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IN regard to the question of requiring architects and engineers to give bonds, there is a little to be added to what we have already on the subject. In nearly all cases these bonds are demanded, not to secure the proper performance of the duties of the architect or engineer, but to force him to guarantee that the contractors shall be faithful to their agreements, or, still worse, that the cost of the work to be done, including an indefinite number of contingencies over which the professional adviser has no control, shall not exceed a certain amount. In either case, the giving of such a bond carries with it consequences of the greatest importance to all the parties. From the moment that an architect or engineer becomes responsible for the carrying out of the contract, or for the completion of the work for a fixed sum, he loses more or less, depending on the wording of his engagement, of his professional relation to his client, and becomes himself the contractor. In this capacity the law recognizes that his interests are hostile to those of his employer, and will support him in maintaining his hostile interest. As a professional man, simply, he could be discharged at any moment, upon payment of a fair compensation, but as guarantor of the contract he cannot be so easily got rid of. In the eye of the law, the money question is always paramount to all others, and an architect who has agreed in writing with his client for a fixed reward to warrant the completion of a certain contract for a given sum is entitled to continue in charge of it to the end, whatever may be the artistic horrors that he inflicts upon his employer. Moreover, if horrors are cheaper than beauties, he may lavish them with unsparing hand, and his client can neither get rid of them nor of him. Where an ordinary architect is ready to consult his employer's taste, to show him sketches, and to do his best to gain credit for both by the artistic success of his work, the architect under bonds cannot be expected to do anything of the sort. If he were to show sketches to his client, or consult him in any way, the latter might wish for something that would not be the cheapest possible thing of the kind, and there would be a controversy, in which the architect, as guarantor of the cost, would prevail. Even the direct and positive orders of his client as to the details of the work will be unavailing against an architect under bonds, so long as the architect keeps within the letter of the specification. The man who guarantees the cost is the one to say how the work shall be carried out, and the owner, as the person whose evident interest it is to get as much as he can without paying for it, will soon find that judges and juries alike will interfere to prevent him from satisfying his tastes at the expense of other people.

IF the client persists in imposing his wishes upon the architect, in spite of the latter's protest, the bond agreement is rendered nugatory and the architect is released. Of course, in order to establish the rescission of such a document as a bond, it would be necessary to prove very clearly the interference of one of the parties to the instrument with the discretion of the other in carrying it out, as well as the formal protest of the latter; but, if these were proved, the legal conclusion would be inevitable that the contract formed by the bond had been rescinded, and that the injured party was not only released from further obligation, but could, perhaps, demand damages for being prevented from carrying out his agreement in his own way, just as the builder could claim damages if the owner should interfere with his operations. It is hardly necessary to point out how seriously this transformation of the architect, from a confidential expert adviser into a hostile contractor, injures the interests of his client. Under the ordinary professional engagement, the architect applies the skill acquired by years of study and practice to the single object of securing for his employer a well-designed and well-constructed building, defending him constantly, in doing so, against the carelessness and dishonesty of the various mechanics who take part in the work; while, by putting him under bonds, it is made his sole interest, and his legal duty, — for the law imposes upon every man the duty of taking care of his own pecuniary interest, so far as he can do so honestly, — to prevent the owner from making any change, or indulging any fancy, which may vary a single item of the specification which he has guaranteed to see carried out, and, where it is necessary to give an interpretation to any part of the drawings or specifications, to give them that interpretation which will best suit his interests, rather than those of the owner. For a time, it is probable that architects and engineers, whose habit it has been for a hundred years, at least, to consider themselves the trusted professional advisers of their clients, would, if the practice of requiring bonds should spread, endeavor to unite a professional position with that of contractor, but this could not last, and the ruin of a portion of the members of the profession would teach the others how to defend themselves. This they could do, if they should be forced to it, with tolerable efficiency; for, if the architect and the owner together cannot always prevent the builder from pocketing some undeserved gains, the owner alone would be absolutely helpless against the combined ingenuity of the architect and the builder pursuing together their lawful duty, that of making as much money out of the contract as lawfully possible.

IN recording the appointment of Mr. Arthur G. Everett as the architect charged with the restoration and preservation of the Bulfinch portion of the Massachusetts State-house, we hope final reference is made to the trials and dangers that have afflicted the building itself and the heart-burnings that have pained its friends. We have been somewhat persistent in keeping this matter before the profession, realizing how widespread and real was the interest in the fight between art and sentiment on the one hand and "business common-sense" on the other, and the very effective and spontaneous protests forwarded to the Legislature by architects in all parts of the country at the crucial moment bear witness to the reality of the interest architects have in this particular monument. As the Acting-Governor and his advisers understood that the architects of Boston had waged the battle disinterestedly and not selfishly, they desired to recognize this fact publicly by placing the work of restoration in the hands of a commission, but as the letter of the legislative act called for the appointment of a single architect, it was necessary to nominate Mr. Everett alone, but with the express understanding that for this work he should associate with himself Mr. Robert D. Andrews and that Mr. Charles A. Cummings should act as consulting architect. In this somewhat roundabout way a most admirable and efficient commission is entrusted with the work, any one of whose members is entirely competent to do the work alone, and yet all are so thoroughly in agreement as to what to do and how to do it and so representative of the profession in Boston that it will not be possible for any one to do anything but applaud the appointment. Mr. Cummings, to whom more than to any one else is due the salvation of Bulfinch's work, has consented to act

as consulting architect only on the condition that it should be explicitly stated that he could accept no remuneration for services which he had rendered, and would still render, in a spirit of complete unselfishness and devotion to the demands of patriotic and artistic sentiment. The present State-house Commissioners will sustain towards Mr. Everett and his coadjutors the same relation they have borne to Mr. Brigham, the architect of the Extension.

ACCORDING to the New York papers, a singular state of things prevails in the freestone trade in Brooklyn. Not long ago, a suit was begun in the Supreme Court of the State of New York, against the Freestone Dealers' Association of the City of Brooklyn, claiming fifty thousand dollars damages on account of the interference of the defendant Association with the business of the plaintiffs. It appears that the plaintiffs, who are comparatively young men, and experienced stone-cutters, had saved a little money, and proposed to go into business for themselves as cutters and dealers in freestone. Knowing of the existence of the Association, and some of its rules, they made application for admittance to it, accompanying their application, as the rules provide, with a certified check for five hundred dollars, to be held as surety for their compliance with the regulations of the Association. The check was returned, and the application refused, on the ground that there were too many firms already in the business. Some time later, a second application was made, and subsequently a third, but both were refused. Notwithstanding these repulses, they went on with their business, but were unable, and are still unable, to buy from quarrymen any freestone whatever, and they have had to buy and re-cut second-hand stone to fill their orders.

THE explanation of this is, as the aggrieved parties say, that the Freestone Dealers' Association includes the quarry-owners, and the latter are pledged to sell stone only to members, under a penalty of five hundred dollars for the first violation of the agreement, and expulsion from the Association for the second; while, as all the members are pledged, under similar penalties, not to buy stone from any quarryman or agent who does not belong to the Association, expulsion from its ranks means total loss of Brooklyn trade. Worse than this, it is alleged that, although the power of the Association has been sufficient to raise the price of rough freestone from the quarry to a dollar and ten cents per cubic foot, the dealers, taking advantage of the completeness of their monopoly, have united in refusing to employ union stone-cutters, or pay union wages, so that the Brooklyn stone-cutters, in order to get employment, are obliged to work for the Association members at little more than laborers' wages. Considering the vast areas of untouched freestone territory in Massachusetts, Connecticut and New Jersey, it is strange that dealers who are not members of the Association should not unite to open quarries for themselves, and get the advantage of the exorbitant prices established by the Association. They would, apparently, have the good will of the unions, for, already, a struggle has begun between the Association dealers and the combined building-trades, which has gone so far that the bricklayers will not back up stone furnished by any member of the Association.

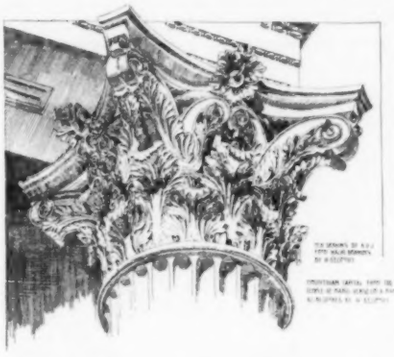
PROF. J. H. MIDDLETON, the Director of the Art Museum at South Kensington, and one of the most learned men of the time, died a few days ago at a comparatively early age. Professor Middleton is best known to the architectural world, probably, through his book on "*Ancient Rome*," a work of immense erudition, although some of his conclusions are not universally accepted by archæologists. According to the New York *Evening Post*, Professor Middleton was sent to school, when a boy, at the convent of La Cava, near Naples. The present Pope, Leo XIII, was at that time one of the tutors in the school, and it is quite probable that the great English archæologist and historian of art may have received his first encouragement from the scholarly and learned priest who was to become the head of the Roman Church. Professor Middleton married an American, the daughter of Mr. W. J. Stillman, once an artist well known in New York and Boston, but now for many years resident in Rome, and a distinguished critic and amateur archæologist.

ANOTHER distinguished archæologist, Dr. Isaac Hollister Hall, died at his home near New York a few days ago. Dr. Hall was Curator of the Metropolitan Museum of Art, and Lecturer in Johns Hopkins University. He was a Professor in the Protestant College at Beyrout, Syria, for two years, and possessed a profound knowledge of the Syriac, Phœnician and Cypriote languages, having been the first to read an entire Cypriote inscription.

THE *Engineering Record* makes some comments on Professor Fernow's last circular, on the tests of Southern pine timber, to which Professor Fernow makes a reply, both the comments and the reply being interesting reading. The *Engineering Record*, apparently forgetting that the circular explicitly states that the tests recorded are not to be taken as commercial tests, warns its readers that the pieces experimented upon were all selected, and, as nearly as possible, uniform, so that for ordinary timber, containing an indeterminate quantity of water, concealed knots and other imperfections, the coefficient of average resistance could not, in practice, be taken at more than two-thirds the values given in the circular.

