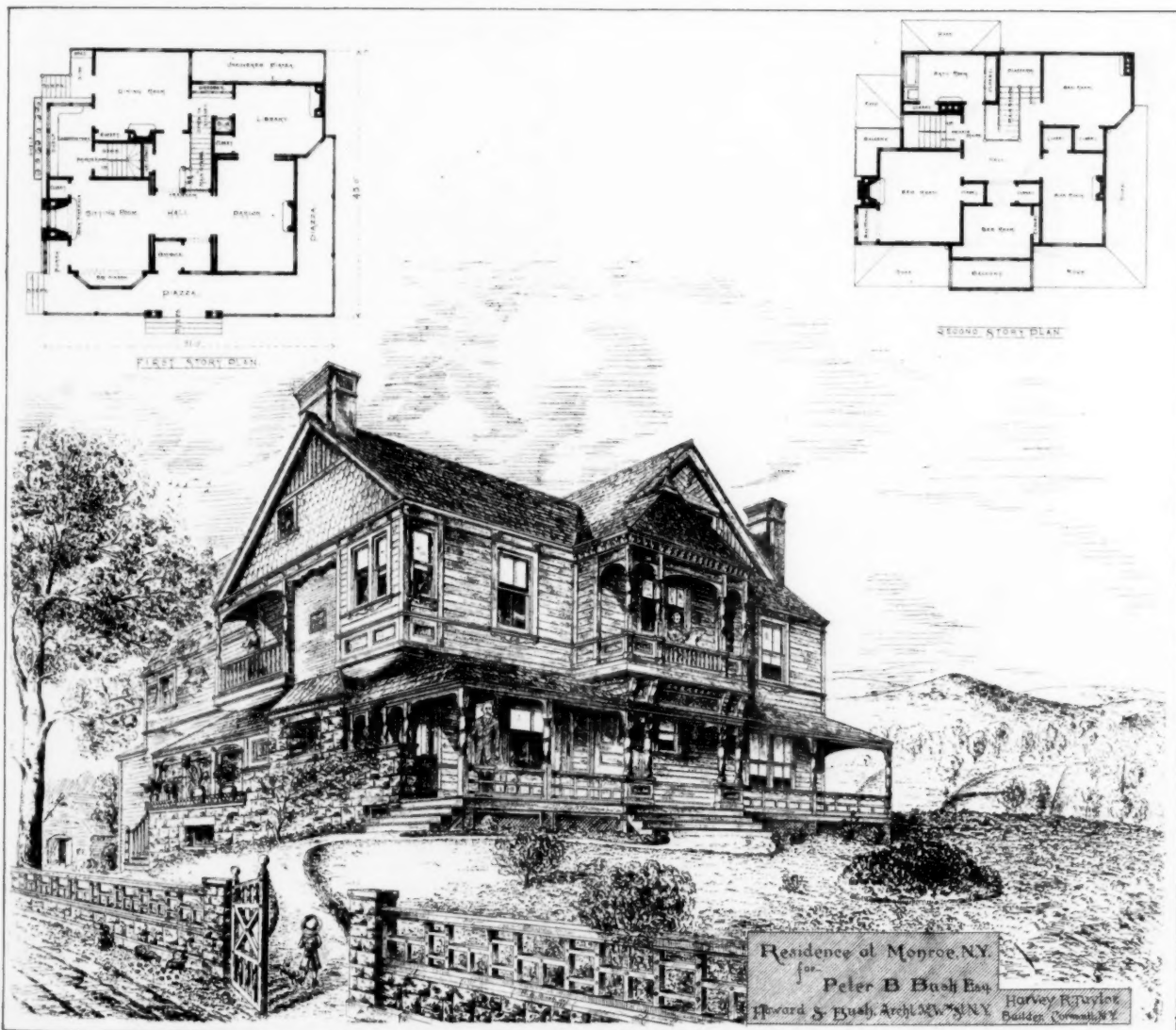
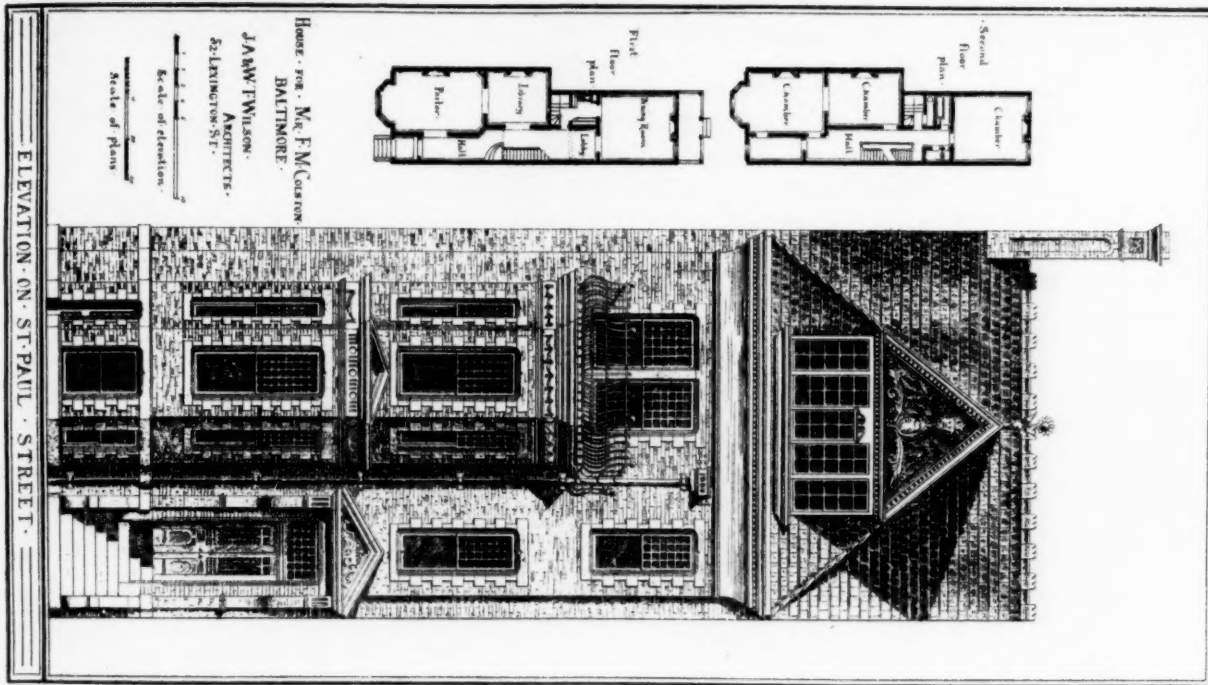




KIRBY & BATES
ARCHITECTS
SYRACUSE N.Y.

THE PARSHALL MEMORIAL
OPERA HOUSE

OPERA HOUSE AT LYONS N.Y.
MRS. D. S. CHAMBERLIN
PROPRIETOR



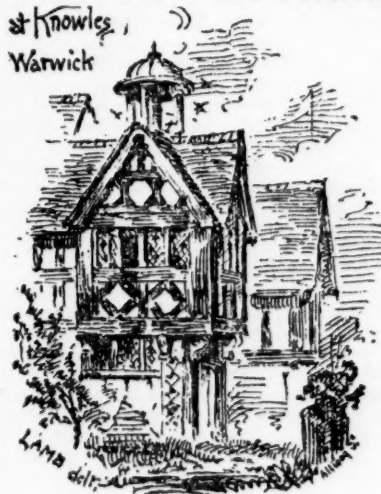
Loomis, J., in delivering the opinion of the court, said: It was the right of the defendants, and the exercise of the right could not be regarded as unreasonable, to occupy the space between the front of their stores and the street line in the way most advantageous to their business. They were under no obligation to consult the interests of an adjoining proprietor. So far as he was availing himself of the open space to secure to himself more light by a window looking out upon it, or an opportunity to display his goods by exposing them in the window, he was availing himself of an opportunity that he held, and must have known that he held, by mere sufferance, for the defendants' store could at any time have been built out in front up to the street line, and so as completely to darken his side window, with no invasion of his rights and no ground of complaint on his part. If possibly a building-line established by the city would have prevented them from building out to the street line, the mere fact that the plaintiff's building was erected before the building line was established was one that gave him no rights against the defendants as to the open space in front of their premises. What they might have done so effectually by building out over this space they had an equal right to do in any other mode no more injurious to the adjoining proprietor. We cannot see why they might not reasonably do it in the mode which they adopted.

But it is claimed that the whole character of the act as to its legality is changed by the fact that an element of malice went into it. And this brings us to the difficult question where the line shall be drawn between structures that are useful and proper in themselves, but into the erection of which a subordinate malicious motive enters, and those where the malicious intent is the leading feature of the act, and the positive usefulness of the structure a mere incident.

