THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. III.] Copyright, 1878, JAMES R. OSGOOD & CO. [NO. 110.

BOSTON, FEBRUARY 2, 1878.

CONTENTS.

AT the very end of the last year Italy lost the most distinguished of her recent architects — almost the only one who had achieved a European reputation — by a death as startling as his career had been brilliant. All travellers who have visited Milan within the last ten years remember the famous gallery or passage named after the late king, the *Galleria Vittorio Emanuele*, the work of the architect Giuseppe Mengoni. It was the most splendid work of modern architecture in Milan, and the finest passage in Europe. Finished to all intents in 1867, it was but a part of a grand scheme of the architect for renovating and embellishing the chief square of the city, — the *Piazza del Duomo*, out of the middle of which rises the cathedral. The carrying out of this scheme, which languished during some years, has lately been quickened, and the entrance façade through which the gallery opens upon the square, which had been left unbuilt, was taken up last year. The work had been so vigorously pressed, that it was substantially done, a day for its dedication was fixed, and the principal staging removed, leaving only a light temporary scaffold from which to give the last touch to the work. On the 30th of December, just ten days before the death of the king in whose name the gallery was dedicated, Mengoni went upon the scaffold to examine some detail which workmen were adjusting upon the cornice of the façade. He was seen to tread upon a loose board, which yielded under him; to fall, clutching vainly at the scaffold; and in a moment lay dead at the foot of his great work.

MENGONI was a man of great energy, in the very prime of his powers, being only forty-five years old; and his death is felt as a public calamity. The city of Milan honored him with a public funeral. He left a number of works which had given him reputation, among them the Savings Bank, and the arcades of the cemetery or *Campo Santo*, at Bologna. The gallery at Milan was on a far more ambitious scale than any that had been built before it. It is two covered passages or streets, crossing each other at right angles, and penetrating one of the blocks, surrounded by four thoroughfares, which border on the Piazza. The greatest length is 630 feet: the passages are nearly fifty feet wide and eighty-five high, roofed with iron and glass, and intersect in an octagon, the dome of which is a hundred and sixty feet above the pavement. The buildings which line them are of fine sandstone, the handsomest in the city, containing shops below, and if we remember rightly, apartments above; the whole designed with breadth and richness, and showing in its detail unmistakable marks of French influence; the first modern Italian work perhaps in which that influence was notable. The treatment of the Piazza according to his great project was still unfinished; but the fame of it had brought him commissions from all sides, even from out of Italy, so that his hands were full of designs. He had prepared among other things a project for a group of covered bazaars at Rome, and for a great mercantile building in the Stephan's Platz or Square of the Cathedral at Vienna.

THE coroner's inquest on the fall of the Tariffville bridge will doubtless be finished before this is printed; but at present the course of the testimony seems to wander vaguely enough about the points at issue. On reading the accounts of it, one is struck by the neglect of some of the main questions, — for instance, whether the bridge was properly constructed in the first place, and whether it had been properly watched since; most of the attention having been given to the question how the accident happened, which is important only for its bearing on the first two. The testimony is somewhat remarkable in showing a common fogginess as to the construction of bridges, not only in those who have charge of them but in those who construct them. The superintendent of the road was not afraid to testify under oath that he knew that a bridge of like strength never failed before under a similar weight. One bridge-builder gave his opinion, which we may sincerely hope is not justified, that the bridge is heavier in iron and timbers than nine-tenths of the bridges in New England. The iron, he thought, could not have had more than 18,000 pounds per square inch to carry, and he could not see how it should have given way, unless the train left the track. He considered the wood strong enough to have borne three times the weight then put upon it. The road-master of another road testified that all the suspension rods which gave way were broken through the screw-threads (which would seem to show that they broke not on account of flaws, but because they were over-strained), and computing the weight on the rods at not over 23,500 pounds to the square inch, "which was much less than they were warranted for," he could not see why the bridge gave way. A civil engineer testified that the iron and timber were heavier than is used in most bridges, and he thought that if one of the three suspension rods in a panel had broken, the other two would have been enough to carry the load.

ALL these things point to a condition of dangerous ignorance in people who build bridges and those who use them. It looks as if they really believed that it is safe to warrant building-materials, and to load them, up to what the tests show to be their breaking weight. If these are a fair specimen of the ideas current among railroad men, — and we do not know why they should be exceptional, — we may expect a plentiful supply of such accidents as those of Ashtabula and Tariffville in the next few years. The question, which has been much discussed, whether the train left the rails in the Tariffville case, is interesting only as a matter of detail, showing whether there was an extraordinary shock or not. If it were proved that it did not, it would show clearly that the bridge was weak: otherwise it leaves the question of its sufficiency untouched. But it is perfectly easy to show by examination and computation whether the construction was proper; and it is pretty sure that it was not. The letter to the *Hartford Courant*, which we copy in another column, gives the only intelligent account we have seen of the structure. We have not verified Mr. Merriman's computations, with which other published, but probably less careful figures, agree sufficiently well, but we have no doubt of their accuracy; and they show what we suggested in our last number, that the iron at least was loaded with double the weight which would have been put upon it by a prudent engineer. We do not see that his censure of the railroad company or of the commissioners is any more severe than the occasion warrants.

THE lesson of the accident in the New York Post Office last year is apparently not lost upon the people who live in or near it; for there has been great alarm lately over the settlement of partitions in the upper stories of the building, and the repairs to which they have led. The money-order department on the Broadway front is a room a hundred feet long, over which are a number of smaller rooms, with brick partitions between carried on iron beams. It is a year and a half since horizontal cracks were noticed near the tops of these partitions, indicating settlement in the beams; and although, being tested by strips of paper pasted over them, the cracks, it is said, have shown no considerable increase, it has been decided to strengthen the partitions by trussing; and for this reason the rooms have been cleared, to the public alarm. The reason given for the strengthening process is not very

much to the point: viz., that it may be necessary at some time to put greater weight in the upper rooms, — safes for instance: since the additional weight must come, not on the partitions, but on the floors, which are doubtless framed independently of them. It does not appear that the settlement has been of a kind to indicate serious injury to the building. Nevertheless the whole fortune of the New York Post Office enforces the lesson that the kind of construction there adopted — the carrying of long and high brick partitions on iron beams — is one to be employed with great caution; because such beams, heavily loaded, are apt to take a permanent "set," and there are no data for determining under what circumstances and to what degree this set is likely to increase constantly in a long period of years; so that, considering the uncertainty of the ordinary qualities of iron, it is necessary to allow a very large factor of safety. There is, in fact, with the late improvements in the manufacture of concretes and terra-cotta, no longer any need of building partitions in fireproof buildings of such heavy materials as have been used.

The recent establishment of a Builders' Exchange in Cincinnati, and the consequent increase of concert among the building trades, have led among other things, as we have reported, to a proposition to abolish the system of general contracts, and substitute the practice of letting out every kind of work in a building in a separate and independent contract directly to the man who is to do it. This resolution is sustained by a law that has been passed to regulate the conduct of public buildings, and there is consequently at this moment, or has just been, some confusion over a public building, which the authorities wished to let out "in the lump," unaware of the prohibition which exists. There is no doubt that the habit of giving out general contracts leads, where competition is keen, to a good many abuses. It brings a great pressure on sub-contractors from bidders who wish to take work cheaply, and subjects them to risk of loss when these bidders prove unsound. It commonly requires two profits instead of one, between the owner and the mechanic who fulfils the sub-contract, and therefore either increases the owner's expense or diminishes the mechanic's profit. In large works it makes the separate contracts amount to great sums, and so increases the risk to the employer. It makes it, moreover, more difficult to follow up and fairly compare the different estimates, or to make the most advantageous combination of them. These things are so important in public works, where the cost is generally large, and the work itself complex, where, moreover, it is difficult to make any exceptions among contractors, who, whatever their habits of work, must stand equally before the authorities, — that the contracts are practically always subdivided. But in private building, unless on a very large scale, there is so much advantage in the directness of responsibility and ease of superintendence due to having one contractor, whose duty it is to see that all things work together, that there is, and perhaps always will be, a very common preference for him; especially as the greater freedom of choice will always enable an employer who wishes to be on the safe side to choose his builder securely if he will. It is a matter, on the whole, to be best settled by the growth of a natural usage: we doubt the wisdom of attempting to regulate it by legislative enactment or by a rigid rule of practice.

Mr. Samuel Huggins writes to the *Builder* to propose a remarkable and ingenious way of building church spires. He would set in the axis of his spire a wrought-iron rod, or post, carrying a cast-iron finial; to the top of this he would attach iron chains, which should form the ribs or arrises of the spire, — four or eight as the case might be, — and anchor them at the bottom into the masonry at the top of his tower. The spire should be completed by hanging between these chains successive courses of perforated and decorated bands, of iron we presume, which would give an effect analogous to an open-work mediæval spire. The chains could be wrought in any shape "from a simple bead-form to one richly moulded and twined with flowers, leaves, and tendrils." "A spire so constructed," he says, "would be equal in effect to a completely pierced one of stone, — a nervous, well-relieved, vigorous structure, worthy of association with any composition, Gothic or classic." Nervous, we should say, decidedly; but not vigorous, unless by dint of a vigor in the designer which overpowered the essential expression of his construction; nor do we see to what known architectural style Mr. Huggins's "catenary spire" could kindly ally itself. It is perhaps not likely that in the face of English traditions any thing so radical will find favor, but if the projector were an American we should certainly expect to see it carried out here; and although he manfully rejects any idea of shamming a stone spire, — upholding his invention on its own merits, — we fear that is precisely the form in which the contrivance would show itself in Yankee-land. No doubt the use of iron has many a new form in architectural design waiting for us; and it may as it grows distinctly modify our ideas of style. The catenary curve, too, is one that we have before this heard suggested as the outline of a spire, though it is much less expressive, to our mind, than a straight line, of the incomparable *élan* of a Gothic spire. But iron, like every other material, will doubtless win its way and mould its shapes in features which its own qualities suggest. We should prefer to see every tub on its own bottom, and should hardly take kindly to the prospect of seeing our stone spires mocked by bunches of festoons, even if we agreed with Mr. Huggins in saying, "Pierce a spire, and you become the rival of the fairies, and impart to it a ghostly, ethereal air, than which nothing can be more highly becoming in a structure of its character and office."

