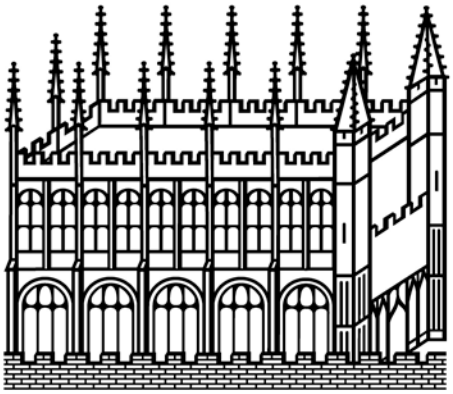


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SESSIONAL PAPERS

OF THE

ROYAL INSTITUTE OF BRITISH ARCHITECTS,

Incorporated in the Seventh Year of William IV.

PATRONESS . . HER MOST GRACIOUS MAJESTY THE QUEEN.
PATRON . . . HIS ROYAL HIGHNESS THE PRINCE OF WALES.

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PAPERS

READ AT

The Royal Institute of British Architects,

SESSION 1868-69.

USUI CIVIUM, DECORI URBIUM.

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OPENING ADDRESS BY THE PRESIDENT,

WILLIAM TITE, ESQ., M.P., F.R.S., &c.

At the Ordinary General Meeting of the Royal Institute of British Architects, November 2nd, 1868.

GENTLEMEN,—It now becomes my duty to address you, and permit me to say that I do so with very great difficulty, because, from pressure of a political and personal nature, I have been unable to devote the necessary time to the preparation of a written address, and to have that address printed, as has been the custom on these occasions. Although my kind friends at Bath have saved me the trouble of a personal canvass, yet still, you know, any individual representing, as I do, a population of nearly 60,000 people, with five thousand voters, there remains much labour, and you may conceive that such an undertaking is not without occupation, though the absence of all anxiety relieves it from much of its difficulty.

My excellent friend, opposite me, (Mr. Beresford Hope), produced his address in a shape necessarily more acceptable than mine, but still I trust this apology will be sufficient to justify me in believing that you will accept what I have to say, although I depart from the usual course of reading an essay.

In the first instance, then, gentlemen, as regards the Institute itself, all are topics of congratulation. The success of the Institute is manifest and increasing. The total number of our friends, in May of this year, was 623. Of Fellows—the more important element—in 1858, ten years ago, we mustered only 146, and at the present time, 1868, we number 262. I think that is an increase which must be satisfactory to every one, because it shows that the main element of success in our profession and position of life, is increasing; and I apprehend there are very few architects in London who have not joined this Institute, and endeavoured to further its objects. With regard to finances, when I give you those numbers, you may conceive that they are equally satisfactory. We have been doing something with regard to our Library and its Catalogue, and I think we have done much which will be very useful hereafter in the latter important particular. One of the last paragraphs, also, in the Report of the Council, dated May 4th, is to the following effect:—

> "The Council are glad to be able to repeat that the new arrangements with regard to the appointment of paid officers, made during the previous session, has worked as satisfactorily as it was then anticipated, and that the Honorary Secretaries, relieved thereby from the more onerous duties of their office, have been enabled to give their attention to many matters connected with the general interests of the Institute, which had previously, of necessity, been in abeyance."

In this I entirely concur, for though in early days, our friend Mr. Fowler, and other honorary secretaries and officers, worked very hard, the business of the Institute has increased so much that it was impossible for any man engaged in the ordinary pursuits of his profession to find time to give that attention to our work which its importance demanded, without having paid assistance. That has worked well, and I recognize with great pleasure, therefore, the testimony on that subject which I have read out of the Report of the Council.

During the past session, the papers read have not been very many, but they have been of great interest. One of them, of great importance, was read by Professor Ansted, on "The Relations of Geology with Architecture." The discussions which followed the reading of that paper showed how important a bearing the one science has upon the other. A paper of great interest followed, prepared by Mr. Digby Wyatt, whose absence this evening I, for one, deeply regret. I have received a letter from him, in which he informs me that he has left for Paris, on a mission for the

government, connected with art matters. His paper was one of great value, and led to a good discussion, which improved our acquaintance with much that might be said to be novel in architecture. The last paper to which I shall refer was that by Mr. Charles Barry, which was one of much importance in connection with structural Architecture, because it showed how, in a large building, with which I am connected as a governor—Dulwich College—he had successfully introduced the use of terra cotta instead of the more costly material, stone. He stated the comparative cost of one and the other, the nature of the material itself, and the incidents which led to its use on this occasion; and, on the whole, it was a paper of great value. I would say, however, having had some experience in this subject, I would caution those around me with reference to the use of this material. I am told, but I may be wrong, that the ante-fixæ of the great Ionic church of St. Pancras, which are composed of terra cotta, have failed; and I need only point to the well-known statue of the Prince of Wales, afterwards George IV., at Brighton, which was also composed of that material, and, before it was removed, presented the pitiable spectacle of a statue having one arm dropped off, and also a leg. To the young architects present, I would say, "You must be extremely careful that the material is well and homogeneously prepared and burnt," and I would caution my young friends not to be too ready to adopt that with which they have not an entire acquaintance. My friend, Mr. Barry, knowing his material well, has adopted it on a large scale, and, I believe, to the entire satisfaction of the Governors of Dulwich College.

I have next to refer to a promise made by my friend the member for Cambridge, that he would bring before the House of Commons a question of the greatest importance, and which is put in the following words:—

> "Mr. Beresford Hope, M.P., Ex-President, gave notice that at the request of the Committee for the Conservation of Ancient Monuments and Remains, he intended to call the attention of the House of Commons to the condition of buildings possessing historical or archæological interest, and make a motion on the subject."

I trust that my hon. friend will be again elected a member of Parliament, and that he will then have an opportunity afforded him of redeeming the pledge thus given.

[Mr. Beresford Hope said he was absolved from it by Professor Donaldson, in the last session.]

I have, since I commenced my remarks, referred only to subjects of unmixed satisfaction; but I think, gentlemen, it now becomes my duty to advert to one which I feel, with the greatest possible respect to the persons most concerned, to be a subject of considerable difficulty; but I am advised that I am called upon to notice it from this chair. The incident itself is of great importance in its general bearing on the position of architects. It seems now to have become the universal fashion for us to be exposed, in all directions, to competition. Now, personally speaking, I have no reason to quarrel with competition. I have been as unsuccessful as most men in the profession in that direction, and occasionally successful; but it is of great importance that competitions should be decided on the fairest principles,—because any supposed or presumed unfairness has a distinct bearing on our position as architects and gentlemen. These remarks have reference to the incidents in connection with the two great competitions which have been recently settled. The one was the National Gallery, and the other the great edifice for the purposes of the Law Courts. I have been desirous to give the details and dates of every step that has been taken in connection with these matters, for I think, at all events, we should like to have them fairly and accurately recorded. The incidents are not many, but they are very remarkable and very peculiar.

The first of the two invitations to compete, viz., for the National Gallery, was issued on the 15th February, 1866, to Messrs. E. M. Barry, Banks and Barry, C. Brodrick, D. Wyatt, G. E. Street and G. G. Scott, and afterwards to Messrs. G. Somers Clarke, O. Jones, F. C. Penrose, F. P. Cockerell, and J. Murray; Mr. Scott ultimately withdrew, leaving ten competitors.

Designs sent in by ten competitors on 1st January, 1867.

Judges of Designs appointed in January, 1867, viz.: Viscount Hardinge, Lord Elcho, A. J. B. Beresford Hope, Esq., W. Boxall, Esq., D. Brandon, Esq., R. Redgrave, Esq., W. Russell, Esq., T. Gambier Parry, Esq., and W. Tite, Esq.

Letter by competing architects to Lord J. Manners, First Commissioner of Her Majesty's Works, &c., pointing out that it would be a breach of faith with them, if one of them were not selected for employment, 16th February, 1867. Judges reported 28th February, 1867, that they were "not prepared to recommend any one individual design for adoption," but that the design of Mr. E. M. Barry, "for a New Gallery," "and that of Mr. Murray for the adaptation of the present building, exhibited the greatest amount of architectural merit."

In this way this important competition terminated, or rather rested; and for a considerable period of time nothing more was done in it. Perhaps the matter was embarrassing enough to the Government, for it was not recommended by the judges that any design should be adopted, but they declared Mr. Barry's to be the best. The general feeling evidently was that it was desirable to pull down the present building and erect a new one.

The next great competition was with reference to the New Law Courts. Here the arrangements were very different, and the complications that ensued were very great. Those arrangements were of the nature and in the order, following :—

February, 1866.—Five Judges appointed. By Treasury: Mr. Cowper (Chairman), Mr. Gladstone, Sir W. Stirling Maxwell. By the Commission: Sir A. Cockburn, Sir R. Palmer.

December 23, 1865.—Treasury minute that the Committee of Judges shall issue the invitations to compete, and their award shall be final.

February, 1866.—Determination to limit the number of competitors to six, and letter of invitation (enclosing printed instructions which contained no promise to employ the successful architect) to Mr. Barry to be one of the six.

Negotiations: in the course of which the Treasury undertook to employ the successful architect; but introduced a condition forbidding him to take new works for three years after his appointment.

March 21, 1866.—Withdrawal of Mr. Scott and Mr. Barry from the competition, in consequence of this condition.

April 20, 1866.—Condition withdrawn; the number of competitors increased to twelve. Mr. Scott and Mr. Barry re-invited by letter, containing printed conditions, finally revised and signed by Lord Cranworth.

January 15, 1867.—Designs sent in by eleven competitors, one having resigned.

June 8, 1867.—Messrs. Shaw and Pownall appointed Judges of Designs, at the unanimous request of the competitors, increasing the number of Judges to seven.

July 30, 1867.—First award of the seven judges to the effect that they considered Mr. Barry's design the best for plan and distribution of interior, and Mr. Street's the best as an architectural composition. Recommendation, therefore, that those two gentlemen should be jointly employed in the respective departments named. Return of award by the Judges to the Treasury, with a request that the Judges would select one architect.

November 28, 1867.—Re-consideration of award by the Judges, and statement of them, that having come to the conclusion that the design of Mr. Barry is the best in regard to plan, and the design of Mr. Street in regard to elevation, and having recommended the joint employment of those two architects, they could do no more.

Reference of case to Attorney General.

Opinion of Attorney General that the award was invalid, and the Government free to make any appointment they thought proper.

May 30, 1868.—Followed by the appointment of Mr. Street.

June 8, 1868.—Letter of protest to Treasury by Mr. Barry, followed by others; but it must be noted that Mr. Barry was appointed Architect to the New National Gallery about the same time, viz., the middle of June, 1868.

Now, our friend, the President, who preceded me, pointed out some of the complications likely to result from the strange conditions of the New Law Courts; for in his address, in the year preceding my nomination, he makes this remark:—

> "I was just observing that there were certain complications attaching to the competition for the New Law Courts. These were of an administrative character, and owed their origin to the fact that the Government had handed over no inconsiderable portion of the control which, in the case of most public buildings, would have been shared between the Treasury and the Board of Works, to a Special Commission, created by Act of Parliament, and comprising a large infusion of the legal element. These gentlemen set to work with a very sound principle strongly before them, and, as was not unnatural, rode that principle a little hard. They assumed that the successful architect (or architects) ought to have made himself practically acquainted with the working of the different Courts of Law, and the inference which they drew from this undeniable proposition was, that it was needful for them to be excessively restrictive in the number of competitors chosen, in order to prevent the business of the Courts from being interrupted by the frequent visits of curious investigators, and so they draw the line at six. This was probably, in the eyes of all men, except the Commissioners themselves, an extravagant application of their principle. Not to allude to any other objection, this restriction manifested considerable confusion as to thear tistic obligation, contracted with the national honour, to produce the best obtainable building. However, it required a vote of the House of Commons to overcome the reluctance of this most respectable Junta."

What my honourable friend then predicted followed exactly: at the same time, the result was not, on the whole, an unsatisfactory one. The calling in of two professional judges—men of the greatest eminence and practical skill—was, no doubt, exactly the course to remedy the difficulty which Mr. Hope pointed out; and the appointment of Messrs. Pownall and Shaw was satisfactory to all. The result was equally satisfactory. It said that the plan of Mr. Barry, and the elevation of Mr. Street were the best. Of course, these two gentlemen putting their heads together to erect these buildings must have been satisfactory to the nation, and to the profession generally. There was good precedent for this, because, in my early days, Mr. Wilkins and Mr. Gandy built one of the great club houses as joint architects; and in another case, in which I was concerned, Mr. Cockerell and myself agreed jointly to build one of the great Banks in the City,—the London and Westminster—and in both cases everything appeared to go on agreeably and conveniently, and with a satisfactory result. However, in the affair of the New Law Courts discussions went on, and it ended, as I have just stated, in Mr. Barry being entrusted with the re-building of the National Gallery, and Mr. Street with the erection of the New Law Courts—a result which does not appear to have pleased anybody very much, and which appeared only extremely difficult to reconcile, because each gentleman had great claims; and the solution which I ventured at the time humbly to suggest to the House of Commons, appeared to me the only reasonable one. A debate occurred in that House in July on the motion of Mr. Julian Goldsmid. The suggestion I then ventured to make was this: that, inasmuch as it was perfectly well known that the Law Courts, as designed, required far more space than could be accorded in the

Lincoln's-Inn Fields site, I proposed that the Chancery and Common Law Courts should be divided and one erected on the Thames Embankment, and the other placed in Lincoln's-Inn, and that the one should be given to Mr. Street, and the other to Mr. Barry. That suggestion was opposed in the House, though it was received with some favour by the Public, and so the matter ended in the very unsatisfactory condition in which we find it.* I am unwilling to pursue this discussion further, except to say that I think the profession generally feels in all these competitions if a strict adherence is not paid to the conditions put forth, it is hardly to be expected that men of character and ability will join in such competitions. The result to the public may, however, end satisfactorily in the present instance, because no one respects more than I do—more, perhaps, than we all do—both these gentlemen: either one would be sure to erect a building creditable to the nation and to our profession; but, to say the least of it, if there is disappointment, and a sense of injustice on the one hand, and inconvenience on the other, damage, I fear, must follow to our honourable profession; and I regret that some more satisfactory result has not, therefore, been obtained. It is unwillingly that I have taken up this question. I have no right to give an opinion of what ought now to be done. I have no intention of giving any beyond the limits within which I have circumscribed myself. I would rather, in concluding an unpleasant subject, which, as I have already said, nothing but a sense of duty has led me to discuss, read the statement of a public writer in the *Builder*, than give any opinion of my own.

The President then read the leading article from the *Builder*, of 13th of June, 1868,—which in the main insisted upon Mr. Barry's claim to the preference, upon the ground that the award of the professional judges was in favour of his plan, which in the instructions furnished to competitors was stated to be the principal object to be kept in view.

Having now performed this unpleasant duty—I hope not unkindly (for I have only urged that where rules are laid down for competition they should be strictly observed)—I have now a subject of a more agreeable nature to refer to, and that is to congratulate ourselves in having obtained a very valuable friend and supporter of this Institute in the person of my honourable friend Mr. Layard, who is now present, and to whom I had the honour of presenting the Royal Gold Medal of the Institute for this year. He will be, doubtless, of great assistance to us, and I understand he has proposed to give us, at some suitable time during the session, a paper on the Art Decorations of Venice, which will deal generally with the ornamentation, particularly in mosaic, of that glorious city.

The general considerations of the position of architecture induces me to believe that we are becoming better recognized as a body of scientific men, and on this subject I cannot help referring to an address of mine, delivered in 1852, in which I said, that in the House of Commons we were not particularly well received. I think that at the present time, even there, we are held in much greater estimation, and are felt to be men who know something of our profession, and something of the arts which ornament and lead to it. The passage in my address is as follows:—

> "I cannot but express my hope that the profession I am attached to, and which I have followed for more than forty years, may receive from me in a kindly spirit a few words of caution—that we ought not to forget that the great principles of art demand something more than a mere patient re-production of forms eliminated in and appropriate to other times, without sufficient reference to the great power given to us by new materials, demanding different treatment, and a new exertion of the imaginative faculty."

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* Since this paper was put in type, it is stated in an official document that the property already purchased for the site has cost £785,000; and that it is proposed to obtain authority from Parliament for the purchase of additional property, estimated to cost a further sum of £668,000.

The caution I then ventured to give, I think also applies with great force to the incidents of the present day. It is wrong to confine our studies and our practice to one style of architecture alone. We ought to begin at the beginning. It is of little use to seek to be a Gothic architect alone, so on the other hand it is of little value to be exclusively a classic architect. Try to understand both styles, and do not be led away by the fashion of the day. The difficulty with us now is that everything must be mediæval! It is very well when judiciously applied, but far from agreeable or fitting when not so applied. My friend Mr. Hope may dispute this opinion with me, because he has offered a premium for a design for a Gothic theatre, when I think that most will agree with me that Italian or French architecture is better adapted to that class of buildings. I have, perhaps, myself done as much as most men in the Gothic style, and I believe I was the first man who attempted to make a Gothic railway station, because it suited what I may call the *genius loci*. Whether I succeeded or not, you will be able to say when you visit Carlisle. It was troublesome, and did not go very well with the platforms, and sheds and roofs, but I had no difficulty with the refreshment rooms and halls. I built other stations, as at Rouen and Havre, in other styles, and I perhaps may think I was more happy there; but I may congratulate my friend, Mr. Scott, on the enormous development of that style of architecture which he is about to carry out at the St. Pancras station of the Midland Railway. In what has been done one sees the joint work of the architect and the engineer, and that enormous shed which alone would cover much that I have built for railway purposes. One cannot sufficiently admire the great skill which is displayed in the construction of that roof, as well as the propriety of the decorations. I am sure from the specimen already executed, that we shall see there a building in every way worthy of our profession, and the time to which we belong.

I am now brought to another subject on which it is always painful to dwell,—that is the necrology of the Institute. I was not personally acquainted with all of those who have been mentioned in the annual report as deceased, but there is one gentleman whom I knew very well, Mr. Burnell, concerning whom I will quote a brief obituary notice, which appeared at the time of his death in the *Building News*, and in every word of which I can cordially join.

> "On the 23rd of July last, Mr. G. R. Burnell, died at his residence in Kensington Gardens Terrace, in the fifty-fourth year of his age. He was a well-known writer of several scientific works. His attainments were numerous. He had extensive knowledge of languages, and had resided in America, France, and Belgium, besides visiting Spain and Sardinia. About seven years of his life were spent in France, during which time he was engaged on the Paris and Rouen Railway, and as superintending architect of the Havre Docks. On the cry being raised of '*La France pour les Français*,' in 1848, he returned to England. Though he executed several works both here and abroad, his bent was decidedly literary. He contributed several articles to the *Building News* early in his career, especially on roofs. In 1857 he wrote a rudimentary work on 'Limes and Cements,' in 1861, 'The Annual Retrospect of Engineering and Architecture.' He edited 'The Builders' and Contractors' Price-book,' and 'The Engineers' and Architects' Pocket-book.' He was connected, too, with the *Journal of Gaslighting* for many years, and wrote several papers for the Society of Arts, and for the Institution of Civil Engineers, for which he received prizes."

Other deaths since our last meeting have been recorded, upon none of which can I give you any particular information. The Hon. Secretary has this evening announced the decease of Mr. T. Allason, Fellow, who I did not know, for he belonged to a comparatively late period; but I knew his father an eminent and popular architect, who had travelled much, and who left us a very valuable work on the Roman Remains at Pola, in Istria; and in other ways contributed to the advancement of our profession.

I find on referring to Mr. Beresford Hope's address, in the year preceding my now second nomi-

nation, that he alludes to the Thames Embankment—I will follow suit. I think it is a work worthy of ancient Rome—a work of which Englishmen may justly be proud. That work has been carried out so far in a comparatively small space of time; and whether we regard the beauty of the material used, the excellence of the workmanship, or the usefulness of the work itself—(for that after all has a great deal to do with it)—the Thames Embankment is marked out as one of the greatest features of the age. Both south and north are equally admirable. I can only conceive that when one shall be able, perhaps within another twelvemonth, to begin with that great work at Westminster and, by means of New Cannon Street, to find one's-self within a few minutes' walk of the Royal Exchange, it will mark an era, an epoch, in the history of architectural skill and national development. On the other side of the Palace of Westminster, it will be continued on up to Battersea, for which powers have recently been obtained. Probably some efforts will be made to continue it on the other side, and soon we shall see that the Thames, so long the great disfigurement of the metropolis, will become one of its greatest ornaments. While speaking of the Thames Embankment, I venture to say how gratified I am at the progress of the New St. Thomas's Hospital, opposite the House of Commons, now being erected by my excellent friend Mr. Currie. It is founded on the principle of the *Lariboisiére* and other great French Hospitals. I hope soon to see other edifices carried out on a similar plan and arrangement. It will, when complete, accommodate 600 sick and wounded persons, and I believe, as a piece of architecture, will be just as creditable as it is as a work of humanity.

During the interval which has elapsed since my honourable friend addressed you from this chair, a great deal has been done in the way of architecture in the City. The great hotels are magnificent pieces of ornamentation, as well as being admirably adapted to the purposes for which they were built. When I speak of those at Charing Cross, and in the City, and at the Victoria Station, I speak of buildings which are elegant in themselves, and based upon the best architectural principles. I recollect the Bishop of Oxford speaking, one day in the Egyptian Hall of the Mansion House, on the subject of the efforts being made for the redecoration of St. Paul's. He said he had been looking at Evelyn, who remarked in one of his works that he had passed through London, and thought it "the ugliest city for its bigness he had seen in Europe." I hope we are now redeeming that great blot on our national education, and our national means, and that soon we shall have a London worthy of the great nation of which it is the capital. I don't think I can say quite as much for the new bridges. I confess I do not much like the bridges which span the Thames in all directions; and on this subject I will quote a short note which is printed in my address in 1862:

> "Blackfriars Bridge, I may also notice, will soon cease to exist. As is well known, it was the work of one of our best architects, the elder Mylne, and it was celebrated, not only in this country, but in Europe, as of surpassing elegance and beauty. In the competition which has raged for some months past as to the designs for its successor, I cannot say I see much to admire in the result, for, unfortunately, the very worst design of the whole has been chosen. Mr. Page's three-arched bridge was a grand idea, though defective in detail. The bridge about to be erected is in five segmental arches of iron, with stone piers, and the architectural features of those piers and other adornments are highly objectionable."

I think the result bears out the remark I then made. I fear, as Evelyn said of London, that it will be the ugliest bridge for its bigness that you will see on the face of Europe. I am sorry, because it supplies the place of a bridge which was admired in Italy and France. However, it is a bridge which will carry us safely over, and will increase the convenience and comfort of the Londoners; and we must be content to sacrifice a little good taste for these admirable results. I feel that I have occupied your time too long, and I fear, in a very unsatisfactory way. I am sorry I have not been able to speak

better, as my voice, for once in my life, fails me. I am greatly obliged to you for listening to me with so much patience, and infinitely more obliged to you for allowing me to appear here in the situation I have now the honour to fill.

Mr. BERESFORD HOPE, M.P. (past President), rose and said :—Allow me, Sir, to invite you to perform a feat which some people may think impossible; namely, to separate yourself into two persons, and, as President of this Institute, to put to the vote a resolution, which I beg to propose, of thanks to our honoured and eloquent friend, who has just given us that interesting address. Of course, I rise on this occasion, as having myself sat in that curule chair, which you now so worthily occupy, and I congratulate you on this auspicious inauguration of your fourth consulate—our President,

"Consulque non unius anni."