PROFESSOR FERNOW, in his reply, explains very forcibly the difference between the scientific tests which he has been carrying on, and the commercial tests which, as is of course obvious, are those which engineers and architects would at present use. It is true, as he says, that random sticks of large timber will break under a strain not greater, perhaps, on an average, than two-thirds the breaking strain on a selected piece; but it is equally true that, although the average of strength may be low, some of the random pieces are likely to have nearly the normal strength, while others will fall below the average; and, as there must be reasons for this, it is plain that, if the engineer understands these reasons, and can tell by inspection which of his timbers will have the normal resistance, and which will fall below it, he can utilize his material with far greater economy than is possible under a practice which applies the same average coefficient to good and bad timber alike. It is with a view to increasing our knowledge of the conditions affecting the strength of timber that his tests have been made, and careful selection, and uniformity in the test-pieces, were indispensable to an investigation which has for its object the establishment of data by which the influence upon the strength of a timber of a given number of knots, or a certain proportion of sapwood, or a given condition of moisture, can be calculated with reasonable accuracy. From a scientific point, and, indeed, from a practical point, Professor Fernow's position is the true one. As compared, for example, with our knowledge of iron, our physical data in regard to timber are ridiculously inadequate. An engineering club would have a hearty laugh at the expense of any one who should test miscellaneous bars, of high and low steel, cast-iron, and wrought-iron of various qualities, collected at random from a dealer's stock, and should average his results, and apply the average coefficient, with a factor-of-safety of six or eight, to all the structural metal with which he had to deal; yet this proceeding would not, in itself, be more unscientific than our present practice in regard to timber. The usual plea in apology for this practice is that the defects in timber are "concealed," so that allowance must be made for them, whether they exist or not; but Professor Fernow's tests are made for the precise purpose of enabling us to detect defects, and to determine their influence, just as we are enabled now to ascertain the tensile strength and elongation of a lot of structural steel, and to proportion our sections accordingly. No doubt, there will be some difficulty in devising methods for determining the presence of knots or internal shakes, and modifying the coefficients of resistance accordingly; but the problem is no more serious than that of ascertaining the proportion of carbon in mild steel, and fixing its probable coefficients of tensile strength, compressive strength and elasticity in accordance with the results of the analysis. The latter problem is solved every day in scores of testing laboratories; and it is not too much to hope that Professor Fernow will, before long, enable us to solve the former even more readily. That the matter is of extreme importance hardly needs to be repeated. If we could tell accurately, by inspection, what pieces of timber would show the normal tensile or transverse strength, so as to be available for floor beams or ties, and which should be used only in compression, a great saving could be made in structural work, amounting, probably, to many millions annually.

SELF-HELPS.



THERE was a tradition current among some of my draughtsman friends at the time when we were all looking forward to the possibilities of architecture as a means of both pleasure and profit through life, that an architect could not grow in his profession after he had started in business, or to put it in another way, that an architect should do all of his studying while still in the inceptive state, for the cares of business and the responsibilities of decision would render it practically impossible for him to expand after the gait had once been set. This belief was undoubtedly inculcated by some wise educator as an incentive to young men to study and improve to the utmost their abilities, or perhaps as a restraint to hinder them from rushing into business before their wings were fledged. Unfortunately, we are every day made aware that some architects do not grow at all and that the style of work with which they started at the beginning of their careers is the style to which they still adhere; but they are the exception rather than the rule. Certainly every architect who prides himself at all upon being abreast with the times feels that, however far short he may fall of what he would be, it must be a poor year which does not mark some development of his power and some addition to his positive available knowledge and experience. Growth in architecture, as in nearly every other mental function, comes by infinitesimal increments. We do not know in advance what will help us, nor can we always rightly appreciate the value of experiences while we are in the midst of them; and yet no one can look back over even a short period of professional activity without a consciousness of gain by some experiences and of loss by the lack of others. After the architect has left school and has hung up his shingle, he is dependent entirely upon himself for his incentive. He has no earnest teacher to prod his lagging thoughts, nor is there a zealous employer behind his back to keep him up to a little higher pitch than he appreciates himself. His growth can come only from within, and he is obliged to call to his aid such self help as his temperament and his opportunities can command.

The first aid which naturally suggests itself is constant and varied use of the perceptive faculties in making drawings, sketches, water-colors, etc. An architect has to think through his pencil and pen, and if the thoughts are clogged, if the ideas stick at the point, though the results may be satisfactory, there is a loss by friction, and he who can express his ideas readily on paper has a tremendous advantage over the one who may have, perhaps, more brilliant conceptions but is less able to make them of tangible value. But there is no royal road to good draughtsmanship and it is not wholly a gift. It requires constant practice to even keep what one has, and though I would not set draughtsmanship at the head of self-helps, nor claim that the capacity of an architect is measured by the beauty of his drawings or the facility of his hand, constant sketching is a necessary adjunct of continuous growth. In the cares of professional life it is very easy to drop the habits one may have acquired as a student, and to feel that there is nothing about the office and little in our relatively uninteresting streets which can inspire us with the pictorial enthusiasm which possessed us in Europe. Quarter-scale and full-size details of actual work are less interesting, but they seem more necessary and it requires a good deal of dogged determination for one to regularly devote a certain portion of each day to making some sort of sketch or drawing. And yet the habit of daily sketching is one which none can afford to neglect. Draw from photographs; make pastels, water-colors, or, even better, occasionally draw from life; but there must be some kind of persistent oft-repeated use of the imitative faculties in this line, or they will soon lapse into the rusty condition which the younger men are so inclined to designate as peculiarly the quality of their elders.

Then the earnest seeker for growth must study the beautiful in all its manifestations, for beauty is a fundamental necessity of good architecture. I do not mean merely the beauty which finds expression in stone and brick, and iron and brass, but also the beauty which lingers around the setting sun, which paints the lily or adorns the rose, which gives its subtile charm to Rosetti's poems, or crowns with glory the canvas of Chavannes. The subtile, æsthetic sense which makes life enjoyable, the beauty of form, of face, of thought and of action, all reflect directly upon the beauty of architecture, and the man who is keenly alive to the one is most apt to bring out the other in his work.

And still in the line of studying the beautiful, we cannot afford to neglect the exhibitions of paintings and drawings which every year are becoming more frequent among us. We cannot miss one of them without loss. It is not such a very far call from Simons or Monet to quarter-scale drawings, though the connection is often missed and the correlation of ideas not appreciated. An honest attempt in any department of art can be studied to advantage until it awakens a responsive echo in the architect, and thereby his horizon is enlarged, his appreciation intensified, and his own art the better understood.

Architecture is so essentially imaginative in its highest expressions that a great deal of help can come from a course of imaginative reading. We are too prone to be matter-of-fact even at our best. The irksome requirements of actual practice tend so often to crush out the dreamier qualities which go with every flight of the imagination, that in the rush of business we may forget the satisfaction and the real growth that might come to us by at times following the intellectual revelry of a work such as the "*Arabian Nights*," "The Ancient Mariner," Prescott's "*Conquest of Mexico*," or Rudyard Kipling's "*Jungle Stories*." Indeed, I know of no better literary antidote for architectural affectation than to travel with Mowgli through the romantic imagry of the jungle, letting our fancies run their own pace in a world which is new to us, leaving us with a clearer vision and a truer perception for the practical, tangible art with which we have to grapple. If I were obliged to choose between fiction and Viollet-le-Duc as a course of reading for an architect, my reason might carry me to the latter, but I firmly believe more growth would come in the long run from a little literary dissipation than from scientific indigestion.

Now all the foregoing means of self-improvement are quite as available for the draughtsman as for the architect, but there are some ways in which the architect is peculiarly able to profit by other people's experiences and ideas, and to help himself into a more fitting condition. I believe that every architect should set out as his rule, first and always to build to suit himself and to have the courage of his own convictions; to resolutely determine to give his clients not what they think they want, but what they really ought to have; to study each problem which comes before him as if it were his own, as if its solution rested with him alone, and never to allow himself to put out a piece of work of any description with which he is not perfectly satisfied. This may seem an impossible rule of conduct; exigencies do arise which oblige one to temporize; architecture is very often a series of compromises; and yet I firmly believe that the growth of the architect is quite closely in proportion to his independence of thought and to the extent to which he succeeds in doing nothing but his best. One of our foremost architects makes it a rule never to let a drawing go out of his office until the copy thereof, which has been made for office reference, is, at least, as good as the original. This means a constant struggle, but it also means that the standard is kept up and the work of this particular architect amply repays the pains he takes with his drawings. A client wants something done in a hurry; we are human enough in many cases to give him what he wants, when our manifest duty to ourselves and to our profession is to stand up and resolutely refuse to be rushed or bullied into doing anything but what we believe to be the best. This is a point which personal experience will fully endorse and from hardly any other source can there come so much real tangible growth to the individual.

The foregoing should not imply a blind persistence in our own ideas. We ought on every possible occasion to measure ourselves with our professional brethren. It is so easy to get into a rut, to acquire mannerisms and special little ways of meeting problems, or, perhaps, one special way of meeting all problems, which is worse yet, that if we are to grow we must see how other people grow, we must compare our work with theirs; if possible, see how they solve the very problems which we have set out for ourselves, and comparatively criticise their work as our own, not to find faults but to find the strong points. Criticism either by ourselves or by our friends or enemies is seldom enjoyed among us. We have plenty of expression of opinion, but architects, like so many other professional men, are prone to draw about them a shell of reserve and to repel rather than invite criticism, so that we often lose one of our great incentives to growth out of our narrow ruts and personal convictions. But even if we are not so fortunate as to have friends whose judgment we can trust and who will honestly and fearlessly criticise our work, we can, at least, criticise it ourselves. If an architect upon the completion of a piece of work would sit down before it and write out in tangible shape what are the good points and what the failures, wherein it fell short and in what respects it might have been better, in how far it was a work of the imagination and to what extent the practical drudgery overcast the æsthetic idea, whether it fulfilled its functions or was only a picture, whether it was well constructed, well balanced, well arranged and well designed, or a mere fortuitous agglomeration of ideas more or less inchoate, — in other words, whether it was real architecture or only the species of graphical juggling which Fergusson condemns as so peculiarly American, — such a process of keen, unrelenting self-criticism, though it would doubtless make many of us profoundly dissatisfied at times with ourselves, ought to lead to the best results.