The only case in which this statute has come up for construction is that of *Harbison vs. White*, 46 Conn. 106, in which it was held that a coarse structure erected for the malicious purpose of darkening the windows of a neighbor fell within the intent of the statute, although it might serve a useful purpose in screening the defendants' premises from observation. Here the malicious purpose was altogether the predominant one, and the usefulness of the structure very limited and merely incidental. In the present case these conditions are reversed, and it is found that the primary purpose was the reasonable and proper one of displaying the defendants' goods, while the malicious part of the motive was secondary. While we are not prepared to say that this relation of the two motives should always determine the court against the granting of an injunction, and the opposite relation in favor of granting one, yet we regard the predominance of the malicious motive as generally essential to a case in which the court will think itself justified in interfering. The statute speaks of the structure intended as a "malicious erection," and one the intent of which is "to annoy and injure any proprietor of adjacent land." We think we do not go too far in saying that this malicious intent must be so predominating as a motive as to give character to the structure. It must be so manifest and positive that the real usefulness of the structure will be as manifestly subordinate and incidental. The law regards with jealousy all attempts to limit the use to which a man may put his own property. This right to use is always subject to the wholesome limitations of the common law, that every one must so use his own property as not to injure another's, and the person who violates this rule is liable to the person injured whether he has any malicious intent or not; but here the new principle is introduced, that the land owner may erect no structure on his own premises, however lawful it would otherwise be, if he does it maliciously, with intent to annoy his neighbor. The common law has always regarded the existence of malice in the exercise or pursuit of one's legal rights as of no consequence; just as its absence is of no consequence in the cases of injury caused by wrongful acts. The inquiry into and adjudication upon a man's motives has always been regarded as beyond the domain of civil jurisprudence, which resorts to presumptions of malice from a party's acts instead of inquiring into the real inner workings of his mind. When, therefore, we inquire how far a man was actuated by malice in erecting a structure upon his own land, we are inquiring after something that it will always be very difficult to ascertain, unless we adopt, as in other cases where the courts inquire after malice, a presumption of malice from the act done. And in this view of the matter we think no rule can be laid down that is on the whole more easy of application, and more likely to be correct in its application, than that the structure intended by the statute must be one which from its character, or location, or use, must strike an ordinary beholder as manifestly erected with a leading purpose to annoy the adjoining owner or occupant in his use of his premises. If the defendant has erected a house or block on his own land so close to the dividing line between his lot and his neighbor's as to darken the side windows of his neighbor's house, no one would say that he had done a thing that was mainly intended to annoy his neighbor, and yet in his heart there may have been a malicious delight at the damage he was doing his neighbor. In such a case the obvious propriety of such an erection should determine the question in favor of the party making it, without putting him under oath as to his motives. In the same way, if a land owner should locate a privy or pig-sty directly on his line, and as close as possible to the near parlor windows of his neighbor, or should erect a rough screen of boards before his windows to darken them, the very character and location of the structures would strike every beholder as decisive evidence of an intent to annoy, and of this intent as an entirely predominant one; and a court might

very properly so determine without leaving the case to rest on proof, generally the party's own oath, that there was no malice in the case.

CONSTRUCTIONAL AND DECORATIVE CONCRETE.



(From the British Architect.)

for the last two or three years, must have become aware of the great improvements in manufacture which have taken place with regard to concrete, and the many applications of the material now to be seen. A few years ago the general builder had only one idea of concrete-adaptation, namely, that it was useful for foundations, and its employment in this semi-solid condition was the only one he could think of. He had no idea that concrete had been in use by the ancient Romans, and that so long as half a century ago, blocks of concrete were used in construction. Even for sub-structures he gave it unqualified praise, and concrete foundations now are as common as any other. The idea of moulding it, or of throwing it between frames of wood for super-structure quickly followed, and many buildings were erected in which the patent building apparatuses of two inventors, intimately connected with the history of this material, were employed with success. But, as it often happens on the introduction of a new process, it was thought desirable to use it for building in localities where other materials were at hand, and the result was that in some cases the cost checked its extended adoption. Architects looked with disfavor upon a material which produced smooth, jointless, and monotonous walls, and the material had, from these causes, chiefly enjoyed a reputation as a constructive material. But when these opinions were formed, few builders or architects dared to hint what the future applications of concrete would be. They never thought of its application for floors and pavements, stairs, wall-slabs, architectural dressings, window mullions, and a variety of other forms, for which brick and stone had, from time immemorial, been the recognized material. For such purposes as doors, tiles, baths, architectural ornaments and drain-pipes, the use of concrete would have been ridiculed. The rapid and progressive employment of the material for all these purposes, and many more for which it possesses advantages over stone or brick, has obtained for it an attention it would never have received from architects. The first thing to notice in the exhibits of this material at the Agricultural Hall is the hardness and finished face it has assumed under modern manufacture. The use of Portland cement instead of lime has done much to revolutionize the manufacture of concrete as a building material, and has led to a renewed use of the material. The old plan of "tipping in" concrete has been superseded by the manufacture of blocks and slabs, and this application of concrete is one which has made a considerable progress, and is beginning to press itself upon architects. Two or three manufacturers have lately vied with each other in producing artificial stone of this description, which can be used for any constructive purpose required by the architect. We need only mention the Victoria Stone Company and the Eureka Company's products to show what has been accomplished in the material for constructive purposes. The former process, that of the late Mr. Highton, consists of reducing granite to small fragments with a cementing agent (Portland cement), and impregnating it with a silicate of soda. The broken granite is well washed, and the cement used is of the best kind available. Briquettes, made of the "Victoria stone" containing Leicestershire granite broken into small pieces, three months old, had a tensile value of 740 lbs. per square inch; and we may attribute the hardness and tenacity of this material to the use of small-sized aggregates, now generally recognized as the best for constructive or architectural purposes. Architects are now fully alive to the advantages of concrete for stone pavements, floors and stairs, in place of stone, and there are few modern public buildings for which wear and strength are desiderata in which artificial stone has not been employed. The use of cement-concrete in embedding iron-work, such as girders and columns, it is needless to here dwell upon, though this is an encasement which architects long shrink

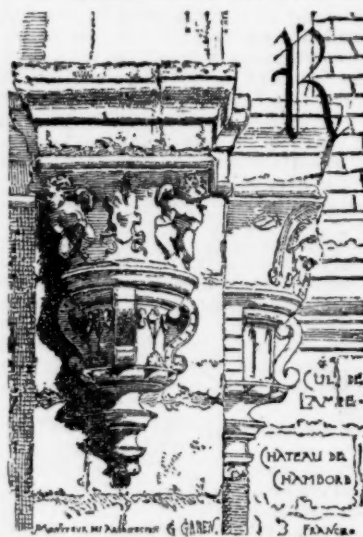
ALTHOUGH the architect has not looked kindly upon this material, and the economical desire of building in concrete has received a check by the revival of brick and terra-cotta, the material in many forms continues to draw to itself an amount of attention from practical builders, and even architects themselves, which suggests the inquiry whether we can afford to dispense with a material which is forcing its way into building. Those who have had an opportunity of visiting the Building Exhibition