You occupy that chair by the suffrages of our affection and veneration. You occupy it alike for your services by voice and by pencil, by being the veteran patron and supporter of this Royal Institute, and by the great munificence with which you have connected your name with it, in ways most useful for those who will come after. Of course, Sir, in proposing a vote of thanks for your address, I do not commit myself to all which you have said, while fully admitting your just claim to advance your own opinions, as you have done this evening, *sans peur et sans reproche*. You have thrown down the gauntlet so bravely that none will take it up, except in a diffident manner. The matters which sounded most pugnacious in your address were the comments you have passed on the late great competitions. In these affairs both you and I were much mixed up. We were joint judges of the competition for the National Gallery, and we sat looking at each other as friendly opponents across the floor of the House of Commons in the debates upon the Law Courts. You have spoken your full mind on this subject: I mean to speak no mind of mine. If you ask me why, I answer—because we are not fairly matched together. You, Sir, occupy that chair most worthily: you have a perfect right to speak with all authority in this Institute; in your hands rests the casting vote. The mover of this resolution, by what I must call the eccentric constitution of this Institute has only a voice, but not a vote on it, and if any one here were so insane as to get up and move a negative to the resolution which I am proposing, I should have to sit with folded hands, unable to vote in favour of my own resolution. I say this is an eccentric constitution. As long as I might have been supposed to be a candidate for the Presidentship I said nothing upon the matter. It would have been bad taste to have done so. While I was President it would have been worse taste, for the duties of office ought always to be a check upon any man's too fervid reforming instincts. But now that I have passed the chair, and that I may be supposed to enjoy immunity from hope or fear for the future, I feel that it is my duty to speak plainly. You will bear with me, then, for saying that the constitution which admits amateurs into the Institute, but subjects them to such restrictions as those I have pointed out, is unworthy of this great body. No doubt the regulation to which I refer was framed more than thirty years ago, and the intervening time has been as 300 years, if tested by the growth of the human mind. You created your class of honorary fellows, who might not serve on council, nor vote upon the most ordinary matters until, and unless, one of them was voted into the chair, and then, for the time being, he was your prime minister. After that the hour struck, and he relapsed into his former impotence. You also have honorary members who cannot even be presidents; £25 makes the one order, merit the other. The *rationale* of the scheme of a donation of £25. making an honorary fellow, while artistic and literary eminence only makes an honorary member, would, to the cynical bystander, seem to amount to this,—that, in the opinion of the Institute, £25. is of more value than eminence. I say that is a ridiculous constitution. I say so with all good will, because there is no ambition on my own part in connection with it:

but having been once your prime minister, with right of vote and right of casting vote, at this moment I am not able even to vote for my own proposition, and I therefore decline to enter into this controversy. I appear here, for the moment, as an outsider, and as such I aver that we have done great things. You have told us how the Institute has increased, and have expressed your desire that the architectural profession should be honoured in the world as it deserves to be; but if it is to be so, I call upon our Fellows to throw away all fear and dread of our non-professional brethren, and to meet them with both hands, as they have met us with theirs. That being so, I beg leave to decline following our worthy President, either with praise or comment, on what he has said on the question of these two competitions. On the general question of competition, I would venture briefly to put it in a shape in which it has not been presented before. If you have not competition, how is the young man to make his professional skill or his genius known? Architecture, as is well known, is a matter which deals with pounds, shillings, and pence; it deals also with a great deal of time. The smallest building, the very least thing in the world that an architect can be called in for, is a matter of three figures. How, then, with the comparatively small amount of chances represented by the brevity of human life—how is a young man engaged in architecture to make himself known? Take the case of lawyers! For our sins there may be four or five lawsuits in a day. The medical practitioner, again, may have his forty or fifty patients, and a day's work in a hospital may stamp him a Harvey or a Brodie. But with regard to architecture, from the physical circumstances of the case, the opportunity for the man of genius to get himself forward is very small indeed; I am not arguing for competition. I only say this,—let those who decry competition give us some other method of bringing young men forward which shall check jobbing, which shall check nepotism, and which shall also check the blighting influences of old prejudices and jealousies. You have referred, Sir, to the motion which I promised to bring before the House last session. At that time I represented a manufacturing constituency, in the Midland counties. Circumstances induced me to accept the first office I ever held under the Crown, that of Steward of the Manor of Northstead, and before I entered Parliament again, there came the death agonies of the old English Parliament. We were walking, as it were, with our shrouds tied about our necks. A variety of grave matters, the compound-householder, the Irish church, and so on, were in full debate, and I felt that if I had brought this matter forward, to which my honourable friend has referred, I might have made a speech—imperfectly reported, perhaps, in *The Times*, and well reported in *The Builder*—but I should have done no good to you. But I did not want to make simply a speech. I thought I had better reserve the matter for our new rulers, and see whether they were up to the summit of their position or not. On that account I did not bring it forward in the last session. I consulted Professor Donaldson, and he gave me a plenary absolution; I felt then that I was excused, but I have not lost sight of the question, and hope to have an opportunity, ere long, to bring it forward, and when I do so, I shall bring it forward as a branch of a much larger question, on which I hold a decided opinion, namely, the necessity of our having a Minister of Art, Architecture and Science,—a minister that shall absorb all the functions of First Commissioner of Works, and all the South Kensington functions of the Lord President, so as to build up an efficient and responsible department of the public service. I do not advocate a permanent minister of this kind, for this reason, that however good a man might be at 48, 58, or 68 years of age, when he gets to be 88 or 98 he might be a little behind the running, but unless he does something egregiously absurd or corrupt, there would be some difficulty in displacing him. I am for a good, efficient, first-rate minister, with the eyes of Parliament and the country upon him, with a permanent secretary to give stability to the machinery, and a removable under-secretary, who would be the responsible official in the House, to which his chief does not belong.

There is only one other matter, and that is to repudiate all idea of quarrelling with you, Sir, about a Gothic theatre. That ghost is not laid, for you will see it flitting about in the prize list of the

Institute for the current year. You say you have never seen a Gothic theatre! That is because it has never been tried. There was a time when we could say we had not seen a Gothic bank, or railway station, before you built the one at Carlisle. My own idea of a Gothic theatre is the apse of a Gothic cathedral—the rounded end of a building with a succession of galleries. There is one point on which we shall, I am sure, all agree; that is, as to the necessity for the architect, who aims at success, studying and understanding all styles. Perhaps my reason for saying that is not the same as yours. I admire Greek architecture as much as any one; but I believe it is imperfect architecture, because those who developed it did not understand the arch. If they had done so, they might have become very good Goths after all. I beg pardon for having occupied you so long; but our President has invited us to discuss so many points, that I hope you will excuse some prolixity, and I will conclude by expressing our hearty congratulations at seeing you, Sir, sitting here in better health, and by proposing our cordial thanks for the address which you have delivered to us this evening.

Mr. G. GILBERT SCOTT, Fellow, said, I have been asked by my friend, Mr. Barry, who was to have seconded this motion, to take that task upon myself. After the very full speech in proposing the vote of thanks which Mr. Beresford Hope has made, very little more remains for me to add; but I do say, that I think every one must have heard with great pleasure the address of our respected President. I hardly know anything in it but what I more or less agree with, excepting that I have no strong feeling on the subject of the competitions referred to. I am satisfied, on my own part, with the result. I am not speaking relatively or argumentatively, but being myself a party to one competition, I believe I speak the feeling of the profession generally, in stating that the result, as to the hands into which that work has fallen, apart from all questions as to the logical grounds of the decision, is satisfactory to them. It is not my intention to follow up the subjects to which the President has alluded, because on almost every one I agree with him,—perhaps not to the full meaning that the President may have had in his mind, but, generally, I differ but very little from anything he has said. I did not quite understand, in speaking of a work I was connected with—the Midland Station at St. Pancras—whether he gave to me the credit for that roof. It was not my work, but the work of the engineer, though I am responsible for its decoration. I will only only add the expression of the great pleasure which all of us feel in meeting the President here in full force, as I hope, and with all the zeal he shows for the success of the Institute and the profession. He has been over and over again thanked for his munificence towards the Institute, but I beg personally to return him my thanks for the immense benefit he has done to the Institute, in promoting to such a liberal extent, the funds in aid of the library.

Mr. GEORGE GODWIN, Fellow: I will beg leave to add a few words for two reasons,—one is, that I may express, with the gentleman who preceded me, my gratitude to Mr. Tite, not simply for what he is always doing for this Institute, but for the exertions he is ever ready to make for the profession generally. His energy is something remarkable, only equalled, it seems, by his liberality. We have had noble instances of it ourselves, and in other societies with which he is concerned it has been equally shown. Only the other day, with reference to the Camden Society, Mr. Tite, having been elected President, and being possessed of a valuable and scarce work, had it printed under competent editorship, and presented a copy of it to every member of that Society. The second reason for my rising is to take advantage of the opportunity which the President's observations on competitions afforded me, of calling attention to some large competitions which are now going on, and which are managed in a very remarkable manner. I allude to the Metropolitan Asylums for the Sick and Imbecile Poor, which are springing up to the astonishment, in many cases, of ratepayers, though not to myself and others, who took part in the measures which led to the Act of Parliament under which they are about to be built. The system on which architects are selected to compete for these buildings seems to be altogether unintelligible People are asking on what grounds the gentlemen who compete are selected. I would not say a word against those named: but there is this

peculiarity, that in more than one or two parishes, for which asylums are to be built, well-known architects of reputation, who have paid rates and taxes for years, have been passed over, and young men are brought into these competitions, whose chief recommendation is, that they are untramelled by anything like preconceived notions, having never done anything of the sort before, and who make their first appearance as competitors for the credit of erecting these asylums. Doubtless many will distinguish themselves therein, but I think men who have won their spurs should not be passed over altogether. Therefore I think it would be well if it come to the ears of the Metropolitan and District Boards that architects are asking the question, by what system these arrangements are regulated, and appointments made. Are the competitors friends of individual members of the Boards? Are they recommended by the body of ratepayers? Or, in what way are the selections made? Enormous sums are about to be spent with either good or bad results, and the question seems to me an important one. With these few observations, I content myself with emphasising most heartily the vote of thanks that has been proposed to the President.

Mr. CHARLES BARRY, Fellow.—Mr. Beresford Hope rather delays asking a vote upon this resolution, in order that others may add their voice in respect to what he has said in reference to the President. On the professional subjects touched upon nothing further remains to be said, but there was one remark which fell from Mr. Hope that I am sure finds response in the minds and consideration of many present—that is, the personal affection we feel towards the President for his kindly aid and sympathy in our difficulties as young men, and which I myself have experienced over and over again whenever I have applied to him for advice. I am sure, from my knowledge of gentlemen in this room, very many will entirely sympathize with my feelings in this respect. Mr. Godwin referred just now to a subject which I will just touch upon, because it is one of the gravest interest, viz., the terms of competition under which architects have been lately invited to compete for certain public institutions to which he has alluded. These consist of large Infirmaries for the imbecile poor within the Metropolitan area; Hospitals for fever and small-pox cases; Unions of parishes for the erection of workhouse infirmaries and pauper schools; and they should obviously afford large opportunities for the display of architectural skill; but it may be within the knowledge of some gentlemen here, as it is within my own, that the terms of the competitions offered in respect of these buildings are so different from the spirit of those to which members of this Institute are accustomed, that I am not surprised to find that Mr. Godwin does not recognize the names of its members amongst the competitors. I may, however, state that this subject, being one of vital interest to our profession, has already attracted the attention of your Council, and some kind of movement will in all probability be taken by them upon it during the present session.

Mr. A. H. LAYARD, M.P., Honorary Member, said:—Although only an honorary member of the Institute, I may ask your indulgence while I address to you a very few words. I think we are now in a very important architectural period, and I particularly wish to call the attention of the Institute to what is about to take place in this great metropolis. The Government, whatever ministry may be in office, is about to undertake the erection of the most important public buildings ever erected in our time in any capital of the world, not even excepting Paris, because though great changes have been made in the streets and thoroughfares of that city, no great number of national public buildings have been added to it. We are now going to erect New Courts of Law, a new National Gallery, the larger portion of the public offices, including the Admiralty, War Office, and Colonial Office, and probably a vast building at South Kensington for the collections of natural history, which must be divided from the art collections and library of the British Museum. We are thus going to commence the erection of some of the greatest and most important architectural monuments in this kingdom, during the lifetime, I hope, of most present. It appears to me, then, of the utmost importance, not only to the reputation of the country at large, but of the profession, the members of which I have the honour to address, that we

should not fall into any gross blunders, either as to the style or as to the site of these great edifices. I do not offer any opinion of my own as to what the style should be, whether gothic or classic; all that I would venture to say is, let us, if possible, give up quarrelling over terms and build in what is really an English style of architecture suitable to the time and country in which we live, and consistent with the habits and requirements of the nation. But what I urge is this; let the Institute keep its eyes upon the Government, whether it is composed of the friends of the honourable gentleman on my left (Mr. Beresford Hope) or of my own friends. It is really a question of national credit and reputation that we should not commit ourselves, and do something egregiously wrong with regard to the public buildings which we are about to erect. We have the Thames Embankment, affording a magnificent site, and the means of erecting a series of buildings which may rival those of any other country in size and splendour. I do not say whether that is the best site or not; I only desire to urge the necessity of our earnestly considering the question. I see Mr. Street present. He has now the duty of erecting the Law Courts. No one will doubt that that great work has been placed in thoroughly competent hands; and it will be for him to point out to the Government that which he considers the most appropriate site. But still it appears to me that it is one of the legitimate functions of this Institute, as a great public body, to take such questions as these into consideration, and to see whether they cannot aid in directing, both the Government and public opinion upon it. I urge this upon you, because no time is to be lost; for the necessity of providing these great public buildings is so great, that I have no doubt when the next Parliament meets, this question will be one of the earliest that will have to be decided. In the meantime, this Institute might confer essential benefit by endeavouring to help public opinion in a direction which may lead to satisfactory results to the country. The two points to be considered are these:—first of all, with regard to the sites of these buildings; and, secondly, the style in which they shall be built. I believe Mr. Street is wholly unfettered with regard to the latter. I understand that his elevation and designs were neither accepted nor rejected by the Government, and that he is left free to rectify or alter them, as he may think proper. Mr. E. Barry has been appointed the architect of the New National Gallery. As regards the new public offices not forming part of the building containing the Foreign and India Offices, there is no decision, whether as regards their site, their style, or the architect to whom they are to be confided. I much regret that the House of Commons has decided not to remove the National Gallery from its present site; but against that decision there is no appeal. The decision as to the sites of the Public Offices and the Law Courts has still to be taken; and if, in the opinion of those most capable of judging, their erection upon the Thames Embankment should conduce most to the public convenience, and should add most to the ornament of the metropolis, the Institute might, I am convinced, be of essential use in influencing and directing public opinion on this important subject. In fact, the Institute might perform an important public function, by exercising a certain control over the architecture of the metropolis, and in saving us from the discredit which, in the past, has attached to so many of our public buildings. I entirely agree with all that has been said with regard to our worthy President. I now have the honour of sitting on the same side of the House of Commons as he has done for some years. I know what the value of his opinion is there. I wish we had more of the profession in Parliament; and I trust other members of this Institute will find their way into that august assembly. I am aware of the generous support Mr. Tite has given. The next best thing to having money, is to be able to make good use of it. I congratulate my estimable friend on both. His wealth is devoted to the most honourable and praiseworthy purposes; and, when a man thus employs his wealth, its possession excites no jealousy on the part of others.

Mr. BERESFORD HOPE then put the motion, which was carried by acclamation.

The PRESIDENT rose and said,—I am much obliged to my excellent friend the mover, and also to

my good friend, Mr. Scott, the seconder, for the motion itself, and to all of you, gentlemen, for the kind way in which you have received it. Self (as Lord Chesterfield said), is a subject on which all men can be voluble, but few entertaining, and therefore I shall say no more on that subject. With regard to the competitions adverted to by my friend Mr. Godwin, it would seem that they only tend to encourage such architects as are willing to accept less than the usual remuneration for their services,—a novel principle in competitions which I can scarcely imagine members of this Institute will approve. We are bound by the rules of our forefathers with regard to the commission paid to architects, and I trust no one will think of countenancing competition as to who will do the work cheapest. It is natural that those who have to raise the rates should wish to economize them as much as possible, and some day perhaps we may hear of them asking people to do the work for nothing. There were two matters which I forgot to mention in my opening remarks. While on the subject of Gothic architecture, I omitted to congratulate you on what has recently been effected at the City Guildhall. The works there have been executed in such excellent spirit, and with such marked success, as to call forth our highest admiration. The roof is beyond all praise, though I am afraid the glazing will make the hall too dark for any purpose not mediæval, but it is remarkable for its architectural propriety and good taste. The new market is an elegant and appropriate building, and both the hall and the market reflect great credit on the City Architect, Mr. Horace Jones. I am happy to say that the Royal Academy will, as I am informed by the President, be ready to receive the pictures at the next April exhibition. Mr. Smirke has so far proceeded with the work as fully to warrant that expectation, and the large additional wall space that will be obtained, will be an enormous advantage to the artists who exhibit their work. My friend, Mr. Beresford Hope, has exerted himself to preserve the colonnade and the peristyle of the entrance of the old building. It will be taken down and re-erected elsewhere as a monument of architectural and antiquarian curiosity. I thank you, gentlemen, for the kind reception you have given me, and for all you have been good enough to say of me.

Mr. J. H. PARKER, Hon. Member, wished to take the opportunity of calling the attention of the meeting, and in particular those who had occasion to visit Italy, to the proceedings of the British Archæological Society in Rome. By the permission of the Pontifical Government, he said they had made researches which had never been made before in the history of Rome. They had been able to discern the ancient walls of the city, and also the sites of the several gates. He was happy to announce that sixty-four photographs had been taken of the historical buildings, beginning with the foundation of Rome, and coming down to the thirteenth century; the accurate representation of which could not have been obtained without the help of photography. He thought it was the duty of this Institute to encourage historical photography, inasmuch as they could judge of the age of a wall by the number of bricks per foot in it, and that could be ascertained by photography only. It was a work of the utmost importance in the study of architecture.

The meeting then adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 16th November, 1868, JOSEPH CLARKE, V.P., in the Chair, the following Discussion (adjourned from the 22nd June last) took place:—

DISCUSSION ON MR. C. BARRY'S PAPER.—"MEMORANDA ON THE WORKS EXECUTED IN TERRA COTTA AT NEW ALLEYN'S COLLEGE, DULWICH."

Mr. C. BARRY, at the invitation of the Chairman, opened the Discussion as follows:—

A very few remarks additional to those contained in the Paper, read by me at the end of last Session, on terra-cotta as a building material, will serve to introduce the Discussion on the subject proposed for this evening.

And, *first*, with reference to the composition of the "body" of the material. It is commonly assumed that terra-cotta is nothing more than baked clay, or baked clay and sand; and in fact a large proportion of the terra-cotta made use of in buildings recently erected, and now in progress, is of no other character. Such ware does not, in my opinion, fairly deserve to be styled terra-cotta; and I do not consider it to be a worthy material for architectural purposes; certainly it is very different, and I think very inferior, to the ware which has been used at Dulwich. A little examination of the best ancient terra-cottas will convince practised observers of earthenware bodies that the best Greek and Roman works contained other elements than clay and sand. Terra-cotta, to endure the severities of change in these northern latitudes, should be a hard vitrious body of a peculiar character. To compound such a body for cream-coloured ware, we must use Cornish, Devon or Dorset clays, with ground flint, Cornish granite sand and old potsherds composed of like materials. If the colour is required to be of a warm stone hue, clay or marl from the Oolite beds in coal measures are used to brighten the mixture; also sands containing protoxide of iron. For brown or chocolate bodies, red clay is combined with manganese, with Dorset clay, flint, &c.

Glazes are prepared from "frits," composed of Cornish granite, flint, red lead, soda and borax. To these frits, after grinding, is added white or red lead, flint, glass, and Cornish granite.

The proportions in which these materials are used is the secret of the manufacturer, and the quality of the ware will differ according to his scientific knowledge; but as some of these materials are expensive, there is some pecuniary inducement to omit them, and a terra-cotta may be manufactured which is nearly equal, when new, in appearance to the best "body," but which is liable after a few years to disintegrate or flake on the surface.

Again, a maker is tempted, when the blocks are of considerable size, to make them with inferior material, and then coat them over with a thin layer of good material; this is most dangerous. The bodies are not unlikely to separate in drying and burning, and flake off. A perfect equality or homogeneousness of the body of clay used throughout the mass of a block is most essential to durability. In some of the work done for me at Dulwich, where diverse colours were wanted, Mr. Blashfield at first tried to colour a superficial layer with the particular chemical required to produce the colour in burning, but always using the same body, and never putting the coloured layer less than three-quarter-inch thick; but even this measure of economy he has since seen it well to abandon, and

make the mass, as I said, of the same character throughout. When this is not done, the effect is to cause a cracking and crazing of the surface, which may probably end in the rapid decay of the whole. Some of the first tesseræ made for modern mosaic pavements and ornamental tiles were so composed, and premature ruin ensued. I do not mean to say that backing up with clay of a coarse texture on a fine surface is always wrong, as it is matter of experience that the coarse "body" used for the middle of an encaustic tile will, if properly managed, satisfactorily blend with the fine body composing the back and front of the tile; but it is important that the coarse body should be so compounded that it shall blend in the kiln with the fine part of the work, and the whole, under the effect of the fire, become homogeneous.

Signor Ottolini, in the Introduction of Grüner's book on the Terra-Cotta of North Italy, says that "a paste not thoroughly homogeneous fails to sustain equally in all parts the influence of heat." And we may, I think, rely upon it that such a body would fail to sustain the influence of frost.

It is extremely difficult to obtain a bed of clay fit for making good bricks without any admixture of sand, lime, or some other earth. Generally the best brick clay is improved by tempering it with adjacent marls or loams. All strong or pure clays crack, and to make good bricks, it is necessary to mix such clays with bodies less liable to contraction and variation of form. How much more important therefore must it be in making large blocks of terra-cotta, based on the strong clays of Devonshire and Dorsetshire, to take care that a paste is produced that will dry equally without cracking, and that will bear firing to a degree at which iron melts without distortion.

One fruitful source of bad work in terra-cotta is the want of sufficient time being given for the air drying; this rather tedious process, when large blocks are wanted, is trying to the patience of the manufacturer, representing as it does interest of money as yet unrealised, and rent for shed room, kiln fuel, &c.; but it is so essential to the durability of the future work, that it cannot be passed over negligently. It will be useful to architects to have some means of forming an opinion on this point from inspection of the work, though, as I have said, the external appearance of bad and good work is, at first, hardly to be noticed; so that, after all, the character of the manufacturer must be the main guarantee to the employer and his architect for good work. At the same time, some opinion may be formed from inspection. For instance: if a piece of terra-cotta either bad in material, or imperfectly dried and burnt throughout, be soaked for five or six hours in sulphuric acid and water (equal parts), it will lose in weight—when it dries will shew efflorescence over its surface, and the liquid will be found to be charged with sulphate of aluminia or alum.

Again, where a piece of red terra-cotta not sufficiently burnt is broken, the fracture will shew a blackish tint in the centre instead of being red throughout. In like manner white terra-cotta will shew streaks or bands of orange and reddish hue. It is right, however, to say that these latter appearances arise sometimes from materials in the body, and do not always denote bad work.

As to the Heat and Weight of Fuel required for burning in the Kilns.

To burn duly a body composed of such materials as I have described, will require an equal weight of coal to the weight of the ware:—one ton of coal to one ton of terra-cotta. As to the heat required to be produced in the kiln there has been some difference of opinion; it having been stated by some at 3000 degrees of Fahrenheit, and upwards. This is probably excessive; and the real heat is so high that it is almost impossible by any pyrometer to gauge it precisely. One good test, however, of the heat necessary to fire terra-cotta that shall be really durable, is to put it at the heat at which soft iron readily melts when introduced into the kiln. Professor Faraday, I believe, stated this heat to be 1800 to 2000 degrees, while Dr. Percy puts it at 2800 degrees Fahrenheit.

AS TO ABSORPTION OF RAIN WATER BY TERRA-COTTA IN THE BUILDING.