But more than anything else, if one is to grow, time must be taken for sober, conscientious thought. It is peculiarly characteristic of this age and of this country that we do not think; that in the turmoil of the daily struggle for existence, the race for the prize which is ever just beyond our grasp, we will not commune quietly by ourselves for a few moments each day and think over what we shall do

or what we have done. And yet I believe there is no one quality which will so conduce to architectural education in the broadest sense as a daily habit of quiet contemplative thought. We design our buildings in a hurry; we build them with a rush, and we close the accounts and forget the problems before the mortar is thoroughly set. The first idea which comes into our head is too often the one which finds perpetuation in the building, to stare us in the face in after years and accentuate our regret at lost opportunities. There is with us very little of the calm well-balanced selection and dignified habits of reflection which brought into being the early Italian Renaissance. There has never yet been found an architect who would refuse a good job, no matter how many he had on hand; there is always room for one more, and if we haven't time to think out our problems as we should, if we cannot give them the careful consideration which we know they deserve, if we fail to profit by the lessons they teach, it surely is not because we do not know better, but, rather, because the whole trend of modern civilization is to destroy or nullify the thinking faculties. I well remember the advice which was given by one of the brightest English architects to an American who was on his way to study throughout Europe on a travelling-scholarship, the whole point of which was that the student need not concern himself with the number of sketches he made nor with the number of drawings he elaborated, nor the number of miles covered in journeys, but that he had better pick out some thoroughly good building wherever he got a chance, sit down carefully before it and study it until he felt its whole being and appreciated the why and the wherefore of all that he saw, until the secrets of the structure were his; and then he could write back to his friends in America that he had not done much sketching, but he had done a powerful lot of thinking. Now I believe no architect ever gets beyond the point where thought can be disregarded. Even the most clever of our designers would benefit by setting aside a certain time each day which would be entirely their own to think and plan their work, to ponder on what might be done and to weigh and measure the results of past attempts. If we are to grow we must think, we must rid ourselves from the frantic desire which every architect feels at times, to get ahead of his work, to have some money laid up in the bank, or to put some jobs out of the way. Life is too short and the rewards too uncertain for us to afford to throw away the enjoyment of æsthetic self-gratification. We want to do our best, and most people feel they could under proper circumstances, but those circumstances never come until we are ready to think them out and until our minds are in the receptive condition in which we can appreciate the peace and the quiet and the rest which ought to find manifestation in every well-balanced building.

So that, while in order to keep our architectural language we need daily practice in sketching; while we need to cultivate our imaginations; while the beauty of nature in every form cannot appeal to us too strongly. Above all, we must think; we must cultivate ourselves and the talents that are in us; discover wherein our strength lies and in what direction we fail; and then by sincere, sober self-criticism we may help ourselves to the thoughtful, scholarly condition which is pretty sure in the long run to result in honest and intelligent work.

C. H. Blackall.

SALISBURY CLOSE.

PASSING under an archway at the head of the High Street, and moving on clear of the houses and trees, you stand within the Close of the Cathedral of Salisbury. There is a wide level of fresh greensward within a border of noble trees, and out of the middle of the velvet turf rises a wonderful mass of gray walls and gables, and a soaring spire. You have before you the most glorious achievement of England's Thirteenth Century, and, as your Fergusson tells you, "one of the best proportioned, and, at the same time, most poetic designs of the Middle Ages" — a great church built in one time and all in one style, completed within the forty years from 1220 to 1260, entirely Early English, except as to the tower and the lovely spire, which are a little later, almost without a trace of foreign influence, as Mr. Fergusson has determined, and the great model of the cathedrals of England.

Were it the first English cathedral one had seen, there might be at first a sensation of some disappointment in the seeming lack of height — an effect the more apparent to an observer accustomed to the churches of France — but, gradually, the perfect harmony of this building makes itself felt and the beautiful proportions of its members as seen from this, the north side, will convince one that certainly in the point of exterior grouping no foreign church excels it. As to grandeur of interior, however, it will not be maintained that any English church quite equals the great French cathedrals. The interior of Salisbury, indeed, strikes one as cold and color-

Houses on the Close, Salisbury.

less. The very homogeneity of style tends to monotony and the lack of painted windows is felt. There are fewer chantries, screens, monuments and chapels than elsewhere, these having been removed to a great extent in the restorations by Wyatt, made about the beginning of this century. Sir Gilbert Scott's work, in our time, confined itself fortunately more to making safe the old work where necessary. I have seen several churches which have been restored extensively by Sir Gilbert Scott, notably the Cathedral of Exeter, one of the most beautiful interiors I have had the fortune to enjoy, and the fine Perpendicular church of St. Mary Magdalene in Taunton. One thing he did at Exeter, setting the organ atop of the rood-screen, where it cuts off the view of the choir and mars the effect from the nave of the ancient glass in the Perpendicular east window, has been condemned. But the organ is a fine old instrument, built in London in the time of Charles I, and its mellow voice is heard with splendid effect from this position, which is evidently exactly the right one from the point of view of the acoustics of the church.

As you walk to the east along the boundary of the Close you get a striking impression of the great length of Salisbury, enhanced by the low height of roof. The wall is relieved by the north porch, then by the transept proper, the northwest transept, the church being a double cross in plan, then the northeast transept, the transept of the choir, and ends with the square east end and Lady Chapel, in which features, departing from the apsidal form of the Norman churches, this church established one of the striking divergences of English Gothic.

The gray walls rising from the green turf are soft and lovely in color. The spire, tapering up from the tower to a height of over four hundred feet, holds the eye with its grace. There are broad belts occurring three times in its height, ornamented with a geometrical decoration of crossed diagonals, making diamond panels with bosses in the centre of each.

Much has been said of late in this journal about the insecurity of Salisbury's spire. It is sincerely to be hoped that the Cathedral authorities are doing everything in their power to secure the permanence of so rare and beautiful a creation of the great past. The problem is one which has taxed the skill of Scott and other lights of modern constructive science.

It is, however, rather the houses about the Close than the church itself which make the subject of this little paper, in apology for which the four accompanying sketches are offered, but it was not possible to turn to the houses without first making our reverence to the great ecclesiastical monument which stands hoary and venerable in their midst.

The most important of the houses looking upon the Close is naturally the Deanery, the residence of the Dean, the first functionary of the Cathedral establishment, and a personage of usually the greatest eminence as well in society as in the Church. South of the Deanery, and also looking toward the west front of the Cathedral, is a very notable house of the fifteenth century known as the "King's House" and built as a royal lodging in which the churchmen of the time occasionally entertained the monarch. On the north side is the "King's Wardrobe," also dating from the fifteenth century, but why so called I am not now able to remember. These houses have considerable interest as good examples of domestic architecture of their day. In the mass they are dignified and beautiful, and in detail their gables, bays and oriels, mullioned windows, arches and doorways are worth studying.

Their generous openings give light in plenty to the spacious rooms, and they are altogether handsome liveable mansions.

They are all built of stone, rough-faced in the broad surfaces of wall and sometimes chequered with panels of flints. The houses of this and the ensuing century are assuredly the most beautiful results of English domestic architecture. They are quite suited to modern needs and will always be models, especially for country

houses and residences in the quieter towns. Many contemporaneous British architects are doing fine work on the same lines, notably Ernest George, who is a master of the style.

About the balance of the Close stand other interesting and picturesque dwellings, and toward the St. Ann's Gate is a row of houses dating from Queen Anne's time to that of the Georges, of which period we have good examples in our own country.

The old gate is the centre of a picturesque group of houses, built against and on the ancient wall of the Close, the red of their bricks and tiles coming in famously with the lichened gray of the stonework.

The Close wall is itself worth looking well at, many old bits of stone from the Cathedral reparations and restorations being discoverable on its surface.

Not far from St. Ann's Gate is the White Hart Inn, a renowned old hostelry which bears little semblance of its ancient looks. Our inn was the Crown in the High Street, not far from the Gate of the Close. It bore the date 1645, and somebody of great eminence had stopped over night under its hospitable roof in that year. It may have been "Charles I, of unhappy memory." It was a quaint little place with an overhanging second story, a bar and coffee-room with very low ceilings, and a little parlor somewhere at the back where we had meals.

There lay on the window-sill in this little parlor one morning a sketch-book of most alluring appearance, whose plain gray cover seemed to be trying to whisper of treasures within. I was sorely tempted to have a peep into it, but did not, for which I am rather sorry now, for it was Walter Crane's. He was having a little holiday there, with his wife and daughter and two boys, and they were all very gracious to us. He did some sketching about the Close and I was delighted with what I saw of his rapid pencil notes of architecture, in which art he is, it is needless to say, well versed. My companion went out with him on the meadows not far from where Constable made his famous picture of Salisbury and they made water-color sketches, looking across the flat-lands and the river winding among pollard willows toward the town. I missed that day, unfortunately, but heard that Mr. Crane's work with the brush was rapid and bold and his technique broad.

We had one morning at St. Thomas's Church, where we studied a wonderfully fine old wood roof, richly decorated with carven and painted shields and angels, very like the roof of Saint Cuthbert's in Wells, lately given in the *American Architect*, and made sketches of the old tiled houses in the churchyard, a drawing of which, in color, I send with these desultory notes. A. B. BIBB.