THE LABOR TROUBLES. — II.

Class Organization.

The outlook upon the world of labor is just now especially gloomy. This is not so much because it is full of troubles — for it has always been full of troubles — as because these troubles, which used to be the isolated quarrels of one set of workmen with their employers, are nowadays gathering into combined struggles which overspread whole communities, and threaten even to involve nations. The same union among workmen which widens their strikes makes them more bitter and prolonged, more mischievous in the present and more dangerous in the future. Every struggle teaches the workmen more and more the possibility of extended combinations among themselves, and the necessity of them if they are to carry out their policy of dictating by arbitrary compulsion the condition of the labor-markets of the world. Within the past year the ship-building business in the north of Great Britain has been kept in disorder for many months, and finally brought to a condition which threatens permanent decline, by the continued strikes of the shipwrights. The iron-manufacturers of the kingdom, already somewhat crippled by the recent rivalry of other countries, — notably of our own, — have been seriously injured by the attacks made on them by their own operatives; the obstinate strikes of carpenters and masons, not yet ended, have disorganized the English building-trades, and in London itself have brought the work of building to a stand-still, interrupting the greatest public works of the day, thrusting thousands of workmen out of employment, compelling millions of capital to lie idle, and inflicting heavy loss upon a large part of the community. In our own country the chief industry of Massachusetts is at this moment crippled by a sudden revolt of the Crispin order of shoemakers, which, there is reason to believe, may work it irreparable mischief. The strike of the engineers, that last summer paralyzed for a time the intercommunication of the nation, and roused the proletariat of Pennsylvania into riots which it took the army of the United States to suppress, has hardly passed out of mind when we find the working-men of San Francisco rising to drive into the sea or burn in their houses a large body of rivals, and defying the civil authorities in threatening meetings, which clamor to Congress for class legislation, and menace with violence and plunder those who oppose their demands.

It is not our intention at this point to discuss the rights and wrongs of the aims of the unions that control these movements, — although, whatever sympathy we may have for some of their objects, it is somewhat difficult to refrain from speaking in blame of their measures, — but only to call attention to the importance of them, to remind our readers how great a factor the labor-unions aim to be and may become in politics

and society, and how vital are the questions which they propose, — questions that are passed by at present in the conflict of other interests, but may at any time be thrust forward in a way that will make them of the utmost moment.

The immediate injury which results from the warfare of workmen in disorganizing industry, and waste of means, is patent enough, though it seems as if only people who are concerned with the employment of labor had as yet time to notice it. The broader secondary results are now beginning to be felt in the absolute decay with which it menaces some of the chief industries of the day. Apparently, if the present temper of working-men continues, we may expect that every productive industry known to civilization must, as soon as it becomes prominent enough to be the occasion of a quarrel, be thrown into disorder and its progress checked by strikes. So that while we are pluming ourselves on our present century as an age of ceaseless national progress and mechanical development, there has been growing up with it an influence which threatens by dint of wilful obstructiveness to blight it at every turn, as the worm follows the growth of the orchard, or rot the introduction of the potato.

The thing which has distinguished the recent strikes, and given them weight as indications of what we may look for in the future, is the breadth of the interests they involve, and the alliances they have led to, as much as the determination they have shown and in some cases the extremities to which they have led. The Brotherhood of Locomotive Engineers last summer threatened to interrupt the whole traffic of the United States. The Crispins in Massachusetts are at this moment appealing for support to their fellows throughout the country, and contributions are made to them by many sympathizers outside their order. The striking trades in England are drawing aid from various parts of the kingdom; and the efforts of the masters to import foreign men have led the workmen to employ emissaries through the United States and Canada, as well as in Continental cities, to counteract by timely representation the inducements of the employers. The International Association has existed for some time; and though its workings are not much known, though its responsibility for the movements of the Paris Commune has doubtless been exaggerated in popular report, and though its congresses have apparently amounted to little, it furnishes a means of communication, and will furnish, when they choose, a means of union, for workmen all over the world, — a means of disseminating doctrines, of encouraging class-feeling, if need be, of concerting movements. There is a whole literature of periodicals, pamphlets, and books, devoted to furthering what are assumed to be the interests of working-men, advocating ideas and political doctrines which are not shared by the rest of the world, and a whole fraternity of agitators, spouters, and demagogues taking every opportunity to publish these doctrines. The anti-cooly organizations in California are occupying the chief attention of politicians in that State, and the legislature has at their instance appealed to Congress to place a prohibitory duty on Chinese immigrants. All these things are symptoms of an increasing disposition to general organization among the working-men, and of the growing breadth of their efforts and their contests. They indicate a tendency to a gradual consolidation of the men into a united class with class-feelings, class-prejudices, class-aims, and class-politics.

In England this consolidation has naturally gone much further than in the United States. The working-men's associations are wider, more united, and have made a more determined effort not only to rule the labor-market, but to make themselves felt in politics, and to secure a direct class representation in Parliament. The stratification of English society, its immemorial division into aristocracy, burgesses, and yeomanry, the more recent growth of the great middle class, the present predominance of manufacturing, the still sharply defined social classification of the people, — all these things make the consolidation of the working class a natural and perhaps an inevitable growth; and in a political fabric that has grown under and been adapted to class government, such a discrimination is possibly salutary as well as necessary, even though it may reach its development through strife. In the United States the working-men have not as yet sufficiently distinguished themselves from the mass of citizens to form an independent and united class throughout the country, though they may be fond of speaking of themselves as such. It is only in certain States that such a class is conspicuous: in Massachusetts for instance, where manufactures are in the ascendent, and where there has been for some years what is called a working-men's party, not yet of importance enough to claim much attention; or in California, where the introduction of Chinese labor has compacted the "Caucasian" workmen into a solid opposition. Nevertheless the indications we have described, and many others, are symptoms of the tendency to gradual formation of such a class throughout the country. Now whatever may be the effect of this in a country like England, whose political and social structure is founded on class distribution, it is quite sure that neither the social nor the political plan of the United States gives any room for a class which when completely consolidated amounts almost to a caste.

It is not necessary to enlarge on the embarrassment which the development of organized classes would bring upon us. We are just recovering from the desolating war which the only caste we have ever had among us indirectly brought upon us, not by its activity but by its mere presence. The trouble which an aggressive labor class would stir up for us would be of a very different kind from the trouble of slavery; but it would be real. The experience we have had of the cases in which class legislation has been pressed upon our rulers is not encouraging. Our whole polity is adjusted on the understanding that every citizen is, first of all, an American; that the interests of one are the interests of all. Our system of party government is only justified on the condition that parties are national. An isolated class, bent on special legislation for its own benefit and without interest in the general questions with which the country is concerned, is essentially an unpatriotic one. Ready at all times to trade off the general welfare for its own private interests, to any one who will promise support to the schemes on which it is intent, it offers the most dangerous temptation to demagogues, — is the readiest tool of unscrupulous political aggrandizement. In our own case the danger is aggravated by the fact that the mass of the working-men is made up of foreigners imperfectly assimilated to the body politic; of immigrants, or the children of immigrants, who have not yet forgotten the prepossessions of their own races, or arrived at interest or understanding for the important questions of our government; who are accustomed to be led, and not to think; and who therefore are at the mercy of whoever is most willing to flatter them.

But if the establishment of one class is to be dreaded in the midst of a people whose form of government and of society is based on the idea of homogeneity in its people, the addition of others of conflicting interests is yet more dangerous. The formation of one class stimulates the formation of another. The union of labor precedes and compels the union of capital. As yet, the employers of labor are not consolidated into a class; and the only thing likely to compress them into a close alliance is the aggression of labor-unions, which thus give consistency and force to the very oppressions, as they consider them, that they aim to resist. The difficulties which the pressure of capitalists, singly or in groups, have at times brought into our legislation, are enough to make us distrust any influences which tend to knit them also into a firmly united body. The antagonism of the two classes adds to the embarrassment of class-interests the perils of class-warfare. The experience of the past year is enough to show how bitter and wasteful such warfare is, and how heavily the burden of it bears upon the whole community.

The mere uniting of men of like occupation in associations for common advantage is, of course, not a matter for criticism. The tendency of such associations is to be judged, not by their union but by their conduct. There are many ways in which they might work for the improvement of their condition, with the sympathy and support of all thoughtful people; but unfortunately these are commonly not the ways to which they turn. When we consider the objects to which they do devote themselves, and, above all, the means to which they resort, their expansion into classes of national and international activity becomes a matter of very grave moment. It may be that our political fabric is firm enough and elastic enough to bear the strain of such activity, as it has borne still more threatening shocks, without injury; but we are likely at any time to be called to face very trying difficulties; and when we consider the possibilities of a

general union extending throughout Christendom, the outlook is serious enough. The extent and radical character of the measures demanded by the working-men, in their meetings in Massachusetts and California for instance, show the measure of the influence they wish to exert, — the expulsion of the Chinese; the regulation by Congressional action of the hours and wages of labor; the sequestration of lands which have been already bestowed by the government; the transportation and setting up of colonists at the public expense; the abolition of the contract system; the assumption by the government of all railroads and telegraphs; the abolition of poll-taxes, and of all restrictions, penal or otherwise, of the suffrage; and the undertaking of public works, not for utility but for the support of working-men. How great the risk is of all these things, depends on the strength of the class-union which it may be possible to accomplish. The character of the means to which they are ready, or may be led to resort, is plain enough from the experience of last summer's railroad riots; the peril of them, in the readiness of the working-men to ally themselves with the worst elements of the people, with the "hoodlums" of San Francisco and the mob of Pittsburgh; the recklessness with which the men are likely to be played upon and encouraged, in the truckling of newspapers and politicians, in the dishonorable complicity of the Pennsylvania militia, in the disgraceful presentment of the Pittsburgh Grand Jury, and in the incomprehensible blindness of legislators who are not ashamed to declaim in their places in Congress about the use of the troops, which alone could quell the riots, to oppress the working-men of the country.

