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THE work of denuding London of her churches still goes on. Nearly all the older churches in London are the works of Wren, and as things go it looks as if in a short time England might be robbed of most of the memorials of her most famous architect. It is not very long since we had to record the destruction of two of his churches, and of the tower of another. One is being pulled down at this moment, and we are told that four others are likely soon to follow. Of these, two are said to have spires of remarkable beauty, — St. Mildred, Broad Street, and St. Margaret Pattens. The first is said by a writer in the *Architect* to have also an unusually fine interior. Mr. William Morris has thereupon written a letter to the *Times*, inviting a protest against this action of the church authorities; for, strange to say, it is they who are the offenders. Mr. Morris says with reason that the loss of these churches will be irreparable, for they form a distinct link in the history of English church architecture. He continues: —

"Many persons suppose that by preserving St. Paul's, that architect's great masterpiece, enough will be left to illustrate his views upon ecclesiastical architecture; but this is far from being the case. For, grand as St. Paul's undoubtedly is, it is only one of a class of buildings common enough on the Continent, — imitations of St. Peter's, Rome. In fact, St. Paul's can scarcely be looked upon as an English design, but rather as an English rendering of the great Italian original; whereas the city churches are examples of pure English Renaissance architecture as applied to ecclesiastical purposes, and illustrate a style peculiar to London, and when they are destroyed the phase of architecture which they exhibit will have ceased to exist, and nothing will be left to record it. The Continent possesses nothing in the least resembling our city churches, and the fact that they are all found in such close proximity to one another only seems to make them the more valuable for purposes of study. One great merit which they possess is shown by the fact that, although they are diminutive in point of size, scarcely any one of them being above eighty feet long, they possess a dignity of proportion, a masterly treatment as to scale, which renders them far more imposing than many buildings double and treble their dimensions."

A foreigner would be tempted to say, in fact, that Wren's churches are England's only contribution of value to Renaissance architecture. Wren was the creator of the Renaissance spire, and succeeded as no one else has in planning churches to suit modern Protestant congregations. St. Stephen's, Walbrook, and the steeple of Bow Church are more distinctively his own than St. Paul's. But the city clergy say that his churches, built in what are now the busy parts of the city, are no longer needed, so that it is better to sell their sites for secular uses and build in the suburbs; which sounds very much like what we have heard in American cities. So, even in conservative England, down the churches come.

AN attempt is making, it is said, to revive the manufacture of tapestry in England. It is, perhaps, not a surprising sequel to the encouragement of all kinds of interior decorative work which we have lately seen, especially considering the tendency to revert to old types rather than to invent new ones. That an enthusiasm or a "craze" for Queen Anne or Jacobean art should lead up to tapestries is, in fact, natural enough, were it not that there seems to be the smallest possible chance of such a manufacture proving profitable. There is, to be sure, a very great interest in decoration of all kinds, but the general demand is for something much less costly. There are probably not many among the small class of persons who could afford to hang their walls with tapestries who would not prefer to commute them into paintings at equal cost. The manufacture has never in modern times been able to support itself for more than a short time without state aid. The only works which now survive, the famous Gobelins, have long since been given up as a matter of profit or commerce, and are only kept alive for the sake of the national glory. Their products, which are few, are given as state presents, not sold; though it may be assumed that if there were any market for them they would be given the benefit of it, as is the porcelain of the national factory at Sèvres. The original English tapestry works at Mortlake were established at the beginning of the seventeenth century by one Crane, and the commercial shrewdness of James I. led him to buy an interest in them for two thousand pounds. They proved profitable under this patronage, and it is recorded that the Lord Keeper paid twenty-five thousand pounds for a set of hangings called the Seasons. For these works Charles I. bought, at the instance of Rubens, the Raphael cartoons, which had been sent to Flanders by Leo X. for manufacture, and lay neglected at Brussels. Charles encouraged the works royally, and at the death of the first proprietor bought them in. They were closed under the protectorate, but Cromwell had the good judgment, at the sale of the royal collection of pictures, to secure the cartoons for the nation, though they were at that time so little valued that they were rated at only three hundred pounds, while Mantegna's Triumph of Cæsar was valued at two thousand. After the restoration Charles II. undertook to revive the manufacture, and got so far as to import a painter, Verrio, to direct it. But Verrio was diverted to other uses, and the works were not resumed. Two or three other attempts to produce tapestry were made in England at different times, but without permanent success.

CONGRESS is making its contribution to the cause of the workingman by the joint resolution, which has passed the House, for enforcing the eight-hour law, providing that "while said act remains on the statutes no reduction shall be made in the wages paid by the government to such laborers, workmen, and mechanics on account of the reduction of hours of labor per day, and that all heads of departments, officers and agents of the government are hereby directed to enforce such law as long as the same is not repealed." General Banks argued that the law was based "on the philosophical theory that in the long run a man can do as much work in eight hours as in ten." — a philosophical theory that may or may not be true, but is made nugatory by general experience, which shows that as a matter of fact, whether he can or no, he will not. Mr. S. S. Cox, on the other hand, argued in favor of the resolution on the ground that it would make room for one fifth more men on the government work. Which of these two conflicting arguments prevailed with our Representatives does not appear, but they made haste to pass the resolution. There can be little doubt, however, that the second would appeal more strongly to constituents; and to contractors like Mueller, under the fifteen per cent. rule, this action of Congress will be a great windfall. As for the mass of workingmen, its effect can hardly be felt by them except in producing discontent, because the government employees are after all but a small portion of them, and government wages do not fix the market price of labor. To make the measure really effective, it should be coupled with the provision of the ordinary workingmen's platform that the United States shall give work to every one who asks for it. So long as the number of places on government work is limited, and the labor market remains full, the law will simply give certain workmen easier positions than they can find on private work; that is, it makes a large addition to the number of government appointments, — wherein politicians find their account.

THE world of labor, meanwhile, and its communistic allies, do not grow quiet, in this country or abroad. The Lancashire cotton strikes have been followed by a general lock-out on the part of the employers. The operatives are apparently not in a condition to hold out long; great numbers of them are appealing for public charity, and as we write comes the news that a proposal from the hands for conference and compromise has failed, the men being willing only to submit to a partial reduction, and

the masters insisting on cutting off the whole ten per cent. Thereupon riots have followed, in Blackburn. The house of the Chairman of the Master's Association has been burned, and that of one of the Aldermen mobbed. It was found necessary to bring both infantry and cavalry from Boston and clear the streets. Difficulties continue in the building trades, as masters in one place after another find it necessary to insist on reducing wages. The painters of Liverpool are on a strike in consequence of a reduction, and the carpenters and joiners of Bolton are threatening the same thing for the same cause. Things seem to have reached such a condition in England that, while every opportunity is seized to insist on an advance of wages, every attempt at reduction, no matter under what necessity, is met with bitter and combined resistance, — a condition under which industry cannot long continue, but to which we as well as the rest of the world are tending.

The anxiety over the Communists seems to be increasing, as the extent of their combination becomes better known. The attempt upon the life of the Emperor of Germany, and the threatenings and slaughter breathed out upon the reporter of the *World*, in New York, by one Mégy, who is reported to have borne his share in the murder of the Archbishop of Paris, are probably significant of nothing but the fact, which we knew well enough before, that many leaders of the Commune are brutal and desperate men — though it may do no harm to have it published as widely as possible. The dread of an uprising against law and order has reached New York, where there have been many flying rumors of companies arming and drilling. An appropriation of $200,000 has been made for putting the National Guard, which includes fifteen regiments in the city and Brooklyn, in condition for active service. Consultation with the dealers in arms has led the *Tribune* to conclude that the current reports are greatly exaggerated. It is said that there have been no considerable private sales of arms, and that though there are doubtless many banded socialists in New York, they have among them but few arms, and no money to buy new ones, or ammunition. The city of Chicago has provided itself with a battery of field artillery, which is, perhaps, as persuasive an argument for domestic quiet as is to be had. The work-a-day aspirations of the socialists show still in the platforms of workingmen's meetings; lastly, in that of the National Greenback-Labor Convention at Philadelphia, which calls for paternal government, in the way of abolishing contracts for prison labor, lowering the rate of interest by issuing "free legal tender" money, repealing the resumption act, holding public lands for the use of the actual settler, encouraging manufactures, and constructing public works for the sake of employing labor. The resolutions expressly disclaimed violence or disorder, but the Chairman of the National Executive Committee, in his closing address, instructed the Convention that by electing a president, in 1880, they must emancipate labor, and "dictate themselves the laws of labor and of finance." Hence we infer that even the mildest and most mannerly of the socialist organizations, which lift the banner of the workingman, do not admit the idea of allowing any play for the opinions of those who disagree with them, but propose, like emperors and popes, to set the world right by dictation.

The Senate has passed the joint resolution allowing thirty-six thousand dollars, out of the money heretofore appropriated, to strengthen the foundation of the Washington monument, provided the commission consider it desirable; but with the proviso, unwelcome to the admirers of the monument, that no money should be spent on the superstructure without further action of Congress. This looks to us as if the Senate, or the committee on public buildings and grounds, to whom the resolution was referred, wished not to commit itself beyond recall to carrying out the design as it stands. We fancy, nevertheless, that Congress is pretty well tired of the monument, as the country seems to be, and possibly the importunity of a few enthusiasts may still weary the government into finishing the work and letting us see the difference between a blunder repented of and a blunder perpetuated.

We are glad to be told that preparation is making in New York for the establishment of a society of draughtsmen. There are many ways in which such a society may be useful, and it would be an advantage if one could be established in every city where there is a considerable number of architectural students. The opportunities of technical study which are afforded to students by the regular course of office practice are more or less limited; they might be greatly increased by association outside of offices. Every student needs constant practice in designing in a variety of ways, for which the routine of his office work gives no great opportunity, but to which an outside society may be made to give a healthful stimulus. The study of professional literature, too, is apt to be neglected under pressure of routine work, unless there is some influence of association to keep it up. A society can do much for this by providing such books and more inaccessible periodicals as are ordinarily out of reach, besides encouraging the spirit of study which leads to their use. When the course of professional study is so indefinite, and the means to it so uncertain, as is the case with us outside the architectural schools, there is especial use for all the help that association can give. We need, among other things, a better standard of draughtsmanship than is common at present, and a wider range of execution, in which there is some danger that we shall come to be limited to a moderate excellence in one kind of drawing with pen and ink. But the greatest need, for the moment, of our profession in the United States is a community of interest, *esprit de corps*, readiness to unite in the study of the common welfare. It is to the coming men especially that we are to look for the growth of professional union. The Portfolio Club of Boston, while its activity lasted, was an example of what association will do for the young members of a profession. It has left its mark in the two series of sketch books that we owe to its effort and example, and to the success of which we owe remotely, the establishment of this journal.