THE ACTION OF HEAT ON CEMENT.[1]

THE modern tendency towards large and high buildings, with a skeleton structure of steel, has made the question of fire prevention and protection one of most vital importance to architects, manufacturers, engineers and builders in general. Countless experiments have been made to devise some means of preventing iron and steel columns and girders from buckling under great heat. Plainly, the only way this can be done is by so protecting the metal that heat cannot come into contact with the metal surface.

Experiments have also been made, and numerous schemes introduced, to devise some means of making a floor between the girders that will withstand the action of fire, and so prevent a fire, even if started, from spreading from one flat to another. Hollow tile, brick and terra-cotta have been tried with indifferent success; and at present the tendency is towards using Portland cement or concrete as a protection for ironwork.

It is not the purpose of this paper to propose or condemn any scheme, or to introduce any new one; but rather to show what really may be expected from a mass of concrete or cement when subjected to great heat. The writer has carefully examined all available literature upon the subject, including books and trade catalogues; and, while many give tests which are alleged to be eminently satisfactory, still, in almost every case, the accounts give such meagre information about the tests themselves as to be almost useless, as far as information is concerned, and certainly so as far as comparisons with each other are concerned. The information as to the action of the cement itself is, in every case, very meagre; and all the information given refers only to the conduct of the system tested, and no information whatever is given as to its condition afterwards.

In making these tests three brands of cement were used — two Canadian brands: "Star," manufactured at Deseronto, and "Samson," from Owen Sound; one foreign brand, "Jossen," of Belgium manufacture. These cements were thoroughly tested for fineness, strength and "blowing" before using, and were found to be first-class. The "Star" and "Jossen" were comparatively slow-setting, and the "Samson" set very rapidly.

Tests were made upon neat briquettes and sand briquettes, mixed in proportions of one sand to one cement, two sand to one cement and three sand to one cement. The age of the briquettes varied from two months to about four years. Over two hundred briquettes were used in making the tests.

The briquettes were heated in a small assay furnace, heated by a large gas-burner, and which gave a range of temperatures of from about 650° Fahrenheit to about 1,775° Fahrenheit.

The temperatures were determined by means of a water calorimeter: the temperature of the furnace being obtained from the rise in temperature of a pint of water, in which had been immersed an iron ball of known weight, and which was heated to the temperature of the furnace. The temperatures given are approximately correct. The calorimeter gave good results — different readings, under the same conditions, rarely differing by more than 10° or 15°, which is very close for such high temperatures.

On heating the briquette and removing from the furnace, the first thing noticed was a loss in weight in the briquette; and almost all neat briquettes showed cracks, some large and some small. Some sand briquettes also showed cracks, but not to the same extent as in the neat briquettes; but there was no exception to the change in weight. This loss in weight is due to the fact that the hardened cement is a compound of hydrated crystals of aluminium silicate and calcium silicate, and the heat drives off the water of crystallization, and the loss in weight corresponds to the amount of water of crystallization driven off by the heat. Now, since the crystals depend upon the water for their formation, it is evident that when the water is removed the crystals are destroyed, and the cement ruined. Such was found to be the case in every instance.

The briquettes, after cooling sufficiently to allow handling, were broken in the testing-machine, the load being applied at the rate of about 400 pounds per minute. The result showed a marked decrease in the tensile strength; and under the best conditions, this loss in tensile strength showed an approximate proportion to the loss in weight. Briquettes which lost 19 or 20 per cent of weight, which is practically the amount of water required for proper crystallization, were practically unable to resist any load whatever, and in very few cases possessed 10 per cent of their original strength.

TABLE I. — RESULTS OF TWENTY-SIX BRIQUETTES HEATED SUDDENLY.

TEMPERATURE, 1,775° FAH. (APPROX.).

Weight in Grammes.		Per cent Lost.	Tensile Strength.		Per cent Lost.
Before.	After.		Before.	After.	
140.02[1]	125.57	10.4	530	190	64.1
139.28[1]	117.47	15.4	"	200	62.3
140.06[1]	115.75	17.3	"	185	65.1
139.07[1]	113 72	18.6	"	53	90.0
140.46[1]	125.99	11.6	"	180	66.1
140.98[1]	132.87	5.7	"	235	55.7
139.23[1]	137.68	1.1	"	330	37.7
140.11[1]	120.89	13.7	"	140	73.6
139.47[1]	133 57	2.9	"	280	47.1
139.21[1]	112.07	19.5	"	15	97.1
140.17[1]	121.17	13.4	"	155	70.7
138.71[1]	119.70	13.7	"	145	72.7
135.77[1]	131.70	2.9	930	0	100.0
133.75[2]	118.85	11.1	"	20	97.8
132.75[2]	dropped from tongs, and broke on floor.				
131.16[2]	123.05	6.2	930	50	94.6
132.76[2]	118 95	10.4	"	20	97.8
134.15[2]	128.70	4.8	"	23	97.5
139.22[3]	125.72	9.7	515	85	83.5
138.41[3]	128.39	7.2	"	75	85.4
140.00[3]	134.23	4.1	"	122	76.3
137.35[3]	135.54	1.3	"	200	61.2
138.47[3]	131.38	5.1	"	97	81.1
138.21[3]	135.68	1.8	"	185	64.1
140.04[3]	112 87	19.4	"	0	100.0
137.26[3]	113.24	17.5	"	10	98.1

[1] "Star" Brand.
[2] Briquettes, four years old, brand unknown.
[3] "Jossen" Brand.

TABLE II. — RESULTS OF TWENTY-ONE BRIQUETTES HEATED VERY GRADUALLY AND BROKEN.

MAXIMUM TEMPERATURE, 1,000°–1,025° FAH.

Weight in Grammes.		Per cent Lost.	Tensile Strength.		Per cent Lost.
Before.	After.		Before.	After.	
139.27[1]	132.34	4.9	530	395	25.6
138.31[1]	130.16	5.9	"	390	26.3
140.26[1]	128.32	8.5	"	348	34.3
140.06[1]	129.16	7.8	"	351	33.7
138.07[1]	126 23	8.6	"	327	38.2
138.04[1]	120.13	12.9	"	152	71.2
139.26[1]	116.27	16.5	"	73	84.3
138.35[1]	113.31	18.1	"	29	94.5
140.21[1]	119.26	14.9	"	110	79.0
139.32[1]	125.34	10.04	"	237	55 2
137.79[2]	129.32	6.1	515	348	32.3
139.42[2]	130.26	6.6	"	348	32.3
140.31[2]	133.58	4 8	"	398	22.6
139.27[2]	127.31	9.3	"	232	49.0
140.32[2]	120.15	14.3	"	182	64.7
138.37[2]	136.32	1.5	"	440	14.7
139.46[2]	134.31	3 7	"	400	22.3
140.07[2]	121.31	13.4	"	195	62.3
139.36[2]	117.26	15.8	"	130	74.6
140.21[2]	122.31	12.5	"	193	62.4
139.36[2]	112.60	19.2	"	10	98.0

[1] "Star" Brand.
[2] "Jossen" Brand.

The effect of different temperatures was rather peculiar. Briquettes placed immediately into a temperature of about 1,775° Fahrenheit showed a very great loss in strength for a very small loss in weight,

[1] A paper by J. S. Doble, Graduate S. P. S., published in the papers read before the Engineering Society of School of Practical Science, Toronto, Canada.

and did not appear to follow this law of proportion between the losses of weight and strength, at least not nearly so well as briquettes treated differently. When the briquettes were gradually heated, however, and allowed to slowly rise to the temperature of the furnace, this law was followed quite closely, as reference to the tables will show. The plotted curves give a good idea of the effect of slow and rapid heating on the relation of the cement to this law. This is accounted for by the fact that the cold briquette, on being placed in the furnace at such a great heat, is immediately subjected to very considerable internal stresses, due to the expansion of the outside of the briquette before any water of crystallization at all is driven off. Briquettes, heated gradually, were not subjected to these internal stresses to nearly the same extent as those which were heated very suddenly.

An attempt was made to discover, if possible, a critical temperature to which it would be possible to subject the cement without danger of injury to the crystals, and where the cement would retain its cohesive powers. It was found that, if such a temperature existed, it was below the lowest temperature generated by the furnace, which was considerably below red heat. The lowest temperature had the same effect as the highest, excepting, of course, that with the lower temperature a longer time was required to effect the same reduction of weight than with a higher one. The lowest temperature necessary to destroy the cement was not determined, but is probably quite low. The following quotation from Heath's "*Manual of Lime and Cement*" is interesting regarding this: "Even good Portland-cement concrete, if exposed to the weather during a hot, dry summer, with no supply of moisture available, will probably be found covered with a network of innumerable hair-like cracks, which are signs of the beginning of disintegration, the natural and inevitable result of the loss of the water of hydration of the cement." (Heath's "*Manual of Lime and Cement*," page 75.)

The only neat briquettes which were not cracked by the heat were some very old ones, about four years old, which were tested. Most of these were uncracked, although some that were very suddenly heated cracked somewhat. All the newer briquettes cracked, the cracks being very large in most cases.

After cooling, the briquettes were found to be quite soft, and could easily be crushed between the fingers. This was especially noticeable in the case of those briquettes which had lost the most water of hydration. These briquettes were like lumps of dry mud or clay, and a very slight pressure was sufficient to crush them completely. Briquettes which had not lost so much water were harder, while those which had lost only about one or two per cent of water were quite hard. Of this latter class, however, these briquettes which had been heated suddenly were much the softer.

Briquettes which were cracked on removing from the furnace showed the cracks much distended and widened out on cooling, and most of those which had not cracked in the furnace showed cracks on standing for a day or two.