PAINTING AND SCULPTURE AT THE CENTENNIAL EXHIBITION. — II.

[The report of Mr. John F. Weir in behalf of the judges of Group XXVII., embracing Plastic and Graphic Art.]

FRANCE.

The exhibit of France in painting and sculpture affords subject for comment, partly on the ground that their art was not fully represented in the Exhibition, as well as in review of the character of the works selected.

France, unquestionably, is the nation which fills the most conspicuous and the leading position in the art of the present century; and a careful review of the art of that country would embrace, in many particulars, a criticism of the most marked and characteristic tendencies of modern art. In commenting on the various kinds of excellence that are found united in this school, — if, indeed, the term "school" finds any proper application in modern art, where such classifications are fast being obliterated, — one is not slow to recognize that this superiority is due to several distinct causes. Passing by those considerations peculiar to the genius of the people, as well as the circumstances that affect the æsthetic temperament most favorably, the simple question of artistic discipline is one which the French have never underrated, if, indeed, the tendency has not been to carry this to excess by allowing technical skill to subvert higher aims in art. The admirable discipline afforded the art-student by the *Ecole des Beaux-Arts*, and in the private *ateliers* of the most distinguished artists of France, has tended to exalt and maintain this high standard of technical merit. An attractive and prevailing excellence of *technique* is certainly commendable in an art so difficult and complex as that of painting; but it is on higher grounds than this that the critic should estimate those qualities which constitute greatness in art, that give to the picture that charm of expression which enkindles revery and raises the work of the artist upon a common plane with that of the poet, the philosopher, and, unconsciously, with that of the moralist. France has not a few artists of this stamp, whose merit we may estimate fairly by this higher standard, and whose power rests not merely in the skilful handling of the brush or the chisel, but in the intellectual grasp and scope evinced in their art, and in a true poetic instinct which renders all technical display subservient to the expression of ideas and emotions, — which, indeed, is the true function of art. J. François Millet, Couture, and Delacroix were artists of this stamp; and others, now living, might be named who have impressed their individuality no less effectively on contemporary art.

But the exhibit of France at Philadelphia was not even fairly representative of these higher achievements of French art. It affords, therefore, a less inviting subject for comment than if it were an adequate representation of the higher aims of this school. And it would be unjust to pretend that this display was, on the whole, a representative one. But in a more general, though less discriminating sense, we may consider it typical of many ideas prevailing among French artists at the present time, and as such it is worthy of attentive study. The absence, for the most part, of works of conspicuous originality and merit, leaves the *ensemble* of the exhibit to the mannerists who collectively form the school; for the founders of schools are not to be confounded with the elements that compose their following. We have here, then, very little that has earned for French art the high reputation it enjoys. It is necessary to observe the above distinction if we would discuss, with any degree of intelligence, questions of artistic merit. Art lives by sincere emotions; its true aim is a thoughtful and expressive one; but when this sincerity, this expression, is subverted by motives and considerations that are entirely foreign to art, its products then become mere objects of commerce: other and distinct ends are sought, and are not to be mistaken for those that are genuine. The absence, therefore, for the most part, of the representative names of this school, is the cause of that unfavorable impression left by the exhibit of France at the International Exhibition of 1876.

But it is with pleasure that we turn to those works which partially redeem this unfavorable impression. M. Carolus Duran contributed a fine portrait of Mlle. Croizette, of the Théâtre Français. The young lady is seated on horseback by the seaside, and the action is exceedingly spirited and natural. There is, too, an open-aired sense of life and animation pervading the picture, which is admirable. The horse is well drawn, and the technical execution is clever and confident. "The Convalescent," by M. Sain, is thoughtful and tender in feeling, and has qualities of true excellence. "The King's Entertainment," by M. Comte, is also very sincere in its aim. The figures are earnestly and seriously engaged, and this in a manner, considering the humorous character of the subject, that is almost irresistible. "The Drawing-School," by M. Trupheine, is a clever sketch rather than a finished work; though, after all, the question of finish is merely a relative one, and if the intention of the artist is attained, the picture may perhaps be properly termed finished. But M. Trupheine's work has the character of a study made directly from the scene itself; it has therefore the usual marks which distinguish the study from the work of the studio. The former has greater freshness and vivacity, the latter more completeness and finish. M. Pabst contributed "A Bride in Alsace," and M. Coltzman a "Court Scene," which are both commendable, though not strikingly meritorious. In *genre*, the pictures of this collection do not impress one favorably. They remind us of better things, done over and over again, and have little earnestness and less individuality. The usual boudoir scenes abound, — slight, superficial nothings, of which the observer soon grows tired, and the cleverness of textual representation fails to redeem the lack of sentiment or thought. In landscape M. Luminais sends his "Gauls returning with their Booty," which is bold, skilful, and decidedly effective. "The Oaks of Grand Moulin," by M. Dumeron, is also clever. M. Japy exhibited "The Valley of the Jura;" M. Renié, "October Snow;" M. Yon, "The River Seine;" and M. Zuber, "Near the Farm." These works evince, to some extent, those excellent qualities that are peculiar to French landscape; but they are not strikingly characteristic, nor of superior merit. But even subordinate artists of this school evince, in their treatment of this class of subject, a certain power that gives interest to their work. The vigor and solidity of their method, united with a skilful apprehension of the technical value of the *spot*, in landscape, are qualities which render their work effective, at least, — if, indeed, to be effective is not necessarily to be truly artistic. It is to be regretted that the exhibit of this nation, which was a large one, contained no examples of Lambinet, Ziem, C. F. Daubigny, Rousseau, Diaz, the Bonheurs, and others. And the deceased painters Troyon and Corot should likewise have been represented. Historical painting in France has given place, as elsewhere, to *genre*, — that is, if we accept the old conventional idea of history-painting, not infrequently based on mere extent of canvas and hackneyed themes of classic verse. In a less conventional sense, however, the French school was perhaps never stronger than at present in history, if we accept the works of M. Gérôme and M. Meissonier as representative of this class of subject. It is now discovered that *genre* may be even more strictly historical in character than canvases of a more pretentious title.

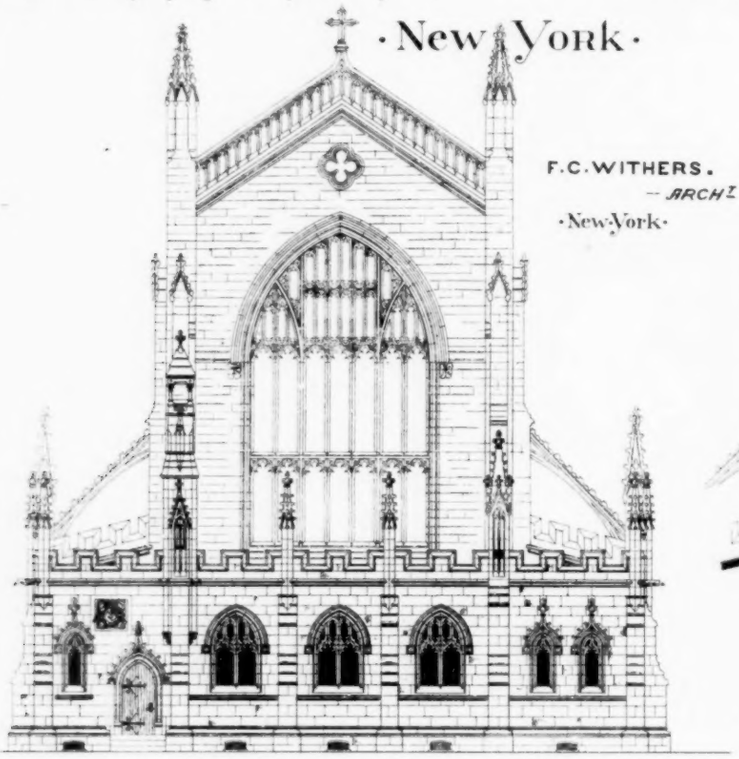
While we recognize much that is of a superior order of excellence in French art, and accord this excellence perhaps the highest place and praise, as a school it is not exempt from many vicious tendencies that are not only subversive of good taste, but which tend directly to destroy a genuine and healthy feeling for art; and these tendencies were abundantly displayed at Philadelphia. In fact, owing to the absence of better work, this impression dominated all others; and in order that we shall not do injustice to the more genuine character of French art, it is necessary to bear in mind that this representation was not complete. As an example of the style to which reference is here made, we may select M. Perrault's picture termed "Rest," — an *odalisque* reclining in a hammock above a running stream, in a sylvan solitude. The thorough knowledge of the human figure here displayed, the admirable drawing, the firmness and roundness of skilfully-modelled forms, and the clearness of the tones and flesh-tints, render this work captivating to the eye; but in saying this we say all that may be said of it in praise. This admirable rendering of the external forms, this clever execution, this merely realistic display of flesh, stimulate no elevated emotion, enkindle no revery. It is an attractive and