At a late meeting of the Royal Institute of British Architects, Mr. Thomas Blashill, Jr., who has investigated the matter sufficiently to be permitted to speak with authority, read a paper on the use of chestnut in old timber-roofs. He said that during the sixteenth and seventeenth centuries the belief obtained that chestnut had been used in many old roofs, and that it was better than oak for such purposes. Wren and Evelyn, amongst others, gave their adherence to the idea. This belief grew steadily until at length the Society of Arts offered premiums to encourage planting chestnut-trees, and it had become a matter of present interest to determine whether it had a foundation in fact, because the trees planted at that time were now mature and their timber was being sold in the market as equal to oak timber, and sometimes as oak timber itself. There were very few timber-roofs of which it had not been asserted that their timbers were of chestnut; and yet Sir Gilbert Scott and M. Viollet-le-Duc, men of largest experience in such matters, said that they have never known a single instance of its use. It had not been a difficult thing to prove that timbers said to be chestnut were in truth oak, for a fresh cross-section always showed the nature of the wood in this way: in oak the medullary rays are collected into plates which appear distinctly radiating from the centre when a cross-cut is made, while in the chestnut these rays are distinct from one another, evenly distributed, and quite invisible to the naked eye. The "flower" of oak panelling is caused by the exposed surfaces of these medullary plates, and is a beauty to which chestnut can lay no claim. The reason that English oak is superior to American oak in beauty is that its medullary rays are more numerous; the same fact accounts for its slightly greater strength, for that the strength of oak is due to these plates of rays is easy to discover by examining a piece of oak submitted to constant wear, a hand rail for instance, where it will be seen that the edges of the plates stand up above the general surface. There would be little danger of a doubtful identity in this country, where chestnut is almost in as constant use as oak, and the difference is commonly well understood. An American architect would hardly hesitate to use it in any position where he would use oak, except as a matter of beauty, taking due account of the fact that its strength is less. It is, on the other hand, somewhat easier to work than oak, and is thought to warp and split less in seasoning, we believe; while its durability is vouched for by the fact that it is preferred to other woods for railroad ties or "sleepers."

THE GOLDSMITHS' WORK AT MYCENÆ. I.

The bodies as they lay on the funeral pyres had been piled with golden ornaments and vessels of gold and silver. The women in the third tomb were buried in a heap of ornaments and jewels, among which were no less than seven hundred disks of gold *repoussée* work in a variety of patterns, large flat

rounded leaves with stems and veins, flat pieces of gold engraved in intaglio, necklaces, pendants, and flat ornaments in the shape of women and animals, and many large flowers of several gold leaves fastened in the middle, all these ornaments looking as if they were intended to be sewn upon the women's robes. One head wore for a crown a thin broad band of gold with a border of standing flowers on its upper edge, and by the other bodies were several diadems, likewise thin bands of gold, richly ornamented in relief. It is reasonable enough to suppose from their great differences and individuality that the golden masks which covered the faces of several of the men were meant for portrait masks, excepting one which represented a lion's face. To provide them for the burial was a natural means of hiding from the spectators the painful destruction of the features by the funeral fires. The heaps of bronze swords, stone arrowheads, and battle axes of both stone and bronze, showed that the warriors, like those of all primitive peoples, were buried with their arms. The rows of gold buttons, lying beside the swords as if fallen from the scabbards, their golden hilts, shoulder-belts, and breast-plates, show the splendor of their panoplies, and their graves were strewn with cups of gold and silver. The collection of copper kettles and cans in the largest tomb shows that these too were a highly prized part of their wealth.

The workmanship of the metal objects suggests some interesting speculations. Except for the bronze swords and axes, which must have been cast, there is hardly an indication of any work but that of the hammer and graver. With all their profusion of gold it is clear that the men of that early day understood, almost as well as we of the nineteenth century, how to make a little material go a great way. A few rings and seal-like pieces of gold engraved in intaglio, and one or two ornaments which Dr. Schliemann distinguishes as "massive," are apparently the only things of that metal in his enormous collection that are not wrought out of thin plates. There are indications that most of the abundant *repoussée* work was extremely thin, although he says little about this. The one piece of gold that was spared for analysis is said to have been only one one-hundredth of an inch thick, which is about the thickness, under firm compression, of two leaves of the paper on which this is printed. Even the cups and larger objects which Dr. Schliemann calls heavy, are apt to show, in his illustrations, a finely crumpled surface which indicates thin metal. The gold was remarkably pure, and therefore remarkably pliant; for the piece that was analyzed was alloyed only with ten per cent. of silver. The softness of the gold of one of the masks is especially mentioned.

Dr. Schliemann quotes from Prof. Landerer a supposition that the *repoussée* work was hammered out upon a block of lead, as is done nowadays, and the finest of the work may very well have been done in this way. But the character of much of it, and especially its constant reduplication, suggests a different process, of which an explanation is furnished by the book itself, though apparently unnoticed by its author. He found in one sepulchre seven hundred thin gold disks, of two or three inches in diameter, and he gives ten illustrations which, he says, include all the different forms of them. He found also in one tomb fifty-three cuttle-fish, apparently of thin gold, and "perfectly alike." All these, and many things of like character that are given, have the rough-edged look of ornaments that are cheaply swaged out or stamped with a die. Many of them are found in pairs, some actually soldered together, and others provided with rivet holes in the edges. In one case a silver pin was found, with a broad flat head of gold, composed of two hollow shells soldered together back to back, clasping the pin between them. There were many similar objects with the halves separated, but clearly intended for a like use. It is noticeable too that the ornaments of this kind are symmetrical about one axis, so that the two halves could be made on a single pattern and put together, unaffected by reversing. These things could hardly have been made and duplicated by hand work, merely hammering into lead. Much as we like to believe in the unsophisticated simplicity of the heroic ages, and shrink from the idea of their employing the tricks of cheap manufacture, it is in evidence here that they had a plentiful supply of cheap jewelry, made thin and hollow, and endlessly repeated from stock patterns, as children's tin horses are made, or as such jewelry is made nowadays, but with this difference, nevertheless, that it was really made of gold, and was worn apparently by persons of royal blood. There is a good deal of Etruscan and Egyptian jewelry to be found in various museums which is made in halves in this way, sometimes hollow and sometimes filled with baser metal; but it is generally in pieces of small size and delicate workmanship, such as pendants to earrings and necklaces. It is only in Mycenæ, as yet, that proofs have been found of its manufacture on a large scale and by rough processes, as if to suit the tastes of a semi-barbarous people.

Now Dr. Schliemann gives us (pp. 107, 109) cuts of two blocks of stone, one of granite and one of basalt, on the faces of which are sunk intaglios of ornaments resembling in character the cheap jewelry of which we have spoken. He considers them to be moulds in which gold ornaments were cast. But two or three difficulties present themselves. There were practically no cast ornaments found at Mycenæ. Among the thousands of ornaments enumerated in the book, but one is believed to have been cast. Then too the indentations in the surfaces of the blocks are apparently very shallow, so shallow that it would have been very difficult, not to say impossible, to cast in them with any success, especially since there are no vent-holes, and the blocks seem too roughly finished to have received a cover. In this respect they differ from moulds of clay stone which Dr. Schliemann found at Hissarlik, and from others found by Mr. Layard at Nineveh, in which the sinkages are deep and extend to the edges of the blocks, or are provided with vent-holes, where too the surfaces are smoothly dressed so as to fit a reverse or cover, showing in some places the holes for the pins or dowels by which they were adjusted to each other. We may confess, too, that we have never been able to see how moulds of ordinary stone, although they might do for metals that fuse easily, could be used for casting gold. It is to be remembered that gold is rather less fusible than cast iron, not melting till it is nearly at a white heat. A mould of sand or clay will stand such a temperature; but one of any granite with which we are acquainted would be destroyed by it. Nevertheless Mr. Layard assures us that such moulds as he found at Kouyunjik and Nimroud are in use among the Arab goldsmiths at this day, although he does not tell us how they are used. But a hard compact stone like the granite (which we suppose to mean syenite), or basalt, is a very appropriate material for a mould in which a sharp, minutely finished intaglio is to be cut in order that a plate of pliant metal may be hammered into shape upon it with punches. This seems to us likely to be the office of these moulds, and the explanation of the character and multiplication of the ornaments found in such profusion.

Many of the ornaments, however, are of much better execution than those we have just mentioned; the large gold flowers, for instance, made of leaves cut from sheets as if with the shears, leaves which apparently do not exactly repeat each other. The diadems are, if we may judge from Dr. Schliemann's illustrations, much more finely wrought than the rest of the ornaments. They are oval bands of gold from eighteen inches to two feet long, from four to six inches wide in the middle and tapering at both ends. They appear to be wrought with great delicacy and precision, and look as if they had been hammered up by hand very skilfully and finished with the graver. In design and execution alike they are much superior to the comparatively rude adornments which filled the tombs in such profusion. These diadems, like all the rest of the work, seem to be of very thin metal, pliant enough to adapt themselves to the head, and some so thin that they are strengthened by piping their edges with copper wire, another device which is commonly credited to modern times alone.

URBAN HOUSING. III.

USE OF FRONTAGE. WIDTH OF STREETS — THE TENEMENT HOUSES POSSIBLE ON SMALLER LOTS.

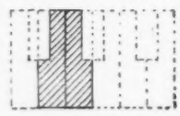
LET us take two plots of ground, each two hundred feet square, as in the previous example, and lay one out as before in the usual New York 25x100 feet lots, and the other with short streets running through the plot, and with shallow lots, each forty feet wide as well as forty feet deep, fronting on them. If we make the streets each twenty feet wide, there will be enough land left for twenty such lots. If we put one house on each lot we shall have twenty houses. Each house can have a frontage of forty feet.