from using, till actual tests in the case of destruction by fire compelled its adoption. Then we have various patents of recent date for building walls in which blocks or facing slabs rebated together, or tied by dovetailed flanges, are employed. These are not new, for there have been several species of interlocking slabs and blocks; but they have been greatly improved. The employment of thin slabs for lining walls has been gradually gaining in popularity, and even architects are beginning to see the merits of a plan which enables timber-framing to be economically and artistically carried out. Mr. Lascelles was the first who introduced the system on a large scale; it has ever since been getting into favor, till now we see several manufactures of a similar kind. The thin tiles and slabs of concrete, made of the best Portland cement colored with metallic oxides wear better than red rubbed brickwork, and promise to supersede red brick and terra-cotta for some technical reasons. If it can be shown that a wall can be built of a concrete core, faced with slabs of concrete of a superior face, quickly and easily, and that sharpness of line and accuracy of fitting can be insured, it will not be long before builders avail themselves of the material in lieu of bricks. Still, there is the artistic prejudice to get over. Why not build solidly, architects say, of brick or stone, instead of veneering our walls with thin slabs of a better material? The very want of substance and solidity destroys the sense of deep mouldings, light and shadow, and fine modelled effects in the mass, and it is in this way the modern concrete manufacturer is out of joint with the art architect of to-day. As the beauty of all architecture is the expression of constructional ideas in the solid, any reduction of wall mass will always be regarded with suspicion, if not with dislike. The solid moulding of windows, lintels and jambs in concrete has been adopted by some of our leading Gothic and Renaissance architects, and we can take little exception to features of this kind being moulded in the mass. Yet the idea of a concrete-mullioned window or door would have been violently repudiated a few years ago, as it was a direct assault of a new material on one of the strongholds of stone-masonry. Experience has proved, nevertheless, the advantage of using a more durable and stronger material than many of our natural building-stones are—one which will not decay, that is more impervious to moisture, stronger and less liable to fracture, fire-proof, and that can be moulded without the drawbacks attending materials exposed to the action of the fire. Terra-cotta and stoneware, excellent for decorative feature, cannot be placed with concrete on the last-named ground, and large blocks of moulded work, after firing cannot be safely employed. The same advantage, in respect of truthfulness of line and section, has been found in the manufacture of large tubular drain-pipes, such as the rock concrete-pipe, and the silicated stone manufacture of pipes in which iron slag is used in the aggregate; even the disadvantage of concrete, in respect of hardness, has been lately got over by first subjecting it to a moist heat, and afterwards to a silicious application. These physical advantages of concrete over other moulded fictile materials are indubitable. Whether they like the material or not *per se*, architects are bound in their own interest to accept facts, and to admit in a graceful manner that, after all, it is better to master the material and mould it into artistic uses, than to get it pushed upon public notice in some of the intractable and inartistic forms it often assumes. In the matter of color concrete has lately undergone considerable improvements, and in the colored cement and marble-mosaic specimens of paving and chimney-pieces a new field is open for the architect and ornamentist. As in other cases, however, where colored forms borrowed from one material have been transferred to another, there is always danger of a want of appropriateness in the decoration. With a modification of the material we look for a difference in the ornamentation, and it is this idea which the concrete specialist who goes in for artistic reproductions of marble mosaic might with advantage make a ruling one.—*Building News*.

VANDALISM IN VIENNA.—In the Hofburg, the principal palace of the Austrian emperor in Vienna, which is about to be considerably enlarged and partially rebuilt, workmen have been recently engaged in fitting up special telephone wires from the emperor's library to the other parts of the palace. The wires had to be carried in one direction through the so-called Crown Prince's Passage, whose walls are covered with very large and valuable paintings, all by old masters. Late, on going his rounds through this portion of the edifice, the Captain of the Palace discovered, to his horror, that the eyes of all the figures in these pictures had been cut out. Respecting the perpetrator and his motives nothing is yet known, but a strict inquiry has been instituted into the circumstances of the case.—*Exchange*.

PILLAGING THE VILLA BORGHESE.—A singular case of housebreaking has occurred at the Villa Borghese, at Rome. Some persons scaled the boundary wall, and, after breaking through the iron grating of one of the ground-floor windows, succeeded in carrying off a bronze statue, one metre in height, of Geta, the brother of Caracalla, which, together with its pedestal, was worth sixty thousand francs, and a marble statuette of Jupiter of little value. Apparently the burglars had also attempted to carry off two large vases, but found the weight of them too great. After three days' search the police succeeded in arresting the delinquents, and in finding not only Prince Borghese's property, but a number of objects of antiquity recently stolen from the catacombs of St. Calixtus, among them a fine sarcophagus and several statuettes of great value. They were all hidden together in a vineyard belonging to a well known Roman dealer in antiquities, who had paid five hundred francs for the statuette stolen from the Villa Borghese.—*N. Y. Evening Post*.

THE INSURANCE OF WATER FITTINGS.



ROBERT RAWLINSON

says in a late issue of the *Builder* that it appears that the Birmingham Water-works Committee contemplate what is termed "Insurance of Water-Supply Fittings,"—that is, it may be assumed, these will be maintained in order by inspection and repair for an annual payment. One shilling per annum on low rentals, increased in proportion of rental; 2s. 6d. extra on bath, and 5s. extra on water-closet fittings. If the tenants will submit to examinations and pay such excessive charges, well and good; no outside person need complain; but experience induces me to doubt the fairness or the acceptance of the terms.

That both water and gas fittings need looking after at short intervals is certain; and it will be as much in the interest of the sellers of water and gas to preserve fittings in good order, as it will be of the users so to have them. It is a fact notorious to water-works engineers that, as a rule, more water is wasted by defective mains and fittings than is legitimately put to any good use. Take the metropolis, where, on an average, about 31 gallons per head per day are supplied all the year round; or, at eight persons per house, about 250 gallons are supplied for each house per day. Who believes that this is all fairly used? As the water supplied to the metropolis is for the most part pumped,—raised by steam-power paid for by the companies,—one may fairly conclude that it is rather more the interest of the supplier than of the consumer that the fittings should be maintained in good order. The truth is, every water-company or corporation supplying water by sale will, as an integral part of their business, some day soon, establish unceasing inspection and repairs of house fittings for the ordinary water rental, as a question of economy. Over and over again, water-company corporations and Local Boards have been driven almost to despair because the waste of water in their respective districts has been so enormous, running up to the absurd volume of 120 gallons per head, or 600 or 700 gallons per house per day.

To this condition did Croydon come some time since, so that with other places it had to discontinue constant service, and go to intermittent service to diminish the waste from defective mains and leaking services; but this did not prove a cure. Inspection and repairs of fittings have, however, stopped the waste. A large proportion of London is now on intermittent service, a small army of turn-cocks being employed day by day to turn the water on for one or two hours, and then to shut it off again. If these turn-cocks were inspectors and fitters looking after and repairing at once the fittings constant service would be found to be by far the most economical mode of water-supply. This statement need not rest upon assertion as it has been well based on fact in several places. The truth is, no public water-supply is complete unless unceasing supervision, inspection and repairs form part of the system. This and this alone will be the best, the cheapest, and the readiest form of water-fittings insurance.

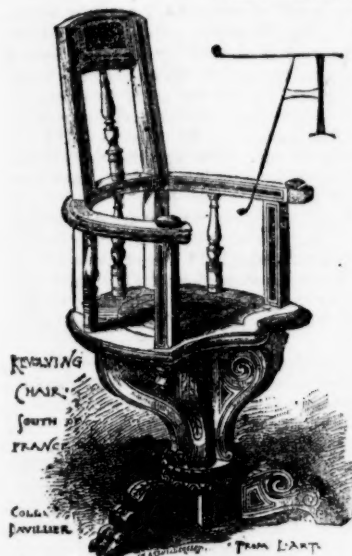
As to gas fittings: gas is sold by meter, and consequently, if it is unduly wasted it is paid for. Companies may, therefore, come to the erroneous conclusion that waste is no concern of theirs, but rather, as more gas has to be paid for, is to their advantage. This, however, is a blind and impotent conclusion, as extravagant waste of any serviceable commodity cannot, in the long run, be good for any party. Wasting gas by leakage is dangerous as leading to explosions, but leakage forms only a small part of the evil of unjustifiable waste. Defective burners must be answerable for the worst and most damaging form of waste, as the gas passes partially unconsumed and unoxxygenated, giving a blurred, smoky and sulphurous flame, injuring all with which its fumes come into contact, and so discrediting the use of gas. Probably nine-tenths of the complaints against gas arise in consequence of defective burners; if, therefore, gas-companies employed examiners and fitters to inspect and repair or renew all gas-burners at short intervals, they would be material gainers, even pecuniarily, as they would preserve customers and add to their number. This, then, for gas-companies will be the best form of Gas-fitting Insurance.

Electric-lighting stares gas-companies in the face boldly and unflinchingly, and if gas is to hold its own it must be burned in the best and cheapest manner; that is, by and with the most perfect fittings, maintained perfect.

In the meantime, periodical inspections of house-drains, water-closets, and their ventilation, water-supply fittings, and gas-supply fittings are being arranged for by private parties, both in London

and in Dublin, at a moderate annual charge, and if the inspecting is regular and well done, it will be most beneficial to householders.

DISINFECTANTS.



REPORT of experiments which were carried on with different disinfectants is contained in the "Mittheilungen" of the German Board of Health. The results do not agree with the opinions generally held. The destructive action shown by carbolic acid on organic germs was very small. Even after five days' action of a two-per cent solution of carbolic acid on germs, these showed abundant traces of life. A one-per cent solution had very little effect on the germs after fifteen days. The practical value of a disinfectant being dependent upon the quickness of its action, and a quick action being only obtained with carbolic acid when it acts as a concentrated solution, its value as a disinfectant is spoken

of as small. It acts well only when the micro-organisms, which have to be rendered innocuous, are not in a permanent form. It is undoubtedly to this that carbolic acid owes its great name as a disinfectant. The experiments made with carbolic-acid vapors showed that, by ordinary temperature, bacillariae germs were not destroyed after six weeks. At higher temperatures the effect is much more energetic. At 55° C. many of the germs were destroyed after half an hour. After three hours few germs were left, and after five or six hours the destruction of all germs could be regarded as complete. A complete destruction of germs in half an hour could, however, not be obtained with higher temperatures. Other disinfectants also showed more energy at higher temperatures.