✠ TRINITY CHURCH ✠

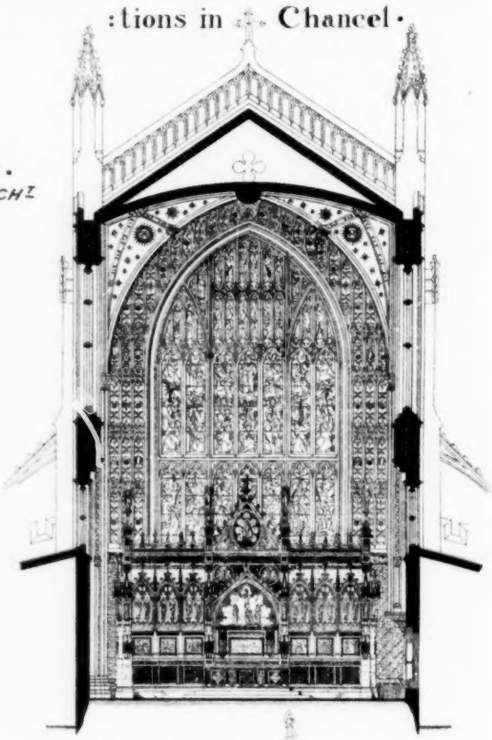
·NEW YORK·

F.C. WITHERS. — ARCHT
·New York·

Additions at rear of Church · and Alterations in Chancel ·

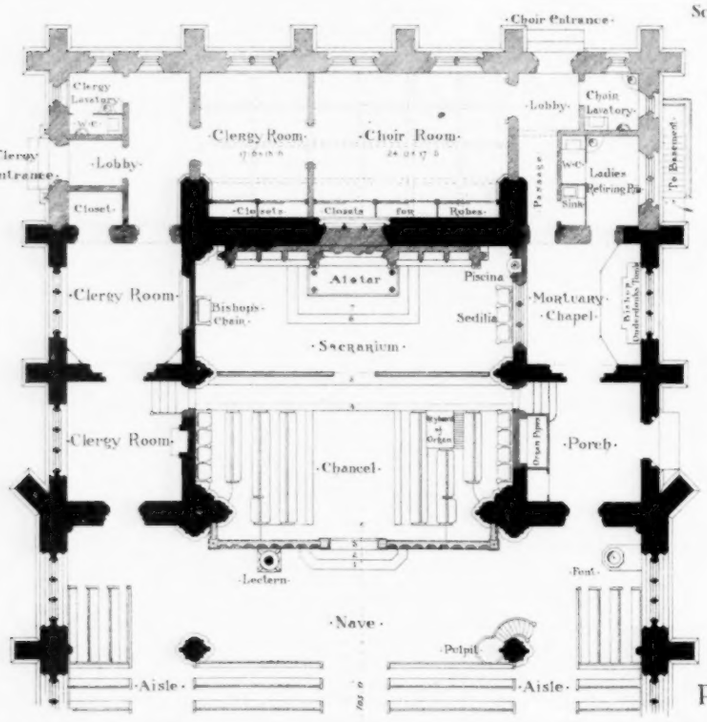


Rear Elevation ·

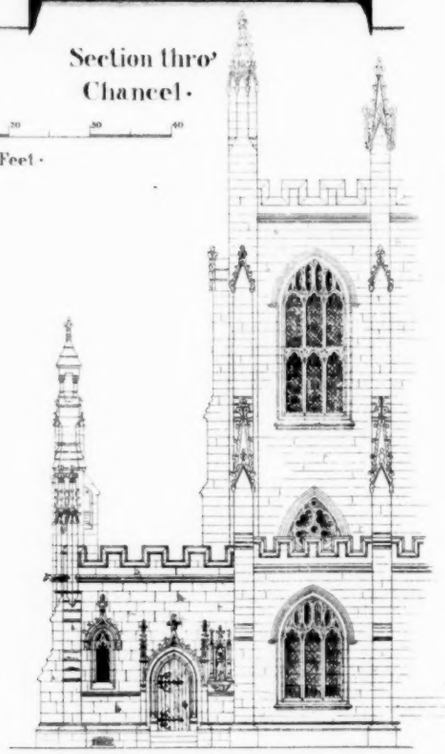


Section thro' Chancel ·

·Scale of Feet ·



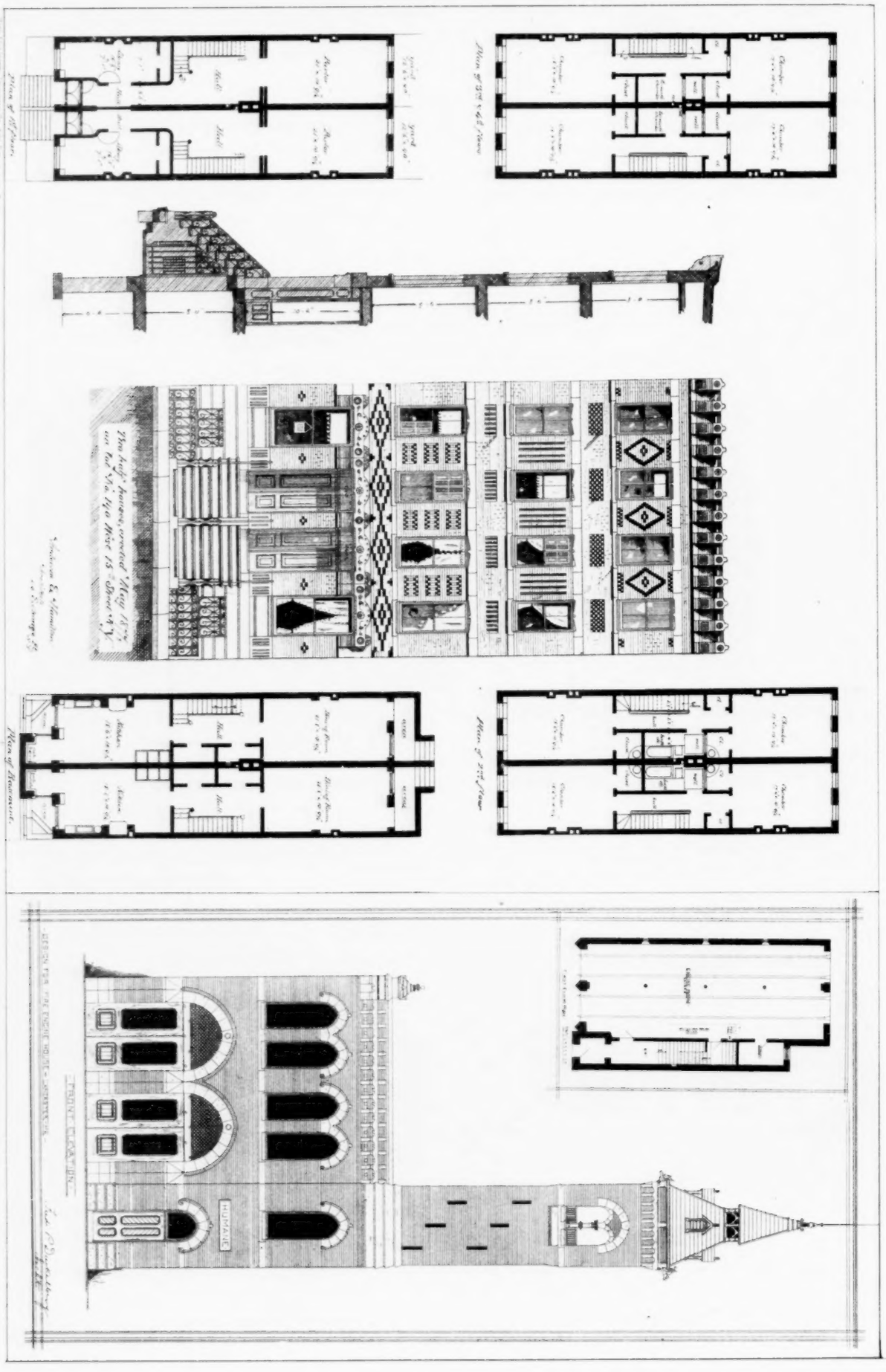
Plan ·

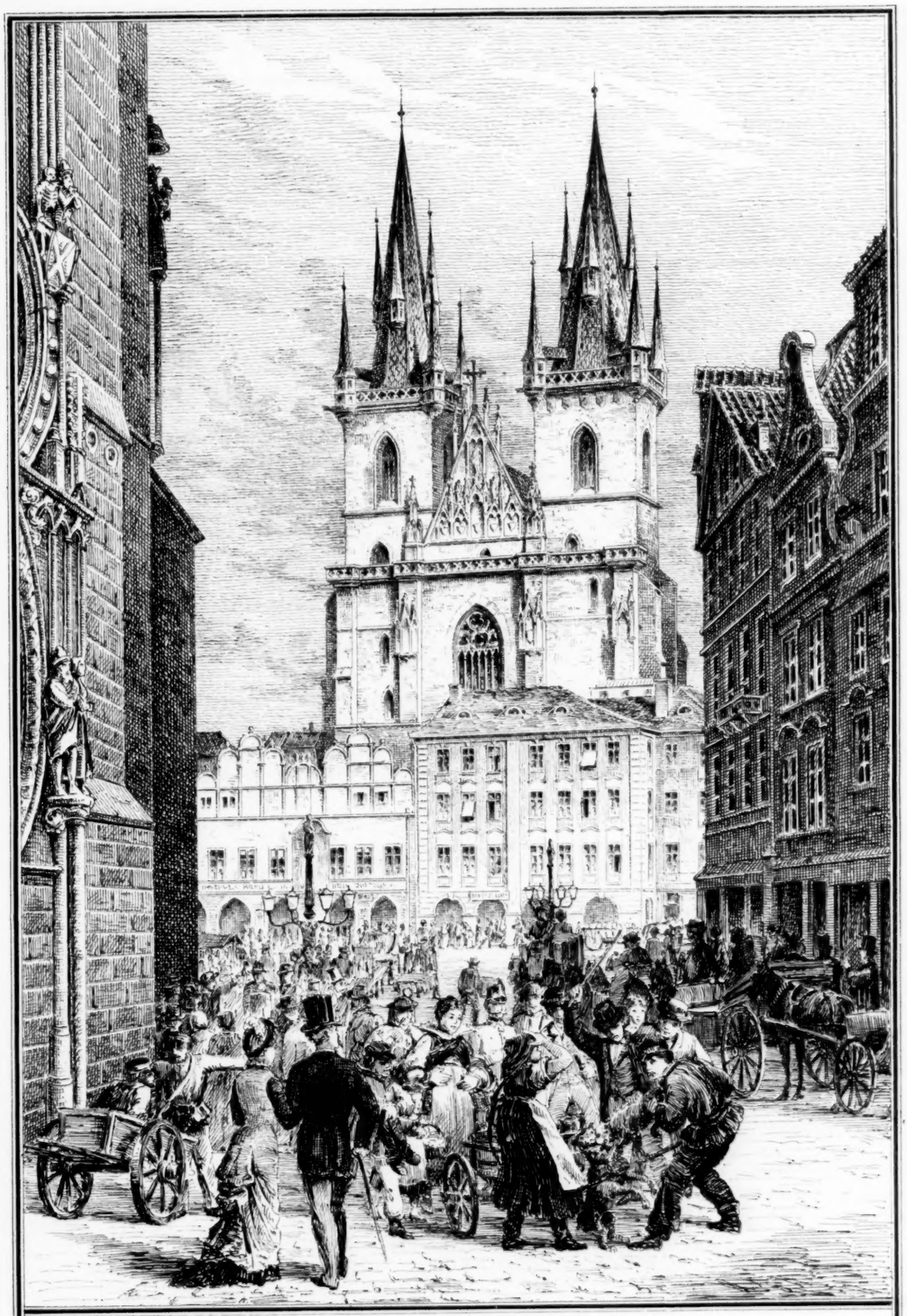


Side Elevation ·

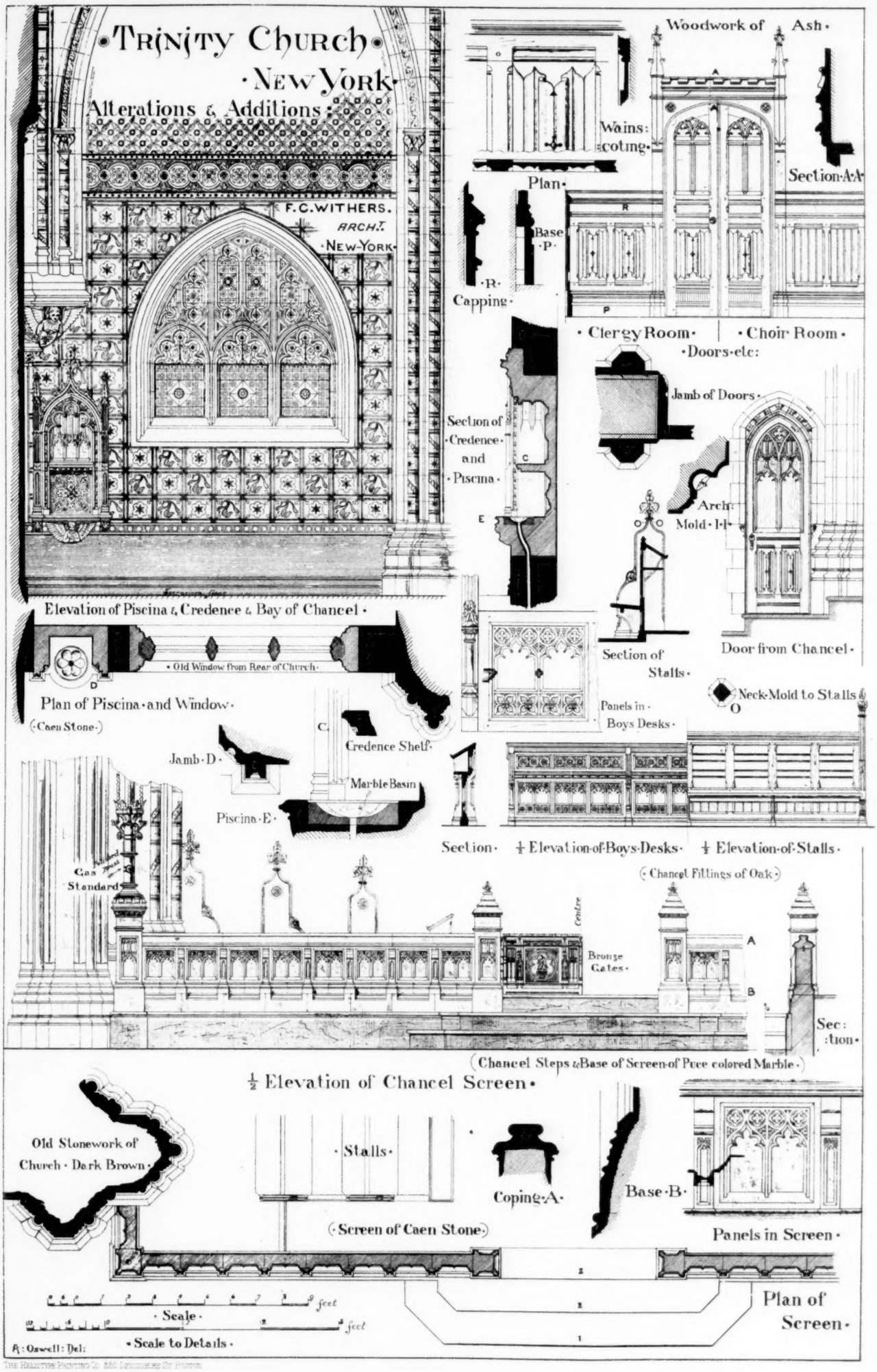
· Stonework a reddish brown Sandstone ·

A. Oswell. Del.





THE "THEIN" CHURCH PRAG L.S.IPSEN DEL.


TRINITY CHURCH
NEW YORK
Alterations & Additions
F.C. WITHERS.
ARCH.T
NEW-YORK
Woodwork of Ash
Wains: coting.
Plan
Section A-A
Base P
R
Capping
Clergy Room
Choir Room
Doors etc:
Jamb of Doors
Section of Credence and Piscina
Arch: Mold
Elevation of Piscina & Credence & Bay of Chancel
Old Window from Rear of Church
Section of Stalls
Door from Chancel
Plan of Piscina and Window
(Caen Stone)
Neck Mold to Stalls
Panels in Boys Desks
Credence Shelf
Jamb D
Marble Basin
Piscina E
Section
¼ Elevation of Boys Desks
¼ Elevation of Stalls
(Chancel Fittings of Oak)
Gas Standard
Bronze Gates
Section
(Chancel Steps & Base of Screen of Pure colored Marble)
½ Elevation of Chancel Screen
Old Stonework of Church · Dark Brown
Stalls
Coping A
Base B
(Screen of Caen Stone)
Panels in Screen
Plan of Screen
feet
Scale
Scale to Details
A. Oswell. Del.

artful appeal to mere sensuous emotion, in the absence of any higher aim on the part of the artist. And this is by no means an exceptional illustration of tendencies that are very pronounced in this school. It is perhaps a natural consequence of an excessive contemplation of the external, and a direct issue from allowing mere technical execution an undue prominence.

A very ambitious illustration of the sensational in art is that of "Rizpah defending the Bodies of her Sons," by M. Georges Becker. This is a product of the annual exhibitions of the *Salon*, where it has become necessary to startle, or strike the observer with force, in order to command attention. Exaggeration and strained effect is essential for this when greater powers are wanting; and the artist has here secured a sensation, not by means of the sublime or the impressive, but through the horrible, the ghastly, and the melodramatic; and his technical skill has been more than equal to his purpose, for the picture is not without decided merit of this kind: indeed, in this particular it is more than clever, — it is masterly. Another equally large canvas is that of M. Clement, "The Death of Cæsar." When one has in mind the admirable and dramatic treatment of this subject by M. Gérôme, and that cool reserve power with which this artist has dealt with the historic facts of this great event with profound learning as well as with great artistic skill, M. Clement's attempt appears altogether inadequate. The instant