Now in cities, where houses are placed close together, side by side, with party walls between them, it is possible to have windows only on the front and rear of a house. The object of windows is to get light and air into a house. The more front and rear wall we have the more windows we can have, and the more light and air in the body of the house. Sixteen houses, each of twenty-five feet front, have, together, four hundred feet of frontage. Twenty houses, each of forty feet front, have, altogether, eight hundred feet of frontage. We see we have twice as much frontage by the latter arrangement.

Similarly, we have double the amount of rear wall. With double the amount of front and rear wall we can have double the number of windows, and so double the amount of light and air in a house. If our object is windows, light, and air, it would seem that this arrangement accomplishes it. Instead of a few large houses, it will give us many small ones, as was shown in a previous example; or, instead of encouraging the building of narrow, deep, and dark houses, it will give us wide and shallow and well-lighted houses, as in the present example.

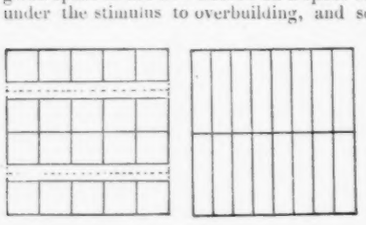
But it may be asked, and very properly, Will not such streets or lanes as are shown in these examples be narrow, sunless, damp, and gloomy? It is difficult to find a short street of exactly the same width, open at both ends, and with one of those ends opening toward the midday sun, in exactly the same direction, and built up along its whole length on both sides with houses of the height contemplated in the proposed streets, such as alone would suffice as an example to give a full answer to this important question. We had, however, in Jauncy Court, in Wall Street, New York, an example of a street nineteen feet wide, with houses four stories high on each side of it, occupied as offices by some of the leading law firms of the country for many years, although it opened only to the north, and was by no means so favorably placed as to currents of air in summer, and the sun at all seasons, as these proposed streets.

We have, in the case of the spaces between the "back buildings," as they are called, of most private houses of the best class, in Philadelphia, a still more pertinent example. These back buildings generally contain the dining-rooms and nurseries, as well as the kitchens, of the houses. They do not occupy the full width of the lot. A strip of land from four to seven feet wide is left on one side, on which their windows open, and each is divided on the other side by a party wall from the back building of the next house. The back buildings of the houses stand in pairs, and are rights and lefts, like a pair of shoes. When a number of these pairs of houses stand in a row, the strip of land left unbuilt-on, and on which the windows of the back building face, adjoins a like strip belonging to the back building of the next house beyond. The two strips together thus make a narrow court from eight to fourteen feet wide, on which the windows of the kitchens, dining-rooms, nurseries, and other rooms most lived-in generally face. Where the house fronts the north and these courts are open to the south, they are bright and sunny. The majority of the windows facing east have the sun a part of the morning, or all the morning if in the upper stories. The majority of the windows facing west have the sun a part of the afternoon, or all the afternoon if in the upper stories. The sunny brightness of these courts is increased by the reflection of the sunlight, from whichever wall it happens to fall upon, on to the wall and into the windows opposite.



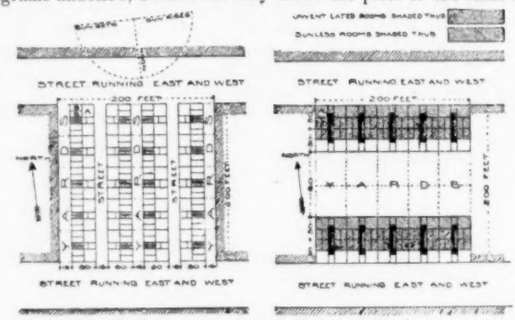
I have made the streets in these examples twenty feet wide, or nearly double the width of the spaces on which we find the windows of some of the most lived-in rooms of the best class of Philadelphia houses facing, and wider than Jauncy Court. The best width for such spaces or streets would depend on the situation and size of the plot of ground to which they belong, and the character of the buildings to be erected upon it. It may, in the long run, be safely left to the intelligence of architects and builders and landlords, and the promptings of self-interest, without calling in the philanthropist or the legislator. The fact that it will not pay to make streets which are dark, damp, gloomy, and unattractive will prevent the making of such streets on private property.

While I have felt that the question of the width of streets, if left to the owners of the property along them, as indeed all questions connected with real estate if left to those most interested in its prosperity, would be managed, not with the inflexible sameness of the New York streets, but with infinitely greater adaptability to the wants of its inhabitants, yet, for purposes of comparison, I have supposed, in the following example, the same number housed on a given space as are now housed on a space of like size, in New York, under the stimulus to overbuilding, and so to overcrowding, given by the system of uniform deep lots. The number housed is the same in both diagrams, not to recommend packing people so closely together, and not to recommend that width of street, but to show that even in such narrow streets homes, where the inhabitants can have windows, light, and air in every room, and can have thorough draughts of air through their dwellings at any time desired; where, owing to the direction of the streets and their open ends facing south, they will have the benefit of the cooling evening sea breeze from the south in summer, and be protected from the cold westerly winds and easterly storms of other seasons, are better than the dwellings provided under the New York system of wide streets, better than the homes created for them by the system of deep lots, better than such tenements as will be seen in diagram No. 2 of the next example, better than tenements where it is impossible to get a draught of air through them however stifling they may be, better than tenements which have no adequate ventilation of any kind from the time the houses are built to the time when they must be pulled down as fever breeding, or otherwise come to their end.



And, as with the width of the streets or lanes, so with the size and number of the tenements. I have drawn the two following diagrams, with the same number of tenements on each, not to recommend the putting of that number of tenements on that space of ground, but to show how, if they must be put there, they may be arranged so as to avoid the "worst evil" of overcrowding. Acting on the assumption of those who hold that the overcrowding of New York tenement houses is a necessary evil, consequent on the limited size of the island on which New York is placed (an assumption which I do not believe for a moment), I proceed to show to those who so believe how to crowd people *in the most humane manner*. In so doing, I suggest a system that is also capable of being followed with fewer families on the same space, so as to make flats or suites of rooms of any extent, with wider streets, etc., and to meet the wants of every class of society, and to afford the most comfort and healthfulness of arrangement at the least expense.

With this preface let us now proceed to take another example, and the last the limits of this article will allow of. Let us take the two plots of ground as before, each two hundred feet square, and lay them out as in the last example, but with, for purposes of comparison, a somewhat different spacing of yards and streets; and let us now further suppose the houses on these plots to be intended for tenement houses. In this example, as will be seen by a study of the diagrams annexed, I have not only made the plots of the same size,



No. 1. No. 2.

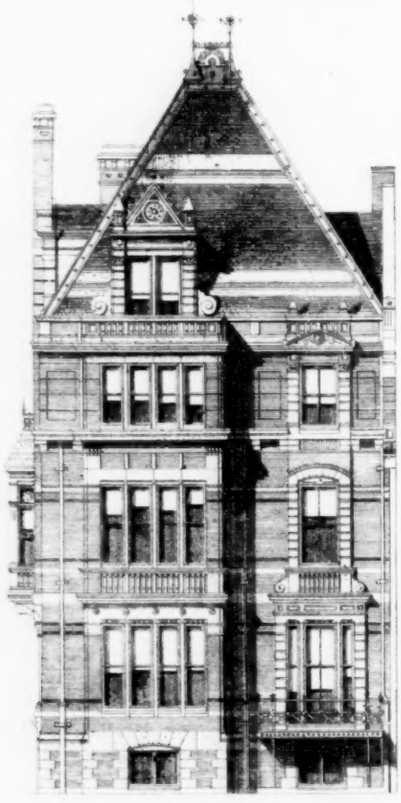
but have also made the number of tenements and the size and arrangement of each tenement precisely the same in both cases. It seems to me that in this way these diagrams show, more clearly than any words can do, that the dark, unventilated inside rooms, which form the worst feature of New York tenement houses, do not arise from the limited width of Manhattan Island, as has been so often asserted, but that they arise on the contrary from the way in which the tenements are grouped together. They show also how, in future, by a different grouping, those main evils can be wholly avoided; and farther show that this can be done without loss of space, and that under the system that they propose, as many persons can be housed comfortably and healthfully on a given space as are now, under the present system, housed uncomfortably and most unhealthfully.

In presenting these contributions toward a better understanding of the influence of imposing inflexible conditions on the distribution of real estate, and making all lots in a city of one size, and that a large size; in showing how deep lots encourage the building of deep houses, and how deep houses necessitate inside rooms, which cannot but be insufficiently lighted and ventilated, and which are therefore not fit for human habitation, my object has been to urge, not a much-needed charity, but a better political economy. And also, in making the plan for tenement houses shown in diagram No. 1, my aim has been to get at a system combining such economy of space and materials as would recommend the system *to owners and builders of tenement houses*, while at the same time securing better accommodations for tenement house occupants, and, especially by providing light and ventilation in their sleeping places, to increase their comfort, elevate their standard of living, and benefit the public health.

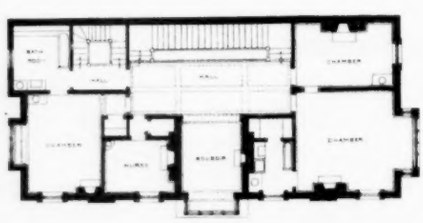
The majority of the tenement houses in New York are situated in streets running east and west. From the way the upper part of the city is laid out, this is and must always be the case, as the majority of the streets run east and west. The present system of building tenement houses is to build them fronting on the street, and either one or two tenements deep. In either case they consist of a living-room, lighted from the street or yard, and two dark bedrooms placed behind it, in the body of the house, which are thus "inside rooms," getting no light or air except through the living-room. In the case of the "two deep" tenements, which are the greater part of the whole number, it is impossible to have a current of air through them, to cool them in summer or to air them at any time. In addition to this their greatest evil, those tenements fronting north, that is half of the majority of the tenements in New York, get no sun, or next to none, from one year's end to the other.