It is, of course, pretty well established as a fact, that with building materials such as stone their durability is almost directly in proportion to their non-porosity. I alluded in my paper to the qualities of terra-cotta in these respects, but I have since had some useful experiments made on this point, as follows: Pieces of terra-cotta, Portland stone, Bath stone, and Kelton stone, of equal bulk, viz. 12 inches square and 2 inches thick, have been thoroughly dried in a moderately-heated oven, carefully weighed, and then plunged simultaneously into water, and left there for thirteen days; at the expiration of that time, they were again carefully weighed with the following results.

	lb.	oz.		lb.	oz.
Portland stone dry, weighed	22	10	wet	23	6½
Increase of weight 1 lb. 6½ oz.					
Bath stone dry, weighed	21	14	wet	23	15
Increase of weight 2 lb. 1 oz.					
Kelton stone dry, weighed	21	11	wet	23	8
Increase of weight 1 lb. 13 oz.					
Terra-cotta dry, weighed	20	9	wet	21	8½
Increase of weight 15½ oz.					

With these few remarks, I will now leave the subject for discussion, and I am glad to know that there are many persons in this room to-night who can, and I trust will afford the meeting the benefit of their opinions and actual experience of this most interesting and attractive material to the architect.

Mr. J. M. BLASHFIELD, Contributing Visitor (responding to the Chairman's invitation) said—It is due to the great kindness and courtesy of Mr. Barry that I am here to-night to speak on the subject of terra cotta. For the general arrangement of the experiments referred to this evening by Mr. Barry, as well as on the last occasion when this subject was before you, Mr. Barry, I may say, is accountable. He has taken such great interest in this subject, that I am sure it will be soon apparent that he has contributed very largely to the revival and establishment in a new form of a material capable of great application in architecture. I should not probably have given the same anxious care to the conduct of the work at Dulwich which I have done but for the constant suggestions and unwearied application which Mr. Barry himself gave to this development of terra cotta in many novel and varied forms. From the commencement of the Dulwich work up to the present time he has not only given the greatest attention to the entire work, but a large portion of these details have been partially modelled by his own hands. With regard to terra cotta as known years ago, I am not about to speak. We are not now dealing with it. My own acquaintance with pottery grew out of my connection with the late Herbert Minton, who was interested in Prosser's patent for making buttons from porcelain. Long before the date of this patent I had been making tesseræ from cement, broken tile, and marble, and contriving tesselated pavements; and at this time may be seen in many places the remains of mosaic and inlaid pavements made by me before Mr. Minton fabricated tesseræ. The consideration of the subject of architectural pottery occupied my mind at the time I began to make these pavements. I pressed upon Herbert Minton the importance of manufacturing architectural pottery; and some twenty-four years ago I gave him a piece of work to make with an ornamental pattern on the surface enamelled. But I had a great deal of trouble at the early period of his making mosaics to keep him up to the mark in the production of such geometrical forms as would readily combine in the formation of pavements,—of Classic, Mauresque, and Mediæval character,—and I never could at that date induce him to give attention to architectural embossed and moulded forms.

When Herbert Minton commenced making tesseræ, he used a coarse pottery body for the base, and laid on the surface a finer material. He did not make the ware as it is now made, in thin slices and little more than a quarter of an inch thick. He at first made the tesseræ in the form of parallelopipedons of coarse clay with a mere facing of blue, white, and other colours. Those colours looked well for a time, but they soon cracked and flaked off. After numerous experiments, Herbert Minton found that the best way of making tesseræ was from clay in dry powder, and of the same colour and body throughout, in the same way as Prosser made buttons, and by means of similar machinery. I recollect a communication which was made by Mr. Prosser, of Birmingham, to the Society of Arts about 1841, in which he expressed his views as to the importance of the use of compressed clay with a view to its application to mouldings; but his machinery was found to be so imperfect for compressing large pieces, that it was a long time before Mr. Minton could make from Prosser's machines an hexagonal brick above $3\frac{1}{2}$ inches diameter and 2 inches thick, from dry powder. Subsequently plain surface forms of larger area were made, and eventually slabs of 3 feet length with arabesque ornament on the face for the chimney pieces of the Conservative Club House. A communication was made, I think about 1845, with Mr. Page (who was then about to construct some bridges at Windsor), on the subject of making voussoirs for arches from clay in dry powder; but some circumstance connected with Mr. Prosser's patent embarrassed the subject, and prevented Prosser going on with experiments for making large masses of ware in that manner. Mr. Prosser had certain views with regard to the manufacture which I am unacquainted with, and which he did not, as far as I am aware, leave on record. I have now related my first acquaintance with pottery. About the year 1850 I began to make terra cotta. I had, before that, made tesseræ and some Greek vases; and in 1847 you will find in the transactions of the Society of Arts a paper I read on Greek fictile vases.

I will now, in order to take up as little of your time as possible, refer to the speciality which my ware possesses. That which is supplied for architectural work in some instances can hardly be called terra cotta. My own ware is more of a body or substance resembling the encaustic tile; its body is fine and close, and contains other elements besides clay and sand. There is a good deal of Cornish stone or pegmatite in the body which runs through the pores of my terra cotta. Great pains is taken in washing and in pugging the clay and passing it through sieves. For ordinary ware I use a sieve having 28 meshes to the square inch, and for finer ware a sieve of 40 meshes. By an admixture of old ware with the clays, and with given proportions of Cornish stone, Lynn sand, &c., I produce a body more like the close paving tile of the Minton character than the ordinary terra cotta of the day. I believe in doing this I incur larger expense for fuel than if I made a porous ware similar to the material generally used for terra cotta. In the north of England for terra cotta, fire clay, sand, and old ware are the materials commonly used. The proper amount of old ware to be mixed with a given quantity of clay is not yet determined; and it would be of great importance if the authorities of South Kensington would call in the aid of some scientific men, and determine what quantity of old ware clays of known character would bear without injury. We all know that cements will bear a given quantity of sand; but if you dose Roman or Portland cement beyond a certain amount, its tenacity is gone. So it is with the use of old ware. It is valuable up to a certain point, but as to what that point is we are (scientifically) in the dark. We make experiments, and think we are right, but in all probability we are very wrong: because there are curious facts in connection with the manufacture of Portland cement which are rather startling, and on this point I may make an observation which is most damaging to terra cotta. In the manufacture of Portland cement you run down a kind of glass. Dr. Medlock—who probably has had more experience in the examination of Portland cement for manufacturers than any other man—will confirm

the statement that there often runs out of the kiln large masses apparently of glass. This is nothing but silica of alumina (alum), lime, and a little peroxide of iron. If these glassy nodules are thrown aside and left for twelve months, they will begin to speckle and afterwards crumble to powder; but if you pulverize them, and mix the powder with water, you will make a cement of great hardness, which will take some eighteen hours to set, and the dry cement will equal about 130 lbs. weight to the bushel. I want to know, whether in dealing with these wares, and in combining the old ware imperfectly with mere clay and sand, without such a flux as Cornish stone, we may not make a material called terra cotta that may go to ruin in the same way as these Portland cement nodules fall to pieces. Some years ago I bought of a terra cotta manufacturer two mignionette boxes, which I gave to a friend at Blackheath. They remained in good condition for a time, but gradually they dropped to pieces and dissolved into mud. What was the reason of that? Simply because the combination of the materials was imperfect; apparently they had enough old ware to keep them true, but there was no substance to combine with and flux the materials and hold the particles together. We know without flux in porcelain the body cannot be held together; and we also know, where there is a proper flux, it is almost indestructible. Chemists have examined old china, and they found in it a large quantity of potash. The Etruscan vases are found to contain considerable quantities of magnesia, peroxide of iron, and lime. These are all fluxes, and, in a moderate degree, sufficient to hold the clay together; and in some of the old Greek vases there has been found an amount of peroxide of iron almost sufficient to have brought the wares into a metallic state at a very high temperature. In the old ware manufactured by the Chinese, no doubt was combined a large portion of China stone. With ordinary China clay they now use China stone as a flux to make the body perfect. In the works I have made of late, I have tried to imitate the mode of making porcelain, and to combine with whatever clay I used such bodies as would give me ware of a porcelain character. If I employ Dorset clay I use flint, old ware, so much glass and so much China stone, which is a decomposed felspar, and roasting these at a heat at which soft iron will melt, I find that the body holds firmly together. It can be tested by acids, and there is little chance of disintegration. To the Devon clays I give more fire and more flint, and a large proportion of Cornish stone. Those clays which contain peroxide of iron, like those found on Mr. Helps's estate, and those of the South of England generally, require only a very small amount of flux, because there is such a large amount of protoxide of iron in the clay, that sufficient flux exists of a metallic character. With regard to the truth of the architectural work I make, I have to depend a great deal upon the operations performed after the work is dry. When the ware is perfectly dry, it is placed in the hands of the mason to bring it into form. It often happens that I have to carve a portion of the ornament after the ware is moulded, pressed, and dried; but when I get it perfectly dry, and have removed the fine film from the surface which prevents some of the fixed air getting out, and have wrought it into true form and line, I place it with confidence in the kiln, and it almost invariably comes out correct. But if it is imperfectly dressed before going into the kiln, and one part of the ware is left with a smooth surface and the other part is left rough, I generally find that it twists. The specimens on the table have been dressed by a mason before they went into the oven, and you see they have come out true; but had they been made in the ordinary way, I should, to have kept them true in drying, have had great trouble in turning them about, and must have used a larger quantity of old ware, and I doubt whether then I should have obtained the same pleasing result. I don't know that I can say more on the subject of the material than has been already said; but I repeat, that if a scientific examination as to the proper quantity of old ware to be used with pottery were made, it would be very valuable to potters. There are certain other elements that may be used in clays for terra cotta, and there might be an examination of them and analysis of various clays also made, so that inexperienced persons might fabricate terra cotta without fear of its disintegrating or readily going to decay.

Mr. GILBERT REDGRAVE, Visitor, said—I am extremely glad of the opportunity afforded me of bringing under your notice some terra cotta which we have used largely at South Kensington, and which, both in composition and manufacture, differs greatly from the material employed by Mr. Barry, at Dulwich. Dispersed through the various geological strata, there are numerous beds of clay, all of them more or less suited to the purposes of the terra cotta manufacturer; and the question he has to deal with is not so much which particular clay is better than another, as which clay, or mixture of clays, will undergo the greatest heat, and produce the best and most durable terra cotta. In the matter of clay, I am a latitudinarian: I consider one clay may make as good terra cotta as another, provided that the manufacturer can combine the proper elements to ensure a sufficient amount of firing; but this remains to be proved by experience. We have before us, the terra cotta which Mr. Blashfield has brought to such a high pitch of perfection at Stamford and the composition of which he has just so ably explained to us; and you see also (pointing to specimens) the ware which is being used at the Royal Albert Hall, South Kensington, manufactured from pure fire-clay by Messrs. Gibbs and Canning, of Tamworth.

I should be far from admitting that any particular terra cotta was better than another, simply because it resulted from an admixture of clays. The excellence of terra cotta is after all more the result of firing, than of any skill in the compounding of the constituent clays. What we call stock bricks, are all terra cotta; and we have, in London, buildings 150 years old, built of this common ware, which have lasted without signs of decay. When I say that the degree of firing to which any terra cotta has been submitted is more a test of its goodness than any technical knowledge exhibited in its manufacture, I do not wish to detract in any way from the acknowledgments due to the manufacturer for the judgment he may display in the selection of his materials, and the many processes and details which he must bring to bear upon their preparation.

The clay used in the work at Kensington, is found in the coal measures, lying in seams above and below the coal, the very material which is destined to bring that clay to its great hardness. This clay, known as fire-clay, produces a material of the hardness of which there can be no question; it will stand heat better almost than any other substance, and taking into account the facility of its production, it compares most favourably with other terra cottas. Mr. Barry has expressed doubts as to the lasting qualities of fire-clay terra cotta; this point can be settled by time alone. As far as we have gone, it has stood well, while the most elaborately prepared terra cottas, on which the manufacturer has expended the utmost trouble, have, in many instances, decayed after a few years' exposure in London: in fact, we are forced to admit, that all the great chemical knowledge of the combination of clays which Mr. Blashfield and his brother manufacturers have attained, will not always save them from accidents and failures. There is no doubt that the terra cotta of the Royal Albert Hall, a material in which Colonel Scott has every confidence, is simply a pure fire-clay. It is obtained from a coal pit close to the manufactory and ground to a very fine powder, with a slight admixture of what is technically called "grog," or powdered terra cotta which has already been subjected to the highest heat of the furnace. This is mixed with the clay to prevent excessive shrinkage, which is liable otherwise to endanger the straightness and accuracy of the work. This clay in a pure state, and this burnt clay or grog which Mr. Blashfield, as I understand him, thinks is liable to decay, is used for the terra cotta which you see on the mantel-piece of this room: if the clay has some principle which leads it after firing to decay in the same way as the glass from the cement kilns, it cannot be the admixture and the second firing which occasion this result.

To-night you constitute the highest tribunal on these matters in the kingdom, and the question before you, is not only as to the fitness of terra cotta for employment by the architect and the best method of using it, but also whether the ware resulting from a mixture and from a pure

material have equal claims upon his attention. There are, I submit, many advantages in a pure material. I may mention the two principal ones—an almost invariable rate of shrinkage, and a great uniformity of colour. A composition of numerous substances, such as, from his description, the terra cotta of Mr. Blashfield must be, is liable, from carelessness of workmen and slight difference in quantities or proportions, to considerable fluctuations, not only in hardness and durability, but also in texture and shrinkage. One clay may have a shrinkage of $1\frac{1}{4}$ inch, and another only $\frac{7}{8}$ of an inch per foot—this in work intended for the same building, is a most serious defect, and constitutes the most important difficulty against which manufacturers have to contend. Mr. Barry has most ably explained the advantages of the terra cotta made on the principle of mixture, and I admit most willingly the superior beauty of texture, and the biscuit-like material produced by Mr. Blashfield, but I consider he attains the finish of his ware, rather at the expense of a certain vigour and artistic touch, which is obtained in a coarser and rougher, though, he must permit me to say, equally durable material, at South Kensington.

With regard to the manufacture of these blocks, there are many makers whose wares are otherwise all that can be desired, but who have adopted the practice of filling in every side of the block, and leaving only very small apertures for the grouting. The best way, both for economy in manufacture and convenience in building, is to leave the back of the block open or hollow, which then admits of filling it in solidly, and bonding it well in with the material of the building, which for terra cotta work, should rightly be brick. Terra cotta is undoubtedly the proper dressing for a brick structure—it may be used in a stone building; but there I think it is out of place and generally a failure.

Terra cotta has been found to sustain far greater weight than brick—an ordinary brick crushes at about 15 tons, whilst a block of terra cotta of the same contents would safely carry 100 tons: there is, therefore, no danger in regard to the bearing power of the material. The principal difficulty in this respect, is that there are frequently hidden flaws which are only found out by testing the crushing power of each block: if, as is the case with iron castings, every block were tested, there would be no difficulty in using terra cotta constructively. The columns at the South Kensington Museum, which have to carry a great weight, have been put together round iron stanchions, and the load is thus removed from them, though I think there would be no danger in entrusting to them the support of the entire weight.

Another point with regard to terra cotta, is that it is capable of receiving a glaze; and there are on the table two blocks made by Messrs. Gibbs and Canning, of Tamworth, upon which various colours have been applied, and here we have, I maintain, a material especially suitable for buildings in London. Terra cotta, however porous and under-baked, may thus be made durable; and if on account of unevenness or inaccuracy, it becomes necessary to destroy the surface, it may by means of this coloured glaze, be again rendered impervious to soot and moisture, and so to speak, imperishable. Almost any colour may thus be obtained, and the additional cost of glazing is very trifling. The extreme cost is in the amount of fuel required for the re-firing and liquefying the colours, and the time employed in painting the ware, which can be done by unskilled workmen. After this second firing, we have, to my mind, a material of the most perfect character, and which satisfies every requirement of the architect.

The only other fact I would wish to point out with reference to terra cotta, is that it must always remain a material in itself—it can never be a rival to stone, and the arrangement of it must be studied specially. Terra cotta can never compare with masonry in accuracy of lines, but you can produce with it a most beautiful surface, a charming variety of tints, and a certain play of colour obtainable in no other material. Terra cotta, I am convinced, will satisfy every one who has to work with it, and the failures we at present experience, result only from our imperfect knowledge of it. I look upon terra cotta, both glazed and unglazed, as a material which will eventually make London architecture permanently beautiful and imperishable.

Dr. MEDLOCK, Visitor, said—I entered this room as a visitor, little thinking that I should be called upon to make any observations on the subject under discussion. But having had some little experience in the analysis of the materials employed in the manufacture of Portland cement and of terra cotta, my friend Mr. Blashfield has asked me to make a few remarks.

Portland cement, as is well known, is made generally of three parts of chalk and one part of river mud. These materials are elutriated together in a wash-mill, run into settling backs, and when sufficiently solid dug out and dried on the drying floor; it is then mixed with a due proportion of coke, and burnt in the kiln. The semi-fused material is ground to a fine powder, and forms what is commonly called Portland cement. The quality of this cement depends upon the composition of the chalk and the mud, and particularly on the proportions in which they are mixed together. Grey chalk, containing from 3 to 4 per cent. of silica, requires a smaller proportion of mud than the white chalk, which is comparatively free from silica. The exact proportions of chalk and mud which are used are governed more by experience, and the practical trials of the strength of the cement, than by real scientific knowledge.

Of the clays which are used in the manufacture of terra cotta, little is known of the mode in which their several constituents are combined. In ordinary chemical compounds we know the exact proportions in which the acids and bases unite together; but in the natural clays we find silicic acid combined in all sorts of proportions,—with lime, with alumina, with magnesia, with potash, and with soda,—in fact, very little is known of the true composition of the silicates; hence the terra cotta manufacturer and the porcelain manufacturer are compelled to work, as it were, by rule of thumb. Not only are we imperfectly acquainted with the real composition of clays, but we know less of their fusing-points, because we have no satisfactory method of measuring heat beyond that of the boiling-point of mercury. I consider it most important for the manufacturer of terra cotta to be thoroughly acquainted with the chemical composition of the materials which he uses, and of the heat at which they run into a flux. My friend Mr. Blashfield has, I know, for the last twenty years devoted much of his time and expended large sums of money in investigating the chemical composition of clays. That his investigations have been successful is evidenced by the beautiful specimens of his works which are now before us.

Mr. CANNING, Visitor (rising on the invitation of the Chairman), said—I feel, Sir, that I have been so ably represented by my friend, Mr. Redgrave, as to the nature of the terra cotta used at the Albert Hall, that very little, indeed, is left for me to say; but I would commence by complimenting Mr. Blashfield on the perfection of the manufacture he has brought before us, and I must be allowed to say, that I think it is a very successful application of the rule of thumb which the learned gentleman who has just sat down described. I regard it as a very successful performance, considering, as chemists aver, that really nothing is known of the component parts with which the manufacturers of this material have to deal. It is nice looking, and deserves the high approbation which has been given to it. But for my own part, I have only to deal with a simple, but pure fire-clay, compounded by the Great Manufacturer, who has laid it there to be dug out of the bowels of the earth, and to be moulded into the shape the architect directs. This is done without any addition to it, excepting a little of the same material burnt and mixed with it, which we call "grog." That is all the mystery of our manufacture of terra cotta, and I think terra cotta has been surrounded with many intricacies and difficulties which, at first sight, would seem to argue against its general use by architects. It would seem to be too costly and too hazardous. I hope Mr. Blashfield will be able satisfactorily to fix his recipe of admixtures before he leaves the subject. The object we have in view in the first instance, is durability. There can be no economy in using an article that is not permanently good. I can say, for my own part, we have used the same materials for twenty years, without, as far as I am aware, any failures having occurred.

The next point is economy—if the material is durable, its economy is unquestionable. Another point is colour, with which, in our material, we have no embarrassment. It produces the fawn-coloured appearance as shown, being the genuine colour of our silicious fire-clay, and I am pleased to think it gives so agreeable a tint, which is seen to better effect in a larger body. We are at present working under the able staff of Colonel Scott and Mr. Redgrave, at Kensington, and I hope we are successful in producing a quality of work creditable, not only to them as architects, but to ourselves as manufacturers. With respect to another feature of our ware, the glazing, we claim the privilege to compare it favourably with the Della Robbia ware. The specimen before us, is the first trial we have made of it, and has been accomplished in the cheapest possible manner. The several colours were placed in this specimen to show the capabilities of the ware to sustain these tints successfully, not as an artistic design, but I take leave to submit it as a suggestion for the decoration of London architecture. In conclusion, I shall always be happy to compare notes with my fellow manufacturers. We are rivals only in manufacture, and it is my wish to cultivate a proper spirit of emulation amongst us, in order that we may benefit the trade at large.

The CHAIRMAN remarked that reference had been made in Mr. Barry's paper to a very valuable discovery of clay at Watcombe, in Devonshire; and he believed Mr. Etheridge, whom he saw present, could give them some information about it.

Mr. ETHERIDGE, Visitor—The deposit of pure terra cotta clay referred to is a very wonderful one, perhaps the largest ever discovered in Europe, being from 70 to 100 feet thick, and of the purest terra cotta clay, red in colour. It is as pure as that of which the Etruscan and Samian vases were made hundreds of years ago. Its quality is as fine as any of the clays of Italy that I am acquainted with, and the quantity, from the measurements which have been made, may be said to be inexhaustible. This clay has been analysed by Mr. Smith at the Laboratory of the Royal School of Mines, Jermyn Street, who has paid great attention to the analysis of clays generally, to the depth of 60 or 70 feet, and extending over a considerable area or acreage. This clay deposit appears perfectly solid and free from all admixture. It readily stands 18003 to 20003 of heat, and both the bricks and the ware produced from it are of the hardest and purest description: the colour does not change under the process of burning, and it can be used for every purpose to which terra cotta is applicable. I merely wish, in a geological and scientific point of view, to bear my testimony to the extreme value of this enormous clay deposit at Watcombe, in South Devon, believing it to be one of the most important discoveries of modern times, because hitherto we have had no such thing as a pure terra cotta clay. What we are now using, and what is generally termed terra cotta, is not the clay of the ancients. The deposit is of very recent formation or origin, and is connected with one of the most recent movements on the British coasts; and its extreme plasticity is perhaps owing to the extreme amount of denudation which the older rocks underwent, and thus the consequent finely-levigated matter of the clay itself. Mr. Maw and others have performed some experiments with the Watcombe terra cotta, and fully believe that all can be done with this clay that was accomplished in Etruscan, Greek, and Roman times. The analysis I believe is given in Mr. Barry's paper; and I may state that some beautiful works of art, in imitation of the Etruscan ware, have already been produced from it, and its discovery I regard as a very important feature for art and science in Britain.

In answer to a question from Professor Kerr, Mr. Etheridge added that the shrinkage of the clay was very slight.

Mr. BLASHFIELD said he had the highest opinion of the Watcombe clay, and produced a sample of it burnt on a rough body. It consisted of Watcombe clay and sand. He had not used it for architectural purposes; but considered that the shrinkage would be about one inch to the foot. If it were not compounded, the shrinkage would be more.

Mr. BLANCHARD, Visitor, remarked that with reference to the Watcombe clay he had had no practical experience of it, but he had seen samples, and he believed it to be a fine clay deserving great attention. In reference to terra cotta generally, so much had been said upon it in Mr. Barry's paper and by a gentleman who had preceded him, that he felt he could not profitably detain the meeting by any observations of his own on that subject.