is ill chosen, and the action unhistoric and forced. A subject of such moment, about which cluster historic interests of the gravest kind, foreshadowing results to which limits can hardly be assigned, should not be treated as if it were a mere brutal assault in the amphitheatre. There are silent, inwardly-acting reserve forces of which a great artist knows how to avail himself in selecting the true moment for such a picture; but in this case M. Clement has not risen to a level with his task.

While we notice these overstrained tendencies and false aims, it would be unjust to allow them to overshadow the acknowledged merits of this school. Since David gave to French art an impulse which impelled it forward in the direction of thoroughness of form, it has made steady and rapid progress. It has oscillated between classic and romantic influences, which have both contributed materially to nourish its growth. Ingres further stimulated that classic influence which is still strongly felt; while Géricault and Eugène Delacroix led the re-action of the romanticists, which is the influence now most pronounced. Had the exhibit of this nation at Philadelphia shown something of this march or progress in the development of French art, with but single examples of representative names, such as David, Ingres, Flandrin, Delaroche, Robert-Fleury, Delacroix, Couture, Decamp, and the recently-deceased artists Hamon and Gleyre, and others, together with the works of the foremost living artists of this school, the result would have been eminently instructive as well as satisfactory, and the impression made would have been quite a different one. So many admirable examples have been brought to this country of late that it may be said, without exaggeration, that its leading artists are quite as widely and favorably known here as they are in France, and not infrequently through their representative works. This opportunity for study renders it very easy to discriminate between that which is truly excellent and that which is imitative and meretricious in French art; and it is well to have it clearly understood that this distinction is now generally recognized.

In sculpture, the works in the French exhibit that commanded attention were in bronze: notably M. Bartholdi's "Young Vine-Grower;" "The Bohemian at the Spring," by M. Ross; "The Juggler," by M. Blanchard; "Italian Shepherd," by M. Moreau-Vauthier; "Mercury, Whispering," by M. Moulin; and "Girl of Megara," by M. Barrias. These works reflect some of the merits that are widely recognized in French sculpture, which evinces a decidedly original and successful attempt to infuse into it the spirit and sentiment of modern life by drawing its inspirations not merely from tradition, or from a cold and calculating intellectual eclecticism, but from the living sources and sentiments that in every great epoch give character to art.