Diagram No. 2 shows two rows of two deep tenement houses built

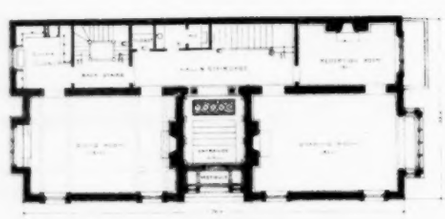
SIDE ELEVATION



FRONT ELEVATION



SECOND FLOOR PLAN



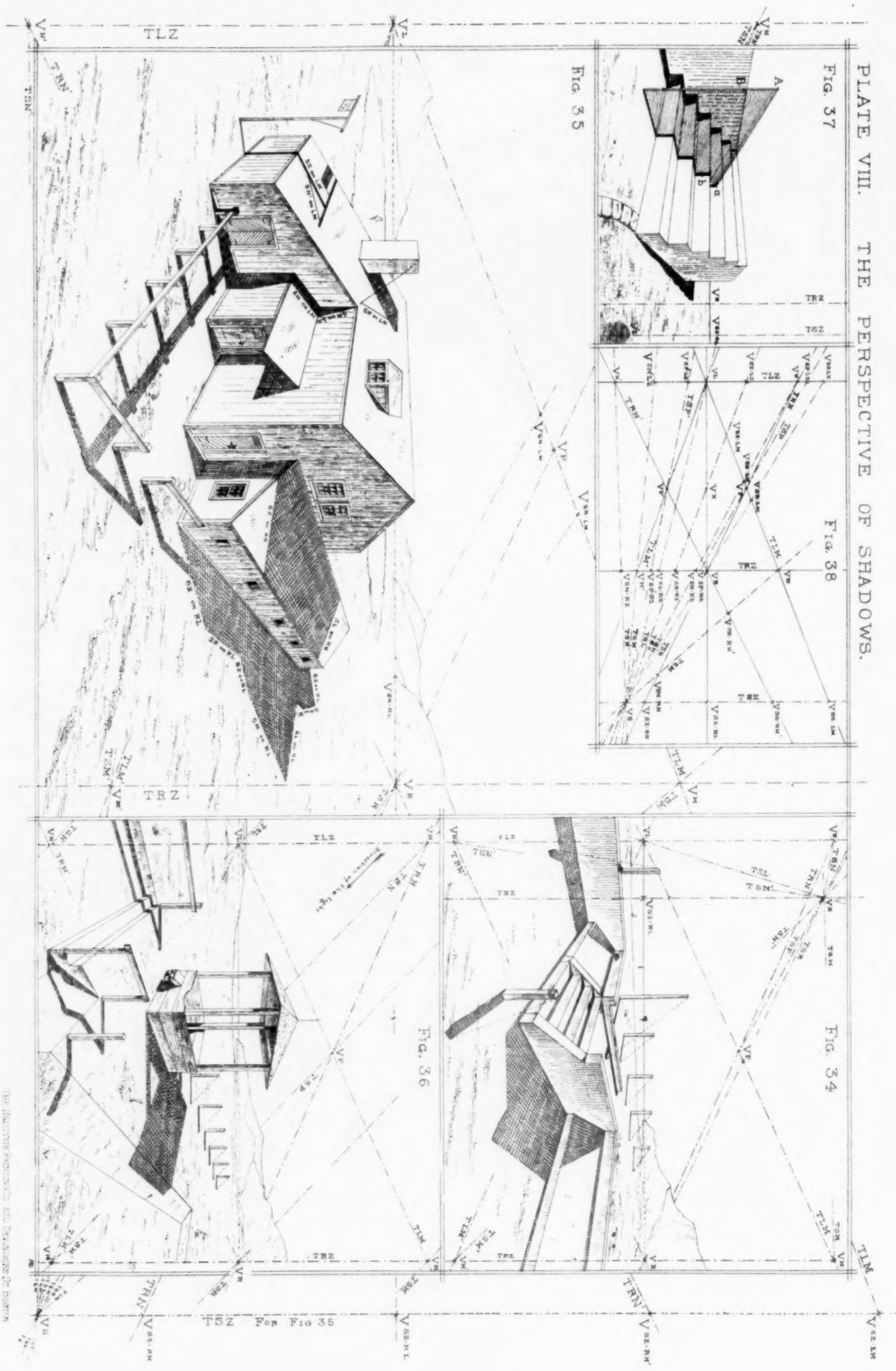
FIRST FLOOR PLAN

THE HELIOTYPE PRINTING CO. 337 CONGRESS ST. BOSTON

HOUSE OF MRS. FISKE. BOSTON. MASS.

MESSRS. CUMMINGS & SEARS ARCH'TS.

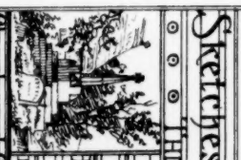
PLATE VIII. THE PERSPECTIVE OF SHADOWS.



Sketches of Three Parish Churches in Monmouthshire & England

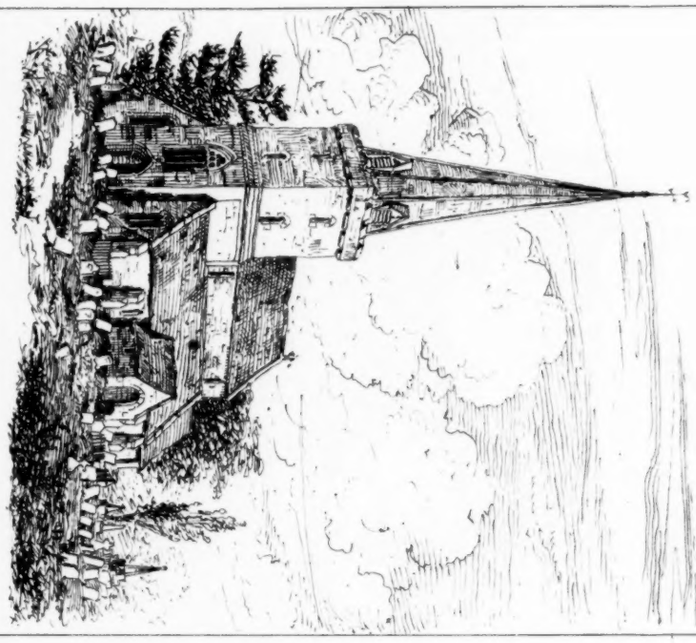
By W. H. Wood. Sept 22 1877

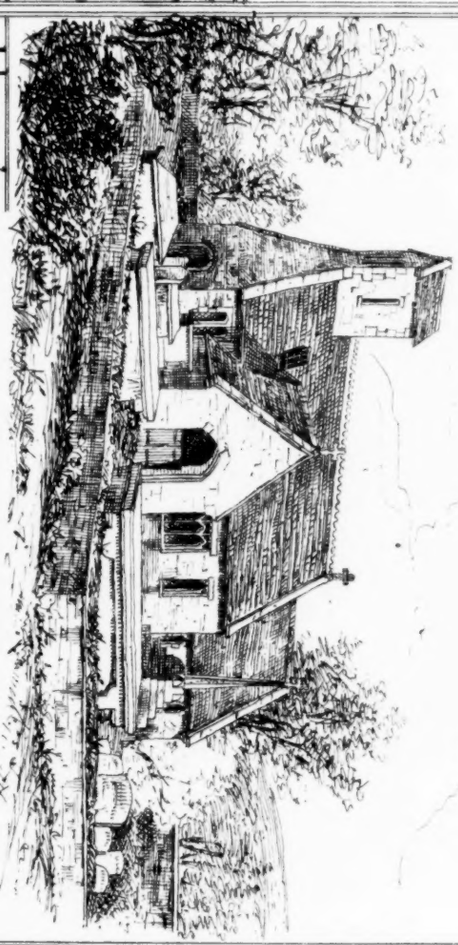
Redrawn by S. E. Tobey



Churchyard Cross

Trellick





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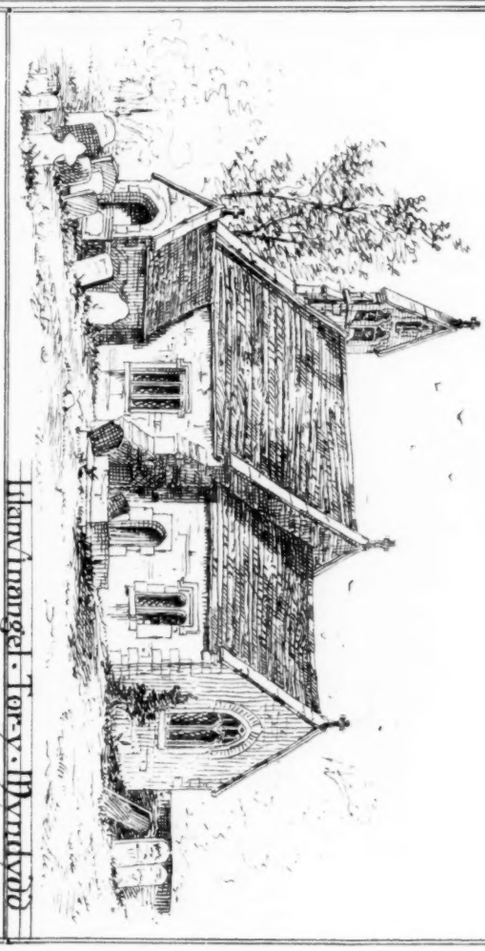
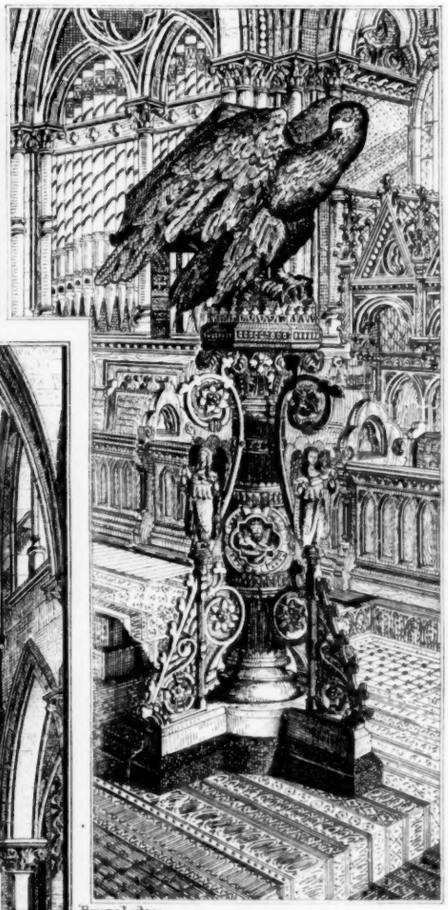