Mr. HENRY DOULTON said—Great credit is due to Mr. Blashfield for having kept up his high standard of terra cotta. The establishment with which I am myself connected has not paid special attention to terra cotta, but we have now and then made some little efforts in that direction. The last was a very interesting one. We were making an addition to one of our manufactories in Lambeth; and I suggested to Mr. Sparkes, the Principal of the Lambeth School of Art, that an opportunity was afforded for the display of the skill of his students in modelling in terra cotta. Some heads were modelled in a very excellent manner; and one student in particular derived such advantage from the practice, that he went in successfully for the Royal Academy gold medal, and he attributed much of his success to his practice in the modelling of those heads. The building on which these heads are placed, may be seen from the South Western Railway. Another young man—a wheelwright by trade—has also had some practice in modelling at our factory, and some medallions, 4 feet diameter, free copies from the Syracusan coins, were executed by him in a very clever manner. They may be seen in the Architectural Museum. Those medallions were composed of nothing but the clay of Dorset and Devon, with an admixture of old pottery and a certain quantity of sand. Mr. Blashfield says his terra cotta partakes of the porcelain character. It is, doubtless, hard and durable. Much has been said about tests. Take a sharp-pointed steel instrument, and if you can make an incision with it in the terra cotta, the tooth of time will attack it; but if it turns the sharp point of the steel, you may be sure it is imperishable. The other test is acid, which in a short space of time will test its durability. I do not consider that fire clays have great advantage—they must be fired at excessive heat to make them imperishable. My own opinion is, that it is undesirable for architects to seek for terra cotta decorations where there are many straight lines. Probably Mr. Blashfield is able to produce wonderful results in that way. It is a question of expense; and it is difficult for architects to satisfy themselves in cheap terra cotta with straight lines. For medallions and such decorations I think terra cotta may be used with most advantage. The experiment which Mr. Canning places before us is an interesting one. If we can get colour cheaply on terra cotta, it will help to decorate buildings in London very beautifully, and at a moderate cost. The use of terra cotta up to this time will, I fear, lead to dissatisfaction, because a good deal of it is likely to go to decay; and therefore I recommend that the work should be proved by the simple test which I have suggested—that of the sharp-pointed instrument.

Mr. PAGE, C.E., Visitor, said—Mr. Chairman and Gentlemen, Mr. Barry has done me the honour to refer in his paper, to my use of terra cotta tiles on the foot ways of Westminster Bridge. Having taken great interest in the progress of the manufacture of terra cotta for architectural purposes, I would offer a few observations on the subject before the Institute. From what I have seen of the work at Dulwich, I would say, both in design, and in execution, it does honour even to the name of Barry; and that nothing I have seen in terra cotta equals the beauty of finish in the ornaments of Dulwich College. I have known Mr. Blashfield's operations for many years. He supplied the best cement with which the second half of the Thames Tunnel was completed while I was acting engineer to the works, under Sir Isambard Brunel; and I am aware of the great attention he has given to terra cotta, not in producing a cheap material, which may soon fail, but an enduring work of art as remarkable for its beauty as its strength. I look upon this revival, and may say of the introduction of terra cotta by Mr. Barry, at Dulwich, as an era in the art, and I trust that Mr. Barry's example

may be followed, and that this material may be introduced extensively in all future buildings. In 1844, I laid before Her Majesty's Commissioners for Metropolitan Improvements, under the presidency of the late Duke of Newcastle, a design for a bridge in a material very much like terra cotta, which was then being manufactured by Mr. Prosser, of Birmingham, and of which he had made hexagonal bricks of great durability, thus proving I consider, better than stone. I believe if terra cotta had been in use for the building of that gem in architecture, Henry VIIth's Chapel, the decaying state of which is shown in one of Mr. Blore's beautiful engravings before Gaybere's restoration, it would not have required to be restored, and restored in a perishable material. There is an opportunity of executing the most delicate mouldings and ornaments in terra cotta; and it is to be regretted, that architects for the sake of some fancied economy, should be driven from the use of a permanent substance, to that which we see decaying every year. This is a material with which even granite cannot be compared in durability. If you look at the balustrade of Waterloo Bridge, and pavement of Southwark Bridge, you will see evidences of decay in the granite. As an engineer who has paid great attention to art, and who hopes yet to see the day when no engineering work shall be constructed, which shall not be an artistic work also, I hail with great pleasure the revival of terra cotta, and I consider that what Mr. Barry has designed, and Mr. Blashfield has executed at Dulwich College, entitles both those gentlemen to the highest admiration in their several capacities.

Mr. C. F. HAYWARD, Fellow, said—My contribution to this discussion, will be but small, and entirely of a practical nature. In a building at Plymouth, in which I employed terra cotta rather largely, it was required to be used in conjunction with limestone and granite, and to carry considerable weight. After some estimates of the cost, I should have abandoned the attempt to apply it altogether, had it not been for the extraordinary perseverance and interest which Mr. Blashfield took in the details, and the assistance he gave me in working out the junctions of the parts, which is one of the special points necessary to be carefully attended to. I differ from the speaker who considered that the use of terra cotta should be confined to brick buildings. There is no practical reason that I am aware of, why its use should be so limited, though of course it is more certain to combine appropriately with a material similar to itself in manufacture, and some care and consideration is necessary to combine it properly with dissimilar materials.

At Mr. Blashfield's works at Stamford, I was much pleased with the artistic skill displayed by the workmen—in fact I ought to say sculptors, for I believe there were several first-rate artists of the classic school engaged upon statues, vases, &c., but the way in which my suggestions were met, and the ready adaptation of skill to the kind of work I wanted, enabled me effectually to co-operate with the workmen. A suggestion to study the carving at the remains of a beautiful early English building in the neighbourhood was carefully attended to, and one of the first results of this study, was the piece of red and white terra cotta which has just been handed about in the room. I hold in my hand the accounts for all the terra cotta work supplied to this building, over £400 worth, and as I am sure Mr. Blashfield need not be ashamed of the items, and as cost is one of the points to which Mr. Barry especially directed attention, I will give a few particulars. The cost of three triple light windows on the third floor, with columns, bases, caps, and brackets, complete in ninety pieces, was £19 13s., or only £6 11s. each. (Mr. H. here referred to large drawing details of the building.)* Two single light windows, complete in twenty pieces, including brackets, £9 2s., or £4 11s. each. The columns for these were single shafts, and with cap and base, were supplied at 20s. each. Larger ones of two shafts, with ring or band between, at 30s. each. Large cornice blocks, were 10s. each. Single light windows on the curve, in sixteen pieces, were £5 each.

* Illustrations will be found in the *Building News* for January 25th, 1867.

Other triple light windows, larger and more decorated, £16 9s., and double lights at £12 16s. each. All blocks were made hollow, of course, but as they had a good deal of weight to carry, it was necessary to have them filled up solid, for I objected to having iron stanchions inside the columns, as are said to be used now at South Kensington. The material used was broken terra cotta and Medina cement; but, as the filling in was done at the manufactory at Stamford, we did not in this instance, realise the economy spoken of by Mr. Barry, as resulting from the diminished weight, and consequent small cost of carriage, and moreover we had of course to pay additionally for this filling in, say about thirty per cent. on the original cost. This made the blocks not only more costly in carriage, but more heavy and difficult to handle. I should advise that this filling in, and all other preparations, should be done by the manufacturer himself, so that he may take the whole responsibility, because if a wrong cement (say Portland) were used, it would be liable to split and blow the work to pieces in expanding. Not one of these blocks, that I am aware of, was rejected on the score of imperfect manufacture. Perhaps if I had been always on the spot, I might have been a little more critical; but on the whole, I do not think there was any special occasion for it. Perhaps as one grows older, one gets more timid, for although upon the whole I find the work sustains well all it has to do, I might not be inclined to trust it in future, so far as to put granite upon it, because so much depends upon its perfect manufacture.

With regard to durability, one can hardly yet speak in this instance; but I may say, that I have placed side by side with it, in two places the most exposed to the weather, slabs of Ransome's patent stone, to test the material, and give others the benefit of judging the result at some future time. As to the general durability, however, we need go no further than the drawing and photograph which I now show of the Tower, or rather, Entrance Gateway of Layer Marney, in Essex, dated 1520. The large windows, parapet, and other parts of which are made of terra cotta, as well as many other examples often referred to in this room, and particularly mentioned in Mr. Barry's paper. The parapet, it is true, is somewhat dilapidated, being probably knocked about by the workmen in repairing the roof, but the windows are quite perfect, although no care has been taken to preserve them. In the case of Layer Marney, the terra cotta is used in connection with an ornamental brick structure, no stone being procurable in the neighbourhood.

I expected many difficulties in the use of this material, especially I feared that special workmen would be required to fix it, but it was all properly set, without trouble, by ordinary masons who had never seen the like before. But it was the time of strikes, and when the building was half up, the masons "went out." The arrival of the terra cotta at that juncture, was most opportune, inasmuch as the stone work was not all prepared, and the contractor was able to resist unreasonable demands, by suggesting the substitution of terra cotta for stone in other buildings he was then carrying on, not that it could have been properly so used throughout, of course.

It has been stated, that good terra cotta should have an extremely hard surface, but I have always understood that the power of cutting terra cotta, if required, was one of its advantages; indeed, highly important, in case of any slight error or difficulty in fixing. I am therefore anxious to know, whether it is always necessary that the terra cotta should have such an extremely hard external surface, as has been stated, — sufficient to turn the edge of a chisel, because, if so, the terra cotta I have used, was not so good as it ought to have been, and may not be expected to stand. In one building where a conservatory was part of the work, instead of using wooden posts, I used a few of the longer columns of terra cotta. My client, however, was somewhat fastidious, and did not like the flower work in the capitals. A compromise was made by cutting half the flowers away. It satisfied my client, and the thing was done by ordinary workmen on the spot without damaging any of the columns, or the rest of the work, and I thought it was rather a success.

Mr. BLASHFIELD.—With regard to cutting, I do not think well-burnt terra cotta can be carved with economy. A mason may dress down parts and may cut a few letters, but generally it is not a good material for carving.

Mr. HAYWARD.—The question is, Whether the fact of your being able to carve it at all militates against the quality of the terra cotta?

Mr. BLASHFIELD.—Not after it is burnt. You may carve it when dry, after it has come from the mould with 25 tons pressure, and you get a sharpness which you cannot get in Caen stone.

Professor KERR, Fellow, said—I propose a vote of thanks to Mr. Barry, and I would include in it Mr. Blashfield and the other Visitors who have taken part in this discussion. As the subject is an interesting one to myself, I would make a few remarks. Presuming that all gentlemen have spoken who wish to contribute information from their practical experience of its use as to the capabilities of the material, I may speak for those of us who have not employed the material, but desire to know how far we may attempt to do so, and I shall therefore express the opinion which I for one have formed from all that has been said. I would commence by getting rid once for all of the coloured material. The example before us can hardly be called satisfactory; and if coloured terra cotta is to resolve itself only into this form for the beautification of London, I cannot wish it success. But when I look at the other specimens, I see work which is much more likely to be beneficial. On the whole, the argument seems to lie before us in the following shape. Mr. Redgrave, representing the operations at South Kensington, states one principle, which is quite different from another which Mr. Barry and Mr. Blashfield have laid before us. The late Cardinal Wiseman made a sound critical remark when he said that brick was "the lowest of all materials." Nevertheless, as it is at the same time probably the most durable for ordinary uses, we naturally desire to discover whether we can so ornament even that lowest of all materials so as to bring it out of that condition. Of course the first effort in that direction is what we call moulded brick. This is, however, superseded and improved upon in the use of terra cotta. We are in fact dealing with a higher material than moulded brick. But directly Mr. Redgrave raises the question of manufacture, he sets forth a difference between two distinct Schools of Art, upon the apparently simple issue whether the material should be natural clay or artificial. Mr. Blashfield says it must be artificial. Mr. Redgrave, arguing at first somewhat in the abstract, lays down the theory that it ought to be the former. Gentlemen following him have described more than one species of natural clay which seems to serve, according to their opinion, all the purposes of the artificial clay which Mr. Blashfield has so carefully dwelt upon. When Mr. Redgrave argues that natural or unmixed clay is of necessity superior to artificial or mixed clay, I think the argument can scarcely be accepted upon the mere nature of things; but it is plain, artistically speaking, that if the natural material is equally good with the artificial, we should prefer the former. Turning then to Mr. Blashfield's material, we ask what are the advantages which he obtains by elaborating its artificial character as he does, when it is fairly compared with the rival specimens. On the one hand, the South Kensington specimens are made from the natural clay, untouched by the tool, and burnt as moulded. On the other hand, Mr. Blashfield's specimens, made from artificial clay, have been tooled carefully before burning; and Mr. Blashfield points in effect to the fine arrises, the smooth and perfect lines, the refinement and finish of his specimens: and all these characteristics, he says, are the effect of the tooling before burning. This, then, is the root of difference between the two schools. The South Kensington authorities say they prefer less refinement and more of the primary or natural artistic touch. Mr. Blashfield says he would sacrifice this so-called artistic touch for the sake of the greater refinement of the revised finish. I fancy if it were the French who were using this terra cotta, they would prefer Mr. Blashfield's principle; but I think the English mind, at least in the present Gothic day, may be

found to prefer the other. No doubt there is in Mr. Blashfield's work a certain elegance of finish which is highly pleasing; but looking closely at the nature of the material as the proper basis of treatment, many will say that refinement cannot be obtained without a surrender of principle; and it becomes a question whether we ought not to be satisfied in all terra cotta with a little roughness, like what we see in the old Italian work, and so confine its use to picturesque designs, and let the more refined species of work remain the province of the stone mason. I remember the late Captain Fowke explaining to me that this was the theory which they entertained at South Kensington; and I could not but admit its force. At the same time, no one would disparage the artistic form and delicacy of finish which Mr. Blashfield has produced, and which do him the highest credit. Again, I understand Mr. Blashfield to say that he prefers to carve over his work before it is burnt, because by that means he gets rid of a certain surface from the clay which impedes the action of the fire; and he thinks if the South Kensington makers were to get rid of this surface from their clay, it would be better for the terra cotta. If so, the question arises in my mind whether some other process might not be adopted to effect the object rather than resort to the tool of the mason—for instance, whether some chemical wash might not serve the same purpose without sacrificing the artistic principle which South Kensington prefers to maintain. Lastly, with regard to the large deposit of clay which Mr. Etheridge speaks of, it is clear, if the ware produced from it is only of the red colour, it would not go far to supply the demand for artistic decoration in ordinary building, because most of us would decidedly prefer the buff colour for dressings, whether to red or white brick. On the whole, it must be felt that we have learnt a good deal about terra cotta by this discussion; and I most cordially propose the vote of thanks to Mr. Barry and the other gentlemen I have referred to.

Mr. CHARLES BARRY.—I am tempted to say a great deal; but at this late hour I will confine myself to the notice of only one or two points. One thing which gives me great gratification is to find that I have started a subject which has attracted so large an interest among my co-professional brethren, and has been the means of bringing before the Institute in an official way some kind of history of what has really been done in this comparatively revived material. In doing so, I can but hail with the greatest pleasure the experience and information afforded by Mr. Redgrave, Mr. Hayward, Mr. Blashfield, Mr. Canning, Mr. Doulton, and those who have taken great personal interest in this material. I do venture to think that the subject has acquired such a hold upon the artistic feeling of architects, that the application of it will be somewhat wider than it has been, and that was the object of my bringing it before you. But if this is to be the case we must, to a certain degree, work in the same spirit. I have already indicated the various branches into which the subject may be divided. Its advantages and disadvantages I have discussed candidly. The question of cost is interesting; the question of strength and durability is not less so; and on all these points I have given you some information; and I had hoped that some of these other gentlemen would have gone over the same ground with reference to this material. If Mr. Canning would subject the terra cotta of South Kensington to the same mechanical and other tests to which I have subjected that used by me at Dulwich, it would be very interesting to us; I may say the same to Mr. Blanchard, regarding the Scotch material. With respect to the observations of Professor Kerr, I heard some of them with surprise, for I am at a loss to understand how architects, who should be artists, can be indifferent to an increased amount of refinement in their works, and should prefer it in a ruder state. I agree with Professor Kerr, that no amount of delicacy will compensate for a bad design, or for the bad grouping of light and shade in the composition,—but why they should not co-exist, I am at a loss to understand. Now there is one essential difference in the theory proposed in the production of the work at Dulwich and that at South Kensington which bears on the subject. I believe I am right in saying that all the decorative work

at Kensington has been produced on the principle of being cast in moulds and being relieved from moulds. That is not the case with reference to the work at Dulwich; and one of the advantages I thought I saw, and do still perceive, in the use of terra cotta is the power it gives you of having from the hand of the artist a really artistic work, which has not passed through a mould. You have in this material the effect due to undercutting and delicate modelling at the same time, which you cannot have in any other material. The cardinal advantage is, that you can employ high-art workmen; you have the original work from their tools burnt, and put into your building, and that is superior to the mechanical process of moulding unrelieved by undercutting, or even by the use of piece moulds. On the question of colour, we have had some colours on terra cotta put before us by Mr. Canning which were not intended, as I understood Mr. Redgrave, as exponents of his highest attainments in artistic combinations and skill, but merely to show, mechanically, that divers colours can be produced by the process which Mr. Canning employs; for I should certainly agree with the Professor in not liking the coloured terra cotta now before us. With respect, however, to this shaft on the table [referring to a specimen of the Dulwich work], I would draw attention to it as a most interesting example.

In the design of the College, the windows of the first and second floors have shafts of this diameter, about 6 inches, and I should have liked to have had these shafts of some polished material, serpentine, or something of that kind, had not cost forbidden it. I then induced Mr. Blashfield, to try to produce the effect of serpentine in terra cotta, as that would of course be at much less cost. He made some experiments, as usual with him, with the greatest zeal and liberality. I proposed to him, it seems, however, a difficult problem. He solved it as far as this specimen is concerned, but I wanted these shafts by hundreds, and that he could not ensure: if he did not succeed, I cannot reproach him with any lack of effort. I was rather sorry to hear the doubting way in which Dr. Medlock spoke of the combination of clays to be used for architectural terra cotta. When he says we know absolutely nothing about it, I hope he speaks as a scientific chemist, and not in a practical point of view, for I am under the impression, that practically, we do know a great deal; and whether through a knowledge of chemistry, or the rule of thumb, we have found some compounds which are very lasting and durable; and for my own part, I think the secret of durability consists in what Mr. Blashfield terms the finding out some kind of flux, which when exposed to the kiln, will permeate throughout the whole mass. That is the secret of durability, and not to trust to an outside skin merely, which will more or less vitrify. Unless we have a homogeneous material of perfectly similar texture throughout its mass, we do not have that kind of material which I hope terra cotta really will be. In conclusion, I trust, that having initiated the subject, it will be followed up by our having from others statistical information concerning experiments which have failed, as well as those which have succeeded, so that we may see the successful and practical revival of the use of a material which I think deserves all the attention we can give to it.

Mr. BLASHFIELD explained that Mr. Barry required shafts from 6 to 7 feet high, in two pieces. These were (he said) to carry a heavy weight, the arches of double and triplet windows. It was important that the columns should be strong, and the difficulty was to make them in two pieces, from 3 to 4 feet long, to carry a true line, and combine like rubbed stone or rubbed serpentine. He added that he was going on with experiments with these columns in different ways, and he looked for ultimate success; but at present he had not succeeded in making a glazed column, of the size mentioned, in pieces which should fit each other with the same precision as rubbed stone.

The CHAIRMAN, in putting the resolution of thanks to Mr. C. Barry and the other gentlemen who had joined in the Discussion, said it had been one of great interest and practical value, and the motion having been carried by acclamation, the meeting adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 30th November, 1868, C. BARRY, Vice-President, (afterwards G. G. SCOTT, Fellow) in the Chair, the following Paper was read:—

ON MOSAIC DECORATION.

BY AUSTEN HENRY LAYARD, ESQ., M.P., D.C.L., Honorary Fellow.

GENTLEMEN,—I desire to call your attention this evening to a subject of some interest, both to the architect and the public, "mosaic decoration." It has already been treated, and very ably treated, as every thing he takes up is very certain to be, by my friend, Mr. Digby Wyatt, in a paper read before the Institute, on the 17th March, 1862. He dealt with the subject as a member of the profession, I can only do so as an amateur, without much practical experience. But since he read his paper, much has been done in mosaic, and in the direction which he then pointed out. I trust, therefore, that I may add a little to the information furnished to the Institute by him.

I have long turned my attention to the subject of architectural decoration, external and internal. It has been connected in my mind with two great objects, public instruction and public enjoyment. In public instruction, I would include all that is calculated to raise the character, cultivate the understanding, and refine the taste, as well as to impart actual knowledge. By public enjoyment, I mean that exquisite sensation of delight and satisfaction which arises from the contemplation of the beautiful, and that pleasurable effect, which, although difficult to define, and very often almost imperceptible, is produced by beauty of form, proportion and colour upon most men.

With a desire, then, to ascertain how these two objects could be best promoted in this country, I have studied, as well as my opportunities would permit me, architectural decoration, external and internal, as employed by the ancients and the moderns in different parts of the world, in the west and in the east, but especially in Italy, which now affords us the best school for the investigation of this subject. But to go into the general question at any length, would be to occupy your time far beyond the usual limits. I shall therefore confine myself this evening to only one branch of it, viz., the decoration of public buildings, religious and secular, in this country, and the materials which may be best employed for such decoration.

It has always seemed to me, that the numerous public buildings which have been erected during the last few years, and which are now in the course of erection, or in contemplation in England, and especially in the Metropolis, would afford an unexampled opportunity for educating the public mind, and improving and elevating the public taste, through the means of mural decoration.

Mr. Ruskin, with his usual eloquence and just appreciation of the real value of art, has observed that the church of S. Mark's at Venice, was "to be regarded less as a temple wherein to pray, than as itself a Book of Common Prayers, a vast illuminated missal, written within and without in letters of enamel and gold. The common people were taught their Scripture history by means of the mosaics, more impressively, perhaps, though far less fully, than ours are now by Scripture reading. The walls of the church became the poor man's Bible, and a picture was more easily read upon the walls than a chapter." "Never," he exclaims, "had a city a more glorious Bible?" And at every hour of the day, he might have added, the book is open. Our own churches might afford, as they perhaps once did afford, public instruction of a similar kind; and might, at the same time, become beautiful and solemn monuments like St. Mark's. Our public buildings might do for our history, political and intellectual,

what our churches might do for our religion. There have hitherto been two difficulties in the way—English prejudice, and English climate; the first chiefly affects the churches, the other, both our churches and public buildings.

As regards English prejudice, there is much yet to get over, although a great deal has been effected in that respect. I do not intend to enter into the reasons for this prejudice, or to seek to combat it. Suffice it to say, that the strong re-actionary feeling against the influence of the Church of Rome, which set in at the time of the Reformation, and which received additional impetus during the Commonwealth, is yet powerful among us, and that church decoration is still connected in the imagination of a vast number of people with the tenets of the Roman Catholic faith. But I will presume, that this prejudice has now greatly subsided, and that we are at liberty to decorate our churches to our heart's content, so long as we do not introduce into them any figures or symbols which may scare good Protestants, without our orthodoxy being called into question.

With respect to our public buildings, there is no such prejudice existing, although there is still floating about, even amongst educated people, who ought to know better, that strange notion that decoration is un-English, unsuited to our climate, and vulgar. A step in the right direction, though unfortunately, owing to various circumstances, not a very successful one, has been made in the ornamentation of the Houses of Parliament. Had that attempt been more successful, the example would, I doubt not, have been more extensively followed in this country than it has been.

The climate difficulty is really the one which stands in our way, and which we must seek to get over. Owing to it, the attempt made in the Houses of Parliament, has been unfortunately arrested, and a great work which might have added to our national glory, has been left unfinished. If the difficulty can be removed, I believe that with the general improvement in public taste, and with the desire for educating the people which now prevails, we may see our churches and our national edifices covered with mural decoration which would serve to cultivate, refine and instruct the masses.