EARLY FORMS OF THE TELEPHONE. — In the preface of a book by Robert Hooke, F.R.S., published about 1666, occurs the following: —

"And as Glasses have highly promoted our seeing so 'tis not improbable but that there may be found many Mechanical Inventions to improve our other senses, of hearing, smelling, tasting, touching. 'Tis not impossible to hear a whisper at a furlong's distance, it having been already done; and perhaps the nature of the thing would not make it more impossible, though that furlong should be ten times multiply'd. And though some famous Authors have affirm'd it impossible to hear through the thinnest plate of Muscovy glass; yet I know a way, by which 'tis easie enough to hear one speak through a wall a yard thick. It has not yet been thoroughly examin'd, how far Otocousticons may be improv'd nor what other wayes there may be of quickning our hearing, or conveying sound through other bodies then [than] the Air: for that is not the only medium. I can assure the Reader, that I have, by help of a distended wire, propagated the sound to a very considerable distance in an instant, or with as seemingly quick a motion as that of light at least, incomparably swifter then [than] that, which at the same time was propagated through Air; and this not only in a straight line, or direct, but in one bended in many angles."

APPLICATIONS OF THE EQUILIBRIUM POLYGON TO DETERMINE THE RE-ACTIONS AT THE SUPPORTS OF ROOF-TRUSSES. — II.

BY JAMES R. WILLETT, A. I. A.

[A paper read before the Civil Engineers' Club of the North-West, Chicago, Sept. 4, 1877.]

FIGURE 5

Is similar in all respects to Fig. 4, except that some of the forces acting on the truss have an upward direction; but this does not alter the solution.

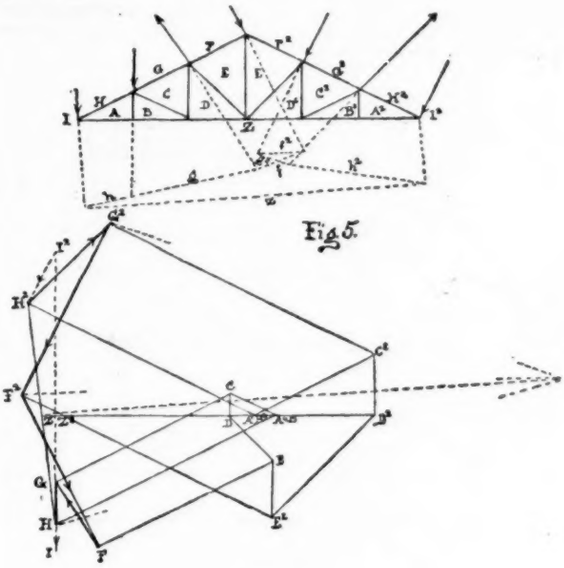


Fig. 5.

FIGURE 6

Is the same truss shown in Figs. 4 and 5; but it is loaded on the tie-beam as well as on the rafters.

The forces acting on the tie-beam are treated as one set, and their polygon of forces is (III); KK^2 being their closing line, and Z^3 the dividing-point on it. Diagram (IV) is their equilibrium polygon.

The forces acting on the rafters are treated as a separate set: their equilibrium polygon is shown by (II); and their polygon of forces is shown by the double line in (V). If the forces IH and I^2H^2 are not considered, the closing line will be HH^2, and the

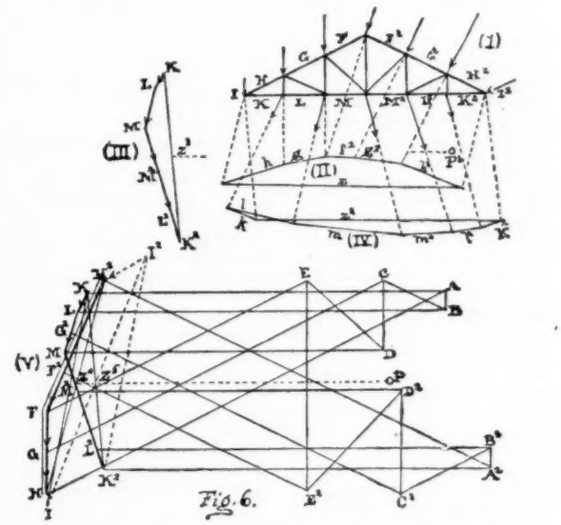


Fig. 6.

dividing-point Z^4. If IH and I^2H^2 are considered, the closing line will be II^2, and the dividing-point Z^5. We will consider these forces as brought in; and therefore Z^5 will be the dividing-point on the closing line.

In order to combine these polygons of forces, (III) and (V), suppose (III) to be superimposed on (V), so that the point Z^3 in (III) coincides with Z^5 in (V), the relative directions of all the forces being maintained: this will give a complete polygon of all the

forces; and the re-actions at the supports will be IK and I^2K^2. These re-actions appear in the diagram to be parallel; but they are not necessarily so. The strains in the members of the truss can now be drawn in the usual way.

In the equilibrium polygon (II) it may be observed that the lines g, GF, and F F^2, all intersect in the same point, which causes the line f to equal o; and consequently it does not appear. This same effect is explained under the head of Fig. 3.

If it is not desired to introduce the forces III and I^2H^2, then the point Z^3 should be superimposed on Z^4 instead of Z^5.

It is to be remarked, that, in arranging the forces in polygons (III) and (V), they must be arranged in a certain order; thus, if the forces on the right hand of the truss which have the exponent 2 are put in the upper part of (V), they must be put in the lower part of (III), or *vice versa*.

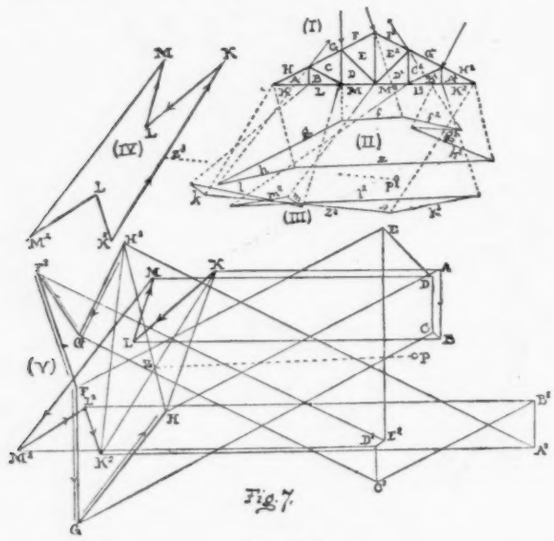


FIGURE 7

is similar in all respects to Fig. 6, except that some of the forces act in an upward direction, and there are no loads upon the points of support. It is introduced here to show the universality of the method.

THE ILLUSTRATIONS.

THE ALTERATIONS IN TRINITY CHURCH, NEW YORK. MR. FREDERICK C. WITHERS, ARCHITECT.

In our issue of Nov. 18, 1876, we gave an illustration of an altar and reredos which was subsequently erected in Trinity Church, New York. The execution of this work involved several changes in the chancel arrangements; and as the accommodation for the choristers had hitherto been insufficient, the vestry determined to build an addition in the rear of the church, and at the same time re-arrange the choir-stalls, etc. The addition is of stone, corresponding with the stone-work of the church which was built by Mr. R. Upjohn in 1846, and contains a room 24 feet by 17 feet for the choristers, communicating with another for the clergy, with separate dressing-rooms, etc. The choristers enter through a doorway on the west side, over which, in a panel, is sculptured an angel blowing a trumpet. The priests' entrance is on the south side, and adjoining it is a carved niche in which is placed a figure of St. Paul, carved by Ellin and Kitson from a model made by Robert Smith of London. The interiors of the rooms are fitted up with ornamental ash wood-work, and the windows filled with colored mosaic glass by Charles Booth. In the chancel a doorway was cut in each of the side walls for the egress of the communicants; and, to obtain increased space for the choir, a Caen stone screen projecting three feet into the nave was built, and the stalls extended to the outside of the chancel arch. The stalls are of oak, the poppy-heads being richly carved. The floors are laid with Minton's encaustic tile, and the walls and groined ceiling decorated in color. The contractor for the addition was Philip Herrman, and the interior work and the whole of the carving was done by Ellin and Kitson of New York.

THE "THEIN" CHURCH, PRAG, BOHEMIA. DRAWN BY MR. L. S. IPSEN, ARCHITECT.

The old city hall square, "Der Altstädter Ring," the centre of the city of Prag, is, from a historical as well as architectural point of view, one of the most remarkable places in this old city, full as it is of interesting memorials of an eventful history. The west side of the square is occupied by the old Gothic *Rathhaus*, while on the east side, above a succession of irregular arches, rise the towers of the "Thein" Church, 253 feet high. This church was built in the fifteenth century, by German merchants, and has been added to from time to time. King George Podiebrad built the two towers and the gabled roof, which he ornamented with a statue of himself, in full armor and with drawn sword in hand; while above was a gilded chalice, the Hussite emblem which indicated that communion was there administered in both kinds. The statue, however, was at a later period taken down, and replaced by a statue of the Holy Virgin. The precursors of Johann Huss preached here as early as the fourteenth century, and from the pulpit once sounded the eloquent voice of the fiery Rohyćana. In the church are the tombs of Bishop Augustin Lucian and the Danish astronomer Tycho Brahe, who died there in exile, having been invited to a seat in the University two years before. Entrance to the church is had through the archways in the lower part of the houses which, as with so many other European churches, were allowed to grow up around and against it. On the old square have been enacted some of the most violent and bloody deeds in the history of Bohemia, one of the last being the execution, by order of Wallenstein, of eleven officers found guilty of cowardice at the battle of Lützen during the Thirty Years' War.

DESIGN FOR A FIRE-ENGINE HOUSE. MR. F. P. DINKELBERG, ARCHITECT.

HOUSES OF MRS. BURROWES, NO. 140 WEST 15TH STREET, N.Y. MESSRS. ANDERSON AND HAMILTON, ARCHITECTS.

These two houses erected in May, 1877, on a full lot (25 x 100 feet), are very substantially built, and are intended for small families, being in size something between a French apartment and an ordinary sized house. Each house contains 13 rooms exclusive of closets, of which there is one for each room. The depth is 60 feet, and the extreme width of each house from plaster to plaster is 10 feet 9⅞ inches, the outside walls being furred. The front is of Philadelphia brick and Nova Scotia stone. The front doors are of cypress, and the dining-rooms and halls are finished with the same wood.

CORRESPONDENCE.

THE DOME CONTROVERSY. — NEW CITY HALL. — MITCHELL BUILDING AT MILWAUKEE. — FIRE-PROOF CONSTRUCTION.