The above experiments were made with solutions of carbolic acid in water. Experiments made with other dissolvents showed the result that solutions of carbolic acid in oil or alcohol do not show the least antiseptic effect. The same can be said of salicylic acid, thymol, etc. If, however, carbolic oil comes in contact with watery solutions, an antiseptic action is then observed.

Sulphurous acid, when acting alone on dry objects, or acting at the same time with water and water vapor, cannot claim a real disinfecting value. Water solutions of sulphurous acid also possess a relatively small power of action on germs. If, however, the objects to be disinfected are made wet before being treated with sulphurous acid, a greater action is observed. All experiments, even those made in conditions most favorable to sulphurous acid, tend to prove that all the germs of organic life are not destroyed by it, sulphurous acid being thus classed as an uncertain disinfectant. The same can be said of bisulphide of lime, which is often used in its stead. The third disinfectant experimented upon was chloride of zinc, of which it was said that it acts even in a diluted solution of 1 per 1000. The result of these experiments shows, however, that germs were not destroyed after being left one month in a five per cent solution of chloride of zinc. A great power of preventing the development of organic life cannot be claimed by chloride of zinc.

The above experiments have shown that three of the disinfectants most in use do not, by any means, answer the requirements. Carbolic acid has much less value as a disinfectant than was believed until now; sulphurous acid has proved uncertain, and chloride of zinc perfectly worthless. A larger quantity of compounds were, therefore, experimented upon, which are either already recognized as disinfectants, or were thought to possess such a quality. For most of these compounds it was observed that their solution in oil or alcohol have no action whatever, while solutions in water have more or less effect. To be of practical use a disinfectant must be not only certain in its action, but it must also act in less than twenty-four hours. Of all substances tested, this property was shown by chlorine, iodine and bromine, and by corrosive sublimate, ozmic acid and permanganate of potash. The last acted only when the solution was five per cent. If the disinfectants are divided into two classes: one for those which completely destroy organic germs, and the other for those which hinder their development, to the first will belong chlorine, bromine and sublimate, and to the second class sublimate again, and some ether oils, thymol and amy-alcohol. For disinfecting closed spaces, bromine can be recommended. Bromine, however, is very dear. Sublimate is the only disinfectant which acts on unprepared objects, and by a single application, and it is to be wondered that it has not been more largely used. This may be, perhaps, accounted for by its strong poisonous quality. It can not, however, be recommended for liquids, on account of precipitates of mercury which might be formed. — *The Metal Worker*

THE VENTILATION OF THE CHANNEL TUNNEL.



AN ounce of fact is worth a ton of theory, concerning some subjects at least, says *The Engineer*. The ventilation of the Channel tunnel during the time it is being made is assumed in some quarters to be a matter which will present no difficulty, the compressed air used in driving the boring machines being held to be sufficient for every purpose. Now compressed air was used on a very large scale in driving two great

tunnels — the Mont Cenis and the St. Gothard. Herr Pieler recently read a paper on the ventilation of underground works before the German Society of Engineers, from which we learn that during the period of driving the St. Gothard tunnel, the men employed suffered very seriously from bad ventilation. The quantity of air delivered to the tunnel in the north end was about 2,750,000 cubic feet, and in the south end 3,125,000 cubic feet per day of twenty-four hours. As the number of men employed was 380 and 420 respectively, or 800 in all, the quantity of air furnished per man per minute was 5.0 and 5.2 cubic feet. When this is compared with the quantity of fresh air that is generally considered necessary in mining, or from 35 to 70 cubic feet per man per minute, the quantity supplied at the St. Gothard tunnel will be conceded to have been very small. If it is assumed that a workman requires per hour, 0.84 cubic feet of oxygen and a lamp burning twenty-nine grammes of oil per hour, 1.80 cubic feet, and that the former produces 7.60 cubic feet of carbonic acid and the latter 1.14 cubic feet, the total consumption of oxygen would be 2.64 cubic feet, and the generation of carbonic acid in the same time would amount to 8.74 cubic feet, the reduction in the quantity of oxygen in the air in the tunnel would be about 4 per cent, and that the increase in the quantity of carbonic acid would be 0.6 per cent of the total quantity of air supplied. Experience in mining has proved, however, that the deterioration of air brought about by the breathing of the men and the burning of the lamps accounts only partially for the reduction in the quantity of oxygen in the air of mines and the increase in the quantity of carbonic acid. Herr Dr. Schondorf concludes, from experiments made in the Saarbrücken coal mines, that it will account only for one-seventeenth of the former and one-ninth of the latter. It may be urged that the electric-light will be used in the Channel tunnel and that no explosives will be employed, but against this it must be borne in mind that both the Mont Cenis and the St. Gothard tunnels are situated high up in a mountainous region, where natural ventilation must be at its best; while the Channel tunnel can have no natural ventilation of any kind, and that the length of tunnel to be ventilated from one end will be as much as ten miles. The ventilation of the Mont Cenis tunnel is so bad that the engine-men have to wear mouth-pieces coupled by tubes to a reservoir of fresh air carried on the top of the cab, while going through it. Putting these facts together, it seems to be tolerably certain that the ventilation of the Channel tunnel presents a problem which should not be flippantly dismissed as of little importance.

SUB-SURFACE IRRIGATION.

NEWPORT, R. I., April 13, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—



KINDLY permit me to make a few remarks in regard to an omission of vital importance in the description of the "Subsoil Irrigation System," in No. XVI of the articles on "Building Superintendence."

This system, which was first brought into use by the Rev. Henry Moule, Vicar of Fordington, England, the inventor of the earth-closet, consists, as described in the above article, of two parts: First, a tight receptacle for liquid and solid house-refuse, from which the water is discharged into a system of underground tiles. Second, a system of common two-inch drain-tiles, laid with open joints a few inches below the surface of the ground, permitting the sewage to escape at each joint, to be partly purified by the action of roots of grass and shrubs, and partly oxidized by the oxygen attaching to the particles of the soil near the surface.

The most essential requirement, that this discharge must be intermittent, has not been stated in the article referred to; not only this, but the illustration of the tank (Fig. 173) shows a nearly continuous overflow from it into the absorption tiles.

The necessity of intermittent action was soon discovered in England by Rogers Field, Esq., C. E., who introduced into this system of sewage disposal a new and valuable feature, the automatic flush-tank. Col. George E. Waring, Jr., introduced the system, thus improved, into this country, and adopted it with success for the drainage of a large number of suburban residences, and on a larger scale for the purification of the sewage at the Women's Reformatory

Prison, at Sherburn, Mass., the Keystone Hotel at Bryn Mawr, Pa. and for the disposal of the entire sewage of the village of Lenox, Mass.

In a pamphlet on "Rural Improvements," issued by the West Ewing Improvement Society, Col. Waring says: "It (the sub-surface irrigation system) is based on the fact that the surface soil which is within the reach of the roots of grass or other plants, and of the action of the atmosphere, is a very active destroyer of organic matter. A cotton rag buried a few inches under the surface is very soon entirely consumed by this action; and all decomposable matter so placed is destroyed by oxidation or slow combustion as completely, though less rapidly, as when it is thrown into the fire. In order to make this process continuous, it is necessary that there should be free access of air into the pores of the soil. In the case of liquid wastes, it is necessary that the discharge be intermittent, for when a constant stream runs into the ground, saturating a small area, the entrance of the air is prevented and the oxidizing action is retarded." (The italics are mine.)

This is exactly what would happen if the tank with overflow, as illustrated in Figure 173, page 147, were used. Only a short length of the tile would receive an almost constantly trickling flow of sewage, saturating the ground around it to the surface and keeping it in an unwholesome condition.

To make the system work successfully, the liquid wastes should be retained in the tank (whose capacity should be larger than the capacity of all the tiles) until the tank is filled; its whole contents should then be suddenly delivered into the pipes, whereby all the rows of tiles are uniformly charged. Thus the whole of the absorption field is brought into use each time the tank is emptied. The purification begins immediately, the clarified liquid soaks away into the ground, the impurities being retained by the earth filter where they are destroyed by oxidation, air enters the pores of the soil and prepares it for future use, while the tank is gradually filling for the next discharge.

The interval required between two consecutive discharges, the exact proportion between capacity of tank and size of house, and between size of tank and number of feet of drain-tiles, the distance between the rows of tiles, etc., are, of course, details requiring judgment on the part of the designer of the work. The intermittent discharge can be arranged either to work automatically (by using Field's flush-tank, or perhaps a tumbler-tank), or else be worked by hand, by opening a stop-valve at the outlet of the tank, whenever this is filled. The automatic arrangement is preferable.