All sand briquettes, whether cracked in the furnace or not, entirely disintegrated on standing in air for a time, the cementing material having been entirely destroyed. Those sand briquettes which had lost most of their water of hydration disintegrated first, and those that had lost less followed soon after. Six briquettes of two sand to one cement were placed suddenly in the most intense heat, and left for about three minutes and removed. They lost from three to four per cent in weight, and two of them which were broken showed a complete loss of tensile strength; one breaking before any load was applied, and the other going at about eight pounds. The remaining four were set away, and in a couple of days commenced to crumble, the edges going first, and leaving an irregular mass in the centre. This, however, resisted for some time, but in about three weeks they also were completely disintegrated. It was thought that the sudden application of very intense heat would cause the water of hydration to be removed from the outside only, and that the inside would remain solid, and resist weathering. The results, however, showed that although the outer part of the briquettes suffered most, as is shown by the rapid disintegration, still the heat also affected the inner part, and caused its ultimate disintegration. These briquettes were too hot to be handled comfortably when weighed, after removal from the furnace, and it is quite probable that the heat still remaining in the outer portion caused a still further loss of water of hydration in the parts in the centre of the mass. The low tensile strength of these two briquettes was probably caused by the sudden heat causing great internal stresses in the briquettes. The parts of the two broken briquettes also behaved in the same manner as the unbroken ones.

A number of briquettes were heated and rapidly cooled by being immersed in cold water, after being heated for different lengths of time at different temperatures. In every case the briquettes cracked when immersed; and, if they were red-hot before immersion, they completely disintegrated — in most cases being reduced to a heap of soft mud. The sand briquettes acted precisely similarly to the neat ones; and it appears conclusive that if cement or concrete is allowed to become red-hot, and is then immersed in cold water, the effect would be ruinous in the extreme. Some briquettes were also heated, and, instead of being immersed were placed under a small stream of water flowing at the rate of about two litres a minute. The results were the same. Red-hot cement completely disintegrated. In some cases when heat had not been applied sufficiently long to heat the briquettes through and through, and where the edges only glowed, the glowing parts chipped off when water was applied, leaving an irregular mass comprising that part of the briquette which had not been heated so much. Even when not completely disintegrated, this central mass showed cracks, was very soft, and had no strength to resist any pressure.

From these experiments, then, the following conclusions may be drawn:

(1) While there is no doubt that a covering of Portland-cement concrete will afford some protection to a metal column or girder, still there appears to be no doubt that the concrete itself will be ruined by the action of the fire, and will have to be removed as soon as the fire is subdued. The concrete covering may remain upon the ironwork during a fire, but the heat will damage it to such an extent that it will disintegrate afterwards. The impression appears to exist that the concrete will be in as good condition after a fire as before. This is a mistake, as a fire of ordinary intensity is sufficient to ruin, completely, a very large covering of concrete.

(2) The concrete covering, if heated, will not stand the action of water; all the experiments show that water applied to hot cement is extremely ruinous. This is a very important point, when we come to consider the immense amount of water thrown into a building during a conflagration. The cement is certain to become red-hot; and then, when the hose is turned on, the water strikes the protecting covering, and it breaks off, leaving the ironwork bare and filling the air with a shower of dangerous falling pieces. In a fireproofed building, the usual construction is to have a system of concrete arches and slabs between the joists and girders. The walls are of concrete, and have metal doors to confine the fire, if started, to one spot as much as possible. The floor is usually cemented over, or boarded with thin flooring, and is, therefore, more or less watertight. The ceiling, or under part, might be exposed to intense heat, while immense quantities of water were being poured upon the upper portion, causing an immense strain on the concrete, not only from the weight of water, but from the opposite strains which the cement would undergo, on account of one side being expanded by the intense heat, while the other side is kept cold by the water upon it. All this time the fire below is eating away the strength of the cement, and a collapse is the result.

(3) In calculating for the design of the columns and girders, and especially for floors, no allowance should be made for the strength of the concrete, but the cement covering should be considered as so much extra load on the system. It is the usual custom, in designing a fireproof system, to consider that the concrete bears its share of the loads upon the girder; and, in a great many cases, the girder is designed on that assumption. If no fire occurs, this is all right; but, during a severe fire, the concrete loses its cohesive properties, both on account of the loss of its water of hydration, and on account of the great internal strains caused by the expansion of one side under heat, and, consequently, becomes unable to resist any stress anywhere near what it was originally able to bear, and in most cases would not even be self-supporting. The experiments have shown that sudden heating is extremely ruinous, much more so than heat gradually applied; and, in the average fire, a very high temperature is generated in an incredibly short time, and concrete subjected to its action would, in a very short time, be unable to bear any strain whatever.

It appears from this that, in a fireproof building, floors should never be constructed of slabs of cement, forming short spans or arches from girder to girder, without any support. If no load were placed on the floor, and it were subjected to heat, it might possibly retain its form, provided water were not thrown upon it; but if loaded, as any floor would be, a collapse is inevitable. Concrete, then, should always have a metal system of some sort imbedded in it, sufficiently to bear the weight of the concrete itself, and all external loads which may come upon it.

The great advantages possessed by cement or concrete, as a fire-protecting material, are its low heat-conducting power and its very small expansion under heat. These advantages, however, are entirely offset by the fact that it loses its strength under heat, is ruined by water applied during a fire, and will disintegrate after a fire, if not during the fire itself. These experiments tend to show, therefore, that the value of concrete as a fire-protecting material has been greatly overestimated, and that disastrous results may follow from confidence in a building protected with such a material.

DEAD CITIES OF THE FAYUM.

THEY are dead absolutely, not shrunk to villages like Memphis and Thebes, but as utterly lifeless as the desert which embraces them now. The sown land on whose outermost fringe they lay has shrunk within its ancient limits and left their streets and squares and roofless houses to be lost under drifts of sand.

The fact of their entire isolation and one further fact make the mounds round the edges of the Fayûm singularly worth exploring, even as sites go in the basin of the Nile. They have not, indeed, to show the remains of great cities which had a more than local fame, but of little centres of life in the richest province of Greek and Roman Egypt — small brick towns perched on slight eminences above those broad arable fields and marshes, stocked with cattle, which the papyrus tax-receipts show to have yielded so much to the imperial revenue. Trade of a sort passed through them, when

SCALE OF FEET

0 1 2 3 4 5 10 15 20 25 30 40 50

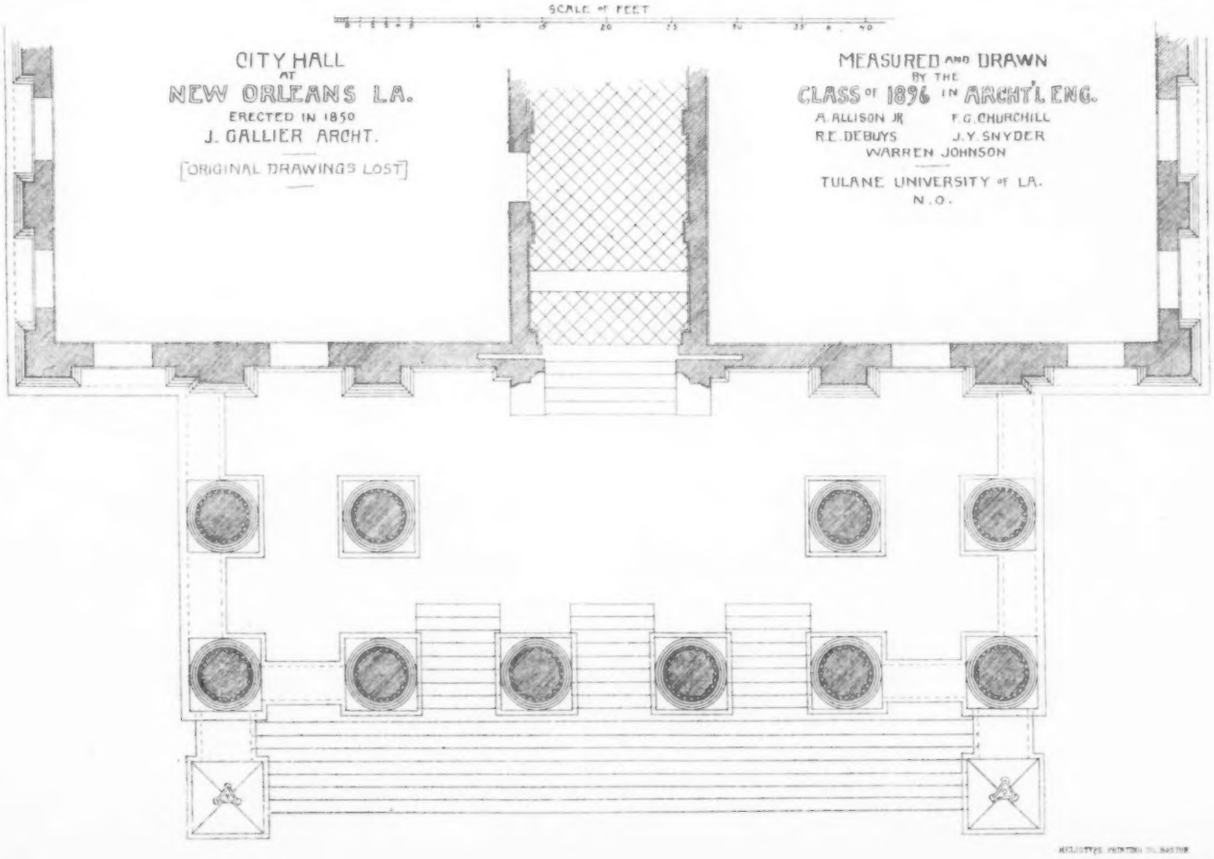
CITY HALL
AT
NEW ORLEANS LA.
ERECTED IN 1850
J. GALLIER ARCHT.

[ORIGINAL DRAWINGS LOST]

MEASURED AND DRAWN
BY THE
CLASS OF 1896 IN ARCH'T'L ENG.