Chicago, January.

The great dome controversy between the city and county authorities is still as far from an end as ever. The proportions it has assumed are amusing, if not profitable to the tax-payers. Your readers are more or less familiar with the circumstances attending the attempt to erect a city and county structure on one lot, but the situation of the building has not been made so clear in your columns. The lot is a square in the heart of the city, bounded by four streets. The county building occupies one side about 350 feet long, and fronts on three streets. The city building is to occupy the other side, and also fronts on three streets. There is a space of about 60 feet between; and the projected dome, if it is ever built, will occupy the centre of this space, its foundations encroaching within the exterior lines of both buildings. The county building had already been carried up to the main story floor before the half of the dome on that side had been commenced. Then the half dome was commenced, and the mild weather permitted the contractor to carry the walls up to nearly half the height of the main story. Meanwhile the main building has been carried up to the middle of the second story, where work has ceased for the season. A gap is left on the side where the dome is to be. This has been nearly closed by the dome structure, but a few days since the building committee ordered the work to be stopped. The walls are built in the most substantial manner, being 19 feet thick in the basement story and laid up solid with dimension-stones averaging 16 cubic feet each. What is now built, being one-half only, presents a strange appearance as it can be seen in section from the west side.

The concrete foundations for the city building had only been put down on one-third of the site when the superintendent ordered the work to be stopped for the winter. The contractors have therefore pushed along the cellar walls on that part until they now reach the grade line. Nothing has as yet been done on the foundations on the city's side of the dome site. The piles which were driven by the county contractor, and which the city has never paid for, are the only things to remind one of the possibility of the completion of the dome.

The whole county building and dome are the work of J. J. Egan, architect. The exterior of the city building is his work also. But Mr. L. D. Cleaveland, Superintendent of Buildings, who was ordered by the Department of Public Works to furnish his services as architect for the city, in his official capacity, has, under orders of the Building Committee of the City Council, changed the plan of that portion which might be occupied by half the dome, and provided for a connecting corridor which is to reach to the axis of the dome, where the authority of the city magnates ends.

Months ago several conferences were had by the county and city

committees, with a view to reconciling their differences on this question, which resulted in nothing. The county people have all along claimed that they have a *contract* with the city to build a dome conjointly. At that time it is well known that a compromise could have been effected, had the city people been willing to erect a rotunda or central exchange, only as high as the rest of the buildings. But on their part there was a display of negative obstinacy seldom equalled; while the county authorities were determined to give additional evidence of their natural propensity to spend as much money as possible, with reckless indifference to the wishes of those who are obliged to foot the bills. Consequently they ordered their half of the work to go on.

It is since then that the city's ground plans have been made and building commenced. The county meanwhile has succeeded in spending $70,000 on the dome foundations and walls, most of which is money wasted unless a dome or tower of the projected height of 320 feet is built; for if both parties should still agree to build a rotunda, the walls would be too thick, and would have to be reduced to make a rotunda of respectable size.

This is still the only practicable solution of the problem — or rather contest, as it should be called.

Mr. Cleaveland, who is an able architect, has made an excellent plan for the interior arrangement of the city building, except in the connecting part, where he has been controlled by the building committee. In its constructive features the materials are not alone *incombustible*, — a word too often mistaken for *fire-proof*, — but are to be made fire-proof in the true acceptation of the term. All the iron-work is to be protected. The interior columns will be made according to Wight's method. The spaces between beams will be filled by terra-cotta arches which protect the beams, and the girders will be incased with the same material.

This system of thorough protection to exposed iron-work has just been carried out in the Mitchell Building at Milwaukee, which will be ready for occupancy by the first of February. This is the most costly private building erected in the West for many years, and is a monument to its owner, Alexander Mitchell. It is the work of E. Townsend Mix, architect, of Milwaukee. The building covers about 100 by 125 feet, and stands on Water Street. This and the old Chamber of Commerce occupy the entire block running through to Broadway. Rumor says that the Chamber of Commerce, also belonging to Mr. Mitchell, is soon to be rebuilt in style equal if not superior to the Mitchell Building. The architecture of this is French Renaissance, perhaps too florid in treatment for a business building; but, as I said before, it is a monument, and the designer may be excused for making its architecture verge on what Frenchmen would call the *monumental*.

The material of the exterior is very light gray sandstone, with some polished granite for contrast. The same material is used in the main vestibule, which is imposing and elaborate in design. It has a mansard roof with small *pavillon* roofs at the corners, and a high *pavillon* with dome-shaped roof over the main entrance. This is used as the United States signal station. The signal lantern is at the base of the flagstaff, and forms a good composition. Here for once the domical mansard roof with its appendages is expressive of the purpose for which it is used. The dormers and chimneys, which are heavy, and rather crowded, are of stone; but all the ribs and crowning members of the roof, which are of elaborate design and good detail, are of hard terra-cotta from the Chicago Terra-Cotta Works. The entire roof is covered with porous tiles set between T-iron rafters, the slates and metal covering being secured directly by nails to the porous terra-cotta. All the iron columns throughout the interior are of the radiating web pattern, and made fire-proof by Wight's process. The girders are enclosed with porous terra-cotta; and the spaces between the iron beams are filled by a system of brick arches and hollow tiles, which fully protects the beams, and affords a very light construction, said to be not exceeding 40 pounds per foot. This is the invention of Sanford E. Loring of the Chicago Terra-Cotta Works. It is of such nature, however, as to require diagrams for a proper description. This is the first building in which it has been employed. All the small partitions are of hollow bricks. The interior finish is very elaborate. Wood has been used sparingly. The columns in the banking room which occupies the corner on the main floor, the basement office, and one in the second story, are finished on the exterior in a scagliola imitation of marble. All the others have a finish of Keene's cement. Sand being used with this exceedingly hard cement, they are fully as durable as stone. The girders are plastered on the porous tiles which incase them, and the ceilings on wooden lath suspended beneath the fire-proof protection to the beams. The decorative painting throughout is polychromatic, and is done by P. M. Almini of Chicago. It is a good example of progress in decorative art. The painting of the corridor ceilings in imitation of encaustic tiles, is original, but not to be commended. Hale's water-balance elevator is used for passengers, and a Hale direct-acting water elevator is provided for the use of the janitor and for any freights that may require it.

It is gratifying to know that in a time like this nearly the whole building is rented for an amount equal to a good interest on the investment. It is designed for offices throughout. The cost has been in the neighborhood of $400,000.

THE OLD RESERVOIR. — THE BROOKLYN MUSIC HALL. — WEAKNESS OF THE POST OFFICE BUILDING.

NEW YORK.

WHAT to do with the old Distributing Reservoir on Fifth Avenue and Fortieth Street, still agitates the minds of many of our city fathers and meddlesome managers. Its mere removal will cost $50,000; and in response to a suggestion that it be roofed in and made to answer as a great armory and drill-room, Commissioner of Public Works Campbell estimates that certainly $450,000 will be required, or with an allowance for contingencies, say about half a million, — certainly far more than New York is just now able to spend. Mr. Campbell very sensibly recommends that the space be turned into a public park, and thus avoid the error of rushing into building of any sort.

On Friday evening, the 25th ult., Mr. William R. Stewart died at his residence on Fifth Avenue. Mr. Stewart will be remembered as an upright, an able, and a successful builder. He came to the city a lad from Vermont, and, following his trade of a mason, undertook some of the most important work now standing in the city. St. Luke's Hospital, the *Herald* Building, H. B. Claflin's store, A. T. Stewart's residence on Fifth Avenue, and the Hotel for Working Women, with many other prominent buildings, were built under his superintendence. He was one of that class of builders who were willing and able to do the very best class of work, and who would not stoop to the low shams now so common.

Among the recent additions to our professional ranks is Mr. Bruce Price, whose first work here is a flat-house, at 21 East Twenty-first Street. Outside, Wyoming blue-stone is used up to the water-table; above, Philadelphia brick and Ohio stone with a red tile roof. It is an English basement house, with a segment-planned bay rising from a column resting on a bracket beside the entrance. The bay is treated somewhat as a single feature, and at its finish above is a large terra-cotta cornice decorated with foliage. The whole is six stories high, the roof showing a pediment with herring-bone brick-work, and a section of mansard. Within, the house is strictly fire-proof, with iron beams, and a main staircase carried up in a brick drum, with risers and treads of slate. An elevator is provided, and a servants' staircase at the back of the building where the kitchens are placed. As the dining-rooms are in front, the arrangement will demand the French system of service; and in many particulars the building recalls Parisian models, and reminds one of Mr. Price's long residence abroad.

Mr. George B. Post has also a notable private residence in hand, to be built at 15 East Thirty-sixth Street, for Mr. H. M. Braem, the Danish consul. It occupies an ordinary lot, but from the front a porch of North River blue-stone will project some feet and give opportunity for some careful carving. Moulded brick of the Peerless Brick Co. is liberally used, while large panels of terra-cotta ornament will be inserted beneath the window openings. These panels are Chicago terra-cotta, and are to be moulded after original designs. The plan is simple and well arranged, with the stairway thrown across the centre of the building. Iron beams and arched flooring with heavy walls will make the structure as fire-proof as possible. Its cost will reach $50,000. Mr. Post has also under way and nearing completion the Brooklyn Music Hall at the junction of Fulton and Flatbush Avenues, Brooklyn. The building is triangular in plan, the street sides about eighty feet long, and the broad end nearly one hundred. The street floor will be fitted up for stores. The entrance to the hall will be at the angle through a broad lobby and up stairs on either side. These stairs are peculiar in being double; that is, in place of leaving the usual head-room from one flight to another, Mr. Post has introduced another set of flights leading to the gallery-floor. This is a very compact mode of construction, though sadly puzzling to the mechanics who estimated on the building. Above the hall, which seats about 1,200 people, a series of lodge-rooms was required; and in carrying these and the roof above, Mr. Post has thrown a pair of trusses from the rear wall to a point at the entrance-end of the hall below. Here a cluster of columns supports a plate upon which rests one end of the lower chord of the trusses, which are twelve feet deep. They are some seventy feet long, and bracing each other form a construction of the strongest character; smaller truss-girders make up the flooring and carry the plates of the flat ceiling below. It is an excellent solution of a difficult problem, and the construction of the building as a whole is worth study.