For some years, I entertained a hope that wall-painting, either buon-fresco, fresco-secco, or water glass, might be adopted in this country. I had carefully examined, and indeed partly traced, almost every wall-painting in Italy. I had convinced myself that, except perhaps at Venice, fresco would resist the effects of climate and of time, when only protected against them with moderate care. The frescoes of Giotto, in the Arena Chapel and at Assisi, (in fresco-secco be it remembered), are almost as fresh and transparent as when he painted them, except where exposed to wilful injury, or, as I regret to say they still are, to the grossest neglect. The frescoes of Ghirlandajo, and the great masters of his time, are only blackened by the smoke of candles and incense, or by dust and dirt never removed. The beautiful decorations of the library of the Cathedral of Sienna, are as bright as the day on which Pinturicchio finished them. The frescoes of Pordenone, in the church of S. Maria della Campagna, at Piacenza, have almost acquired the consistency of enamel, and would seem to be indestructible. In Venice only, owing, it is alleged, to the extreme moisture and saltness of the sea air, wall-painting seems to have partly failed. The great works of Giorgione, Titian and other masters of the Venetian School, which once embellished the palaces of that city have perished; and of those of Pordenone, which adorned the cloisters of S. Stefano, only fragments now remain. But these frescoes, it must be observed, were on the exterior of buildings, and therefore completely exposed to the effects of the atmosphere. Tiepolo's frescoes in the Labbia Palace, and in some churches, do not appear to have yet suffered. But still it would seem that the Venetians distrusted the durability of fresco, and never employed it on a large scale even for internal decoration, when it was being so used in almost every other city of Italy.

With the examples of fresco-painting which I have mentioned, and with my desire that mural decoration on a large scale should be introduced into this country, I was rejoiced to see that which was being done under the direction of the Fine Arts Commission, of which the Prince Consort was

President. I lost no opportunity of advocating, publicly and privately, fresco decoration. Amongst those, who took the same view of the subject as myself, was my distinguished friend, Mr. Watts. But he did more than I could ever hope to do in the cause, and with a devotion to his art and a public spirit, which are the best accompaniments of genius, he undertook to execute without remuneration, a vast fresco on the walls of the Hall of Lincoln's Inn. That work, criticise it as you like, is the greatest of its class on this side of the Alps; and I cannot believe that any man of feeling can be insensible to its grand and solemn character, or any man of taste to the additional value and majesty it gives to the architecture. Unfortunately, Mr. Watts has never completed the decoration of the Hall, all the empty spaces in which should be treated in connection with the fresco, forming the principal feature in it. I do not think that we are yet sufficiently impressed with the fact that in decoration, completeness and general harmony are essential, and that without them, the true and full effect of a great fresco, or any other similar work, can never be properly appreciated.

My hopes with regard to fresco painting were doomed to disappointment. I have no reason to believe that any serious deterioration is taking place in Mr. Watt's fresco at Lincoln's Inn; but in the Houses of Parliament, some of the frescoes had scarcely been painted, before decay commenced, and many of them are even already almost gone. The same thing has taken place with the late Mr. Dyce's frescoes in All Souls' Church, in Margaret Street, which, I am informed, have required almost entire re-painting.

I was at one time inclined to assign this rapid decay to some defect in the materials employed, either the pigments, the intonaco, or the lime—especially as the same deterioration had occurred in some of the frescoes at Munich, (though by no means in all, it would appear), where at least the fault could not be laid upon the English climate. The Germans, however, attributed it to the effects of the atmosphere acting upon the exterior surface of the painting; and to prevent this, they invented a method of covering the fresco with a solution of silicate, called water-glass, which was supposed to be impervious to the air. The great frescoes by Kaulbach and others at Berlin, have been painted on this principle, and Mr. Maclise and Mr. Herbert have adopted the process in their most recent works in the Houses of Parliament. It is perhaps too early to pronounce decidedly upon the durability of the water-glass, but there are grounds for fearing that it will not resist the insiduous attacks of our London smoke. Dr. Percy, after a very careful scientific examination and analysis, carried on under official instructions, has come to the conclusion that no wall-painting, whether executed in buon-fresco or fresco-secco, can resist an atmosphere impregated, as that of London is, with the chemical substances evolved from the consumption of coal. He doubts even the efficacy of water-glass, and gives it as his opinion, that Mr. Herbert's well-known fresco will not be safe, except under glass. The scientific investigations of Dr. Percy have unfortunately been confirmed by the practical experience of Mr. Digby Wyatt.

I confess to great disappointment at this unexpected result of the attempt to introduce fresco-painting into England. It is a noble art—the one declared by Michel Angelo to be best fitted to shew the genius of a man—the one which gives the really great painter the widest influence over, and can bring him into the closest communion with the great mass of his fellow-men. It can raise the great painter to the level of the great poet. Think one moment of the fame which Leonardo da Vinci, Michel Angelo and Raphael have achieved through their wall-paintings! Leonardo's "Last Supper," is more widely known than any poem that was ever written—not excepting the "Iliad." Throughout the whole civilized world, some kind of copy of this immortal wall-painting, may be found in the palace and in the cottage. But after what has occurred, I am afraid that we must give up the hope of seeing fresco-painting introduced on any considerable scale into England, or at least into London.

Thus disappointed, I turned my attention to mosaic, as a means of supplying the place of fresco. With this object in view. I have carefully studied most of the finest examples of mosaic decoration in Italy.

It is unnecessary for me to enter into the history of mosaic. That has been done already by Mr. Digby Wyatt in his paper, to which I have already referred. It is sufficient now to say, that the art of putting together small cubes, or tesseræ, as they are technically called, of different substances, so as to form patterns and figures, either in monochrome or in various colours, is one of very ancient date, and was known even to the earliest civilized nations, such as the Egyptians, Assyrians, and Babylonians. Mosaic was applied to the decoration of walls and pavements, and was extensively used, especially for the latter purpose, by the Greeks and Romans in their public and private buildings. Owing to the durability of the materials generally employed, such as hard marbles and porphyries, enamels or glass, and terra cotta, mosaic has defied the ravages of time, probably more effectively than any other architectural decoration. To this day, the remains of mosaic pavements are the most usual indication of Roman sites in England and in many countries of Europe, as well as in parts of Asia and Africa. But pictorial mosaic on a really large scale was first used for the decoration of public buildings during the later days of the Roman Empire, and during the supremacy of Byzantium, and in those countries which derived their civilization and arts from Rome and her Eastern successor. It took its chief development after the spread of Christianity, and in the decoration of Christian edifices, so that we may call it essentially a Christian art. The most magnificent examples of ancient times were to be found in the churches of Christian Rome, Constantinople, and Ravenna. It is to this Christian mosaic that I wish now to draw your attention. I shall not, therefore, touch upon other kinds of mosaic, for a description of which I refer you to Mr. Digby Wyatt's paper.

The chief features, then, of this Christian mosaic are the vast extent of wall-surface to which it was applied, its most frequent use on domes, apses, and curved surfaces, and the representation of figures and ornaments on a gold ground; although a gold ground was not always used, as in the early mosaics in S. Pudentiana and S. Prassede, and in the baptistery of S. Giovanni Laterano in Rome, in which the ground is blue. In Italy, the epithet "Byzantine" is indiscriminately, though wrongly, applied to this mosaic. It is true that the art flourished in the East when it had almost died away in the West, and that Italy owes to a great extent to Byzantine artists its revival. But a direct Roman influence, as Mr. Digby Wyatt has well pointed out, may be traced in Italian mosaics up to the eighth and ninth centuries. The art, however, flourished contemporaneously in the Eastern and Western parts of the Empire.

The extreme richness of this mode of decoration, and, at the same time, its grand and solemn character when used in large masses, made it especially applicable to religious purposes, and it appears to have been generally employed for the embellishment of churches, although there are several recorded instances of royal palaces having been very profusely adorned with it. A vast mass of ancient mosaic-work has perished; no small amount in the East is still covered with whitewash and plaster. There scarcely seems to have been a church or baptistery of any importance built within the precincts of the Byzantine Empire, that had not more or less mosaic decoration. The fashion spread across the Alps, and we find Charlemagne decorating his basilicas and palaces with mosaic.

This general use of mosaic led to improvements in the materials employed. Marbles and porphyry could no longer be exclusively used, and earthenware did not furnish the required durability. Enamels, or vitrious substances, which the Italians call "*smalti*," were mixed with them. The art, too, of enclosing gold leaf between layers of glass (a very difficult one, and requiring great nicety of manipulation) was also discovered—there is no evidence, I believe, that it was known in pure classic times—and thus the gold ground, one of the peculiar features of this mosaic, could be effectively executed.

Of these early mosaics the most remarkable now preserved are those of S. Sophia, of a church at Salonica, and of the baptistery of Constantine or S. Costanza at Rome, which shews a curious mixture of

Pagan and Christian figures and symbols, and the style of which almost approaches that of the painted ornaments in the baths of Titus; those of the apse of St. Pudentiana, also of the fourth century, of the monumental chapel of Galla Placidia and of the baptistery at Ravenna, and of S. Maria Maggiore, at Rome, of the fifth century; and those of S. Vitale, of S. Apollinare in Classe, and of S. Apollinare Nuovo in Ravenna, of the sixth century.

Unfortunately, few of the early mosaics at Rome, and even Ravenna, are free from considerable restoration, and their original character is in many instances much destroyed. Frequently these restorations are even made with mere coloured plaster.

I will now direct your attention to those edifices which furnish the examples of mosaic decoration most deserving of study, with a view to the use of mosaic in this country. I exclude S. Sophia, because the mosaics on its walls are for the most part concealed by plaster. In its original state it must have been, as far as the interior is concerned, one of the most glorious buildings that the world ever saw. In no other, probably, were such vast spaces covered with the richest mosaic decoration, and every part that was not so covered appears to have been panelled with the rarest and most costly marbles. I had the good fortune to see S. Sophia when under repair, and when the plaster had been removed, under the direction of an Italian architect, Signor Fossati. The effect of this partial revival was truly magnificent. Some idea of the variety and richness of the details may be obtained from Salzenburg's work, which is in your library. I would particularly dwell upon the extraordinary preservation of the mosaics. They had been covered since the Turkish conquest, and probably had not undergone much restoration in previous times.

The examples, therefore, of mosaic, which I would particularly point out for imitation, if the time should ever come, as I hope it will, when people in this country will be duly impressed with the value of internal decoration, are S. Mark's at Venice, the Cathedral of Monreale, and the Capella Reale at Palermo, and the basilicas at Ravenna. I do not place these buildings in order of date, but according to their importance as illustrating mosaic decoration.

S. Mark's, taken on a whole, is the most perfect example of internal decoration in the world. In other edifices you may probably find instances of details, or detached mosaics, more beautiful than any in S. Mark's, but you will nowhere find an example of one grand and noble conception so thoroughly and completely carried out. It furnishes, too, the fullest and most valuable chapter in the history of mosaic, for in this one building we have specimens of mosaics extending over a period between the eleventh, or certainly the beginning of the twelfth, to the end of the seventeenth century, and consequently comprising a variety of styles, and showing many different modes of employing mosaic. Every square foot of the church, the baptistery, and the vestibule, domes, apses, sides, and pavement are covered with mosaic work, except where the richest marbles panel the lower parts of the walls. There is no uncovered or naked space. The eye, I may say the mind, is completely satisfied. Nothing looks as if it were unfinished, or as if there yet remained anything to be done.

I cannot imagine that any one could enter this glorious edifice without being deeply impressed with the solemnity and majesty, and, at the same time, with the exquisite beauty and perfect harmony of all around him; without feeling that if we are to have decoration in our sacred edifices on a large scale, and so as to add to their religious character, and, at the same time, to produce a sense of enjoyment of the purest nature, mosaic is the most appropriate of all decoration. The lustrous surface of the enamels, the large masses of gold ground, the richness of the colour, produce an infinite variety of the most beautiful effects, ever changing as the sun changes its place. S. Mark's is never the same. Enter at any hour of the day, in summer or in winter, and whether the sky be clear or overcast, and you will ever be surprised and delighted by some new and unexpected effect. In the

morning the recesses of the nave, and the grand solitary figures of Christ, the Virgin, and the Evangelists, will be revealed to you. At mid-day, when the full light of a southern sky is equally diffused over the interior, the many domes and vaults are so illumined, that every detail in that vast maze of figures and ornament, can be plainly detected. And when the rays of the setting sun stream through the western window upon the great apse above the high altar, the majestic form of the enthroned Saviour seems to float in a sea of burnished gold. Even when the shades of night are fast gathering over the lower part of the building, a mysterious and solemn light lingers for a time on the golden domes and vaults of the upper, like the bright clouds which float in the sky after a Venetian sunset.

The singular harmony, notwithstanding the abundant richness of the gold grounds, which prevails throughout the decoration of S. Mark's, is owing to its completeness. Any whitewash, or plaster, or blank undecorated space, such as one sees in our churches, would have been an eyesore, and would have marred the marvellous beauty of the whole. Decoration, when thus complete, whatever may be the wealth of gold and colour lavished upon it, is never vulgar or tawdry, but on the contrary, when a just balance is preserved in them, it is sober and harmonious, and can be made eminently subservient to religious purposes. It is only when decoration is introduced as if it were something not forming an essential part of the building itself, but only put there for show, and as if too precious except to be doled out with a niggard hand, that it does become vulgar and tawdry, and appears inconsistent with the objects of a sacred edifice.

S. Mark's teaches us that it is very necessary to avoid white spaces, and especially white plaster, when materials so rich as mosaics are employed. We see this well established in the sacristy. Its vaulted ceiling, lunettes, and spandrils, furnish one of the most exquisite examples of cinque-cento mosaic-work with which I am acquainted. But the general effect of the chamber is greatly impaired, and an appearance of weakness and want of finish is given to it by a panelling of white marble, which runs completely round it, between the mosaic decoration, and a skirting and benches of dark walnutwood below.

In S. Mark's we can study, and satisfy ourselves as to the best mode of employing mosaics, and the style best suited to our churches, should mosaics be introduced into England. We have in this very museum of mosaic decoration, specimens of all styles and manner of work. The most ancient are simple figures on a gold ground, probably the work of Greek artists, or if not, certainly copied from them, and properly termed Byzantine. Such are the colossal figure of Christ seated on a throne, in the apse over the high altar; the figures of patriarchs, saints, and apostles, in the domes, on the side-walls of the nave, and on the pendentives; and the group of Christ, the Virgin, and St. John, over the principal entrance. So also are some of the figures, arranged in processional order in various parts of the church—a tradition of the classic period of mosaic, as seen in the basilicas of S. Vitale and S. Apollinare Nuovo, at Ravenna.

In the baptistery and vestibule, and in the semi-domed recess over the most northern exterior entrance, we have examples of the work and design of the thirteenth and fourteenth centuries. A more complete grouping of figures is attempted, and more variety in the tints. The tesseræ, in some instances, are very small. The general design and arrangement of the figures are still strictly architectural. In the chapel of the Mascoli, one of the most beautiful portions of the church, the waggon-shaped ceiling, docorated by Gianbono towards the end of the fifteenth century, shows how the growing feeling for classic ornament had modified the old manner, and had produced a style very appropriate to architectural decoration in mosaic. In the sacristy, in the works of Zuccati, we have the graceful and flowing ornamentation, and the broad treatment of the draperies, which mark the cinque-cento period, still, however, made subservient to the architecture, and forming part of it. Lastly, on the upper part of the walls to the left of the high altar, in the vaulting over the western end

of the nave, and in the lunettes over the exterior entrances, and over the central entrance in the vestibule, the mosaics having been executed from cartoons by Titian, Tintoretto, Salviati and other great masters of the sixteenth and seventeenth centuries, we see how the mosaist vied with the painter in producing pictures, not only without reference to the architecture, but altogether independent of it. I will point out hereafter, which of these different modes of treatment I consider best adapted to our modern buildings, and most consistent with the legitimate use of mosaic.

Perhaps the most perfect specimen of mosaic decoration, after S. Mark's, with which I am acquainted, is that of the "Capella Reale," or as it is frequently called, the "Capella Palatina," in Palermo. The chapel was built in 1132, and the mosaics were finished in 1143, or soon after. Consequently they are all of the same period, although the original character of many of them has been somewhat altered by modern restorations. I place this interior next in order after S. Mark's, because although much inferior in size to other buildings similarly decorated, the decoration is complete, leaving nothing to be desired. It forms one beautiful and harmonious whole, without a spot upon which the eye can dwell with regret. It also possesses that solemn religious character, and shews that infinite variety of effects, which form the glory of the Venetian temple. The cupola, the sanctuary, the walls of the aisles and nave, are covered with mosaics, in which figures of Christ and the Apostles, and scenes from the lives of St. Peter and St. Paul form the principal subjects. Beneath the mosaics is a skirting of rare marbles. The pavement is of mosaic work ("opus Alexandrinum,") of serpentine, porphyry and hard marbles.

The Cathedral of Monreale, near Palermo, magnificent as it undoubtedly is, and superabundantly rich in mosaics, which cover, according to the Duke of Serra di Falco, no less than 97,973 Sicilian palms (a palm being rather less than a foot) of enamel mosaic, and 13,041 of "*pietre dure*" mosaic (opus Alexandrinum), requiring for their execution the continuous labour of 150 mosaists for three years, does not produce the same impression as S. Mark's. This arises from the roof being in timber, from the absence of those numberless curved surfaces which distinguish the Venetian church, and which are especially suited to mosaic, and from the greater diffusion of light. The effects are less solemn and religious than those of S. Mark's. Still, however, it is a glorious building, and furnishes to the architect an invaluable collection of beautiful designs and patterns of a particular period and style —the church having been entirely built and decorated towards the end of the twelfth century. It affords, too, an important example of the use of mosaic for pictorial purposes on side walls, which at Monreale are covered with stories from the Old and New Testament. The colossal form of the Saviour on a gold ground in the semi-dome over the central apse, has also a grand and imposing effect, and is a fine example of the manner in which this architectural feature in a church can be appropriately decorated with a single figure. The lower part of the interior walls are panelled with marble slabs, divided by bands of mosaic in endless variety of designs.

Unfortunately the ancient Basilicas of Ravenna have either been allowed to fall into decay, or have been so much changed by modern restorations and alterations, that we can no longer judge of the effect which the mosaics they contain must have produced when the whole ornamentation of the interior was in complete harmony with them.

What is usually called the "Jesuit Architecture" of Italy—that vulgar Renaissance which is so offensive to good taste, and so utterly opposed to all solemnity and true religious feeling—introduced the fashion of breaking up the interiors of ancient churches by the introduction of side chapels, and of vast altars composed of columns, cornices, and pediments of marble of every hue, piled up without any reference whatever to the surrounding architecture, or without any pity for the frescoes and ornaments which may have adorned the walls. The original simplicity and symmetry of almost every sacred building of any antiquity in Italy, has thus been destroyed. Most fortunately, S. Mark's, for various

reasons—amongst them, perhaps, the jealousy with which its clergy has preserved its antique church ritual—has been spared, and remains, both in form and ornamentation, nearly as it was intended to be by its builders.

In the Basilicas of Ravenna we can only judge of each mosaic as an individual example, with reference to the actual work and the capabilities of the material. We can form no adequate conception of the general effect which it was calculated to produce as a portion of the general decoration. The richness and harmony of colour are neutralised by the vast spaces of plaster and naked walls by which, in most instances, these mosaics are surrounded; with the exception, however, of the tomb of the Empress Galla Placidia, which still maintains, as a whole, much of its ancient character and beauty. But in themselves, the mosaics are deserving of the most careful study, as belonging to the best period of early Christian mosaic art. They are especially valuable to the architect as affording some of the finest examples of the treatment of pictorial mosaic, and of the technical qualities of the material. For beauty and purity of design, which nearly approaches that of classic times, and for exquisite harmony of colour, the mosaic of the Good Shepherd in the tomb of Galla Placidia is one of the most perfect specimens of the art that can be found. For the processional treatment of subjects, and for ancient costume and architecture, the Basilicas of Ravenna furnish most excellent models, especially the church of S. Apollinare Nuovo. Indeed, at no period were the use and capabilities of mosaic so thoroughly well understood as in the fourth, fifth, and early part of the sixth centuries.

Before concluding this branch of the subject, I would mention, as an example of exterior decoration in mosaic, the cathedral of Orvieto. To judge of the full effect of the mosaic pictures which adorn its gorgeous façade, it must be seen from a distance. Its position — standing majestically on a platform supported by precipitous cliffs rising out of a deep valley—is admirably suited to the display of its richly-ornamented façade. The mosaics, which are modern, are not of the best style, and are too pictorial for the architecture unless seen from afar. Still the effect is undoubtedly very striking, especially on a bright day when the façade sparkles in the sunlight, with all the hues of the rainbow. I should hesitate, however, to recommend similar decoration for imitation in this country.

No one acquainted with the magnificent examples of mosaic decoration which I have described, will probably be inclined to doubt its great value, at least for the ornamentation of sacred edifices. And I think that those who have no prejudices and preconceptions on the subject, will be equally disposed to agree with me, that if mosaic can be used effectively and advantageously in sacred edifices, there is no reason why it should not with equal propriety be employed in secular buildings. All that is required for this purpose is a knowledge of the principles which regulate its proper application, and of the capability of the material.

In many respects mosaic is undoubtedly preferable to fresco for decoration, especially in our climate —even without reference to the atmospheric influences upon wall-painting. It is more durable, it is more lustrous, it is more effective when employed at a considerable distance from the eye; it is far richer and more brilliant, especially when gold grounds are extensively used, in the subdued and frequently insufficient light of our climate; and lastly, in case of injury, or deterioration from dirt or other causes, it can be restored and cleaned without any detriment, or loss of character, to the original work. However, when making this observation, I would add that fresco painting and mosaic have distinct and separate attributes and capabilities, and that when both can be employed under equally favourable conditions as in Italy, they need not interfere with one another. And this reflection leads me to endeavour to point out what the proper attributes and capabilities of mosaic decoration really are.

Let me remind you, in the first instance, that I am not dealing with that minute and elaborate mosaic work, chiefly practised at Rome, which is intended rather for the reproduction of easel pictures and altar pieces than for architectural decoration. This kind of mosaic is rather to be avoided than imitated, and with it the architect has nothing to do.

Legitimate mosiac decoration, like all true architectural decoration, should, in the very first place, be made subservient to the architecture—or rather, it should be made essentially part and parcel of the architecture. The truly great architect will devise and superintend the decoration of his own building, even, if possible, to the minutest details; for there is nothing which adds more to the effect of an architectural monument, and to its grandeur and nobility of character, than the feeling that one clear, well-defined and lofty conception pervades the whole of it. When this identity of conception is apparent in a building, however inferior it may be in certain details to another edifice in which this homogeneity is wanting, it will always be far superior to it in the general effect produced.

In order, then, to make mosaic decoration harmonise with architectural lines and forms, all the best designers for mosaic have sought to give their cartoons a certain conventional and architectural character, and have avoided any attempt to make the mosaics look like pictures in oil. As, from the nature of mosaic (tesseræ placed together with more or less precision) it is best seen at a distance, it should be used, especially when pictorial, at a certain height from the spectator. There are no mosaics in S. Mark's less, I should think, than 10 feet from the pavement, and the greater number are at a very considerable elevation. Consequently, distinctness of outline, not only in the figures themselves, but in their extremities and parts, so that they be not lost in the mass, is required. When grouped, each figure should stand out boldly, and not interfere with any other figure. For this reason, the mosaists of the best periods of the art generally preferred the processional treatment of their figures. Any attempt to produce different planes of distance, which require, to be properly represented, all the subtle tints of the painter's palette, should be avoided. The outlines should be distinct, well-defined, and marked somewhat heavily; their darkness and thickness being regulated according to the elevation of the mosaic. This rule applies to both pictorial and purely decorative work. Reference should be specially had to the style of architecture of the building; always, however, bearing in mind that, although the general arrangement of lines and treatment of the subject may be varied to suit it, yet that whether mosaic be introduced into a Classic, Gothic, or Renaissance edifice, the general laws which regulate its use are the same.