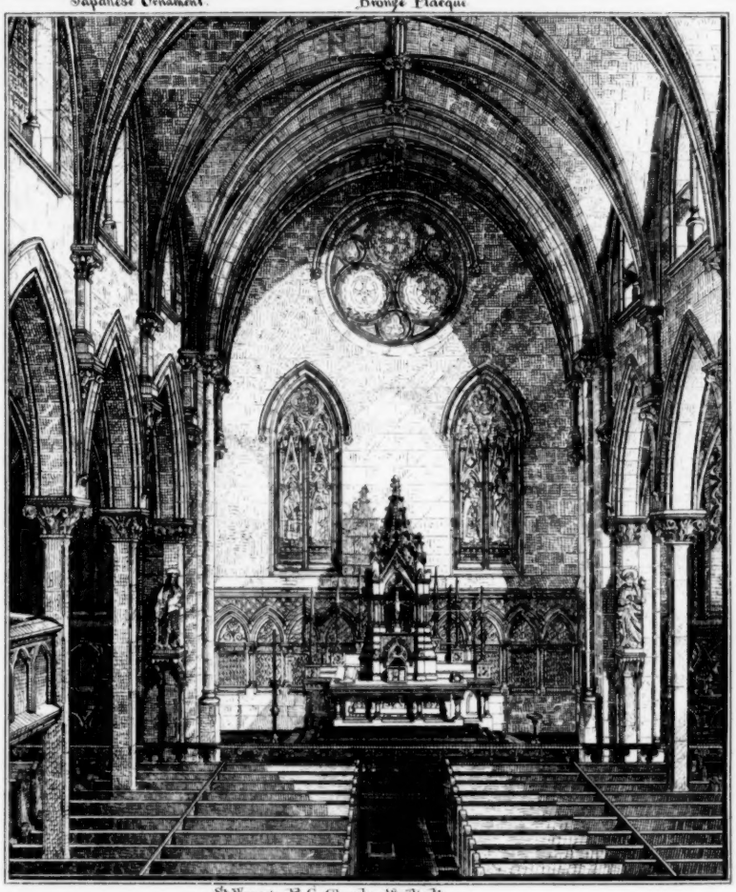
Llanvihangel Torey Llwydcoe

Japanese Ornament.

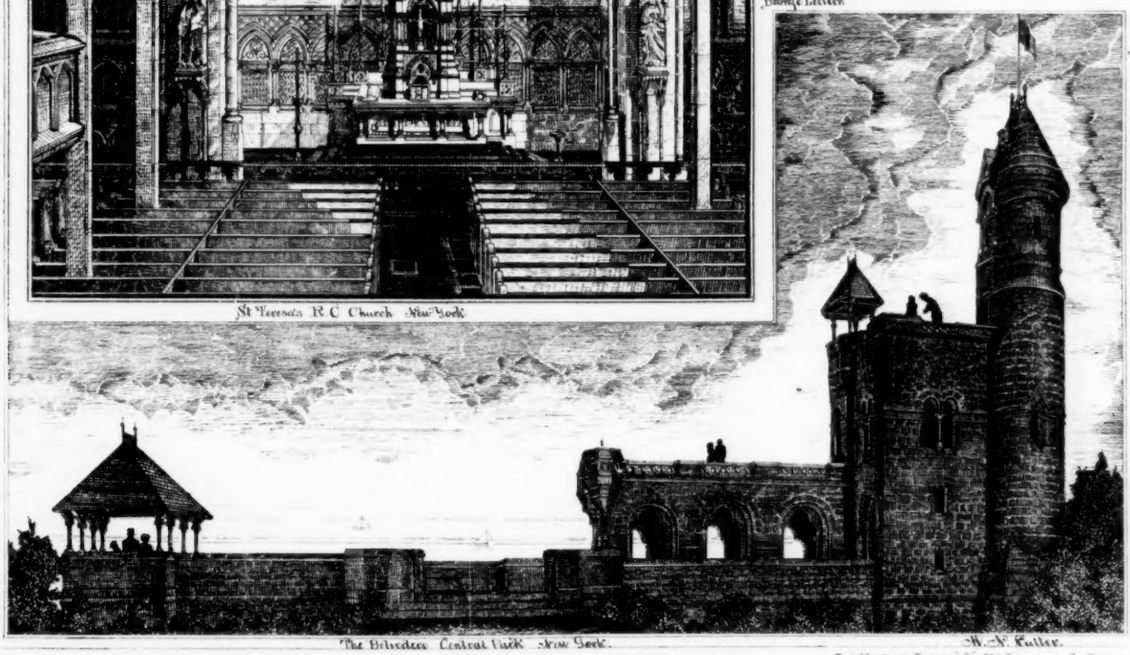
Bronze Plaque



Bronze Lectern



St Veronica's R.C. Church New York



The Belvedere Central Park New York.

W. A. Fuller.

The Heliotype Printing Co. and Engravers of Boston

according to the present system. Each row of tenement houses consists of two rows of tenements placed back to back, so that the bedrooms are shut up in the body of the house.

Diagram No. 1 shows how these evils may be wholly avoided, with no sacrifice of space or diminution of the number or size of the tenements, by placing these rows of tenements at equal distances from each other, thus securing air and light; and, by having them face east and west (as shown in diagram No. 1) instead of north and south (as shown in diagram No. 2), securing to every room, whether living-room or bedroom, an hour or two, or more, of sunshine daily. The passage-ways between the houses would be short, narrow streets, running through from street to street, open at the ends, thus giving free passage for air and sunshine throughout the year.

The space occupied, the number of tenements, and the size of each tenement, are the same in both cases. The diagrams show this. This plan recommends itself, therefore, to those who may be led to believe that the main evils of the tenement houses in New York result not from overcrowding, but from the manner of the overcrowding.

RECAPITULATION.

Tenement houses in New York with the same number of families on the same space.

PRESENT SYSTEM.	IMPROVED SYSTEM.
Most of the bedrooms have no windows, light, or air.	All the bedrooms have windows, light, and air.
It is not possible in hot weather to get a current of air through most of the tenements.	It is possible in hot weather to get a current of air through every tenement.
Half of the tenements never have any sunlight the year round.	All the tenements have sunlight, front and rear, the year round.
Dark halls and stairs.	Light halls and stairs.
Escape in case of fire impossible or difficult.	Easy escape in case of fire.
A trifling saving in cost of building is gained by sacrificing the health and comfort of the tenants, and results in lower returns from the capital invested.	A trifling increase in cost of building provides for the health and comfort of the tenants, and results in better returns from the capital invested.

But, while the system of building houses not more than two rooms deep, so that every room may have windows, light, and air, is set forth in diagram No. 1 in such a way as to recommend itself to those who may, for any reason, want to house as many people as possible on a given piece of land, and who yet would prefer, in doing so, to avoid the worst evil of the present New York tenement houses, yet it shows only one of an almost infinite variety of plans which may be made, founded on that system. The same system can be used and have wider streets,[1] and where desirable larger suites of rooms. This can be done to any extent, and preserve all the advantages of the system, and avoid all the evils of inside rooms, which, not only in tenement houses but in the present style of flats, have unfortunately become common and are in all cases found greatly prejudicial to health and to comfort of living. With houses built shallow, so that each tenement has air and light and sun, front and rear, and in every room, the *possibility* of wholesome and happy homes is secured. Under the present system wholesome and happy homes are *impossible*.

An effort has been made in these articles to set forth, what has seemed to me, the worst evil of our New York tenement houses. From what I have seen in other cities and countries, and from what I can learn from those who have given the evils of the lodging-houses of the poorest classes in London and elsewhere special attention, this particular and most flagrant evil of having inside bedrooms and other rooms without windows, light, or air is nowhere to be found except in New York, and in those cities which have, in whole or in part, a deep lot system similar to that of New York. "We have," says one devoted to good works, when shown this feature of the New York tenement houses, "lodging-house horrors enough in London, but nothing like that — nothing so bad as that." I have also endeavored to show, by a variety of examples taken from the infinite number possible to be made, how by recognizing the cause and attacking it, by violating the New York system of lots, by subdividing the blocks and intersecting them by wide or narrow streets, we may obtain, even in New York, shallow lots which offer no premium to over-deep building, and on which the best form of house from a sanitary point of view, the best form of house if occupied by but one family, and still more the best form of house if occupied by a number of families, namely, the house which is but two rooms deep, with windows front and rear, will not only be possible, but will also be the most profitable. If a house is but two rooms deep, with windows front and rear, there can be no dark, unventilated, windowless rooms in it. I have endeavored to show why, in New York and its imitators, alone of the civilized world, such houses are ceasing to exist, and then how even in New York they may be obtained; and farther to show how, even putting as many people on a given area as are now in the worst crowded tenement houses, they may be housed in tenements with light and air in every room.

The present New York system puts a premium on overbuilding. The system presented in this article would put the premium on open spaces. The value of open spaces is apparent when they are in front of buildings; it is overlooked when they are in back yards and add nothing to the attractiveness, or the apparent attractiveness, of buildings. If in front, they address the general public, and in so far as they add to the charm of site and appearance of importance of a building, in so far they may be safely left to take care of themselves. Attractiveness which is added to a house by unbuilt on land in front of it is a much cheaper attractiveness than is added by built-on land in the rear of it.

Any capitalist can see this when it is put clearly before him. The difficulty is to state it so as to put it clearly. We have all felt that in reference to the housing of the poor and those of moderate means there is "something wrong the matter" in New York; but the question has been what it is. Unfortunately, the notion that the size of the island was the wrong matter, although it was the saddest of notions to contemplate as far as the present and future of New York was concerned, seemed such a sufficient and convincing explanation (it gives such rest to the soul to get at a certainty, and to feel relieved of responsibility thereby!) that it has not only paralyzed a study of the subject, but it hinders most persons from taking any other view of the subject. "The greatest pain a human being can have," says a late writer, "is the pain of entertaining a new idea."

The New York system says to the architect, the builder, the physician, the sanitarian, the philanthropist: "Expand yourselves. Let us see what you can do." The cook might as well say to the dough in the waffle-iron: "Expand yourself; expand in any way you please; let us see what you can do." One is as easy to say as the other; and one is as easy to do as the other. We are told, in New York, that the evils of our tenement houses, the like of which, if troglodytes are no more, is not upon the face of the earth, — evils which creep into every class of society, and harm in unnumbered and curiously unsuspected ways, — are evils that cannot be helped, are evils for which there is no cure, and that New York is cursed above all the cities of the earth in its situation, which carries with it these evils, and shuts out hope of ever being free of them. What New Yorker is willing to believe this?