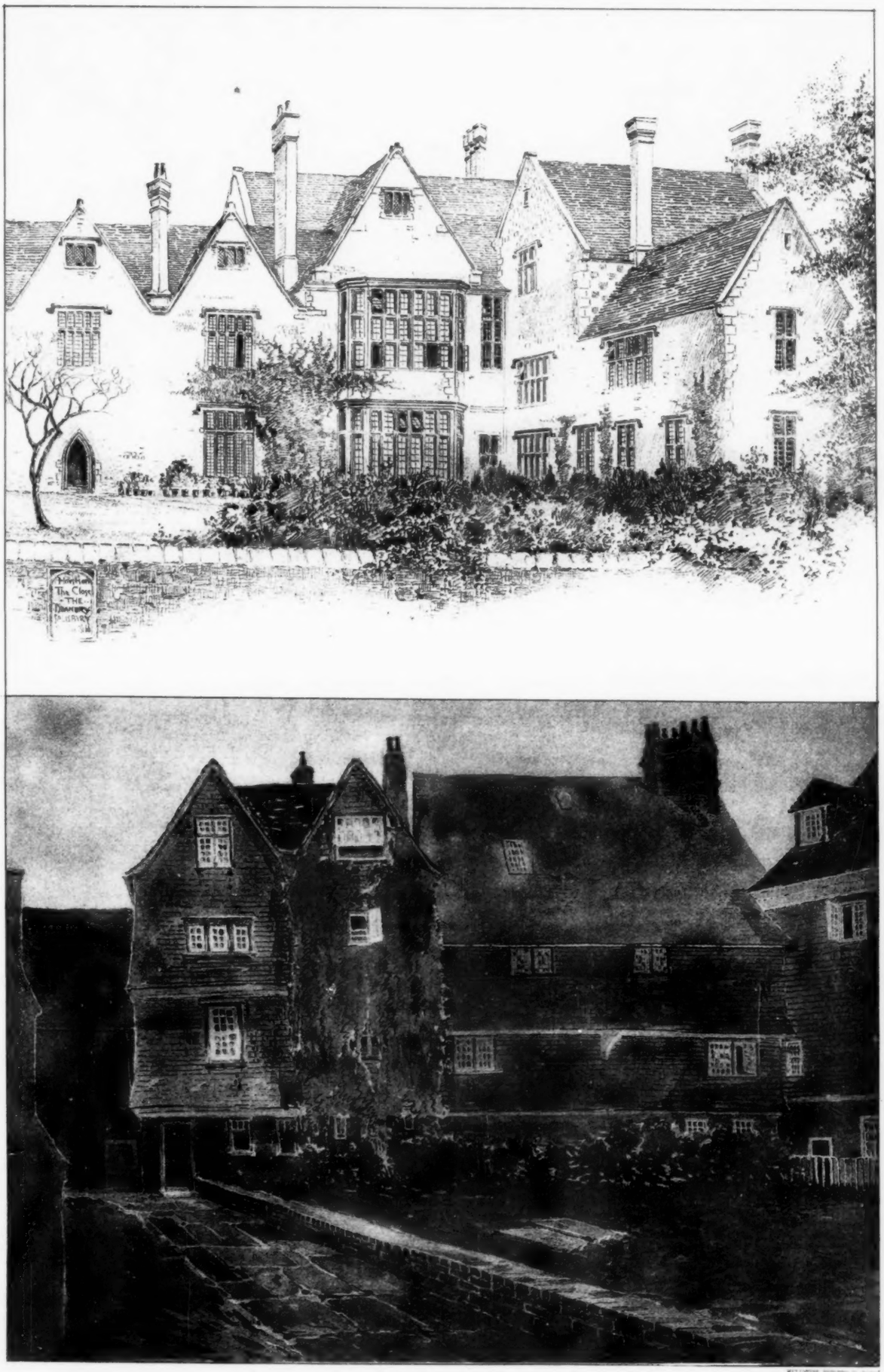
A. ALLISON JR. F.G. CHURCHILL
R.E. DEBUYS J.Y. SNYDER
WARREN JOHNSON

TULANE UNIVERSITY OF LA.
N.O.



INTERIOR OF CHARTRES CATHEDRAL.

After a Water-color by T. G. HOLYOKE



HOUSE IN ST. THOMAS'S CHURCHYARD, SALISBURY, ENG.