For a work which is very far from being a model of construction, if it be in fact a model of aught save ugly instability, the Post Office building claims attention. Again the papers are filled with stories of cracking walls; and once more the public officers, for whose accommodation, security, and comfort the building was erected, are compelled to scurry from their quarters, while the shorers and patchers brace up the settling partitions and thrust in additional girders. The whole trouble is due to the practice of making large rooms on the lower floors and smaller ones in the upper stories, and then failing to use girders strong enough to sustain the brick partitions above. Deflection follows, cracks are seen, and what was neglected at first has afterwards to be carried out at heavy expense. Entirely apart from the architectural defects of the building, which are many and glaring, the construction is by no means so good as is popularly believed; and some time hence the cast-iron in the foundations may be heard from in an

unpleasant manner. The wood-work, what little there is of it, is bad, the elevators are models of cumbersome unhandiness, while the staircases are so arranged as to be as far out of the way as possible.

Meantime, of all the architects in this city, Mr. Thomas R. Jackson, who built and defended the Brooklyn Theatre, is found to fill the post of resident architect. *Apropos* of shams is a story of what is going on in the way of tenement-house "skin" building, brought out by the exposure of a heartless contractor who economized in plumbing by omitting his sewer-trap, and so caused the death of a tenant or two. But the whole story I will tell you in a subsequent letter, and speak now of the action of the Park Commissioners in dismissing Mr. Frederick Law Olmsted from his post as landscape architect of the department.

The yearly estimates of the department have been cut down; and as a measure of economy Mr. Olmsted is dismissed, despite a general protest. The opinion of the thinking classes here, who know Mr. Olmsted and his work, has been shown in a letter to the commissioners signed by the best of our business men and citizens.

But after a long debate the commissioners in their wisdom cut the knot by the adoption of the following: —

Resolved, That Mr. Frederick Law Olmsted be and he is hereby removed from the position of landscape architect of this department; and it is further

Resolved, That Mr. Frederick Law Olmsted be and is hereby appointed consulting landscape architect to this department, his services to be paid for at such rate as this department may determine from time to time, as they are availed of. W

THE TARIFFVILLE DISASTER.

Sheffield Scientific School of Yale College.
New Haven, Conn., Jan. 21, 1878.

To the Editor of the Courant, — The Farmington River, which flows toward the north at Tariffville, is crossed obliquely by the Connecticut Western Railroad, and hence the bridge was built on a "skew" of about thirty-eight degrees with the direction of the abutments and pier. The total length of about 333 feet is divided into two spans, each about 162 feet in the clear. The western span of the bridge fell when covered by a locomotive and cars; the eastern span, though also covered with cars, remained standing, and upon it the measurements given below were made.

The bridge is of the type known as a Howe truss, the two chords and the braces of each truss being wood, and the vertical ties iron. The lower chord is twelve feet above the ice in the river, and upon this lower chord rest the cross beams which support the stringers, ties, and rails of the single track. The width of the bridge is fourteen feet in the clear, or including trusses nineteen feet; and it has horizontal bracing both at top and at bottom. The depth of the trusses between centres is $21\frac{1}{10}$ feet, and they are divided into sixteen panels, each $10\frac{1}{4}$ feet long. Each truss is terminated by the four vertical posts and stiffening rods usual in the Howe system; but the chords were continuous over the middle pier, thus uniting the two spans, and possibly rendering their action slightly different from that given by calculation. The southern truss of the west span fell first; and the chords are separated directly over the pier, those of the other truss breaking several feet west of the pier. The bridge was uncovered and unpainted.

The weight of the bridge as computed from my measurement is 1,320 pounds per linear foot. To determine the strength of the several parts, I assume the live load or weight of the train to be 2,250 pounds per linear foot. Engineers will bear witness that this is a small live load to use in discussing so light a bridge, particularly when no allowance for "locomotive panel excess" is made.

The top chord of the trusses is composed of four timbers, $10\frac{3}{4}$ inches deep; two of the timbers are 6 inches wide, and two are $7\frac{1}{4}$ inches wide; these are spaced apart by blocks to 30 inches in width and bound together by bolts. The strain upon this top chord under the passage of a train is 986 pounds per square inch. The timber is pine, which, according to a recent recommendation by a committee of engineers, should never be subject to a compressive strain of more than 900 pounds per square inch, when (as in this case) the length of the piece exceeds ten times its least diameter. This recommendation extends only to sound timber. In the Tariffville bridge the timber of the top chord is badly decayed over the pier where it was torn apart, and in the fourth and fifth panels east of the pier. It is possible and probable that the top chord of the fallen truss was in a similar or perhaps a worse condition.

The lower chord is composed of four pieces, two $6\frac{1}{4}$ inches wide, and two 7 inches wide, all $13\frac{3}{4}$ inches deep. There are two end main braces, each 9 by $11\frac{1}{4}$ inches. Each panel has a counter brace usually 7 inches by $8\frac{1}{4}$ inches. These dimensions will enable engineers to compute the strains per square inch upon them.

There are three vertical wrought-iron tie-rods in five panels of the truss from each end, and two in the other panels. Between the first and second panels, two of the rods are $1\frac{7}{8}$ inches in diameter, and the other is $1\frac{3}{4}$ inches. The next set has two of $1\frac{3}{4}$ inches, and one of $1\frac{1}{2}$ inches. In the next set there are two of $1\frac{5}{8}$ inches, and one of $1\frac{1}{4}$ inches. The next set (between the fourth and fifth panels) has all three rods $1\frac{3}{8}$ inches in diameter. The strain upon these rods under the passage of a train exceeds in two instances 19,000 pounds per square inch, or nearly twice as much as that allowed by bridge-engineers who do their duty. There is evidence that in some of the tie-rods the ends were not properly upset (or increased in diameter) before cutting the screw-threads upon them; should such be the case with those just mentioned, their effective diameters would be decreased $\frac{1}{4}$ of an inch, and the strain upon them would be more than 22,000 pounds per square inch, exceeding probably the limit of elasticity of the iron.

The above facts are sufficient to enable bridge-engineers to form an opinion concerning the strength of this bridge, and to judge of the causes of its failure. For the general public, however, these results need to be further popularized and emphasized.

The Tariffville bridge may have failed either by the breaking of the rotten upper chord, or by the breaking of the overstrained tie-rods. It is a matter of little importance which broke first: *the defects of either are sufficient to account for the disaster.*

The antecedent causes of the failure of the bridge were three: it was not properly built, it was not properly kept in repair, and it was not properly inspected by a commission appointed and paid by the State to make such inspection. That it was not properly built, there can be furnished, besides the above figures, good engineering authority. Trautwine, for instance, gives the following as the proper dimensions for a Howe truss of 162 feet span (the Tariffville bridge is a few feet longer): for the upper chord, a cross section of 396 square inches — the Tariffville bridge has 284; for the lower chord, 522 square inches — the Tariffville bridge has 365; for the end braces 255 square inches — the Tariffville bridge has 203; for the end tie-rods, 15 square inches — the Tariffville bridge has less than 8. In short, the designers of this bridge violated mathematical calculation and engineering precedent; to save the money which a few pounds of iron would have cost, human lives were daily put in danger.

Wooden bridges are usually covered to protect them from the action of the rain, ice, and snow; but this was left exposed for six years until the upper chord became rotten enough to give way under a fraction of the strain which it was intended to support, and no steps were taken to repair it. Not even the iron rods were painted. To save the money which repairs would have cost, the lives of passengers were daily risked.

It was not properly inspected by a commission which has examined it every year since its erection on behalf of the State. An efficient inspection would have discovered the defective tie-rods six years ago; an effective inspection would not have allowed it to remain exposed to the action of the weather for six successive years; an intelligent inspection would have detected and repaired the rotten timbers. For the lack of such inspection, human lives were lost.

The immediate responsibility for the accident must fall upon the officers of the railroad company, not for running two locomotives over the bridge, but for building such a structure and neglecting to keep it in repair. But the State of Connecticut is also responsible for sanctioning, as it has done annually by its railroad commissioners, the use of such an ill-proportioned and unsound bridge. The incompetency of such a commission to hold an investigation concerning the cause of the disaster will be apparent to every engineer. Mansfield Merriman.

NOTES AND CLIPPINGS.

The National Museum Bill. — The House Committee on Public Buildings and Grounds has agreed to report favorably the bill for the construction of a fire-proof building on the grounds of the Smithsonian Institute to be used as a national museum, appropriating therefor $250,000.

Accident to an Armory Floor. — Gen. D. D. Wylie, Chief of Ordnance of the State of New York, and the custodian of the State Arsenal on Thirty-fifth Street, says that during an evening in the latter part of last December, he was sitting in his office, which is on the second floor directly beneath the drill-room, when he heard a sharp crack like the report of a rifle in the gun-room adjoining his office. He at once made an examination, and found that one of the girders upon which the floor of the drill-room rests had sprung out of position, and the noise which he had heard was the snapping of an iron plate which connected the girder with another at the ends. The Twelfth Regiment was drilling in the room at the time, but as it had nearly finished he said nothing to alarm the members, and on the following day he informed the Department of Buildings of the incident. Deputy Superintendent Dudley, of the Department of Buildings, made the examination, and submitted a report, of which the following is an extract: "One column on the floor below the drill-room we found slightly out of plumb, and the girder on the top, supporting the drill-room floor, was twisted at the ends and split. The girders supporting the drill-room floor are not of sufficient strength for their bearings. These girders are only safe at 23,784 pounds, and have to sustain, under a vibratory load, 60,000 pounds. This is taking, according to our law, 120 pounds to the superficial foot, and double the same for a vibratory load. The girders, in my opinion, are not of sufficient size for the purpose for which the building is used, and are liable to become dangerous and unsafe."