An important caution to be observed is to intercept all solids and fatty waste matters, which should not be discharged with the liquid sewage into the absorption drains, as they would in a short time clog these and interfere with the action of the flush-tank. An intercepting chamber, similar to the one shown in Figure 173, of suitable size, must therefore be built between the house and the flush-tank, usually close to the latter.

With these precautions the system may be said to answer admirably for country residences and isolated buildings not in reach of a public sewer, and with sufficient ground about them. As described on page 147 of your valuable journal, I venture to say that it cannot work properly except at the very beginning, but must soon become a serious nuisance.

One more word in regard to the name of the system. The term "subsoil irrigation" is misleading, and the more correct term "sub-surface irrigation system" should be substituted for it. The subsoil would not be able to effect a complete purification, as the oxidizing influence of the atmosphere does not so freely reach it. It is the layer of earth next to the surface, the subsurface, which, assisted by vegetation, acts on the sewage.

Respectfully yours,

WM. PAUL GERHARD,
Civil and Sanitary Engineer.

[No doubt the intermittent discharge is desirable if it can be obtained without inconvenience, but this is not always an easy matter. In my own first experiment a Field's flush-tank was placed to receive the wastes from baths, sinks and wash-trays, the soil-pipes being connected to the drain below the flush-tanks. This proved to be very troublesome, the flush-tank soon clogging with grease, which could only be removed with difficulty, and after two years' inconvenience it was cut off and the drain connected directly. Since then the system has worked, apparently, perfectly well. A second trial led to precisely the same result, and in a third the flush-tank was altogether omitted, this proving from the first the most satisfactory of all, and still continuing, after some years, to give good results. In the first case, as long as the flush-tank was connected, the liquid discharged into the pipes was inclined to make its way to the surface near these ends; with the removal of the flush-tank this tendency disappeared. The introduction of an intercepting grease-trap between the house and the flush-tank is new to me, and may solve the problem completely; or a tumbler-tank, either in the cesspool or above it, might be very useful if such things were to be easily procured. — T. M. CLARK.]

TO INSCRIBE A CIRCLE IN A SPANDREL.

BROOKLINE, MASS., 6th April, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In your issue of to-day appears what purports to be a solution of the geometrical problem contained in a "student's query" in your paper a few weeks since: to inscribe a circle in a spandrel.

The solution by "another student" from Indianapolis is the cor-

rect one for only one kind of spandrel, and I venture the assertion

that observation of buildings containing arched windows will show that this kind of spandrel is not the most common kind by any means. The dictionary tells me that a spandrel is formed by drawing from a point outside an arc, which forms one side of an arch, two straight lines which make a right angle at the point taken, and intersect the arc (Fig. 1). Let B C D be an arc; let A be the point outside thereof. The spandrel in this case is the quasi-triangular space formed by drawing straight lines from A at right angles to each other, meeting the arc B C.

The original solution given by yourselves was: "draw a straight line from A bisecting the right angle, and take different points on this line and try till you get the right point." In other words the centre of the required circle is always somewhere on the line bisecting the right angle. This is perfectly true; but it is true, not with any reference to the arc B C, but on account of the relation of the straight lines drawn from A.

In your issue of to-day the solution given is: draw a line from A, bisecting the right angle; where this line meets the arc B C draw a tangent to the arc; inscribe a circle in the triangle thus formed by the two straight lines from A and the tangent last drawn; and then is given the familiar rule for inscribing a circle in any triangle.

I have to say this: whenever the spandrel is such that the line bisecting the right angle also bisects the arc, the solution is correct;

but wherever the spandrel is such that the line bisecting the right angle does not also bisect the arc, the solution is incorrect. Suppose we have a spandrel formed thus: (Fig. 2.) In this kind of spandrel a line bisecting the right angle at A will not bisect the arc B C, and while the centre of the required circle is always somewhere on the line which bisects the right angle at A, I submit its precise location is not to be found by the process indicated in the solution given by your correspondent of Indianapolis.

I think it amounts to this: whenever the two straight lines A C and A B are equal, the solution given in your paper of to-day is correct; but whenever they are unequal, that solution is incorrect. I regret very much that I am unable to give a correct solution applicable to any spandrel, but I suspect it is by no means so simple a problem as a hasty reader would suppose it to be.

Yours very truly,

JONAS M. MILES.

A TOUR FOR A VISITING ARCHITECT.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—What suggestions would you (or any of your correspondents) kindly offer to an English architect who proposes a short visit to see American construction? Where can he see the best specimens? Where are the most notable buildings in progress, through the country generally—such as State Houses, Law Courts, etc., and where such buildings finished?

Your early reply will oblige

"VIATOR."

[If "Viator" does not mean to confine us to the difficult task of mapping out an economical itinerary we will suggest that, as he writes from Baltimore, he should visit the new City-Hall there, and the beginnings of the new Post-Office, then turning northward, stop at Philadelphia for an inspection of the Post-Office and the new Public Buildings; next, after having exhausted the multitude of buildings in New York, and having visited the new Capitol and the City-Hall at Albany, take a run into Canada to see the new Parliament Buildings at Ottawa, and the new walls, etc., at Quebec. After this, by going up the St. Lawrence and through the Lakes, he can easily reach the newly finished Capitol at Lansing. Then taking the notorious Chicago Court-House and City-Hall on his way to the new Capitol at Springfield, he can leave this side of the Mississippi, and, taking the Custom-House at St. Louis, and the new Capitol at Des Moines, can set out for the new City-Hall at San Francisco, taking en route the new Capitol at Lincoln, Neb. After wearying of the new civilization of the West he can, by taking the Southern route to the East, compare it with the older civilization of the Zulus. Then, if desirous of ascertaining how beginnings are made in this country, he may proceed to Austin, Tex., and inquire what progress has been made in fixing the site for the new Capitol of the Lone Star State. Inspection of the various government buildings at New Orleans, Nashville, Montgomery, Atlanta, Mobile, Charleston, W. Va., etc., will allow him to make useful observations on his way north to Washington, where he will find enough, in the way of good construction, at least, to occupy his time perhaps until the completion of the Washington Monument. We think it not impossible that as, with one exception, all the buildings we have mentioned are unfinished, large, and important, they will offer such opportunities for studying our methods of construction that by the time he has completed the tour, he will have been in the country so long that the most sensible thing he can do is to take out naturalization-papers, and put in practice for the benefit of his adopted country the broad knowledge he has acquired during his trip. — EDS. AMERICAN ARCHITECT.]

A QUESTION ON VENTILATION.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In a large public building, in which it is desired to expel foul air at the level of the floors, is it essential to introduce

the pure, warm air at the top of the room, or would it give as good an effect if introduced at the bottom, but, of course, on the side opposite to the exit registers?

When the impure air is gathered into the basement, would it not be well to expel it directly, by means of a fan, into a grass-covered area, open to the wind at each end, instead of carrying it to the top of the building, where either a fan or large steam-pipe would be necessary to create a draught? Yours truly, P.

[The only important objection to introducing the fresh warm air at the floor level is the liability to cause annoyance to the people near the inlet registers by the currents, which must have considerable velocity to give an adequate supply of air to a large room, and will feel cool to persons close to them, unless their temperature is considerably above 100 degrees.

If the impure air could be made to stay in the basement, it might be discharged into an area by a fan of sufficient power, but with difficulty. The reason for taking it to the top of the building is that if enclosed in a high vertical shaft, the column of air in the shaft is balanced against one of equal height outside, and the foul air in the shaft being in winter always warmer, and therefore lighter, rises, and the fresh cool air presses into the building beneath it by the same sort of natural circulation which exists in a fireplace and chimney. In exhausting the warm foul air directly from the basement into the outside atmosphere, it must be driven against the cool current, which presses in more or less all around the lower parts of a warmed building, with a considerable expenditure of force.—EDS. AMERICAN ARCHITECT.]

THE ENTASIS OF PILASTERS.

HARTFORD, CONN., April 8, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In the remodelling of an old colonial church in which Ionic pilasters will be used, would it be advisable to make an entasis on the front as well as on the sides of such pilasters?

Some of the old gallery columns in the church (built in 1761) have a rather violent entasis, as well as an extreme elongation, being about fourteen diameters high. The length cannot be diminished except by building pedestals which would interfere with the seats. Would you correct the columns by means of a lathe? Or if not, would you distort the new work to harmonize with the old?

In case considerable apparent strength is required, under ceiling-beams for instance, would it be allowable to make an Ionic column or pilaster but eight diameters high?

In the carving would you advise giving a Greek or a Roman character to the acanthus or other ornament? The old pulpit, which is to be removed, is very delicately carved and moulded.

Yours,

M.

[The questions proposed by our correspondent are somewhat difficult to answer without an actual inspection and study of the building, but in general we should decidedly prefer not to make any entasis or diminution on the front of such pilasters. Even on the sides we should avoid it unless it were necessary to conform to the old work near by.