~Female Asylum, Tewksbury Mass.~

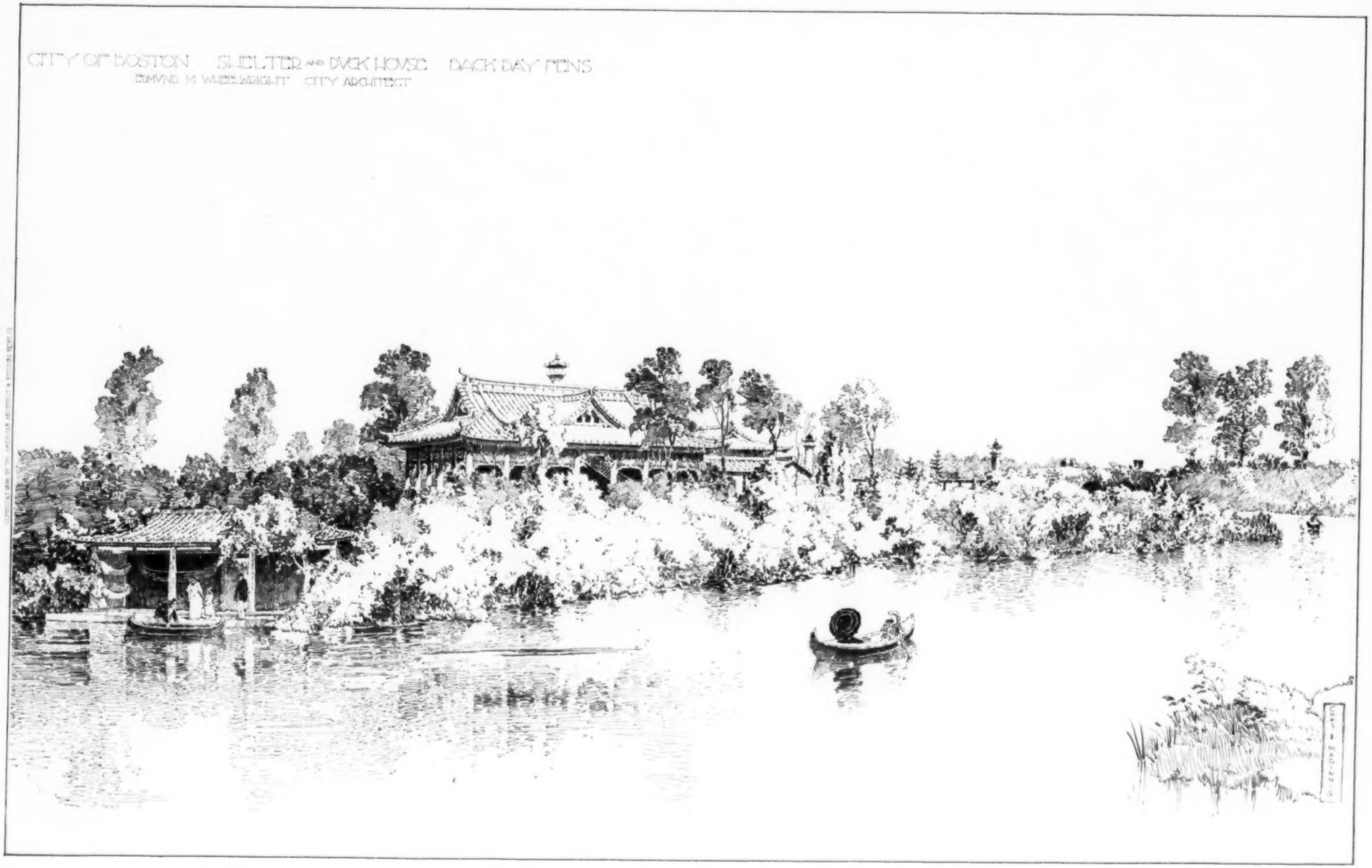
South West View

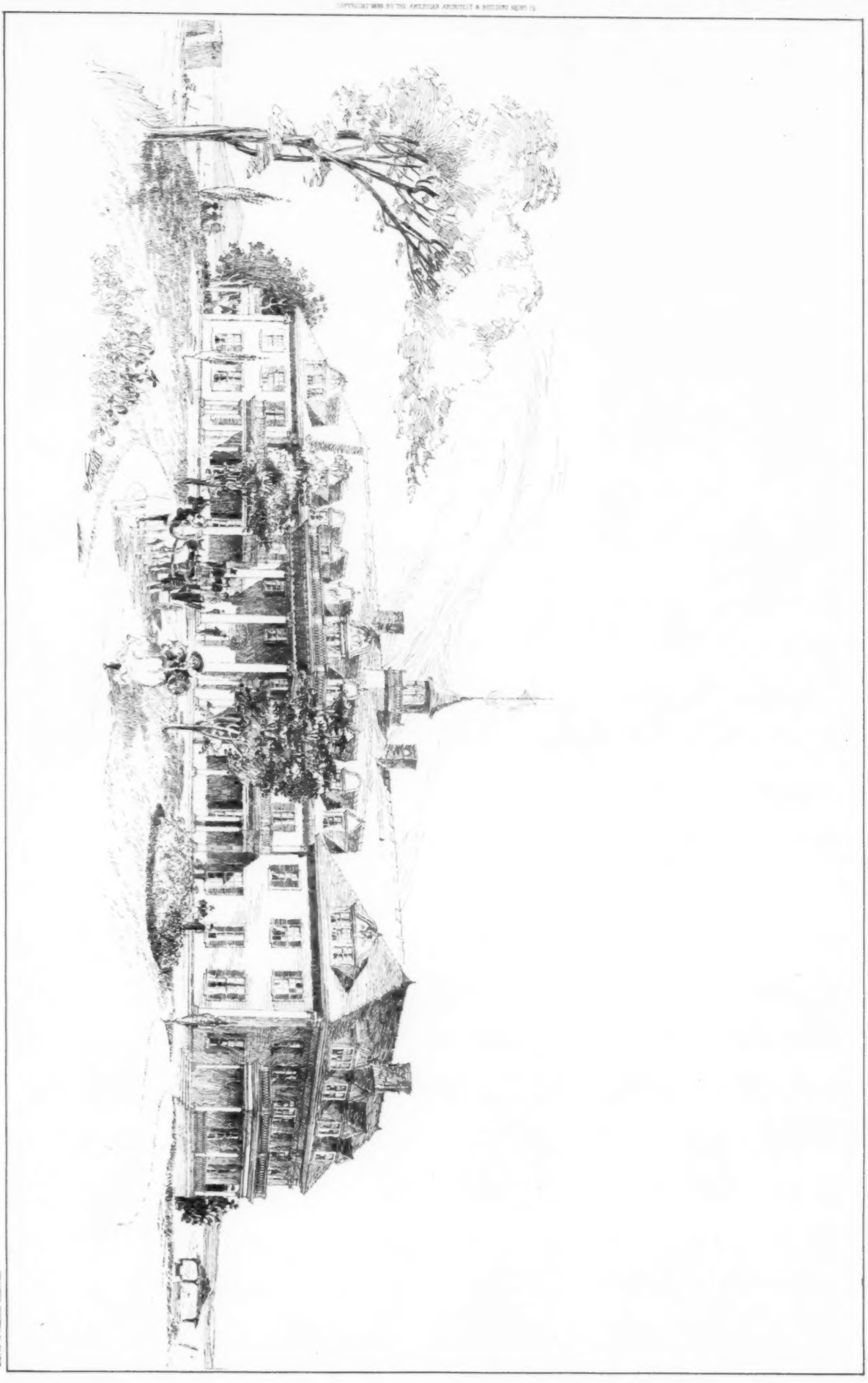
First Floor Plan

John A. Fox Architect Boston

HOTEL ALBION, CHAMBLY, P. Q.

BROWN, McVICAR & HERIOT, Architects.





HOTEL ALBION, CHAMBLY, P. Q.

BROWN, McVICAR & HERIOT, Architects.

the merchants were travelling between the home capital, Arsinoë-Crocodilopolis, and the Oases, and also they came in time to be something of health resorts; for when it was June in the Nile valley, and the river had become low and foul, the great sheet of Lake Moeris lay broad as ever in the view of these towns, and the winds of the Libyan Desert came across its cool waters. Therefore, although their walls are but of mud-brick, and they have at best a small temple apiece built of any material more sumptuous, they stood far above the rank of mere villages, and would be worth exploring even were not each so perfectly preserved under the sand as to be a small Pompeii.

But, as has been said above, there is a further count in their favor — briefly, that more than all other sites of Egypt these yield papyrus. The famous water-plant was, it seems, dirt-cheap in the Fayûm, as in the Delta; but, whereas in the climate of the latter and under its salt soils the papyrus product quickly decays, the Fayûm desert lies almost within the rainless area. In the streets and houses on its mounds, every rubbish-heap, every lumber-room, has conserved its scraps of waste-paper intact, and there is hope of lighting now and again on a little library or record office, or at least on the torn remains of some of the rolls they contained once, not thought worthy to be taken when the town was abandoned. There remains also to be added the chance of finding in the tombs a papyrus intact between the knees of the dead or serving for his pillow, or even broken up and gummed to form a *papier-maché* coffin. But so thoroughly have the cemeteries been plundered in antiquity, and so often do the graves lie in damp salt strata, that experience has shown the towns themselves to be the happier hunting-grounds.

The native dealers of Cairo and Medinet el Fayûm have long known the safe and easy sources of spoil, and have worked for the benefit of European museums unregarded and with no obligation to keep or publish records. Mr. Petrie alone has exploited any part of the Fayûm desert with a scientific object, but his efforts were confined to that corner where the Bahr Yusuf breaks through from the Nile valley. The topography of all the rest of the circle remained unknown, and the miscellaneous collections of Fayûm papyri in Cairo, Vienna, Berlin, Paris and London have lost half their interest and value from the uncertainty as to exactly where or how they had been found. It has been reserved to the English society, the Egypt Exploration Fund, to obtain the first precise scientific facts about these papyrus hoards and the first additions to our scanty knowledge of the map of the ancient Fayûm.

In December last the representatives of the society, Mr. D. G. Hogarth and Mr. B. P. Grenfell, having obtained the concession of a long strip of the northern desert fringe, went down into the Fayûm and settled on the two largest mounds east of the lake, called by the natives Kûm Ushim and Kûm el Qatl (*i. e.*, "Mound of Murder"). To this region desert routes from the north, whether from Nitria, or Alexandria, or Memphis, must have converged on their way to Arsinoë or the Lesser Oasis; and it was not long before the excavators discovered from the papyrus documents which were unearthed in the second mound that they were, in fact, on the site of Bacchias, a town set by Ptolemy (as Bacchis) on the desert road from Alexandria, and conjecturally placed hitherto by topographers in all localities but this. In like manner the first-named mound was determined to be Karanis, a name read more often on Fayûm papyri than any other, except Arsinoë, and that of the city which lies at Dimêh, but, owing to the absence of any record of the provenance of those papyri, never until now identified with any particular site. Karanis showed abundant evidence of the plundering which had produced these papyri, and it yielded far less to the explorers this winter than Bacchis; but from its tomb came rather unexpectedly certain large fragments, found lying loose in the sand, of which one is in Latin, the rarest of all scripts on papyrus, and three contain portions of Greek literary prose texts, not yet identified with any known author. Furthermore, there were many scraps of Homer, and such were found also at Bacchis, but these last were exceptions to the rule of non-literary documents prevailing on that site. By way of compensation, however, the diggers of Kûm el Qatl were rewarded with two fragments of peculiar importance. The first contains a large part of a rescript of an emperor, probably Commodus, addressed apparently to all provinces and cities of his empire. This text is beautifully penned by a local scribe with very deficient knowledge of Greek orthography. The second (also second century) purports to be a letter written by the Emperor Hadrian to a friend on the subject of his own approaching death. The fragment seems to be a schoolboy's copy of some once well-known text. Palæographers, rather than the general public, will welcome the intelligence that a great many documents and fragments of documents have been found, dated to the first century B. C., a period of which hardly any papyri exist. The most part were found in a chamber of the temple of the local god of Bacchis, discovered and dug out this year, and among them are two little complete petitions addressed to the god, whereof one seems to contain the prayer of some love-lorn maiden fearful that her beloved one may slip through her hands and depart from the city. Less pleasing, but always of great interest to the student of ancient life, are the mass of legal documents, memoranda, letters and the like which these two towns have yielded. So many were found in one spot at Kûm el Qatl that it appears probable that the situation of the local record office, or at least of the outpourings of its official waste-paper baskets, was chanced upon. — *London Times.*

SOCIETIES

BALTIMORE ARCHITECTURAL CLUB.

THE Baltimore Architectural Club proposes to give its first annual exhibition of architecture and the allied arts at the Peabody Institute, Baltimore, from November 1st to November 30th, inclusive. Drawings to be in on or before October 25, 1896.

WM. M. ELLICOTT, JR., *Secretary.*

THE ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE GUARANTY BUILDING, BUFFALO, N. Y. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

[Gelatine Print, issued with the International and Imperial Editions only.]

ALTHOUGH this building was put through its preparatory stages before the dissolution of the partnership between Messrs. Adler and Sullivan, the building itself has been erected as well as designed by Mr. Sullivan.

FACADE OF THE CITY-HALL, NEW ORLEANS, LA. MR. J. GALLIER, ARCHITECT.

THIS building has been measured and drawn by the pupils of the class in Architectural Engineering at Tulane University.

OLD HOUSES ON ST. THOMAS'S CHURCHYARD, SALISBURY, ENG.

THE DEANERY, CATHEDRAL CLOSE, SALISBURY, ENG.

SEE article elsewhere in this issue.

INTERIOR OF CHARTRES CATHEDRAL.

FEMALE ASYLUM, TEWKSBURY, MASS. MR. J. A. FOX, ARCHITECT, BOSTON, MASS.

SHELTER AND DUCK HOUSE, BACK BAY FENS, BOSTON, MASS. MR. E. M. WHEELWRIGHT, CITY ARCHITECT, BOSTON, MASS.

ALBION HOTEL, CHAMBLY, P. Q. MESSRS. BROWN, McVICAR & HERIOT, ARCHITECTS, MONTREAL, P. Q.

[The following named Illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXI: GARDEN OF THE VILLA CASTELLO, NEAR FLORENCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXII: MENAGGIO, ON LAKE COMO, FROM THE VILLA MELZI.

INTERIOR DECORATIONS.

STAIR-RAILS.

[Additional Illustrations in the International Edition.]

ELEVATOR SCREEN: GUARANTY BUILDING, BUFFALO, N. Y. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

[Gelatine Print.]

"THE VISITATION": GROUP AT THE MAIN DOORWAY OF THE CATHEDRAL OF RHEIMS, FRANCE.

[Copper-plate Etching.]

ENTRANCE HALL: BROOK HALL, NEAR CHESTER, ENG.