I may cite, as an example in illustration of what I have said, the semi-dome over the most northern, and the lunette over the adjoining, exterior entrance to S. Mark's. In the semi-dome, the original mosaic of the thirteenth or fourteenth century (its precise date is doubtful) represents a procession of figures bearing the body of St. Mark to the church, a view of which, as it appeared when the work was executed, is seen in the background. The subject, simply and somewhat rudely treated, harmonises perfectly with the surrounding architecture. The mosaic of the adjoining lunette represents the Doge and Venetian Magistrates venerating the body of St. Mark. It was executed from a cartoon by Rizzi, and is probably one of the finest known examples of enamel mosaic, both as regards execution, and the wonderful beauty and richness of the colours, especially the blues, purples, and golds. But this mosaic, however admirable in design and in execution, does not combine or harmonise with the architecture. It looks like a fine picture suspended on the façade, and which might have been hung any where else. Consequently its effect is infinitely less pleasing than that of the earlier, simpler, and ruder mosaic. What the effect of all the entrances must have been before the original mosaics were removed to receive the later, may, to some extent, be judged of by Gentil Bellini's great picture in the Academia, in which the façade of S. Mark's is represented with almost photographic minuteness, as it appeared in the fifteenth century. No one will doubt that it was superior to that produced by the modern mosaics.

I may add that, in order to increase their effect, almost all good pictorial mosaics with which I am acquainted are surrounded by a band of appropriate ornament in the same material, the width of which depends upon the elevation and position of the mosaic picture.

It may be said that these considerations as to the designs for mosaics should be addressed to the painter rather than to the architect. But I contend that the design for a mosaic, whether pictorial or simply decorative, is essentially the business of the architect, and that unless he attends to it, and makes it himself, or causes it to be executed under his own immediate direction, he will never produce a really great architectural monument if mosaic decoration is to be a prominent feature in it. As I have ventured to remind you on a previous occasion, architecture is the noblest of all arts: for, when rightly understood, sculpture and painting become her handmaidens. When they were so, the most beautiful and perfect edifices were produced, whether in Greece or Rome, in Italy or more northern climes. It is the architect who takes this lofty view of his profession, and educates himself to carry it out, who will erect the greatest monuments and earn the highest fame.

Although the chief merit of the mosaic must depend upon the designer of the cartoon, much is left to the skill and judgment of the mosaist who executes it. It is surprising how much effect may be produced by a judicious selection of tesseræ of different sizes for different parts, by the mixture of tints in large masses of one colour, such as a gold ground, so as to avoid monotony of tone, and by the dexterity with which the arrangement of the tesseræ is made to follow leading lines, and the undulations of flesh or drapery. The intervals between the tesseræ must be regulated according to the distance, and can also be made to contribute to the general effect. These things, and the proper selection and matching of the tints, form the duty of the mosaist.

Having thus endeavoured to place before you the nature and capabilities of mosaic, I would invite your attention to the main objects of this paper, which are two—1st, to ascertain whether this mode of decoration can be advantageously introduced into this country, and, 2ndly, if so, whether there be the means of employing it on an adequate scale?

With regard to the first point I have already expressed my opinion on the subject of the decoration of our public monuments, as well as of our churches. Not only am I convinced that pictorial decoration might be introduced into such edifices much more extensively than it has hitherto been, but that it could be so introduced very much to the public advantage, both as regards public enjoyment and public instruction. But, unfortunately, the apparent failure of fresco and other wall-painting has discouraged the public, the architect, and those who have the superintendence of our national monuments. It is a matter for regret that mosaic was not more generally known, and had not been introduced into England, when the decoration of the Houses of Parliament was commenced. I hope that it is not yet too late to introduce it into a building, which is eminently calculated, especially in its halls and passages dimly lighted through stained glass, for this mode of decoration. It was truly a noble idea to make the walls of the palace of the representatives of the nation the record of her history; and we must deplore that it has not been fully carried out, principally owing to the failure of the materials employed. It will be a national loss if the fine wall-pictures of Mr. Maclise should perish—whether we regard them as monuments of the genius of the painter, or as most careful representations, in every detail of costume, and even of portrait, of great events which have occurred almost within his time. Had they been executed in mosaic, we should, no doubt, have missed the skilful touch of the master, but we should have preserved designs worthy of him, and he would have been enabled to employ the years that have been consumed in the actual manual labour required to execute such vast works, in preparing other cartoons for the completion of the decoration of the walls, in two panels alone, of which the battles of Trafalgar and Waterloo are now represented.

The works of some of the principal painters of our time, executed at no small cost to the nation, will perish, in all probability, within a few years; and our only chance of preserving any memorial of them is by reproducing at least a portion of them in mosaic.

Ghirlandajo was not wrong when he declared that mosaic was the only painting for eternity. He

would have been still more right had he been an English fresco painter. I know only one mosaic executed from a design by him—that of the Annunciation over one of the side doors of the Duomo at Florence, which is, I believe, in the most perfect preservation, although it has been exposed for nearly four centuries to the effects of the atmosphere. It contrasts strongly in the brilliancy of its tones with the blackened and discoloured surfaces of the frescoes by the same great master in the churches of S. Maria Novella and the Trinità.

Besides the Houses of Parliament, we have rising up around us, Museums, Picture Galleries, Public Offices, Courts of Law, Town Halls, Railway Stations, and other edifices. Each of such buildings might, like the Houses of Parliament, be made to contribute something towards the instruction of the public, and towards the elevation of the public taste, by appropriate pictorial decoration in mosaic. They have blank spaces, which need to be filled up, and which the architect would, probably, gladly fill up. But he hesitates to do so now with wall-painting, because he cannot satisfy himself that it will resist the effects of our climate, and the smoke and dirt of our principal cities. If a suitable and durable material were at hand, in which such pictorial decoration could be executed at a reasonable cost, he would probably avail himself of it. Judging from the manner in which mosaic in Italy and in the East, when used externally, as well as internally, has defied the ravages of time and weather, we may infer that mosaic, if of good quality, is precisely the material which would suit our climate and atmosphere.

It may be said that the climate of Constantinople and of Venice is less variable and less injurious to mosaic than that of England, but I am not prepared to admit this assumption without considerable qualification. Both those cities are liable to changes of temperature of the most violent and sudden nature, and to extremes of heat and cold which are unknown in this country.

I cannot conceive anything more instructive and interesting to the great mass of the people than pictorial decoration carried out in a comprehensive and intelligent manner in our great public buildings. Millions have yearly to while away some spare minutes in railway stations, town halls, and courts of law. We might make such places, as the Greeks and Romans did their public edifices, a means of teaching and amusing the people, and, at the same time, add much to their beauty and interest, by representing on their walls great national events, or recording important scientific discoveries, which have increased the prosperity and power of the country, or have contributed to our civilization and our intellectual development. Such decoration, too, would furnish an excellent opportunity for developing a really English School of Art.

As a familiar illustration of what I mean, I may mention that I learnt more of the different forms and employment of locomotive engines than I had ever known before, when spending a quarter of an hour, a few weeks ago, at a railway station of a small Italian town, round the principal hall of which was very artistically painted, in lunettes, every variety of engines for railways and the mode of their use.

In our museums and picture galleries, with the exception of the South Kensington Museum, where a most praiseworthy and, on the whole, successful attempt has been made to introduce ornamentation on a large and complete scale, we have hitherto been sadly deficient in rich and appropriate decoration. And yet the value of a work of art, and the impression it is calculated to make, are very much enhanced, as far as the general public are concerned, by the beauty or magnificence of the building which contains it, like a jewel which gains by a rich and appropriate setting. Our National Gallery, for instance, is a disgrace to a great and civilised people. Its floor of common boards, its coarsely papered walls, its undecorated ceilings, its mean internal approach, have unquestionably a tendency to depreciate, in public estimation, the value of the treasures which it contains. Our pictures crowded on the walls of such apartments, look as if they were hung for approaching sale in an auction room. Thousands who

visit the National Gallery, and for whose instruction and elevation its contents are partly intended, leave it without any adequate notion of the worth and beauty of what they have seen, merely because they cannot believe that things of real value can be so poorly cared for. There is something elevating and refining in rich and beautiful ornament, when introduced into a public building, and, depend upon it, the working classes feel the influence of it.

Mosaic decoration is particularly fitted for our churches, on account of the grand and solemn effect which, when employed in large masses, it is calculated to produce. It is especially suited to curved surfaces, such as domes, vaults, and apses, because, when thus applied, it produces an infinite variety of effects of light and shade, especially when gold ground is extensively used. These effects are constantly changing throughout the hours of the day. We may imagine what the dome of St. Paul's would have been had Wren's original idea of covering it with mosaics been carried out. Even the gloom of the dull and murky atmosphere of the City would have been conquered by the bright and luminous enamel, and those who have seen S. Mark's at night can picture to themselves the effect of an evening service at St. Paul's when the golden ground of the overhanging dome would reflect the thousand lights beneath.

In connection with exterior decoration, which has of late years become better understood and valued in this country, I would point out the use of gold mosaic as a ground to bas reliefs, whether figures or ornament, in white marble and other materials. The Byzantines and Venetians were well aware of its worth for this purpose, and of the singular beauty and delicacy of its effect. There are some charming examples in the façade of S. Mark's. Mr. Ruskin thus eloquently describes them:—"The small glazed surface of the golden ground is washed by every shower of rain, but the marble usually darkens into an amber colour in the process of time; and when the whole ornament is cast into shadow, the golden surface being perfectly reflective, refuses the darkness, and shows itself in bright and burnished light beyond the dark traceries of the ornament. When the marble has retained its perfect whiteness, on the other hand, and is seen in sunshine, it is shown as a snowy tracery on a golden ground, and the alternations and intermingling of these two effects form one of the chief enchantments of Byzantine ornamentation."

In the best period of Italian art, the sculptor was well aware of the beautiful effect of sculpture in white marble relieved by a gold ground, and the niches which received the statues on the exterior of the church of Or San Michele at Florence were, for the most part, lined with gold mosaic.

An important consideration in the use of mosaic in England, and especially in London, is the facility with which dirt, and the discoloration produced by smoke and soot, can be removed from its surface, either by simple washing, or by the employment of an acid, without the least detriment to its brilliancy. I understand that recently some of the most ancient mosaics at Ravenna, dating from the fifth century, have been cleaned, and that they are as bright in colour as when first executed.

Let me now, in conclusion, ask your attention for a few minutes, to my second point,—Have we the means of using mosaic for decorative purposes, in this country?

In England we have never had a school of mosaists. The few specimens of ancient mosaics that we possess, such as those in Westminster Abbey, were executed by Italians. An attempt was made, four or five years ago, by Mr. Cole, with his usual zeal for the promotion of applied art in this country, to found a school of workers in mosaic, who were to employ tesseræ of terra cotta, or, as they are technically called, "ceramic tesseræ," instead of enamel, for figures and ornaments. Some very creditable specimens were produced, principally by Messrs. Minton & Co., and Messrs. Simpson & Co., but the attempt does not appear to have been altogether successful. For some purposes these terra cotta or ceramic tesseræ are sufficiently effective, but they lack the richness, brilliancy, and luminous quality of enamel. Certain colours, such as reds and purples, cannot be produced in them, and they can never equal the effect of the gold of the Byzantine mosaics. Moreover, the gold being applied

externally, and not protected by a film of glass, is liable to tarnish and to injury. As regards the durability of ceramic mosaics, I hesitate to give an opinion, after the solemn warning of our President in his opening address of the session, against the indiscriminate use of terra cotta, at least for external decoration. I will only mention this fact, that in repairing the mosaics of S. Mark's it has been found that, whilst the ancient tesseræ in enamel are perfectly preserved, those in terra cotta and other materials (for such were mixed with the enamels) have either perished or have greatly suffered.

But mosaics in enamel have been executed with considerable success by several eminent firms in this country. I may particularly mention some of the full-length figures in the principal hall of the Museum of South Kensington, by Messrs. Rust & Co., and by Messrs. Harland, Fisher & Co. Some of the enamels used were, I am informed, produced in England by Messrs. Powell of Whitefriars, but the greater part were, I believe, obtained from abroad,—mostly from St. Petersburg, where, as it is well known, a manufactory of mosaic, which has produced some remarkable works, was founded by the Imperial Government, under the direction of Signor Bonafede, a distinguished Roman mosaist, who is only recently dead.*

In Italy the traditions of the workers in mosaic have been handed down through centuries, and although at times the art has been very low, and indeed was scarcely practised at all, yet it has never altogether died out in the Peninsula. At Monreale certain families of mosaists have been employed from generation to generation in keeping up and repairing the mosaics of the cathedral. In Rome, owing to the demand for elaborate mosaic in the reproduction of pictures, and for furniture and personal ornaments, the skill of the mosaist was almost exclusively directed to those objects, but still the ancient traditions were not lost, and workmen were, without difficulty, found to execute the series of mosaics which adorn the walls of the new Basilica of San Paolo fuori le Mura. At Venice the old secrets were still preserved in the Island of Murano, which had been celebrated as far back as the twelfth and thirteenth centuries for the beauty of its manufactures in glass, and for its enamels. But the sad condition to which the mosaic art had been reduced may be seen by the restorations and renovations which, during the last century and the early part of the present, were executed in S. Mark's.

A few years ago a poor glass-blower of Murano, named Lorenzo Radi, applied himself, with that singular intelligence and perseverance which are not uncommon amongst Italian artists, to the improvement of the manufacture of enamel mosaics, and to the application of some of those secrets which were traditionally preserved in the Island. He particularly turned his attention to the manufacture of gold mosaic. The success which attended his experiments attracted the notice of Dr. Salviati, a lawyer of Venice, and a gentleman of much ability and ingenuity, who perceived the value of his discoveries, and foresaw that they might be applied to the revival of mosaic decoration. He accordingly entered into an arrangement with Radi, and opened an establishment at Venice for mosaic, obtaining artists from Rome to instruct Venetian youths in the art.

In former times, mosaic work, having to be executed on the walls, required considerable time and labour, and was consequently very expensive. The mosaist had to copy the cartoon on the wall itself, fixing the tesseræ, one by one, in the cement prepared to receive them. Dr. Salviati succeeded in avoiding the necessity of working on the spot by an ingenious process, which, however, is only applicable to decorative mosaic, and cannot be used when much delicacy of execution, and extreme nicety in the gradation of tints, are required. He taught his workmen to reverse the cartoon, and to place the tesseræ with their proper faces downwards. The tesseræ are fastened, with common paste, to sheets of

* I have been informed by Messrs. Rust & Co. that this statement is not quite accurate, and that they have succeeded in producing all the enamel mosaic used by them in the works which they have executed, and that they have supplied more or less material to other artists, who have exhibited mosaics at South Kensington.

coarse brown paper, on which the cartoon is traced. When the work is finished, it has only to be fixed with cement upon the wall destined to receive it, and the brown paper is then removed from the face of it. This process requires considerable skill and practice, especially when figures have to be executed, but is perfectly successful. Thus the decoration of any number of square feet of surface can be forwarded from Venice to any part of the world—to America or to India—with safety, and at little cost. Having thus found the means of executing mosaics in the establishment at Venice, and having trained a number of young Venetians to the art, and much improved the quality of his enamels, he endeavoured to introduce this mode of decoration into foreign countries. It was chiefly in England that he met with success. The increased feeling for colour and decoration, and the gradual improvement in the public taste which had taken place in this country, chiefly through the enlightened influence of the Prince Consort, were very favourable to his attempt. It was principally through the knowledge of art, and the well-known taste of the Queen, that Dr. Salviati obtained his first important commissions,—the decoration of Wolsey Chapel at Windsor, and that of the Albert Memorial in Hyde Park. The mosaics of the latter monument are now complete, and cover above 1100 square feet. In the Wolsey Chapel very little remains to be done. The general designs for the introduction of mosaic decoration on both these monuments were by our distinguished Fellow, Mr. Gilbert Scott, and were carried out under his directions from the cartoons of Mr. Clayton, of the firm of Clayton and Bell.

The Albert Memorial and Wolsey Chapel furnish excellent examples of mosaic used both for external and internal decoration. On the Albert Memorial, mosaics adorn a pediment and two spandrils on each face, and the vaulting above the statue of the Prince. The four pediments are occupied by allegorical female figures on a gold ground, representing Poetry, Architecture, Sculpture and Painting. Beneath each pediment, on two spandrils, are figures, also on a gold ground, illustrating the application of the art typified in the figure above. The vaulting is blue, set with gold stars, and adorned with emblazoned coats of arms. The general effect of the mosaics, as far as one can judge in the present unfinished state of the monument, is rich and harmonious. Mr. Clayton has designed his cartoons with a thorough knowledge of the capabilities of mosaic, and of the requirements of architectural decoration. The figures are distinctly and clearly defined on the gold ground, and can consequently be seen from a considerable distance. Except on the Cathedral of Orvieto, there is, I believe, no similar instance of the employment of mosaic on so large a scale for exterior decoration. The mosaics of the Albert Memorial, exposed to the full influence of our climate and atmosphere, and facing the four quarters of the heavens, will furnish the best test of the durability of the material when used in this country on the exterior of monuments.

If I am not much mistaken, the Wolsey Chapel, when completed, will be one of the most gorgeous and perfect specimens of modern decoration in Europe. The intervals between the ribs of the groined roof, including an area of about 2,100 superficial feet, are adorned with angels, heraldic devices and various ornaments in mosaic on a gold ground; the soffits of the twelve side windows are similarly ornamented, and the twenty-eight panels of the great blank west window are occupied by full-length figures of historic persons, who have been connected with the erection and decoration of Windsor Castle, also in mosaic, on a gold ground. The windows are filled with the richest stained glass.* The walls of the chapel are panelled with a series of Scripture subjects, in marble tarsia, each framed in bands of ornament formed by white marble reliefs, inlaid in marbles of various colours, the whole executed by the Baron de Triqueti. The tarsia of coloured marbles, with engraved outlines and shading filled with mastic, is a revival and improvement by the Baron de Triqueti, of an art practised during the Italian cinque-cento, and carried to its highest perfection at that time in the pavement of the Duomo of Sienna.

* By Messrs. Clayton and Bell.

Above each panel are introduced medallion busts of the Queen and Members of the Royal Family, by Miss Durant, a pupil of the Baron de Triqueti.

As the decoration of the chapel is not yet finished, the time is perhaps not come to pronounce a final opinion upon it. But I cannot refrain from saying how much impressed I have been with the refined beauty, and at the same time with the exceeding richness, of the general effect. I especially rejoice to see an example of interior decoration thoroughly carried out, and I cannot but believe that it will lead to still greater works of the same nature.

Besides the decoration of the monument which I have described, Dr. Salviati has obtained other commissions for public buildings in England. In the Museum of South Kensington he has executed several full-length figures of celebrated painters, sculptors and other artists, after cartoons by some of our most eminent painters. I may particularly mention the figures of Nicola Pisano, by Mr. Leighton, and of Appelles, by Mr. Poynter. In Westminster Abbey, the Last Supper over the communion table is by him, after a design by Mr. Clayton. It is a very fine specimen of the art, but the figures are somewhat too small to produce their full effect in a building of such vast proportions. For St. Paul's, he has executed the mosaics of two pendentives of the dome, one from a cartoon by Mr. Watts, the other from a cartoon by Mr. Stevens, and he has a contract for the decoration of the remaining pendentives. I trust that the day may come when the whole of the dome may be similarly decorated, as the dome of St. Peter's at Rome is. The architect of that noble edifice, Mr. Penrose, has not, I hope, relinquished the idea of carrying out Sir Christopher Wren's original design. The late Dean, Dr. Milman, was exceedingly earnest in his desire, that this great work should be accomplished, and its completion would be a worthy memorial of this distinguished man. But, as in many such undertakings, the difficulty in the way, is the want of money. It may seem somewhat a strange circumstance, when it is remembered that St. Paul's is the Metropolitan church of the wealthiest city in the world. If Venice, rich and enterprising as she undoubtedly was in her golden days, could build and adorn the church of S. Mark, as a monument of her glory and her piety for all time, cannot London, whose riches and enterprise so infinitely exceed those of Venice, and whose piety, we may hope, is not less, even finish the Church of St. Paul's ?

In addition to these great commissions, Dr. Salviati has executed several reredos in mosaic for churches in England, into which they have been introduced with excellent effect.

Abroad, the principal commission obtained by Dr. Salviati is that for the complete restoration of the mosaics on the walls and in the pavement of S. Mark's at Venice, for which a contract has been entered into extending over fifteen years. In some parts, especially in the vaulting of the nave, in which the Apocalypse was represented, the mosaic has fallen away, and must be replaced. This is owing entirely to the cracking of the walls, in consequence of considerable subsidence in the foundations, which has necessitated large works of restoration in the building. The mosaics that have suffered are the most modern, not the most ancient, which, for the most part, are still in excellent condition. Many of the cartoons of such as have perished are still preserved, and I trust that the restorations will be executed with every care; indeed, with such reverential feeling, that this grand and unique monument may in no wise lose its original character.

In order to sustain an industry of so much interest, and of so much importance to Venice, a few English gentlemen have provided the necessary capital, which, owing to the condition of the city, was wanting; and Dr. Salviati's establishment has become that of an English Company, under his artistic direction. At the same time means have been found to promote another most ancient and beautiful art, which, in the middle ages, contributed to the glory and greatness of Venice,—that of the manufacture of blown table-glass, the revival of which in Murano, its early seat, is also due to the energy and ability of Dr. Salviati.

From what I have said, there cannot, I think, be a doubt that mosaic, both for pictorial and simply decorative purposes, not only can be, but ought to be, employed in this country. I have shown that when protected from the effects of the atmosphere in the interior of buildings, its durability cannot certainly be questioned. With regard to exterior use it may yet have to be tested, although I see no reason why it should not be proof against our climate, if proper precautions are taken in fixing it. These precautions consist mainly in the selection of the cement which binds the tesseræ together, and fixes the mosaic to the wall. That used by Dr. Salviati has been subjected, I believe, to adequate tests by Mr. Gilbert Scott and other eminent architects, who have employed mosaic, and has been found of excellent quality. The architects of S. Mark's appear, at one time, to have used, as an additional precaution in fixing mosaics, especially on walls and ceilings, large nails with heads in the form of a star, and, as it were, split at the end, in which a wedge was inserted, which opened up the nail as it was driven into the wall. But such precautions appear to be scarcely necessary when perforated bricks are employed for the reception of mosaic, and they do not appear to have been used by the most eminent mosaists.

There is still another point of a practical nature upon which the architect, and the public also, will naturally require some information,—I refer to the question of cost. Upon this subject Mr. Digby Wyatt made some statements in his paper; but, since then, owing to the greater facility of execution, and of producing certain enamels, the scale of prices has somewhat altered. The cost of mosaic depends principally upon the following considerations—the quality of the work, the distance from the eye at which it is to be placed, the predominance of figures, ornament or simple ground, and the prevalence of certain tints.

On the walls and on the table are various specimens of Venetian mosaic, which will afford some idea of the relative quality of work used for architectural decoration. I do not, of course, include the fine Roman mosaic. The most elaborate works executed for decoration in England are the figures in the South Kensington Museum. It would be difficult to find finer specimens of this branch of the art. But they are, of course, the most expensive—requiring very skilful artists, who receive high pay. I doubt whether mosaic of this nature can ever be introduced very largely for purely decorative purposes. The great monuments of Italy and of the East contain no work so elaborate and highly finished.

The pictorial mosaics of the Albert Memorial and of the Wolsey Chapel are purely decorative, and are meant to be seen from a distance. In order to be effective they are not too fine in the workmanship, or too elaborate in the gradation of tints. These figures are good examples of what mosaics for internal decoration should be; but they are more elaborate in execution and in gradation of colour than most of the decorative mosaics of the early Italian and Byzantine churches, although there are specimens in S. Mark's, as in the semi-dome over the exterior northern entrance, in the Mascoli Chapel, and in the sacristy, which exceed them in fineness of work, and the smallness and exact fitting of the tesseræ.

The figure of Christ in the act of blessing, from a cartoon by my friend, Mr. Gambier Parry, an eminent amateur artist, is a good example of two qualities of work united; the head having been executed by a skilled artist, according to the usual process, that is to say, not on the reverse, the drapery by less skilled hands on the reverse.