The attenuated columns would probably not be improved by having the entasis turned down to a correct profile. The exaggeration of the curve helps to correct the disproportion of height by drawing attention away from it, and the new work would, we should say, be best in conformity with the old. Under the ceiling beams or elsewhere there need be no hesitation in placing Ionic pilasters eight diameters high, or even less. By making the projection from the wall very small, the heavy effect of the short proportion may be corrected, and such pilasters should certainly have the sides parallel.

If any of the old carving is to remain, it would probably be Roman in character, and the new work would look much better to harmonize with it as far as possible.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

DISCOVERY OF A BRONZE GRECIAN CUIRASS.—One of the most interesting specimens of archaic Greek art in existence has been brought to light by Mr. Stillman, and is now exciting the keenest interest in the archaeological circles of Athens. This treasure is the back of an elaborately wrought bronze cuirass, and is thought to be at least as old as the sixth century before Christ. There are seven subjects engraved on it, which are thus described: The main subject, which occupies the lower part of the cuirass, consists of two groups of three figures each, each six inches high, and it has been diversely interpreted to represent either the reconciliation of Apollo and Hermes or a king consulting Apollo. On the one side is Apollo playing on the lyre, attended by Lato and Artemis, and on the other a royal or divine figure, followed by two attendants. The personages are dressed in the most elaborate costume, and every detail is rendered with finished skill, the patterns even of the stuffs of their various garments being delineated with the utmost precision. The subordinate personages are barefooted, but Apollo wears a pair of sandals, and the other principal figure high peaked boots such as are worn to the present day by the Epirotes. Above this row of figures, running across the lower part of the cuirass, there is on each of the clavicles a bull, and above the bull a lion, each facing his counterpart on the other clavicle. Between them are two leopards, rampant, supporting each other, surmounted by two sphinxes also rampant and in the same attitude. Each of these subjects is framed in rich ornamental borderings of different patterns, that which runs along the lower edge of the cuirass under the chief design being especially quaint and elaborate. This unique art-treasure was found some twenty years ago in the Alpheus by a fisherman, who caught it in his net and sold it as old metal at a shop in Zante, where it lay buried among a mass of worthless lumber until Mr. Stillman's critical eye discerned its value and rescued it from oblivion. It has been placed in the museum at Athens.—*New York Tribune.*

HOW A MISSISSIPPI CREVASSE IS CLOSED.—The crevasse at Live Oak plantation broke through the night before we went down the river, and two days later, on our return, we stopped to examine the manner of closing it. A large supply of material, 3" x 4" and 4" x 4" joints, inch boards, bales of hay, and empty bags having been collected, two men having a reputation for judgment, experience, and skill are chosen captains with dictatorial powers. These divide the forces into two gangs, one for each side of the break. First, the broken ends of the levee are protected from further denudation by bracings of lumber and coverings of tarpaulin, and, when the nature of the ground will permit it, a row of stakes is driven outside the levee to prevent driftwood from washing through and hindering the work. Then, starting from points twenty or thirty feet from the break, so as to allow for accidents, four rows of piles made from the joists are driven firmly into the soil. These rows do not project directly across the crevasse, but at an angle of 45 degrees from the inner side of the levee. Between the first and second row, and between the third and fourth, the distance is about three feet, while from the second to the third row is six feet. The piles themselves are driven three feet apart, and as fast as driven are firmly braced together by boards spiked on laterally and diagonally so as to strengthen them as much as possible, while loose boards laid upon these braces serve as platforms on which the men stand while at work. In this manner they feel their way along until the outer ends of the two cribs are within ten feet of each other, when the line is driven straight across and the two are connected together. All this time great care is taken to allow free passage for the water between the stakes, and to disturb the bottom as little as possible; nevertheless, it often happens that the treacherous soil gives way and a big section of the crib goes sailing off into the field. In time, however, the circumvallation is completed and holds firm, and the process of filling in begins. First, the space between the first and second row of stakes is filled with armfuls of loose hay that is carefully matted together and weighted down with bags of earth. Through this the water leaks as through a sieve, but the rush of the current is stopped. Next, the broader space between the second and third row is packed solid with bags filled with earth, and rammed down till not a drop of water can ooze through. Finally, loose earth is shovelled and rammed upon the rear, until not only is the third compartment filled, but the bank slopes back fully ten feet beyond the inner row of piles; and not until then is the work declared safe and the crevasse conquered. It is now ten days since the Live Oak crevasse broke. It is not over thirty feet wide, and the surface of the river was not more than four feet above the ground level inside of the levee, yet already more than 60,000 feet of lumber have been expended, and this morning 20,000 more feet were ordered, while nearly 100 men have been working at it daily from dawn to dark. In the meantime the water has covered not only Live Oak plantation and the rice fields adjoining, but is spreading over the corn fields beyond, both up and down the river, carrying destruction wherever it goes.—*Correspondence of Boston Herald.*

LIME IN COAL MINING.—It has been proposed to introduce caustic lime into bore-holes in coal or other minerals, and to bring it into contact, in a confined condition, with water, so that by the expansion of the lime in becoming slaked, and by the pressure of the steam generated, sufficient power will be developed to effect the breaking down of the mineral. The introduction of this method in connection with coal mining is said to be accompanied by the two-fold advantage of avoiding the danger of explosion of fire-damp, and of obtaining the coal in much larger blocks than would be the case with the ordinary blasting operation. The invention may be carried into practice in a variety of ways, but it is preferable to finely pulverize the caustic lime and then press it into cartridge form, inclosing it in water-proof casings to exclude moisture. A rod or needle is first inserted into the bore-hole; the cartridges, which are provided with a groove, are then introduced, the surface of the groove being next to the needle; and finally, the contents are tightly rammed so as to insure their filling the hole. After the cartridge or cartridges have been inclosed, either by tamping with clay or other suitable material, or by a bung or otherwise, the needle is withdrawn, and a tube is inserted in its place, which tube is fitted with a tap or automatic check-valve, or other means of closing it. Through this tube the water is conveyed to the lime by a force pump, or other power; when the water has been so forced in, the pipe connecting the pump with the said tube is detached, and the tube is closed so as to prevent the escape of the steam generated by the action of the water upon the lime. In order to cause the whole mass of cartridge or cartridges to be subjected more or less simultaneously to the action of the water, so as to bring about a rapid and energetic action, the cartridge may have a groove, as before mentioned, formed along its side, or a hole through its centre, into the front end of which groove or hole the tube for conveying the water is made to enter, so that the water is forced in along the whole length of the cartridge or cartridges. The tube itself may be made to extend along the whole length of the cartridge, and may be provided with perforations or slits through which the water can issue. Although the above method of forming the lime into cartridges is preferred by the inventors, it may be rammed into the bore-hole in an unprepared condition, the tube conveying the water being first introduced. If desired, fluids other than water, such as diluted sulphuric acid, may be employed, or the water may be used hot in order to accelerate the expansive action of the lime, other substances being mixed with the latter for the same purpose.—*Iron Age.*

THE ROMAN FORUM.—Excavations in the Roman Forum are going rapidly forward, and the Minister of Public Instruction, who is a Roman by birth, intends that they shall be continued without interruption until the whole area from the arch of Titus to the Tabularium is entirely disclosed. This will require the removal of the two modern causeways that cross the Forum, but by this means there will at once be afforded from the level of the Forum splendid views of the arch of Septimius Severus and the temples of Saturn and Vespasian.

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.]