NOTES AND CLIPPINGS

MOSAIC DISCOVERED AT MELOS. — In the course of further excavations in the Island of Melos by the director and students of the British School at Athens, one of the most important discoveries has been that of a mosaic which is believed to be the finest yet found in Greece. It seems originally to have been about forty metres long and to have consisted of five panels, three of which are ornamented with geometric

patterns, and the other two with figure subjects, very beautiful both in design and color. On one of them are represented two vines with leaves and grapes, among which birds and animals are grouped, the other panel, with a circular design, consisting of a series of different fish, while each of the angles holds a tragic mask, very finely treated. The finer details of color are represented with glass tesseræ, while portions of the black are laid in gleaming obsidian, so that the whole has a most brilliant effect. More recently the excavators have come upon a series of graves of the sixth century, B. C., in one of which were found a number of ornaments in gold and silver. In another (Roman) tomb were found a series of gold leaves from a wreath and a gold ring with a fine subject in cameo. The excavations are now being closed for the season, and Mr. Cecil Smith, the director of the school, is shortly expected in England, when further details will be published. The annual meeting of the subscribers to the school will be held about the middle of July, when Mr. John Morley has consented to preside. — *London Times.*

On the Dome of St. Peter's. — The strangest, most extravagant, most incomprehensible, most disturbing sight of all is to be seen from the upper gallery in the cupola looking down to the church below. Hanging in mid-air, with nothing under one's feet, one sees the church projected in perspective within a huge circle. It is as though one saw it upside down and inside out. Few men could bear to stand there without that bit of iron railing between them and the hideous fall, and the inevitable slight dizziness which the strongest head feels may make one doubt for a moment whether what is really the floor below may not be in reality a ceiling above, and whether one's sense of gravitation be not inverted in an extraordinary dream. At that distance human beings look no bigger than flies, and the canopy of the high altar might be an ordinary table. And thence, climbing up between the double domes, one may emerge from the almost terrible perspective to the open air, and suddenly see all Rome at one's feet, and all the Roman mountains stretched out to south and east, in perfect grace of restful outline, shoulder to shoulder, like shadowy women lying side by side and holding hands. And the broken symmetry of streets and squares ranges below, cut by the winding ribbon of the yellow Tiber; to the right, the low Aventine, with the dark cypresses of the Protestant cemetery beyond, and the Palatine, crested with trees and ruins; the Pincian on the left, with its high gardens, and the mass of foliage of the Villa Medici behind it; the lofty tower of the Capitol in the midst of the city; and the sun clasping all to its heart of gold, the just and the unjust, the new and the old alike, past and present, youth, age and decay — generous as only the sun can be in this sordid and miserly world, where bread is but another name for blood, and a rood of growing corn means a pound of human flesh. The sun is the only good thing in nature that always gives itself to man for nothing but the mere trouble of sitting in the sunshine, and Rome without sunlight is a very grim and gloomy town to-day. It is worth the effort of climbing so high. Four hundred feet in the air, you look down on what ruled half the world by force for ages, and on what rules the other half to-day by faith — the greatest centre of conquest and of discord and of religion which the world has ever seen. A thousand volumes have been written about it by a thousand wise men. A word will tell what it has been — the heart of the world. Hither was drawn the world's blood by all the roads that lead to Rome, and hence it was forced out again along the mighty arteries of the Cæsars' roads to be spilled in the Cæsars' battles — to redden the world with the Roman name. Blood, blood and more blood — that was the history of old Rome — the blood of brothers, the blood of foes, the blood of martyrs without end. It flowed and ebbed in varying tide at the will of the just and the unjust, but there was always more to shed, and there were always more hands to shed it. And so it may be again hereafter; for the name of Rome has a heart-stirring ring, and there has always been as much blood spilled for the names of things as for the things themselves. — *Marion Crawford in the Century.*

MacMonnies and the West Point Monument. — The figure of "Fame," modelled by Frederick MacMonnies for the Battle Monument, at West Point, is the occasion of a mild commotion in the artistic camp. The great shaft of the monument was erected on Trophy Point in memory of the officers and enlisted men of the United States regular army, who were killed or died of wounds received in action during the Civil War. The idea of erecting a battle monument at West Point was first conceived by Major C. H. Hasbrouck, now of the Fourth Artillery, when he was a young lieutenant, in 1864. Every officer in the service contributed a sixth of his pay for one month to the committee that had been appointed at West Point, and at the end of the month $50,000 had been raised. It was nearly thirty years later when the first stone was laid. In designing the monument the architects were careful to make it purely martial in character and impressive in form. Grace and beauty of outline in absolute harmony with the surroundings were kept in view. Bulky or massive treatment was put aside, and a monolithic shaft of splendid proportions rises to almost a height of eighty feet above the many trophies gathered on the spot. The base of the monument is circular. Granite steps lead up to it. Huge polished spheres of the same material rest on cannon at appropriate intervals. These cannon are set on square blocks of granite, weighing several tons each. The figure which is to surmount the whole is supposed to be the crowning glory of the monument. It is this figure, soon to be unveiled, that has caused the trouble. Frederick MacMonnies was selected to make it. Its name was to be "Fame." When the committee who had the matter in charge viewed the figure, after it had arrived from France, there was considerable dissatisfaction expressed, but after a consultation with the architects, the figure was placed on its lofty pedestal on the site of old Fort Shelbourne. A date had been set for the unveiling ceremonies, but the officers found fault with "Fame" and the date was postponed. The gentlemen in charge of the matter declared that the figure had not been designed for so lofty a pedestal. However, a meeting of the committee was called, the architects and MacMonnies were invited to be present. "Fame" was formally pronounced a failure, and MacMonnies received an order for a figure of "Victory." This displacement of one of the finest statues ever constructed by Mr. MacMonnies has caused much public comment. When the figure of "Fame" was first placed on the Battle Monument at West Point, it received most favorable comment from every direction. It was reproduced, by request, in three-foot bronze statuettes, and these have been scattered throughout the country in schools and other public buildings. Leading artists have declared that Mr. MacMonnies's conception of "Fame" was most forcible, and suggestive in every way of dauntlessness. The statue of "Victory," which will soon be erected in its place, though dignified and poetical, does not seem, to many sculptors, to lend the same inspiration or suggest the same force as the figure it replaces. All attempts to get a statement from the architects as to why the first figure was displaced have been unsuccessful, and artists are puzzled to know the motives behind the change. Probably the only approach to motive in the matter is military ignorance of the fine arts. — *The Collector.*

The Canal Lock at Bremerhaven. — Next fall the new imperial harbor of Bremerhaven will be opened to the public, and a work will then have been completed which must be counted among the most important of its kind. The new harbor has been in course of construction since 1892. It will be protected from all sides by very strong levees against the frequent high flood-tides of the North Sea, and will contain three large basins, which will be open during ordinary high tides, while at ebb-tide the entire complex of basins and passages will be closed off by gigantic locks. Since the dimensions of steamships are continually growing, and the largest steamers of the North German Lloyd must be able to enter the new harbor, the entry had to be made large enough for all. The former inner harbor at this point was greatly increased in size, and a new entrance was built, which comprises, besides a strongly-built dike over three-quarters of a mile long, the largest lock so far constructed. This lock will be kept closed whenever the water in the Weser River is lower than the depth of water to be mantained in the harbor. When open, the lock has a clear width of 91 feet, the gate being 38 feet high, the largest in the world. The length of the lock between the two gates is 700 feet, and at ordinary high tide there is a depth of water of 33 feet. The gates rest in two masonry structures built on caissons of 20 feet in height and solidly cemented to the ground. The building of these structures, which took place under very favorable conditions, has succeeded surprisingly well, considering that it is one of the most difficult technical problems. The entire construction rests upon pile work, the length of the piles varying from 50 to 70 feet. Most of the construction work was carried on during the ebb-tide, recurring twice every twenty-four hours, so that only four hours a day could be employed at that work, and that only in favorable weather. What an immense amount of work was necessary to construct this harbor is evident from the following figures: Twenty thousand piles were sunk for a foundation, 45,000,000 cubic feet of soil had to be taken away on dry ground, and as much more dredged out by the immense dredges formerly used in the construction of the North Sea Baltic Canal. At the entrance of the harbor 4,750,000 cubic feet of masonry work were necessary to strengthen the dikes and hold the colossal locks. An immense dry-dock has been built immediately adjoining the harbor, which will accommodate the largest vessels of the world, its dimensions being identical with that of the lock at the entrance of the harbor. — *St. Louis Globe-Democrat.*

A Colossal Copper-plated Statue. — A colossal statue of St. Fidelio has recently been erected upon the People's Tower at Palazzolo, a small city between Brescia and Bergamo, in Lombardy. While the statue measures not less than 24 feet in height, its weight is only 1,760 pounds. Had it been cast in bronze this statue could not have weighed less than 50 tons. This fact is of the greatest importance, since the statue is erected upon the top of the dome of the great tower, at a height of 350 feet above ground. The statue is made of galvanized-copper, and has shown what artists and architects can do with an intelligent employment of electro-plating. The statue was modelled in clay by the sculptor Antonio Ricco. The shaping of the galvanized-copper plates took place in the electro-plating establishment of Count Vittorio Turati, in Milan. The work of the sculptor was first modelled in plaster, full size, the mold being then divided into 17 parts. Each of the pieces was then covered with a layer of plumbago and placed successively into the galvanic bath. To facilitate the deposit of copper upon the plaster a net of metallic wire, shaped to the form of the surface to be reproduced, was placed quite close to the form itself, and a number of small pins or pegs kept it at even distance from the plaster form. The bath consisted of a solution with a base of sulphate of copper. Once the first layer of copper was deposited upon the mold, the metallic net was taken away. In a few of the more delicate parts, however, the wire net was allowed to remain, and was thus entirely covered by galvanic-copper, so that it remained a sort of strengthening armature to the piece itself. The duration of the plating process was from 10 to 12 days for each piece, and in some cases more; the intensity of the current was regulated in such a way as to obtain a metallic cover of great cohesion. The thickness of the metallic surface deposited is on the average four millimetres. The surface of the statue which had to be covered with copper is in the neighborhood of 400 square feet. The electric current necessary for the plating was generated by a dynamo of 600 ampères, at a tension of from four to six volts, and a four horse-power gas motor furnished the power. The cost of this work is considerably less than if it had been cast in bronze. The expense averaged from 8 to 10 lire per kilogramme (80 cents to $1 per pound), or about $1,600 for the entire statue. — *Philadelphia Record.*

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