Still coarser work even than any specimen exhibited here, is well suited for simple architectural decoration, and even for figures; producing an excellent effect when far removed from the eye—a better effect, indeed, than more finely executed mosaic.

Of course figures require, under all circumstances, more careful execution, and more skilful workmen than mere ornament.

As regards the relative cost of tints, the reds and purples are the most expensive, on account

of the materials used in them, and of the difficulty of producing them. The gold mosaic, and especially the silver, which is even more difficult to obtain than the gold, is more costly than common tints.

To show the requirements of a mosaic establishment, I may mention, that in order to execute in a satisfactory manner the cartoons which have hitherto been confided to Dr. Salviati, a stock of nearly 1,500 tints has been brought together, for the most part produced in the Company's furnaces at Murano.

I may point out that any quality or tint of gold may be obtained by darkening or lightening the colour of the glass upon which the gold leaf is laid, or by using a film of coloured instead of transparent glass over it. Or the brightness of the gold may be deadened by roughing the surface of the outer film of glass with the wheel. The architect or painter can consequently choose the quality of gold which best suits his work or his taste.

Taking, then, the various qualities of mosaic, which may be fitly used for decorative purposes, the prices would vary from about 30s. the square foot for the coarsest work, to £4, or, at the utmost, £5 for the finest. This includes the fixing, but not, of course, the price of the cartoon.

When these prices are compared with what an artist of eminence, and fully employed, would receive for the execution of a great fresco, or any elaborate mural decoration—in fact, with what the artists engaged on the wall-paintings in the Houses of Parliament have received—they will be found, I think, very moderate. Of course, we must take the cost of the cartoon into consideration; but if even this be added to the cost of the mosaic, supposing the cartoon to be executed by an artist of high reputation, the whole expense of the mosaic would be far less than that needed for the execution of an elaborate fresco by the same artist. It must be borne in mind that all great fresco painters have, before commencing their work on the wall, executed most careful cartoons for it—cartoons, indeed, which would be more than sufficient to guide the skilful mosaist.

As regards simple decoration, when the durability of the material, the facility with which it is cleaned and restored, and the admirable effect that it is calculated to produce, are taken into consideration, the price of mosaic is certainly not an obstacle in the way of its use on a large scale in our great public and even private buildings.

In conclusion, I would venture to express a hope that the subject which I have brought before you this evening is one not unworthy of the attention of English architects; and that by the aid of mosaic we shall see erected public buildings which, in their internal decoration as well as in their exterior architectural features, may be worthy of the wealth and greatness of the country.

Mr. M. DIGBY WYATT, Fellow (responding to the Chairman's invitation), said:—The first remark in such a discussion as the one we should hope for this evening, ought obviously to be an echo of the feeling of delight and gratitude we have all I am sure experienced, and would now fain express, to Mr. Layard for the paper with which he has favoured us. Having myself, as it were, trodden a little in his footsteps in the earlier stages of the development of the art of mosaic in this country, I cannot but recognise in Mr. Layard's suggestive remarks a most interesting sequel to the observations I have endeavoured to lay before the Institute upon this subject on other occasions. It is now about twenty years since we began to think of the possibility of using mosaic on a large scale in England; and at that time I ventured to state, in the rooms of this Institute, that I saw no reason whatever why we, in the nineteenth century, should not do all that the ancients had ever done, in geometrical or pictorial mosaic. To me it is therefore a matter of unqualified delight to find that the application of this art is rapidly making progress in this country; and in no way do I think that it could be better stimulated than by such able and intelligent communications as that to which we have

listened with so much pleasure this evening. We must however feel that there is a great deal more yet to be done, and I think the great deal which has yet to be done, rests very much indeed upon the shoulders of the architects. Thus, it seems quite clear that we have plenty of mosaic workers ready to decorate our buildings, and mosaic in plenty fit for our buildings; but the question really is now, whether we have buildings fit for the mosaic and the mosaic workers. In the history of the arts of this country, pictorial mosaic until quite recently presents a total blank to us, and as its process was not comprised among the resources of the designers of English mediæval structures, in order to obtain the effect of richness when they had ample money at command, they spent the bulk of their funds and energies in working stone into elaborate forms. This, in the later panelled state of Gothic architecture, usually left but little space on which mosaic on a large scale could be well executed, or upon which, when executed, it could be well seen. In mediæval structures so designed in connection with such elaborate stone work, there are usually such large masses of stone, more or less wrought, which must either be painted—and thus spoil to a great extent the fine effect of the mason's work—or be left white, so that when mosaic is added it either fails to combine well with the paint, or looks uncomfortable, because its contrast with the large quantity of white stone fails to produce that general harmony of effect which Mr. Layard very properly lays down as essential to the success of mosaic decoration. We must therefore feel that the right use of mosaic in this country has to be much associated with the development of brickwork, which is for us in this smoky atmosphere both a natural, a durable, and an economical material; and I feel that if we make up our minds to design suitable lofty and spacious structures, in which brickwork plays a leading part, and in which we not only make brick arches, but brick vaults as well, we may hope to save money by using a material of reasonable cost; and our so doing may admit of our applying the money thereby saved to elaborate decoration by mosaic. We shall thus not only employ a mode of structure assimilating well with mosaic in general decorative effect, but we shall obtain those curved and hollowed surfaces, without which it is almost impossible to work out some of the most satisfactory effects attainable by the use of mosaic. A very few words will suffice to explain why it is that gold ground, and all glass mosaic, with light-reflecting surface, looks best upon concave grounds. When a mosaic of that kind is placed on a vertical plane surface, and that surface is illuminated by clerestory windows, or the side windows of the nave of a church, or any windows directly opposite to the mosaic, the light so transmitted will be usually reflected to the spectator's eye in one dazzling sheet. It will reflect the glitter only, colour will disappear, and it will show the pattern in a deep neutral tint, as I now see the coloured pattern on that gold ground mosaic which hangs suspended against the wall opposite to me. On a curved surface, on the other hand, the light by which it is illuminated is brought to a focus in one part only, and many different kinds and degrees of illumination are always shown on other portions of the concavity. Large portions remain in shade, lit up by strong reflected lights. On such large surfaces, colours and patterns are always, as it were, legible; and when the sunlight reflected from the pavement of the church beams upwards in sudden and fleeting pencils of light, it never fails to echo as it were from side to side in the luminous vaulting, until the whole seems to glow and almost irradiate. Effects of this sort are amongst the most beautiful which are to be seen in the ever lovely vaults of St. Mark's. It is on these, and other grounds, which time will not permit me to dwell upon, that I think we have much to do yet in making up our minds for the design of structures really appropriate for such decoration as that of mosaic upon any large scale. The architect can never, indeed, evolve the richest harmonies from any system of decoration, unless he predetermines his scheme of decoration, and prepares his structure for its reception. To make a structure irrespective of decoration, and then to expect it to fuse into a perfectly homogeneous result, when decoration is even most skilfully applied to it, subsequently, is to rely upon assimilation by chance proving as successful,

which it can never do, as assimilation by design. With regard to the history of mosaic, there are one or two points which I would glance at in reference to what Mr. Layard has said,—more particularly as I was in hopes that we might have heard something from him, founded upon his invaluable researches in the East, respecting the real origin of gold ground mosaic. We know it existed among the Romans, at least in Imperial times, since we have the instance of the beautiful column found at Pompeii, and now in the Museum of the Studii at Naples, in which much regular gold ground mosaic is used of quite as perfect manufacture as was in use at any subsequent period. Mr. Layard will also, no doubt, remember the elegant "lararia," or recesses for holding "simulacra" of the household gods which occur in many of the houses of Pompeii; and the decoration of several of which (gold-ground mosaic being freely introduced in them) seems to have formed the prototype of the decoration at later periods of the conchas of the early Christian basilicas. Interesting specimens of such Roman mosaics, in which gold ground was used, may be seen, I think (having been left there on loan), at the South Kensington Museum. I am inclined to believe that gold-ground mosaic was much more common amongst the Romans than we now fancy; and I base this belief partly on the brilliant description of the magnificence of such buildings as the golden house of Nero, given by contemporary writers,—partly on the quantity of gold-ground mosaics constantly turning up upon such sites as those of the Baths of Caracalla, Diocletian, &c.,—partly on the change in taste which led the Romans from Grecian to Oriental models in later Imperial times,—and partly on the almost instantaneous development the art assumed on the removal of Constantine to Byzantium. We know that even early in the best ages there existed in Rome at least two classes of coloured decorative design, one of which was based upon the Etruscan and Greek system of using generally reds, blacks, browns, and low-toned colours; and the other, in which gold abounded, and the ornament was executed in the most luminous colours that could be employed. I was in hopes Mr. Layard would have told us that in the East he had met with gold-ground mosaics which might have preceded those of the Romans, and which might have given us a clue to the source—whether Phenicia, Sidon, Egypt, or India or Persia—from which the Romans might have derived the idea of their use. With reference to Latin mosaics to be met with in the north of Europe, of which but very few specimens exist, I may direct the attention of any members of this Institute visiting Cologne to a particularly interesting series of fragments (now laid down anyhow) on the floor of the crypt of the church of Saint Gereon, in that city. These fragments probably formed a portion of a large pavement representing in regular Latin black and white tesselation, the Virtues, and the corresponding Vices. One fragment—a head, with the inscription "FORTI" upon it—was evidently a portion of a representation of Fortitude. I mention this because it has only lately fallen under my observation, and because it forms an important addition to the very limited lists I was previously enabled to give of this very rare class of mosaic. To pass to times present, all his hearers must have felt pleased, not only with the account Mr. Layard has given us of the progress made by Dr. Salviati, but also with the efforts which we know to have been made by other intelligent producers of mosaic in England, to spread the growth of that art in this country. Mr. Rust has been most successful in some of his colours and textures. Mr. Powell has also produced many good specimens; Messrs. Minton, Messrs. Harland and Fisher, Messrs. Maw, Messrs. Simpsons, and others, have made great strides in different directions; and we must all feel that the more of this kind of thing done—the more labourers in the field—the better. It is not one tradesman, nor twenty, who can even now supply the wants of the civilized world in the way of mosaic, and supply and demand are sure to increase concurrently. One delights to recognise the perfect work done at St. Petersburg on a most magnificent scale, and we may be sure that the more mosaic there is executed in the world, the more there will be wanted. The process of vitrification may be applied to form a permanent

polychromatic decoration, to which I would for one moment allude—viz., enamelling upon iron. We see now in all directions large slabs of metal covered with what must be a perfectly durable material. It remains only to apply a little taste and judgment to current productions by that process in order to create a new element of external decoration, which cannot but prove most valuable to the architect of the future, even if it should fail to come to pass for the benefit of the architect of the present. With reference to the value of external mosaic, about the durability of which in this climate I expressed strong fears on a former occasion, the great point we have to take care of is the quality of the cement used in connection with the mosaic. If it is merely a quick-setting open-grained plaster, or cement, with any diliquescent salts, the capillary attraction of the substance will draw moisture from the rain that falls outside on the mosaic, through to the plaster at its back. In that case the frost would soon get in and blow the mosaic from its backing. I would rather suggest the use of some bituminous or even oleaginous substance, which might go into the joints of the mosaic, and so seal up, as it were, the backing. The tesseræ we know to be impervious to moisture. If the joints can be made equally safe, not only will the mosaic be safe, but the wall it covers will also be protected from damp, and the general stability of the structure will run less risk of becoming deteriorated. Time unfortunately, or rather the want of it, will not permit me to express a great deal of the pleasure I feel in looking at this beautiful mosaic by Dr. Salviati, after the design of Mr. Gambier Parry. It is the most harmonious of any specimen I have seen produced in this country as yet, and furnishes another evidence of the assurance we feel of that gentleman's great talent and refined taste. If it is competent for me to do so at the present stage of the discussion, I shall have great pleasure in moving a cordial vote of thanks to Mr. Layard for his very able paper, and with your permission beg now to do so.

Mr. G. E. STREET, Fellow, said, I rise to do that which I am sure all present in this room would willingly do, that is, to second the vote of thanks to Mr. Layard. I sympathize with almost everything he has said on the subject of mosaic. I do not quite sympathize with his reasoning as to painting on walls. That is a large question in itself, and I think it quite possible that distemper painting, which even now covers our old church walls in hundreds of cases, may give good results still. With regard to the remark of Mr. Digby Wyatt, that the buildings in the middle ages were conspicuous for the large space of white walls, and also as to the general inapplicability of coloured decoration to buildings in our old English style, I may remark, that not only do old examples refute the statement, but the observations made by Mr. Layard with reference to the admirable effect of the decorations applied to the Wolsey Chapel do the same also. I agree with Mr. Layard that, as far as it is possible for an architect to do so, it would be well for him to know from the beginning when his walls are to be covered with mosaic, and to make all his designs with that view. But this is rarely possible. In St. Mark's we see the results not only of the architect's own work, but of the labours of a succession of artists, working for centuries in the same church; and no doubt a building may be rendered at least as interesting from having the work of different minds devoted to it, as if it is entirely the work of one mind. As to the manufacture of mosaic, as far as I have been able to see it, the work which Dr. Salviati has accomplished is better than any I have seen in England. The only thing I doubt in the examples of his work which are exhibited to-night is, whether the cubes of gold are not larger than those used in similar cases in old mosaics. Some years ago I had the bad luck, or good luck, to be at Torcello at the time they were restoring the church, when a quantity of mosaic was ruthlessly knocked off the walls by the scaffolding. They were wheeling it away among the rubbish, and throwing it into the canal close by, and I saved as much of it as I was able to collect. The other day, looking at it, I found there was not a cube of the whole (which came from the upper part of the walls) more than three-eighths of an inch square. They were irregular, varying from one-fourth to three-eighths of an inch, but none were of larger size than that,

and the cement joints were excessively wide. In making a design for figures, one would do well to remember what Mr. Layard has said upon that subject. What is wanted is excessively clear, decided drawing, as little gradation of tints as possible, and strong lines, rather than the shading and the gradation of tints which we see a tendency to in the specimens exhibited here. So also with the example of mosaic work designed by Mr. Gambier Parry. I do not know what the effect is opposite the picture, but looked at from where I am standing, one hardly realizes that it is mosaic, it is so smooth and gradated in colour, that it has not the peculiar brilliancy of mosaic. In ancient work one sees that the glass cubes are fixed rather roughly to the wall, and set at so many angles that there is much more variety of effect than there can be where the work is very smooth and even on the face. Before I sit down, I may refer to another use of mosaic work which Mr. Layard has mentioned, and which I am very anxious to see extensively adopted. That is, filling in with mosaic behind carving, or as the backgrounds of bas-reliefs. This mode of decoration was adopted in the north-west door of St. Mark's at Venice, and it is hardly possible to exaggerate its beautiful effect. It is, moreover, much more possible to introduce mosaic in this way than in large quantities. For myself, indeed, though I hope to live to see a great deal of mosaic about my buildings in course of time, I am at the same time bound to confess, that all I have been able to do hitherto has been to introduce it in small fragments, and not over the whole interior of a building. But I have always thought I did a good work in introducing it where I could do so, even on this small scale.

Mr. G. AITCHISON, Fellow, said:—I have to thank Mr. Layard, personally, for his interesting paper to-night, and for the subject he has brought forward. It is one in which I have taken a great deal of interest, and on which I have had an opportunity of making a good many observations. It is greatly to be desired that we should have in this country, and particularly in London, some specimen of a building completely decorated with mosaic, and I think it is not beyond our expectation that, in a short time, we may have some portions of the large public buildings, which are now in the hands of distinguished architects, decorated with mosaic in a perfect and complete manner; and in that way present to the public of England a perfect specimen of the most beautiful kind of coloured decoration: and I think it is of the greatest importance that this coloured decoration should be of what has been called Oriental character, viz., on a gold ground. I cannot agree with Mr. Wyatt on the definition of high and low tones. I should call the white and light colours high and the gold ground low-toned; and the low-toned ground will afford the most satisfactory decoration. In the instances abroad, and especially in those at St. Mark's, the effect of the gold ground is not to produce a glittering surface, but almost that of a neutral, greyish green. I have not examined the mosaics high up at St. Mark's; but in many of the churches in Italy I have had that opportunity, and I have found that where the apse, or rather the semi-dome of the apse, has been decorated with mosaic, the effect of the original work was very superior to that which had been restored. This was a source of great astonishment to me, for I could not, from below, make out what was the reason for it. The modern mosaic in the semi-dome had more the appearance of a beaten brazen or copper vessel, whereas the others had not the same unpleasant glitter. Going up to examine this, I found that when the mosaic was executed at a distance from the ground, in ancient work, the mosaic was put in in long slips, lengthwise, one end in the white mortar, and the other left detached, so that there was a space left round each tessera, and this took off the glitter. In the cathedral of Pisa one of the domes of the apse had been recently restored, and the tesseræ were apparently put on as these are, with the whole of the mortar joints flush with the finished surface, and the tesseræ were larger, so that there was constantly a large piece of glittering gold, that gave rather a coarseness to the dome. In the use of mosaic nearer the eye, the ancient workers used the tesseræ in very small

pieces, though roughly cut, some of them apparently merely broken off with a hammer, and the plaster was in many cases of a pink tint, but flush with the tesseræ, so that on the whole there was not more than two-thirds of the subjects covered with mosaic, the remaining one-third consisting of this opaque greyish plaster; but in modern work the pieces were more accurately cut, and the contiguity of the pieces was greater, and the effect greatly worse. I have very little more to say on the subject, except that I think, at the present moment, we have a *large number of distinguished artists*, many of whom would be extremely glad to give a great deal of time, almost gratuitously, to the designing of figure pictures for our large public buildings. I could mention several who, I believe, would readily devote time to such a subject, and who would do it as a work of love, rather than of remuneration. It would be invidious to mention names; but I am certain there are many who would only be too happy to assist architects with their suggestions, and even perhaps with their designs. There is one point about full-coloured decoration, viz., on gold or dark blue ground, which I would mention; white in them is as gold to ordinary grounds—the valuable colour. With full colour in large masses, it is the white which tells. The gold ground is a neutral colour. As in stained glass, so in mosaic. The white is to be used with the most sparing hand. As to the effect of a building wholly covered with mosaic and lit with stained glass, I do not know what the effect might be; but, judging from the effect of stained glass in the St. Chapelle at Paris, I should say it was not quite happy. To make mosaic effective, it is necessary that the parts of the walls below it should be done in coloured marble, or of some material of a rich, and at the same time of a low, tone; and if the quality of colour reflected from the wall was that of a rough material, I think it would damage the effect of the mosaic. We cannot help seeing in St. Mark's that most of the tints are very beautiful, some arising from partially decayed, and some from polished marble,—we may say precious stones. With regard to the suggestion of Mr. Digby Wyatt of using oil, or some bituminous substance, for filling up the joints and rendering them impervious to moisture, I may state that in some of the old work, that has been done. When I was at Cairo, I went to one of the old mosques in the neighbourhood, and I was asked by the man in attendance whether I would have a piece of the mosaic cut down to take away with me. This I declined, when he told me I might as well have it, as there were some Frenchmen who had got permission from the Pasha, and had taken pieces away to convert into a chimney-piece. As there were some pieces cut out, I examined the backing, and I found on the walls there was a thin coating of asphalte, on which the mosaic was put. This mosaic was of the most costly description, all the white being made of mother-of-pearl. I do not know whether mosaic would be effective for outside work if formed into a perfectly flat slab, but there can be no doubt as to the good effect of gold mosaic as a ground to relieve sculpture; for, as Mr. Street says, some of the most exquisite pieces of work I have seen are the vine-leaf bosses, with a gold mosaic ground, over the doors of St. Mark's. I think it might to be used almost generally in this country for such purposes, for the cost of it can hardly be very great. I know that glass covered with gold, and that again covered with glass, was used by the Romans in classic times; fragments of etched portrait medallions I have seen, but I was not aware that gold mosaic was used by them for roof decorations, and that the aurea laquearia, and aurea tecta, might be translated as ceilings of gold mosaic. The only other remark I have to make is as to the size of the tesseræ. I have seen them used of larger sizes than those Mr. Street mentions, where the effect has not been bad; but those I have measured have generally not exceeded one quarter or three-eighths of an inch. The largest I have seen are those used for the decoration of clothes and the nimbus, where they are an inch or two in diameter, generally convex, and put in solely as plaques.

Mr. DIGBY WYATT (in explanation) said—I regret I have been misunderstood by Mr. Aitchison.

The low tone I spoke of had reference to that class of colours which, brilliant in themselves, are lowered by the addition of a considerable quantity of black. You may use the most brilliant colours, and using them boldly in small, equally-balanced quantities, you may get great tranquillity of effect, and hence what may appear to be a low general tone; but colours, into the composition of each of which black enters largely are, strictly speaking, "low-toned colours," and should be distinguished from low-toned effects of colour, which may be produced, as I have said, by using brilliant colours only in a particular way, and as, in fact, the Persians usually did. The great distinction is, that with low-toned colours it is almost impossible to get brilliant effects of colour, while, by using brilliant colours, you may make your effects of colour brilliant or low-toned at will, if only you know how to do it. Mr. Layard has spoken of the extensive repairs which have been undertaken in S. Mark's, and the assurance we may feel in the restorations being properly carried out. If he has anything to do with the matter, of that we may rest assured; but after all we cannot forget that they have been already a good deal "pulled about" by old restorers. In Vasari's pages an account is given of the part which was taken by Titian, both in making new and restoring old pictures. He alludes to Titian as having been the presiding spirit in procuring good wages for the skilled workmen in mosaic, in making proper cartoons, and in superintending the restoration of almost the whole of the mosaics. He says the repairs extended over a large surface; and on a careful examination of the vaults, the student will, I think, be struck by a certain apparent modernness in some features of the pictures—such, for instance, as a hand too carefully drawn to correspond with the other part of the work, strongly corroborative of Vasari's account of the wholesale character of the ancient restoration. I myself remember shrewdly suspecting that somebody or other had been playing tricks with certain portions of the mosaics in S. Mark's; for I frequently noticed, in the same picture, anomalies for which the only explanation could be some such tampering with antiquity described by Vasari. With reference to the bad effect of too smooth a surface of gold on a large scale, we remember what a capital illustration of that is afforded in the Hof Capelle of Munich, and also in the basilica of S. Boniface in the same city, where leaf gold has been laid on in large sheets, from which the spectator gets all the effects of a burnished shield. On the other hand, by the old process of drawing on a flat plastered surface, from which only just enough at a time was cut to receive a single piece of mosaic, and, after the fixing of which, another small piece of plaster was cut away to put in another piece of mosaic, it is obviously impossible to bring pieces of glass so separately inserted into an absolutely true plane. In a large space of vaulting or wall, then, so covered, you have mosaics separately laid at thousands of angles, differing, some widely, others microscopically, but all reflecting light at different degrees. This it was, and happily still is, which gave and gives such endless sparkle and semi-transparency of tint to the best old mosaics, and entirely did away with that copper cauldron-like effect in much modern gold groundwork to which Mr. Aitchison has alluded.

Professor T. HAYTER LEWIS, Fellow, said—At this late period of the evening I will only very briefly advert to one or two points concerning Mr. Layard's excellent paper. During the time I was sketching at S. Mark's, the mosaics were being repaired, the old tesseræ were thrown into the street, and I collected all that I could, and put them into this frame (referring to specimens exhibited), together with some of those with which the work was being repaired, in order to compare the ancient with the modern. Certainly the size of the old tessera in this particular case was generally much smaller than those used in the restoration. To show the enormous improvement we owe to Dr. Salviati, you have only to look at the latter specimens and those with which the ancient mosaics were restored. They are fully an inch square, and of a greenish tint, contrasting most unfavourably with the deep rich yellow hue of the old, the largest of which are not more than half an inch square.