- 256,111. ELEVATOR.—John B. Atwater, Chicago, Ill.
 256,144. SASH-FASTENER.—Alonzo Johnson, Springfield, Mass.
 256,145. BURGLAR-ALARM.—Joseph V. Knight, Lynn, Mass.
 256,194. CAP FOR CHIMNEY FLUES.—Ebenezer Blackman, Brooklyn, N. Y.
 256,207. FIRE-ESCAPE.—George W. Gibbs, Salem, O.
 256,217. SAW-SET.—Hiram H. Hitchcock, Ionia, Mich.
 256,235. WASH-BOWL.—L. Hamilton McCormick, Chicago, Ill.
 256,247. PARLOR DOOR-HANGER.—Samuel Shreffler, Jr., Joliet, Ill.
 256,254. BLIND-ADJUSTER.—Orvel C. Velle, Corning, N. Y.
 256,263. LOCK.—Harvey C. Aldrich, Norwich, Conn.
 256,291. AUTOMATIC STORAGE PRESSURE RESERVOIR.—Richard R. Coggin, Brooklyn, N. Y.
 256,306. PARQUET-FLOOR.—Robert W. Eltner, New York, N. Y.
 256,317. FIRE-ESCAPE.—John Harrison and Michael Follard, Brooklyn, N. Y.
 256,321. BURGLAR-ALARM.—William B. Howell, Albany, Mo.
 256,327. STEP-LADDER.—Russell F. Jones, Forestville, N. Y.
 256,336. STEP-COVER.—William E. Lawrence, New York, N. Y.
 256,337. WOOD-BORING MACHINE.—William E. Lawrence, New York, N. Y.
 256,345. HEATER.—James H. Mackintosh, Paterson, N. J.
 256,351. RATCHET MONKEY-WRENCH.—William F. McGregor, Chicago, Ill.
 256,354. SAFETY ATTACHMENT FOR ELEVATORS.—Chas. B. Morgan, Oakland, Cal.
 256,361. LOCK-HINGE.—Singsmer Needles, Sedalia, Mo.
 256,368. ROOFING COMPOSITION.—Gustav H. Püschel, Union Hill, N. J.
 256,371. DERRICK.—Israel S. Reeves, New Orleans, La.
 256,406. HINGE.—Alvah Sweetland, Syracuse, N. Y.
 256,411. PARLOR HEATING-STOVE.—George G. Thomas, Philadelphia, Pa.
 256,415. TILE OF GLASS, PORCELAIN, ETC., FOR DECORATING WALLS.—Elihu Vedder, New York, N. Y.
 256,439. DESTRUCTIBLE SHUTTER-FASTENING.—Frane O. Mathiessen, Irvington, N. Y.
 256,447. FIRE-ESCAPE LADDER.—Lorenzo D. B. Shaw, Revere, Mass.
 256,448. DIE-STOCK.—Alfred J. Signor, Elkhart, Ind.

SUMMARY OF THE WEEK.

Baltimore.

- STORE EXTENSION.—S. Dalsheimer and Bro., No. 55 North Eutaw St.; cost, \$3,000; Mr. Wm. F. Weber, architect.
 STORE.—T. S. Bowen, three-sty brick building, 17' x 68', Pratt St., near Washington St.; cost, \$6,000; Mr. Wm. F. Weber, architect.
 BUILDING PERMITS.—Since our last report forty permits have been granted, of which the more important are as follows:—
 Conrad Kraeter, two-sty brick stable, No. 65 Central Ave., n of Orleans St.
 Baltimore Gas-Light Co., two-sty brick building, 29' x 77', Holiday St., and one-sty brick building, in rear of same.
 D. Allers, one-sty brick office, Barre St., w of Eutaw St.
 Mary McNally, two-sty brick building, No. 19 Hope St., bet. Lanvale and Townsend Sts.
 B. F. Smith, 12 two-sty brick buildings, Cooks St., bet. Clement St. and Fort Ave.
 Geo. W. Hopper, 2 two-sty brick buildings, Vincent Alley, bet. Harlem Ave. and Lanvale St.
 John Weber, three-sty brick building, No. 2 Stockton St., n of Patterson Ave.
 Chas. Branninger, one or two-sty brick building, No. 90 Eastern Ave., bet. Exeter and Canal Sts.
 Patrick Pendergast, three-sty brick building, West Falls Ave., n of Block St.
 J. B. Irvine, 4 two-sty brick buildings, and two-sty brick shop, Vincent Alley, bet. Harlem and Edmondson Aves.
 S. D. Price, 9 two-sty brick buildings, rear of Ann St., bet. Biddle and John Sts.
 Dr. Alfred Hughes, 3 two-sty brick buildings, Moore Alley, bet. Pennsylvania and Druid Hill Aves.
 G. D. Clark, Jr., 8 three-sty brick buildings, commencing n e cor. Fulton and Harlem Aves., fronting on Fulton Ave.
 G. D. Clark, Jr., 3 three-sty brick buildings, Harlem Ave., commencing 95' e of Fulton Ave.
 Chas. Markell, 2 five-sty brick warehouses, Lombard St., e of Light St.
 Benj. G. Buck, 12 three-sty brick buildings, Lanvale St., bet. Mount St. and Bruce Alley, and 3 three-sty brick buildings, Mount St., s of Lanvale St.

W. G. H. Gluck, three-sty brick warehouse, Gay St., n of Jones Falls.
 John Snyder, 5 two-sty brick buildings, Patterson Park Ave., bet. Fayette St. and Fairmount Ave.
 John F. Donnelly, three-sty brick building, s w cor. Chase and Valley Sts.
 Sommerwerk & Weighard, two-sty brick building, Register St., bet. Eastern and Canton Aves., and 2 two-sty brick buildings, in rear of above.
 Consolidated Gas Co., two-sty brick buildings, n e cor. Lancaster and Streeter Sts.
 Jacob Oster & Son, 2 two-sty brick buildings, Watson St., bet. Lloyd and Exeter Sts.

Boston.

- BUILDING PERMITS.—Brick.—Haver Ave., No. 20, Ward 6, for Patrick Hession, dwell., 13' and 26' x 25' and 37', three-sty; D. Sullivan & Son, builders.
 Newbury St., near West Chester Park, Ward 11, for Walter Hunnewell, dwell. and stable, 25' x 80', two-sty; Rumery & Maxwell, builders.
 Brimmer St., No. 17, Ward 9, for Robert Codman, dwell., 28' 6" x 63', three-sty and mansard; Weston & Shepard, builders.
 Lenox St., No. 94, Ward 19, for B. M. Cunningham, store, 12' x 20'.
 Boylston St., cor. Berkeley St., Ward 11, for Boston Young Men's Christian Association, association building, 100' x 105', five-sty; Chas. Dodge, builder.
 Wood.—Lamarine St., near Wymen St., Ward 23, for Joseph Griffin, dwell., 24' x 40', three-sty, hip; Robert D. Ward, builder.
 Kendrick St., rear, near Lake St., Ward 25, for J. A. Downing, poultry-house, 24' x 125'; John H. Lee, builder.
 Centre St., rear No. 37, Ward 21, for Louis Prang & Co., storage, 20' x 22' and 49' x 50'; J. A. Sutherland, builder.
 Parker St., Nos. 689-691, near Tremont St., Ward 22, for John Barnard, 2 dwells., 26' x 53', three-sty; Robt. D. Ward, builder.
 Wales St., rear, near Tremont St., Ward 22, for Cheever Newhall, stable, 22' x 38'.
 Pearl St., rear No. 15, Ward 3, for Thomas Doane, dwell., 12' 6" x 25' and 35', three-sty; C. B. Maynard, builder.
 Knollton St., No. 9, Ward 15, for Arthur H. O'Neill, dwell., 21' x 31', two-sty, mansard; John Earley & Son, builders.
 Taylor St., rear of, near Taylor Ave., Ward 23, for Henry L. Batchelder, dwell., 13' x 27' x 28', two-sty; Frank H. Webster, builder.
 Mt. Bowdoin Ave., near Eldon St., Ward 24, for Wm. Hunt, carpenter-shop, 17' x 36'; Wm. Hunt, builder.
 Mercer St., No. 13, Ward 15, for Lyman Lock, dwell., 24' x 31'; ell, 15' x 19', three-sty; Lyman Lock, builder.
 Mercer St., Nos. 9 and 11, Ward 15, for Lyman Lock, 2 dwells., 23' x 31'; Lyman Lock, builder.
 Lafayette St., rear, near Orient St., for Eliza Dunn, dwell., 11' x 15'; Wm. Dunn, builder.
 Elm St., Orient Heights, for John Booth, dwell., 18' x 24', two-sty hip; G. W. Adams, builder.
 Brookside Ave., rear of, Ward 23, for Cable Rubber Company, manufactory of rubber, 49' x 40'; Joseph P. Shaw, builder.
 Everett St., near North Beacon St., Ward 25, for Thomas McManara, dwell., 21' and 26' x 31', two-sty; Donald M. O'Connell, builder.
 Dorchester St., Nos. 332 and 394, Ward 15, for Mary E. Nolan, 2 dwells., 20' x 31', two-sty mansard; D. L. Morrill, builder.
 Dudley St., Nos. 735-757-759, Ward 20, for James Dolan, 3 stores, 18' x 45'; W. J. Jobling, builder.
 Border St., Nos. 142-148, Ward 2, for Osborne Engine and Manufactory Co., mechanical, 50' x 70'; ell, 16' and 30' x 25' and 50', two-sty, mansard.

Brooklyn.