[1] If the yard spaces, shown on the diagram No. 1, be wholly left open as lanes, or be left in common but with gates at the ends, or else have passages of communication railed or fenced off at the back of them, so that the ashes and garbage may be removed in the rear of the houses, an additional advantage will be gained in the cleanliness of the streets resulting therefrom.

THE ILLUSTRATIONS.

SKETCHES OF THREE PARISH CHURCHES IN MONMOUTHSHIRE, ENGLAND, BY MR. WILLIAM HALSEY WOOD, ARCHITECT.

THESE sketches were made during a recent tour through England, and represent fairly the picturesqueness of numerous small parish churches so characteristic of a farming district.

ST. TERESA'S CHURCH, ETC., NEW YORK, N. Y.

STUDY IN PERSPECTIVE — PLATE VIII.

See Paper on Perspective in this number.

HOUSE ON CLARENDON STREET, BOSTON, MASS. MESSRS. CUMMINGS AND SEARS, ARCHITECTS, BOSTON.

PAPERS ON PERSPECTIVE.

IX. THE PERSPECTIVE OF SHADOWS.

170. THE rays of the sun, being practically parallel, constitute a single system of parallel lines, with the same two vanishing points, 180° apart. (5.) Both these vanishing points may be found by looking in the direction followed by the rays. If one looks up in the direction of the rays, he of course sees the sun itself. If he looks down, away from the sun, he sees the shadow of his own head. Of the two vanishing points of the system, then, one is in the sun itself, and the other, just opposite, is in the shadow of the spectator's head, and is of course as far below the horizon as the sun is above it.

171. If the sun is in front of the spectator, it is the first of these vanishing points, that in the sun itself, which is behind the plane of the picture as in Fig. 34, and the vanishing point of the sun's rays, V^s, is above the horizon. If the sun is behind the spectator, as in Fig. 35, the other vanishing point is in the plane of the picture, and V_s, which we now call the vanishing point of shadows, since every point throws its shadow towards it, is below the horizon. It appears in the figure in the extreme right-hand lower corner of the plate, beyond Fig. 36. If the sun is just in the plane of the picture, neither in front of the spectator nor behind him, but on one side or above, the light falls parallel with the plane of the picture, and both vanishing points are at an infinite distance upon that plane. This is illustrated in Fig. 36.

172. The shadow of every point is accordingly a line proceeding from that point, through the air, towards the vanishing point of shadows. This line is generally invisible, the air being generally transparent; but when the air is loaded with dust or moisture this line of shadow becomes visible, as is often witnessed at sunset, when the shadows of clouds near the western horizon are thrown across the sky in parallel lines, — lines which seem to converge towards the sun in the west, and in the east to converge towards the vanishing point of shadows opposite the sun. If this invisible shadow of a point strikes any solid object it becomes visible as a point of shadow on its surface. The *invisible* shadow of a point, then, is a line in space; the *visible* shadow of a point is a point situated where the line of invisible shadow pierces any intercepting surface upon which the shadow may fall.

173. In like manner, the *invisible* shadow of a line is a surface in space, and the *visible* shadow of the line is a line, being the line in which this surface intersects the surface upon which the shadow falls. If the line that casts the shadow is curved, the invisible shadow is cylindrical; if it is a straight line that casts the shadow, the shadow in space is a plane, and if the surface that receives it is also a plane, the line of visible shadow is a straight line, being the line of intersection of two planes.

In Fig. 37 both the visible and the invisible shadows of a line are represented. The sun is supposed to be behind the spectator, in such a position that the shadow of the spectator's head is thrown upon the ground within the limits of the picture at V^s. The rays of light, and the shadows of every point in the line are directed towards this point. The shadow in space is seen to be a plane, and the shadow on the ground and steps is seen to be the intersection of this plane by the several planes which it encounters. It sometimes happens in photographs that the shadow of the camera is seen in the foreground, at the vanishing point of shadows.

174. If a solid body casts a shadow, the *invisible* shadow, passing downward through the air away from the sun, is a solid cylinder, or solid prism, according as the line upon the body that casts the shadow is a curved line or rectilinear. This line is obviously the line upon the surface of the body which separates the side towards the sun, which is in light, from the shady side. This line is called the *dividing line of light and shade*. The *visible* shadow of the solid object, seen upon any other object, is a surface, the shape of which is determined by the shadow cast by the line of light and shade.

To find the shadow of a solid body, then, is the same thing as to find the shadow of a line, namely, the shadow of its dividing line of light and shade.

175. In finding the shadow of a point, also, the only practicable way is first to find the shadow of some line that passes through the point, and then to find in this line of shadow the point of shadow that corresponds to it. This point is easily found by drawing a line, representing the invisible shadow of the point, through the air, from the perspective of the point to the vanishing point of shadows, V^s. Its point of intersection with the visible shadow of the auxiliary line is the shadow of the point in question.

Thus in Fig. 37 the point A has its shadow at *a*, and conversely, the shadow at *b*, at the bottom of the steps, is cast by the point B; this shows just how much of the stick throws its shadow on the ground. In Fig. 34, the shadows of all the principal points, such as the top of the sign-post or of the peak of the gable, are found by drawing lines to V^s, and marking their points of intersection with the shadows of the lines in which these principal points lie.

176. The whole problem of shadows, thus resolves itself into the problem of finding the shadow of a line; and as in this paper we will consider only the case of straight lines throwing their shadows upon plane surfaces, we have to do only with rectilinear shadows, lying where the plane of the invisible shadow cuts the plane of the surface that receives it. The whole question becomes, then, simply a question of the intersection of planes.

177. Now the line of intersection of two planes, as we have seen in the case of two intersecting roof planes, has its vanishing point at the intersection of the traces or horizons of those planes. (34.) Hence the (visible) shadow of a line upon a given plane will have its vanishing point at the intersection of the trace of that plane with the trace of the plane of the (invisible) shadow of the line. And since, if any plane is given in perspective, its trace is already known, the only thing that remains to be done is to find the trace of the plane of the shadow. The direction of the line and the direction of the light are of course also given; that is to say, their vanishing points also are known.

178. But these two vanishing points being known, the trace of the invisible plane of the shadow is easy to ascertain. For the trace of a plane passes through the vanishing points of any two lines that lie in it. (13, c.) Now, as may be seen in Fig. 37, the line that casts it lies in the plane of the shadow, and so does the invisible shadow of any point in that line. The trace of the plane of the shadow accordingly passes through the vanishing point of the line that casts it, and through the vanishing point of shadows V^s, and may be found at once by drawing a line through them.

Thus in Fig. 34 the trace of the shadows of the right-hand horizontal lines R, whose vanishing point is V^R, is the line T S R, the trace of the shadow of R, joining V^R and V^s. In the same way, if we call the plane of the shadow of L, S L; that of M, S M; that of Z, S Z; etc., we shall have the traces of these planes T S L, T S M, T S Z, etc., connecting V^s with V^L, V^M, V^Z, etc., respectively. As V^z, the vanishing point of vertical lines, is at an infinite distance in the zenith, T S Z, like T R Z and T L Z, is a vertical line.

179. It is not in general very easy to follow these invisible planes of shadow in imagination, and to see just how they go, by a mere inspection of the figure. But in the case of a vertical line, such as that of the nearest corner of the building, one can see that the plane of the shadow must be a vertical plane nearly parallel with the right-hand side of the house, but not quite so, being at a less angle with the plane of the picture. It seems reasonable, then, to find its trace T S Z parallel with T R Z, and a little further to the right.

180. Since all these planes of shadow have one element parallel to the light, all their traces, as is seen both in Fig. 34 and in Fig. 35, pass through V^s. This point thus furnishes an illustration of the proposition (13, b.) that the traces of all the systems of planes that can be passed through a line, or drawn parallel to it, in any direction, pass through the vanishing point of the system to which the line belongs, and intersect each other at that point.

V^s, accordingly, resembles the centre of a wheel, the spokes of which are drawn through the vanishing points of all the lines in the picture.

181. The intersection of the traces of these planes of shadow with the traces of the different planes on which the shadows fall gives the vanishing points of the different lines of visible shadow. Thus in Fig. 34 the trace of the shadow of the sign-post is T S Z; and the successive portions of its shadow which fall upon the ground R L, upon the side of the house L Z, and upon the roof L M, are directed to the points of intersection of T S Z with T R L, or the horizon, with T L Z, and with T L M, respectively.

Fig. 38 exhibits these relations in a diagram. The vanishing points of shadows are marked in this plate by four letters, thus, $V^{SZ\text{-}LM}$, which signifies the vanishing point of the shadow of vertical lines falling upon the plane L M. It hardly needs to be pointed out that all the different shadows cast by the lines of any system, on whatever plane they fall, have their vanishing points on the trace of the shadow of that system; and that all the shadows that fall on a plane, whatever kind of line casts them, have their vanishing points in the trace of that plane.

182. The direction of the lines of shadow being thus predetermined by the determination of their vanishing points, and their length being fixed either by the limits of the plane on which they fall or by the limits of the length of the lines that cast them, everything is known about them except their exact position. To fix this it is necessary to know the position of some one point in the line of shadow. This is generally given in the conditions of the problem. In Fig. 34, for example, so much of the shadow of the sign-post as falls on the ground is determined in position by its initial point. The shadow begins where the pole touches the ground. Thence it goes off in the direction of its vanishing point, at the intersection of T S Z with the horizon, as far as the ground extends, that is, to the wall of the house. The terminal point of the shadow on the ground is the initial point of the portion that runs up the wall, and so on.

All the shadows in Fig. 34 and Fig. 35 are drawn in this way, and illustrate these principles. It is not worth while to take space to describe in detail what may now easily be understood from an inspection of the plate.

183. If no convenient spot to begin at is furnished by the conditions, it is necessary to pass an auxiliary line, in any direction that is most convenient, through some point in the given line, and to find the point where it pierces the given plane. This point will be the initial point of the shadow of the auxiliary line; the shadow of the point selected can then be determined upon it, and the shadow of the given line drawn through that point of shadow.

It is generally most convenient to take this auxiliary line in a vertical direction.