- BUILDING PERMITS.—Monroe St., s s, 300' w Marcy Ave., 10 two-sty brownstone dwells.; cost, each, about \$1,000; owner, architect and builder, F. C. Vrooman, 444 Gates Ave.
 Rodney St., s s, about 115' w Lee Ave., three-sty brick dwell.; cost, \$1,000; owner, Frederick W. Wurster, First St., cor. South Sixth St.; architect, E. G. Gaylor; builders, W. & T. Lamb, Jr.
 Lafayette Ave., n s, 4th e Nostrand Ave., 6 three-sty frame dwells.; cost, \$2,500; owner, D. MacKenzie, 607 Lafayette Ave.; builder, M. McCarty.
 Palmetto St., n w cor. Wyckoff St., two-sty frame office and dwell.; cost, \$5,000; owner, Bushwick R. R. Co.; architect, R. B. Eastman; builders, James Ashfield & Son, and Long & Barnes.
 Lynch St., n s, 144' e Harrison Ave., 4 three-sty frame tenements; cost, \$3,500; owner and carpenter, J. B. Asert; Johnson Ave., near Union Ave.; architects, J. Platte and J. Auer.
 Bergen St., No. 1119, n s, three-sty brownstone dwell.; cost, about \$9,000; owner, H. E. Jacob, 1117 Bergen St.; architect, F. E. Lockwood; builder, F. D. Norris.
 Hopkinson Ave., No. 137, e s, 25' n Hull St., two-sty frame dwell.; cost, \$2,100; owners, Konrad Arnold, 157 Hopkinson Ave.; builders, C. Barry and H. Jaeger.
 Hudson Ave., No. 272, w s, 100' s Tillary St., two-sty brick hide house and stable on second floor; cost, \$6,000; owners, F. Hornby and F. A. Van Iderstine, on premises; architect, C. Werner; builders, R. Hudson and A. Baloche.
 Lorimer St., e s, 100' n Nassau Ave., 4 three-sty frame tenements; cost, each, \$2,400; owner and carpenter, Samuel Self, 66 Newell St.; mason, I. Reed.
 Stagg St., s s, 325 West Waterbury St., 2 four-sty frame tenements; cost, each, \$5,000; owner, J. Timmes, Bushwick Ave., cor. Stagg St.; builder, J. Platte.
 Varet St., s w cor. Bogart St., 2 three-sty frame tenements; cost, 11,000; owner, Wm. Hellmann, 16 Bogart St.; architect, Geo. Hillenbrand; builders, J. Schlereth and J. Kueger.
 South Eleventh St., n s, about 100' e Second St., four-sty brick tenement; cost, \$8,500; owner, Claus Doscher, Ross St.; architect, E. F. Gaylor; builders, Thomas Gibbons and Samuel L. Hough.

Wareley Ave., e s, 300' n De Kalb Ave., two-sty brick stable; cost, \$2,500; owner, E. K. Robertson, 292 Washington Ave.; architect and carpenter, H. J. Smith; mason, J. J. Benton.

South Eleventh St., n s, about 129' e Second St., three-sty brick stable and dwell.; cost, \$9,000; owner, Claus Doscher, Ross St.; architect, E. F. Gaylor; builders, T. Gibbons and S. L. Hough.

Canton St., w s, about 70' s Park Ave., two-sty brick stable; cost, \$4,000; owner and architect, L. H. Smith, Park Ave., cor. Canton St.; builder, T. B. Rutan.

Spencer Pl., Nos. 20, 22 and 24, w s, 3 three-sty brownstone dwells.; cost, each, \$6,000; owner, William Westlake; architect, A. Hill; builder, B. Luiken.

Atlantic Ave., s s, 400' e Rochester Ave., two-sty frame dwell.; cost, \$2,000; owner and architect, G. R. Waldron, 271 Pacific St.

Third St., n e cor. South Ninth St., two-sty brick stable; cost, \$2,000; owner, B. H. Howell, South Ninth St.; architect, Th. Engelhardt.

Lefferts Pl., n s, 112' 10' e Clason Ave., 4 four-sty brownstone dwells.; cost, each, \$9,000; owner, architect and builder, J. A. Thomson, 300 Lexington Ave.
 Quincey St., n s, 425' e Sumner Ave., 4 three-sty brick tenements; cost, each, \$5,500; owner, Jon. F. Hutson; architect and builder, F. Weeks.

Chicago.

- HOUSES.—On North Franklin St., near Chicago Ave., Mr. Z. C. Peck will build 2 residences, 54' x 60', two-sty and basement brick and stone, Elizabethan front; cost, \$15,000; Mr. W. J. Brookes, architect.
 Church St.—Trinity Evangelical Lutheran Church will build a new stone church on La Salle and Elm Sts.; Mr. C. O. Hansen has been selected as the architect, and is now preparing plans for same.
 BUILDING PERMITS.—George Quicksons, two-sty dwell., 29' x 42', 256 Sangamond St.; cost, \$2,500.
 W. D. Walker, two-sty dwell., 31' x 44', Prairie Ave., near Twenty-eighth St.; cost, \$6,000.
 P. Coughlan, two-sty store and dwell., 24' x 45', 3290 South Ashland St.; cost, \$3,700.
 W. Keefe, two-sty dwell., 23' x 49', 388 Congress St.; cost, \$4,000.
 Henry Holman, three-sty dwell., 21' 6" x 57', 163 Tremont St.; cost, \$5,500.
 Geo. A. Seaverns, four-sty rear building, 106 Randolph St.; cost, \$6,000.
 Western Ave. Congregational Chapel, one-sty church, 40' x 93', 1021-1023 West Polk St.; cost, \$5,000.
 Helene Thal, three-sty dwell., 24' x 62', Wells and North Ave.; cost, \$5,000.
 Wm. Schraeder, two-sty dwell., 24' x 51', 617 North Ave.; cost, \$3,000.
 Chicago & W. I. R. R., one-sty freight-house, 50' x 307', Fourth Ave. and Taylor St.; cost, \$20,000.
 M. Export, three-sty dwell., 41' x 46', 294 Twenty-ninth St.; cost, \$12,000.
 A. Bercher, three-sty store and dwell., 25' x 73', 574 Sedgwick St.; cost, \$7,000.
 Chas. Moses, 2 two-sty dwells., 33' x 40', 270 La Salle St.; cost, \$7,000.
 Thos. Nicholson, two-sty dwell., 17' x 60', 3352 Vernon Ave.; cost, \$4,000.
 Louis Weick, three-sty dwell., 24' x 56', Clark and Belden Ave.; cost, \$6,000.
 C. J. Hull, 4 two-sty dwells., 48' x 50', 269-271 Forquar St.; cost, \$12,000.
 F. Flanders, two-sty dwell., 22' x 48', Kemper St., near Orchard St.; cost, \$2,700.
 No change in quotations this week.

Detroit.

- BUILDING PERMITS.—124 permits have been granted since March 20, amounting to \$176,745.
 The following are those costing over \$2,000.
 J. A. Moeller, vinegar factory, Gratiot Ave.; cost, \$5,000.
 W. Barclay, frame dwell., Twenty-third St.; cost, \$3,300.
 Louis Geigle, frame dwell., Mt. Hope Ave.; cost, \$3,100.
 Armstrong & Co., frame store, No. 838 Beaubine St.; cost, \$2,500.
 Spitzley Bros., brick dwell. and store, 377 Antoine St.; cost, \$15,000.
 R. G. Heiner, frame dwell., Fourth St.; cost, \$2,700.
 I. C. Goodrich, frame dwell., No. 37 Myrtle St.; cost, \$4,000.
 Jos. Geelord, frame dwell., Mother St.; cost, \$2,400.
 D. H. Osgood, 2 frame dwells., Nos. 63 and 65 Fulton St.; cost, \$4,200.
 A. C. Varney, frame dwell., No. 33 Selden St.; cost, \$2,600.
 John Gibson, block of frame dwells., Eighth St.; cost, \$8,000; also frame dwells. on Cherry St.; cost, \$4,000.
 A. Albrecht, brick dwell., No. 153 Columbia St.; cost, \$3,000.
 H. Carew, brick dwell., No. 185 Wight St.; cost, \$3,300.
 F. Lemhagen, 2 frame dwells., Nos. 164 and 166 McDougall Ave.; cost, \$3,600.
 C. W. Green, frame dwell., No. 590 Cass Ave.; cost, \$2,300.
 H. W. Halcomb, frame dwell., No. 439 Fourth St.; cost, \$2,605.
 A. Chapoton, Jr., addition to brick Safe Works, East Fort St.; cost, \$10,000.
 Perrin Bros. block of brick stores, Michigan Ave.; cost, \$18,000; Henry Heck & Son, contractor; Carl Schmid, architect.

New York.

- APARTMENT-HOUSES.—Mr. Geo. E. Harney is preparing plans for 3 apartment-houses to be built up town. He has also drawn the designs for the apartment-house No. 26 North Forty-seventh St. The walls of the present building will not be taken down.
 MUSEUM.—Mr. F. T. Barnum proposes to build a building for a permanent museum and family resort for entertainment as soon as he can secure a desirable site.

Continued on next page.