184. Fig. 36 illustrates the case in which the sun is neither behind the spectator nor behind the picture, but just in the plane of the picture, throwing his rays parallel to it and to the plane of measures. This is by far the most convenient position for the sun when the objects represented are drawn in angular or two-point perspective, as they generally are. It is almost sure to produce a picturesque disposition of light and shade.

It is also much simpler and easier to work than either of the other cases. For since the vanishing point of shadows is at an infinite distance, V^s is entirely off the paper, and the rays of light cross the paper at their real inclination with the ground; and not only the lines of invisible shadow, but the traces of the planes of shadows, have the same inclination. There is an apparent difficulty in the case of vertical lines, and of other lines parallel to the picture, since their vanishing points, as well as the vanishing point of shadows, are at an infinite distance, and it is impracticable to find the trace of their shadows by drawing a line from one infinitely distant point to another. But it is obvious that these lines must cast their shadows in planes parallel to the picture. The shadow of such a line on any plane, then, will be parallel to the trace of that plane. (80.)

Fig. 36 furnishes abundant illustration of this case.

185. It is not always quite obvious, from mere inspection of a drawing, which of the edges of a solid object really determine the form of its shadow; which of its lines go to make up the dividing line of light and shade (174); which of its surfaces, that is, are turned towards the sun, and which are turned away from it. It is not easy to tell, for example, whether the further slope of a roof is in the light or not; whether the eaves or the ridge is casting a shadow on the ground beyond. Conversely, it is not always easy to judge just where the sun must be put in order to produce the distribution of light and shade upon the different surfaces that is desired.

These difficulties disappear, however, if we consider that what we want to know is whether or not the sun has set, so to speak, to the plane in question, and apply to that plane the same test that we apply to the horizontal plane of the ground. If the sun is above the horizon, or the vanishing point of shadows, opposite the sun, is

below the horizon, we know that the ground is in light, and *vice versa*. So of every other plane: if the sun is above its horizon it is in light; if the sun has set to it, and the vanishing point of shadows is above its horizon or trace, the plane is in shade.

In Fig 35, for example, V^s is beyond T R Z; it is above the horizon of the plane R Z, the right-hand side of the house. This side of the house is accordingly in the shade; the sun has set to it. If V^s were moved to the other side of T R Z, below this horizon, that side of the house would obviously be in the light. So of R N, the plane of the back of the roof. V^s is above T R N; the sun has set to that plane also, and the dividing line of light and shade runs along the ridge; it is the ridge, not the eaves beyond, that casts a shadow.

186. But it is to be noticed that when the sun set to the end of the house which is in sight it rose to the other end of the house which is parallel to it, and as both these planes have T R Z for their trace we must discriminate between them.

This we can do if we recall the distinction already pointed out between the surfaces that are in sight and those that are not: "A plane surface upon a solid object cannot be seen unless it is on the side of the object next the trace of the plane" (12); that is to say unless it is below its horizon. (38.)

187. Bearing this in mind, we have the following rule for the illumination of surfaces by the sun: —

A plane surface that is in sight, being turned towards its trace, is in the light if the sun is on the farther side of its trace, or if the vanishing point of shadows is on the hither side, and *vice versa*.

A plane surface that is out of sight is in the light if the sun is on the hither side of its trace, or the vanishing point of shadows on the further side, and *vice versa*.

188. It has not seemed worth while to encumber the figures with constructive lines and their application. It is for the most part left to the intelligence of the reader to trace, point by point, the application of these principles in the various cases they present. In Fig. 35, however, a notation has been used for the outline of some of the principal shadows which will serve both to recall the principle of their construction and to indicate the point to which they are directed. The expression "S Z on R L," for instance, indicates that the outline to which it is attached is the shadow of a vertical line Z, on a horizontal plane, R L; "S N on L M," in like manner, when applied to the shadow upon the upper roof of the iron rod which supports the chimney, signifies the shadow of a line N upon the plane L M. In both cases the line of shadow is a line of intersection of two planes, and has its vanishing point at the intersection of their traces; in the former case at $V^{SZ \cdot RL}$, where T S Z intersects with T R L, in the latter case at $V^{SN \cdot LM}$, where T S N meets T L M.

189. In a few cases the lines of invisible shadow have been indicated, converging to V^s, to show their use in determining the length of the visible shadow. In Fig. 34, where this is done, it will be noticed that the dotted lines drawn from the top of the posts converge at the sun, while their shadows converge to the point on the horizon below the sun. In Fig. 36, the visible shadows are parallel and horizontal, while the dotted lines that indicate the invisible shadows follow the real direction of the light, falling parallel to the picture, and are parallel to each other and also to all the traces of shadows drawn through the various vanishing points.

190. It will be observed that wherever a line is parallel to the plane on which it casts its shadow it is an element of both systems of planes; the traces of both planes accordingly pass through its vanishing point (13, b.), which is their point of intersection, and the shadow is parallel to the line that casts it, as it should be.

OLD HOUSES MADE NEW.

MR. WOOLLETT'S little book, "Old Houses Made New,"[1] is an interesting collection of designs for the alteration of old country houses, a branch of architectural practice which engages, or ought to engage, the best invention, judgment, and good taste of the architect. As an old house is, *primâ facie*, better than a new one, so an old house which is worth altering may be presumed to have some character and merits of its own which are worth preserving. To effect the changes desired without insulting the original, to add the picturesque or decorative features without overstepping the modesty of nature, to steer clear of the rock of pretension on the one hand and of awkward newness on the other, is a task requiring the careful exercise of a trained experience and a ripe judgment.

We cannot say that Mr. Woollett has in every case quite successfully avoided the dangers we have alluded to. In some instances, indeed, one or another of them has visibly got the better of him. Thus the last example in the book raises the suspicion that the new house has lost the simple, homely grace of the old without gaining, at least on the exterior, any compensating beauties. In most of the cases illustrated, Mr. Woollett was fortunate in having houses to deal with which made no appeal on the score of original grace or character, and he may be easily forgiven for taking small care to preserve the old features or expression, — or, to use his own words, for "changing the exterior so as to blot out all remembrance of the original dwelling."

Mr. Woollett's most successful attempt seems to us to be that illustrated in plates 8, 9, and 10, where both the interior arrangement and the exterior design are managed with much skill and good taste. His interiors are not altogether satisfactory, being almost all too ambitious for the houses to which they belong; and it is singular to observe that while he expresses great admiration for the "simple and beautiful spirit" of the colonial style, so called, he has in his work, so far as it is set forth in this book, given no example of its use.

[1] Old Houses made New. By William M. Woollett, F. A. I. A. New York: A. J. Bicknell & Co. 1878.

CORRESPONDENCE.

THE BANK OF NOVA SCOTIA BUILDING. — THE SAVINGS BANK BUILDING.

ST. JOHN, N. B.

THE new building of the Bank of Nova Scotia is the first stone-fronted building (one warehouse excepted) which has been built in St. John since the fire. It is about thirty-eight feet in width, three stories high, and has a slated Mansard roof with the galvanized-iron semblance of three stone dormers. There are two front entrances, each emphasized by projecting porticos with polished columns of gray granite. It would be a difficult matter to decide whether the classic or the Gothic style preponderates in the design. The columns, bases, and entablatures of the porticos, for instance, are classic in both form and proportion, while the capitals are Gothic in outline, and are crowded with the most florid carving of interlaced foliage, beast, and bird. The cost of the structure is about $25,000. Mr. Samuel Brookfield, of Halifax, is the builder, and I am informed he also prepared the working drawings. A sketch, furnished by Mr. Dewar, was the only architectural assistance asked for by the directors.

Next southward of the Bank of Nova Scotia a fine building belonging to the Bayard estate is nearly completed. This is the first building here in which the principal floor has been kept high above the street grade, to admit of the basement being used for offices. This work is in charge of Mr. H. T. Starbuck, architect, who is to be congratulated on the success of his arrangements.

Tenders are now being invited by the Dominion government for the reërection of the Savings Bank. The new building is to occupy the site of the old one, destroyed by the fire, and except in the addition of an attic story will be nearly an exact reproduction of it. It will have a frontage of fifty feet on Canterbury Street, and of forty feet on Princess; it will be three stories high with basement. The front walls will be faced with freestone ashlar. The other walls and the principal partitions will be of brick. The roof will be flat, and covered with Warren's patent asphalt felt and gravel roofing. The style of the design is classic; a plinth or base is carried up to the level of the principal floor; above this is a dado 3 ft. 6 in. high, with projections at intervals forming pedestals for the Corinthian pilasters, which extend through two stories to the main cornice at the level of the third floor. Above the main cornice is an attic story with smaller pilasters, cornice, and parapet. The longest front is relieved by increased projection of the central pairs of pilasters, the break being carried up through the cornices, and finishing in a broad panelled and moulded chimney top. The interior of this building is arranged for the banking offices on the principal floor; offices for the Dominion treasurer and auditor on the second and third floors; and janitor's living rooms, boiler, fuel, etc., in the basement. The large fire-proof vaults of the old building having remained uninjured will with new doors be made to answer for the new structure. The floors throughout the building will be timbered with spruce joists, as usual here, but will be protected against fire by iron and plaster ceilings; and care is to be taken to fill the spaces between the furrings at intervals, so that no flues will be formed to carry accidental fire from one part of the building to another. The drawings have been prepared by Messrs. McKean and Fairweather, architects, under instructions from the Department of Public Works, and are now open to contractors at the offices of that firm.

With the exception of the public buildings, churches, etc., very little is being done in the way of building. The sites of many of our finest residences are still heaps of ruins, and the better class of dwellings will, I fear, be replaced but slowly. Many good tenement houses have been put up, and promise to bring in good returns; they are as a rule a vast improvement on the buildings of their class of former times.

Several new firms of architects have opened offices here this spring. Nearly all the assistants of any ability who were dismissed last fall have gone into business on their own account, and the consequent facility with which any number of sketches may be had for no other consideration than the giving their producers the chance of a job will not tend to raise the profession in the esteem of the public.

VERAX.

A NOVEL HYDRAULIC PRESS. — A curious accident took place in Providence, R. I., on the first of May, when near the middle of the morning the occupants of an office in the basement of the Wilcox building were surprised to see the floor of the room slowly rising at its middle to a height of some eighteen inches. Suggestions that the walls were settling, that it was the effect of an earthquake or of the rising tide, proved foundationless. It was at length discovered that a small leak had opened in a six-inch water main that passed under the building, and the escaping water had found in the four walls of the building a cylinder, as it were, from which it could not escape, and in the fourteen-inch-thick layer of concrete a piston head.

NOTES AND CLIPPINGS.

Protecting Theatres from Fire. — Mr. C. J. Phipps, F. S. A., who has built or remodelled some twenty or more theatres, says that in cases where the proscenium-wall is not of brick, it may be made to a certain degree fire-proof, or rather fire-resisting, by covering it to the thickness of one and a half inches with a composition made of plaster of Paris and coke breeze, or broken and ground burned bricks, which can be applied at a cost of about a dollar a square yard. This coating will, it is thought, withstand the fire for some ten or fifteen minutes.

A Large Blast. — A successful blast was made at the quarry of Mr. F. J. Fuller, at West Quincy, Mass., on April 12th. About a year ago it became necessary to enlarge the quarry towards the south about one hundred feet. The vein or layer of granite in the new pit was separated from the old quarry by a mass of seamy rock about twenty feet in thickness, and as the new opening was then about forty feet deep, it became necessary to get this mass of rock out of the way. To do this with the least expense two holes three inches in diameter and ten feet deep were drilled into this seamy rock five feet apart. These holes were charged each with five pounds of Dualin and exploded by electricity for the purpose of making a seam for powder. This being successfully accomplished, eleven kegs of powder were put into the seam and exploded, causing the whole mass of rock to be lifted from its bed and thrown into the old quarry, about forty feet below. The mass of rock moved contained about thirty thousand cubic feet, or more than two thousand tons.

Foreign Strikes. — The cotton strikers in England have already shown signs that they are willing to become rioters, and have, as at Darwen, given the police a hard fight before they could be quieted. We may yet hear of such riots as have lately taken place in Christiania, Norway, where, because the manufacturers had given notice that they were about to reduce the wages of the operatives, a mob of some five thousand men and women besieged the house of one of the leading manufacturers on April 14, and when the police interfered drove them off with showers of paving-stones. A detachment of cavalry was treated in the same way, and the mob dispersed at midnight, only to assemble again in the morning, when, as the cavalry proved ineffective, a half battery of artillery and two companies of infantry were sent to their assistance. There seems to have been little firing done, and consequently there were but few fatal injuries. It is rather subversive of the accepted notion of the merits of the two arms of the military service to find that it was the charging of the infantry with fixed bayonets that routed the rioters, against whom the cavalry, though using their swords freely, were unable to make headway.

The Shakespeare Memorial Theatre. — The new theatre at Stratford-on-Avon is making rapid progress, and the foundations are being laid for the new museum, library, and picture gallery, all to be devoted to Shakespearian objects. Henry Graves, the art publisher on Pall-Mall, has announced that he has by will bequeathed all his pictures of a Shakespearian character to this gallery. The stained glass window given by the Americans to the town of Stratford, illustrative of the Seven Ages of Man, is now nearly completed. It is in the Church of the Holy Trinity, and immediately opposite the spot where the remains of the poet lie.

A Galvano-Plastic Statue. — The Electro-Metallurgical Company of Brussels has lately completed a colossal statue of Jan van Eyck, modelled by the Belgian sculptor Pickery, in bronze, by the system of electric deposition. The galvanic process occupied several months, although a thickness of but six to eight millimetres (about one quarter of an inch) was attained. It is believed to be the largest article which has been produced by this method, being over twelve feet in height, and is regarded as a much more perfect imitation of the model than could be obtained by casting.

Cremation. — In Italy, at least, the rite of cremation bids fair to supersede any other mode of disposing of the bodies of the dead. A Cremation Society at Milan has been an incorporated body for some time, but until within a year it has been necessary to obtain the special permission of the Minister of the Interior before a body could be burned. Now, however, any prefect of a province may grant a permit, provided the relatives of the deceased and the Cremation Society make a joint petition for it.

Dr. Le Plongeon's Troubles with the Mexican Government. — Dr. Schliemann's troubles with the Turkish government, while pursuing his investigations on the site of Troy, find a parallel in the case of Dr. Le Plongeon, whose researches in Central America have already proved of remarkable interest and value. A confidential executive document has been placed before the Senate, in which Dr. Le Plongeon appeals to the United States government for protection while pursuing his archæological researches. It appears that the Mexican government has already despoiled the explorer of some of the fruits of his toil in that it has seized the fine statue of Chaacmol, which was discovered in the ruins of the ancient city Chichen-Itza. Dr. Le Plongeon, like Dr. Schliemann, is accompanied and assisted by his wife.

New Docks on the Clyde. — Mention has been made more than once to the size of the docks in London and Liverpool, and to them the new docks on the Clyde may be compared favorably. One of these docks, which will have cost about eight million dollars, has a water surface of some thirty-four acres, and a depth of water of twenty feet.

Deposits in Steam Generators. — Analysis has shown that the tubercular deposits formed in steam generators and reheaters consist of fatty matters that had become oxidized. The acid can therefore, be neutralized by an alkali, and milk of lime is recommended as a most economical agent, which will prove very effective in preventing the dangerous deposits.

Strikes. — It is said that there were one hundred and ninety-one strikes in England, during the year 1877.

A Long Cannon Range. — The range at Dülmen, in Westphalia, belonging to Herr Krupp's establishment, having become too short for the satisfactory conduct of experiments with the heavy and long range ordnance now manufactured there, a larger piece of ground has been recently converted into a range at Meppen. The old range was 7 kilometres long; the new one is 17 kilometres in length, and can, if necessary, be yet further extended. It is, therefore, the longest range in existence, and will suffice for the trial of the largest guns at present made. The ground runs from south southwest in a north northeasterly direction, nearly parallel to the Westphalian Railway, beginning near the station of Meppen, and extending past the Kellerberg to the Lathern station. The first piece of ordnance fired on the new range was a 15 centimetre siege-gun, weighing 3,000 kilogrammes. With a charge of 6.5 kilogrammes of prismatic powder and a shell weighing 31 kilogrammes, including a bursting charge of 2.3 kilogrammes, an initial velocity of 473 metres and a range of 10,000 metres was obtained, the time of flight being 45 seconds. Excellent practice is reported to have been made, all the shells bursting close to the target. As soon as the necessary railroads and buildings have been constructed, further experiments are to be made on the range with a 35.5 centimetre and a 40 centimetre gun.

Large Iron Roof. — The gas-works at the Grasbrook at Hamburg have recently been covered with a gigantic iron roof, constructed by the Essener Union. Its weight is 113,300 pounds and its length 273 feet. With the exception of the roof on the Liverpool gas-works, it is the largest gas works roof in Europe.

M. Viollet-le-Duc on the Exhibition Buildings. — It is said that M. Viollet-le-Duc, the eminent architect and historian, is to contribute a series of articles to the French review, *L'Art*, on the buildings in which the Paris Exhibition is held. They will be richly illustrated with etchings and sketches.

The Oracle at Dodona. — We have given accounts of the discoveries of the oracle of Dodona (see vol. ii., pp. 186, 220), and think that the following from the Philadelphia *Press* will also prove interesting: M. Carapanos, who was the first to determine the site of the celebrated Temple of Jupiter at Dodona in Epirus, considered to be the oldest in Greece, has just published an account of some of the results which he has obtained in his explorations. Besides statues, utensils, arms, and coins, he has recovered a considerable number of leaden plates on which are inscribed the questions addressed to the Deity. Some of them are merely curious, whereas others concern the general or local history of Greece. One has the commencement of an interrogation put by the city of Tarentum, but unfortunately it is incomplete; another asks for advice as to the policy to be pursued under certain specified circumstances, by a people living near Molossis; on a third, the Corcyreans (Corfu) inquire as to the sacrifices necessary to establish concord among them. In others, a woman asks for the means of curing a disease; Agis wishes to know whether his missing blankets and pillows are lost to him forever; a shepherd seeks for information as to whether a certain bargain offered him in reference to his flock would be to his interest if he accepted it. On some of the plates the answers are inscribed, and no one will be astonished to learn that they are obscure, or, rather, impenetrable. In some the word "truth" appears, and in many others that of "confidence," no doubt referring to the trust demanded by the oracle. The formula of interrogation is frequently preceded by the dedication: "To the God of Good Fortune." M. Carapanos does not admit, as has been generally believed by antiquarians, that the sanctuary and the rites practised there were of Egyptian origin; and in the account given by Herodotus he sees nothing more than a testimony of the ancient relations existing between the valley of the Nile and the Pelasgico-Hellenic oracle of Epirus.

An Ancient Bronze Foundry. — At Cagli, the Roman Callis, in Italy, a number of bronzes have been discovered lately, and some of them show such evident traces of never having been finished that it is supposed that a bronze foundry was once established at the site. What tends to confirm this inference is that in the same place a number of terra-cotta vessels were found, such as are used by founders.

Architects as Witnesses. — The behavior of architects in the witness-box is a thing that very much requires to be regulated by etiquette. It is quite common for three or four gentlemen on one side, and three or four on the other, to contradict each other so flatly that the judges feel compelled to comment upon it, even after counsel may have said quite as much as they dare. That such contradiction is also frequently considered to be as devoid of scientific intelligence as of personal good taste is not too much to say. Medical men, no doubt, may be said to contradict each other not a little to order, but etiquette, at least, keeps their differences of opinion within limits. Architects, on the contrary, would seem to be so glad sometimes to earn a few guineas, and so elevated by the honor of a solicitor's retainer, that their opinions cease to have any value whatever. Especially when the case of dispute happens to affect, as it frequently must, the personal interests of a brother practitioner, if it be only in respect of his work, etiquette, we need scarcely say, ought certainly to govern very strictly. — *The Architect.*

A Cement for Wood. — It is said that a cement for wood vessels required to be water-tight may be formed by a mixture of lime-clay and oxide of iron, separately calcined and reduced to fine powder, then intimately mixed, left in a close vessel, and mixed with the requisite quantity of water at the moment when ready to be used.

Solar Photography. — M. Janssen is acquiring new and valuable knowledge relative to the structure of the sun's disk, by means of large images and brief photographic exposures. He is thus enabled to neutralize the effects of irradiation. By means of a special and very perfect mechanism, he has reduced the time of exposure to *one three thousandth* of a second, obtaining sharply-defined images corresponding to disks of more than a meter in diameter. — *Comptes Rendus.*