Dr. Salviati has also, I understand, succeeded in reproducing the silver mosaics—a most difficult process. We must not, I think, forget our debt of gratitude to Mr. Powell for the great exertions he has used in reproducing, and with very great success, the manufacture of glass tesseræ. In respect of the art character of mosaics, I think we must all agree that it is necessary to have a broad style of drawing—that even a shadow put in is often almost too much—that instead of shadows you want lines to produce clear, distinct effects at a distance. In the very best of the sixteenth-century mosaics of S. Mark's, one feels the want of that; and even the mosaics of Titian, however beautiful in design, have not the fine general effect which the simple outlines of the earlier produce. The figures not being separated as the older are by the deep gold background, the large masses of colour and shadow produce a very heavy effect. I have no doubt whatever that the treatment by the ancient artists from the fifth to the thirteenth century was the only one which we should adopt in our modern works. I have been asked to bring with me this evening a selection from my sketches of St. Mark's. That of the ceiling of the sacristy is, so far as I can remember, the only specimen of cinque-cento work which will bear comparison in point of design with the ancient. It is a very large arched ceiling, with half length figures arranged in circular panels. The main part is composed of solid gold tesseræ. The outlines of the circular panels are marked out with strongly coloured borders, and the spandrils are filled with very beautiful pieces of ornament; the same broad effect is thus produced which we see in the very early works. I beg cordially to endorse the vote of thanks to Mr. Layard for his paper.

Mr. JOHN P. SEDDON (Hon. Sec.) said—We have had some definite and useful information as to the size of the tesseræ used in those mosaics, and I should like to ask for some equally definite information with regard to the joints. We have been told by Mr. Aitchison, that they were in the old work irregular. I believe that is the fact. It is a long time since I was in Venice, and I cannot speak as to these details. I should like, therefore, to be told the size of the joints, as compared with the mosaic. With regard to the colour, it seems to be far more regular in modern than in ancient work. When we see the gold tesseræ put in so close together, and almost of the same character throughout, one almost wonders that it should have been broken up into bits at all. The same error pervades our modern imitation of the thirteenth century stained glass, and is one cause of its comparative inferiority.

Mr. LAYARD—Mr. Digby Wyatt has stated that the ancients used gold mosaic. I know they used it, but I was not aware that in classic times they were acquainted with the art of enclosing gold-leaf between layers of glass. The Byzantine gold mosaic consisted of gold-leaf pressed on glass, and then covered by a film of glass which was placed over it in a liquid state of heat. The process requires very delicate manipulation, and my impression was, that it was a comparatively modern invention, and not known in classic times. As regards the question of the colour of the gold in modern mosaic, I have stated that it depends a great deal upon the taste of the architect, or of the designer of the cartoon. You may have gold at any tint you like by varying the colour of the glass on which the gold is placed, or by tinting the upper film of glass. It is for the designer of the cartoon, or the architect to determine the colour of the gold to be used for the ground. I agree with the observations which have been made, as to the monotony which is apt to prevail when large masses of one colour are introduced into a mosaic. A skilful worker in mosaics will mingle tesseræ of different tints, both in gold ground, and in masses of colour, so as to prevent this monotony of tone. With regard to the size of the tesseræ in the mosaic, they vary very much it St. Mark's. Some are very small, especially in the mosaic over the north-west exterior entrance. In the chapel of the Mascoli, they are larger. In some parts of the church, they are as large as those which I have exhibited; but I may state that I never saw tesseræ used of the size of those in Professor Lewis's frame, and certainly Dr. Salviati's restorations are not made with tesseræ of that magnitude. I may further mention, that Dr. Salviati has only

commenced restoring the mosaics of St. Mark's within the last six months; before that time, the restoration was undertaken by another hand. The tesseræ used in S. Sophia, appears to have been of a medium size, as will appear by the specimens which I have here, and which were collected by me when the church was restored. In Dr. Salviati's mosaics, tesseræ of different sizes are frequently used, as in the mosaic executed from Mr. Gambier Parry's cartoon, in which a finer kind of mosaic is used for the head, with coarser and larger tesseræ for the drapery. All these matters may be left to the taste of the designer of the cartoon; the artist may point out the size of the tesseræ he requires. A good deal, moreover, depends upon the height at which the mosaic is to be placed, and the effect which it is required to produce. With regard to shewing the cement between the tesseræ, it is not easy to persuade people in this country, that when you see the cement the work is not coarse and ill-executed. Some of Dr. Salviati's work has, I believe, been found fault with because the cement appeared, and it was even suspected that this had been purposely done to economise the tesseræ. Yet there is no doubt that an excellent effect may be produced, especially in mosaics placed at some distance from the eye, by not placing the tesseræ too near each other, and by filling up the interstices between them with cement. I hope when the art becomes better known in England, we shall arrive at some definite results on all these points, which are, after all, of secondary importance, and easily settled. I am afraid from what I hear from Dr. Percy, that we have little hope in regard to wall-painting in London. He has recently, he informs me, made another report upon this subject, in which he declares it to be his opinion, that the coal smoke of London is fatal to all paintings, whether executed in fresco, tempera or water-glass, on wall surfaces. Of course he does not include in this opinion wall-paintings not exposed to smoke, as in country churches. I may remark that in the oldest mosaics of St. Mark's, there are no true reds and purples, those colours being the most difficult to produce.

Mr. DIGBY WYATT.—Mr. Cole presented me with some tesseræ which he collected, and they exhibit the same characteristic, the gold being always applied on white glass. The ancient Roman tesseræ have the gold on white glass.

Mr. LAYARD.—The effect of dark colour on the gold noticed by Mr. Aitchison I have no doubt arises from a greenish film, the result of age. The mosaics of the fifth century at Ravenna, from which this film has been removed, are as bright now as when they were first put up.

Mr. JAMES FERGUSSON, Fellow, said, I have no personal knowledge of the subject, never having paid any special attention to it, and I am not, therefore, qualified to offer any opinion regarding it which would be worthy of the attention of the Institute; but I most fully agree in what has fallen from the various speakers to-night, with regard to this material affording one of the best opportunities for employing colour in building. With regard to the red enamels, there are in the domes of some of the churches of Constantinople some mosaics dating before the conquest of the city by the Turks, in which the reds are beyond all the other colours in brilliancy. Those of St. Sophia have no reds, or very dull reds; but in the other churches they are all very brilliant. I was not aware it was so rare a thing in that age. I thought those were most brilliant, and I hope Mr. Cole will get copies of them. In the far east, to which my attention has been especially directed, there are, I believe, no glass mosaics of any kind, and I have consequently no knowledge which will justify my speaking on the subject generally. I rejoice that Mr. Layard has brought it before us, and I hope the thing will go further, because I feel that it is the most capable material I know of for coloured decoration.

Mr. G. GILBERT SCOTT (having taken the Chair in the absence of Mr. C. BARRY).—If no gentleman has any other remarks to offer, I will proceed to the grateful task of begging you to express your vote of thanks by acclamation to Mr. Layard. There can, I am sure, be but one opinion here as to the importance of the subject which he has treated, and as to the ability and knowledge

he has brought to bear in what he has laid before us. It is a great pleasure to all that the discussion of it has been so able and interesting. It is most unfortunately the case, so far as my own experience goes, and I believe that of most others, that our modern decorators have not succeeded as we might have expected them to do, in making their work durable. I cannot see why it should be so, except perhaps in London. There one can understand it: but why we should not be able to paint on walls with the same durability as our predecessors did 600 years ago, who gave us paintings which have lasted to the present day in more or less perfection, and which, though whitewashed over, did not receive much harm, and up to the time of the whitewashing experienced no great deterioration, I cannot see. Why cannot our decorators do the same now? They always tell us that they must use oil and turpentine as their vehicle for painting. Our predecessors rarely did so. They tell us, if we paint in distemper it will perish. The old painters painted in size 600 years ago and their pictures have not perished. When we paint in oil and turpentine it fails, from the obvious cause that there is damp in the wall behind, and the oil prevents it drying on the surface. Such is not the case with distemper, and did not operate so, and yet we find that fails also. The fact, however, remaining that we have not succeeded hitherto in our efforts in this direction, it becomes, I think, of the highest importance to find out another material, though, it may be, not largely used in ancient buildings in those northern countries. That our mediæval forefathers did not object, but on the contrary, to mosaic is proved by an instance within a mile of this place. In Westminster Abbey there are, as we all know, considerable remains of ancient Italian mosaic which have stood uninjured to the present day, except where the hands of pickers and stealers have removed it from its place. They used it, just as was done in Italy in similar works, for filling in the spaces, the small spaces in recessed work, shewing up the edges of the marble to form the outline of their patterns. We have lately found that they used it somewhat in different positions, for filling the sunk spaces in monumental slabs on the floor. I do not know whether we have many other specimens in the north of Europe, but I remember one, though I am uncertain whether it is of terra-cotta or of enamel mosaic, in the front of a chapel projecting from the south transept of the Cathedral of Prague, in which a considerable surface in the spandrils is mosaic (a proof, by the way, of its durability when used externally). These are sufficient proofs that the material was valued and thought suitable for buildings by our northern forefathers, at the same time that similar works were going on in Italy. That the work in Westminster Abbey was done on the spot we have two pretty conclusive proofs,—first, that the marble is Purbeck marble, and secondly, in taking up the pavement around the altar we found in the concrete, on which it was laid, numbers of pieces of the glass mosaic,—the *débris* of the mosaic workers thrown into the concrete. Mr. Layard has mentioned two places where I have myself made use of mosaic in England. I hope they will be successful. For the artistic carrying out of my views I have mainly to thank my talented friend Mr. Clayton, who, considering he was doing almost the first work on a large scale in England, has shown great skill in dealing with it. The chapel at Windsor will have no portion of ordinary stone visible. Such as remains after filling in mosaic or marble work will be painted. How far that marble can be made to harmonise with the mosaic I cannot say, but I do not see why it should not, because in St. Mark's we see very large surfaces of marble. I think, perhaps, Baron Triqueti's mode of dealing with the subjects is somewhat too elaborate. I think we ought to keep to the strong, firm and simple line, such as we see in the case of brasses, the shading being expressed by single, though stronger lines, rather than by means resembling engravings: but these subjects are very new and tentative among us, and we must not be hard upon partial failures of a minor class. It has sometimes occurred to me that the free use of gold on incised lines might tend to harmonize this work with the glass mosaic, especially in the foliated inlayings in the framework to the pictures, which is in a character very different from what I had myself intended, and shewn by drawings.

With regard to the instance in which I have used glass mosaic for external work, it may have been somewhat venturesome on my part to do so. I think, however, that it will answer. I intended at first to use some of our own hard cements, but Dr. Salviati objected, and he has made use of his usual cement, which is a fine kind of lime, brought from Italy in the form of putty ready made. He mixes this with marble dust, and I think a little pounded tile. There is every appearance of toughness about it. It is not so hard as many of our artificial cements, but it has a great amount of toughness. As to protecting the surface of the joints, I am undetermined at present whether to harden the joints with silicates, or to make use of some oleaginous application. I think common boiled oil is likely to afford a good protection, and I have almost made up my mind to treat the whole with boiled oil in a hot state, carefully wiping it off the surface of the glass; and I hope this will be sufficient to protect the joints both from rain and the damp of the atmosphere. [Mr. DIGBY WYATT.—Taking great care that the plaster is quite dry before it is done.] It is now nearly dry, and will be protected by a covering during the winter. As far as it has gone, I may say there is every appearance of great firmness.

The vote of thanks having been passed by acclamation,

Mr. LAYARD again rose, and said, I am much obliged to you, gentlemen, for the indulgence with which you have listened to this paper. I consider it was boldness on the part of an amateur to read a paper before a professional body better acquainted with the subject than I am. With regard to the Wolsey Chapel at Windsor, I guardedly said the general effect was most harmonious and beautiful; with respect to the details, no doubt there is plenty to criticise, and plenty of people to do it. But when I see a grand work which produces an impression satisfactory to me, I confess my feeling is to judge it as a whole, rather than to criticise the parts. I have no doubt the known good taste of the Chairman will do that which is necessary to put the work in harmony even in the most minute details.

The meeting then adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting held on Monday, Dec. 14th, 1868, J. CLARKE, F.S.A., Vice-President, in the Chair, the following Paper was read:

NOTES ON THE CELTIC, ROMAN, MOORISH, AND OTHER REMAINS IN ALGERIA.

By Professor T. HAYTER LEWIS, F.S.A., Fellow.

AT the request of your Hon. Secretary, Mr. Seddon, I have put together a few notes, made during a recent and (for various reasons) a hurried visit to Algeria. The time which I could afford allowed me to make but few sketches, and these, in order to be seen during the Lecture, have been enlarged by gentlemen well known in this room—Mr. J. Tavenor Perry, the Messrs. Henman, and Mr. Hanson. But the most careful enlargement, even by the original draughtsman, necessarily involves some play of the imagination, and I have therefore thought it better to produce also my original sketches. They were made, I need scarcely say, without any regard to artistic effect, and have only one merit, viz., that of being, I believe, tolerably faithful studies of the objects represented.

The country which I have to describe comprises the town of Algiers, and the districts round it, most of which are shown on the map. It will save time if I shortly describe them now.

The town of Algiers lies on part of a chain of lofty hills, called the Sahel, or the Boujareah, which rise immediately from the sea, and attain near Algiers to a height of upwards 1300 feet. This range stretches for a considerable distance along the coast, and on the margin of one of the deep ravines which cuts through it some nine miles westward from Algiers, and near the French village of Guyotsville, we encounter the Celtic remains of which I shall have to speak; a little beyond is Sidi Feruch, where the French landed. Beyond here is the village of Bou Ismail, where are the remains of an early Christian church. Near Kolea, a great deal further west, high up on a peak of the same range of the Sahel, we come to the famous Kbour er Roumia, or Tomb of the Christian Lady, of the details of which I shew you drawings—the first, I believe, ever made. Some fourteen miles further still, and low down on the coast, close by the sea, is Tipasa, where the remains of Roman works are very numerous; and still further west, a lofty spur of the Lesser Atlas Mountains divides Tipasa from Cherehel, the ancient Cæsarea, full also of ancient work.

South of the Sahel range lies the long, wide, level plain of the Metidja; some forty to fifty miles long, and varying in width up to fourteen or fifteen miles. It is abundantly fertile, and in most parts well watered, but its colonists have two terrible enemies unknown to ours—fever and earthquake. This plain is bounded on the south by the range of the Lesser Atlas mountains, up to which a railway has been carried by Sir Morton Peto. The end station of this line is the town of Blida (thirty miles from Algiers), celebrated for its lovely groves of orange and lemon-trees; and not long since a characteristically Moorish town. But the late terrible earthquakes destroyed it, as they did most other towns near the Lesser Atlas, and it is now a modern French city. It is for this reason that I shall have to speak but little of the cities of the plain of the Metidja.

To the south of Blida is the celebrated pass of the Chiffa through the Atlas mountains, and thence

there runs a modern road, admirably made and kept up by the French, for 250 miles further, right down to Lar 'Ouat, on the borders of the desert. A long way to the east, in the province of Constantine, is the celebrated tomb (of which I give you some drawings) known as the Medracen, near Batna, and some distance beyond my map to the west, are the three other edifices—also, no doubt, tombs—known as the Djedar.

Algiers itself is best known as a nest of pirates; but years ago Northern Africa was occupied by nobler races. Large fragments of their works remain, and as it is interesting to trace the architecture of the different nations, as wave after wave came and passed away, a slight sketch of its history may be excused, as an introduction to the study of its architecture. The descendants of its earliest inhabitants are supposed to form still a very large portion of its population, and are well known under the name of Kabyles—in early history as Berbers—a nation supposed to have been originally a branch of one of the Semitic nations of Asia. Their language is said to be one quite to itself, containing no Phœnician, Roman, Vandal, or other words of foreign nations, except the Arabs. The modern Kabyles are a fine hardy race, superior to the Arabs in most of the qualities of good citizens. They are hard-working, saving, and temperate, and I can sum up the whole of their qualities by mentioning one simple fact, viz., that the English contractors who made the only railway in Algeria found that the Kabyles earned well their three francs a day; lived on very much less, and carefully saved the rest.

I shall have nothing positive to say as to their architecture, but I venture to call your attention to some few specimens of an art still practised amongst them, and many of which are of singular beauty. They are very peculiar, being worked chiefly on a base of white metal, on which a pattern is raised by thin lines of the same metal, precisely in the manner of Cloisonné enamel, but in such a manner as to shew clearly that it was not intended to fill most of it up. Some portions of it were, however, filled with delicate enamel or corals, chiefly of green and red; and this slight ornamentation was arranged with such skill as to produce an extremely rich yet delicate effect. Specimens of this work were exhibited in the collection of the Algerian Department in the Paris Exhibition of 1866, the best of which have been retained in the present Government Museum at Algiers. Both the forms and colours shew a very high appreciation of art, and it is a curious question as to whence this was derived. A wild mountain tribe such as that of the Kabyles is not likely to have learned it in later times, even were the teachers of it present; and we must suppose that it shews to us the remains of what once was a grand art school, now preserving in its decay simply a traditional record of what it once was. Very much, in fact, as the mosaics and enamels of India tell of the glories of which they dimly only reflect the light. I have one thing more only to mention of these earliest inhabitants of Algiers, viz., their pottery. It is rude in shape and primitive in colour, but offers no mean examples of the potter's art, and no bad specimens of colour (specimen). It is singular that some of the Kabyle pottery was found at the opening of the Kbour, which had been closed since the seventh century; so this kind of pottery is of that early date at least.

Next to the Berbers came the Carthaginians, that grand and mysterious race of Tyre and Sidon, whose works have yet to be disinterred and known, and whose colonists of Carthage met the Romans on equal terms. At some remote date a band of this Phœnician people landed in northern Africa. To those who like precise dates I beg to offer that of B.C. 860 (I am sorry that I cannot give the week and the day), their leader Dido, and the locality, Tunis. But be that as it may, it is pretty certain that, at a very remote period, whilst Nineveh was a flourishing city, and the great Babylon of Nebuchadnezzar unbuilt, the Phœnicians had colonized a large portion of the northern coast of Africa. Some two centuries after (675) came the Greeks. They founded the well-known city of Cyrene, and many another on the coast. But their colonies were far off from the province which I have to describe, and I need not further notice their presence.

Then came the Romans, and with them authentic history. In B.C. 202 they defeated the Carthaginians at the famous battle of Zama, and in B.C. 145 Scipio captured and destroyed their capital. But it was not until long after that they took complete possession of the country, whose native kings were still allowed to reign under the protection of the Romans. The well-known Massanissa ruled in eastern Algeria, and had as his capital Cirta, known as Constantine (since A.D. 313). His kingdom was, in the later Roman times, known as Numidia. He died in B.C. 148, and his successor, Micipsa, embellished Cirta still further with grand architectural works, and it is clearly recorded that for this purpose he called in the aid of Greeks: but whether this meant Greeks of Greece proper, or of Alexandria, I am not quite clear. He died in B.C. 118. Under Augustus (B.C. 25) the western kingdom was held by Juba II., who founded a new capital at Cesarea, which he embellished in the most lavish manner. His death took place in A.D. 19. In A.D. 43 the kingdom became a province of Rome, under the name of Mauritania Cesarea. The province of which Cirta was the capital, retained its name of Numidia. The site of Algiers was then occupied by the small city of Icosium, whose name has, almost by accident, been preserved to us by a few inscriptions.

In 428 came the Vandals under Genseric. Their name and his are so synonymous with all that is destructive, and have been so well borne out by the reality, that I should scarce have mentioned them, had not the Vandal conquest led to the coming of one of the great regenerative nations of mediæval times—the Byzantines. In 533, Justinian's famous general, Belisarius, landed in Africa, and destroyed the power of the Vandals. Their work was done, and they henceforth and for ever disappear. But with their conquerors it was different. Wherever the Byzantine has come his mark has been left; and all over the province something for ever crops up to shew that this half Greek, half Persian, had been there. But their era is to be noted in another way; for from the time of their war with the Vandals is to be dated that era of ruin and desolation, from which northern Africa has never risen. It was reckoned at the time that, in the few dreadful years of the Vandal wars, 3,000,000 of people perished, and large tracts of country, before luxuriant and fertile, lapsed into the desolate masses of thorny bushwood which every traveller in the province recognizes too well. We may well believe this sad story, in remembering that even in a small part only of a country so depopulated, the terrible famine of last year slew, at the lowest estimate, I believe, 300,000 souls. The Byzantine power was shortlived, for, little more than 100 years after their conquest, there came that utterly mysterious event, in whose presence we can but humbly bow and submit, the religion and conquests of Mahomet.

In A.D. 642 the Saracens invaded northern Africa. In thirty years more they had overrun and conquered the whole, and then for nearly 1200 years it was, and has still remained, in the main, Mohammedan, as has been nearly in every other country out of Europe which the Mohammedans ever conquered. But Africa was not, until long after the conquest, all Arab, and it was not until 1050 that the conquerors summoned their countrymen from the deserts of Arabia to people those of Algiers. With them there came, of course, another style of architecture, which has lasted well-nigh to our own day. But it was seriously modified at various times, chiefly under the Turks, who had entire possession of the government from the sixteenth century.

In 1830 the French landed at Sidi-Feruch, and destroyed the government of the Algerine Beys. In 1837 they stormed Constantine, and from that time Algeria has been a half-civilized province of France.

Of the various works of all these different peoples, I take first those usually termed Celtic or Druidic (for want of a better name), and not from any decided opinion as to their having been the first in order of time, but because they are the rudest, and know no tradition, bear no mark, molding, or detail of any kind, which may tell us of their authors, or kindred, or date. Of these works vast numbers exist in Algeria, and many of a most curious kind. Of the rudest class, I take those found in abundance near Algiers, on the margins of a deep ravine of the Sahel, near the modern French village

of Guyotsville. Only a few years since they were reckoned by hundreds; but, as in England, so in Algiers, these old monuments were little prized by the men who have just preceded us, and most have been turned into cottages, fences, or walls. But the French government has now awakened to the calls of its *savans*. The old Celtic graves have been declared to be national monuments, and further destruction is, I hope, stayed. Those at Gauyotsville are simple cromlechs, similar to that of Kit Coity House, near Maidstone for instance, and hundreds of others found in nearly every country of the old world. They are formed of large, rude, unworked stones, set up edgeways, so as to make a small chamber, which is covered with one or more large flat stones at top. The sketches shew this better than any explanation could do. That these are sepulchres there can be no doubt, as bones have invariably been found in any newly opened; and it is clear also that these sepulchres were not the results of any one great battle (as has been sometimes surmised), because the skeletons are those of persons of all sexes and all ages. The most common articles found have been flint implements; and I could neither see nor hear of any trace of a tumulus over any one of the cromlechs. There is no mark of a tool on any of the stones which I could see. It has been suggested that they might be the burial-places of an Armorican legion (from Brittany) which is known to have been located in north Africa. But, beyond the fact that it was so located at some period, nothing is known. In fact, I know of no case of any mark or inscription of any kind on any Celtic remains, except in one case in Brittany, of which I give you a drawing; and this inscription still remains unread. We have more curious remains of the early races, whatever they were, in the eastern province, at Djebel Karonba, and these seem quite peculiar to the country. All are circular on plan, with an external diameter of about 20 feet. They have thick external walls of good, large, rough, coarse stone work, and are covered with flat stones in oversailing courses. They may be reckoned by the hundred, and they also bear no mark, no molding, nor possess even a tradition to tell of their authors or date.

I now came to a very great advance indeed.

Twelve miles west of Kolea, on the top of a hill in the Sahel range, rising there 850 feet above the sea-shore, is the famous Kbour-er-Roumia, or tomb of the Christian Lady.

The site is now utterly desolate, but occupies one of the most commanding positions possible, and the tomb can be seen for an immense distance along the plain, or from the sea, standing boldly out above the range of the Sahel, as a great conical tumulus.

Up to the time of the present Emperor's visit to Algeria, it was an utterly confused mass of stones, the lower part having been buried by the ruin of the upper. But he provided the requisite funds, and, in 1865, the work was begun. A portion of the lower part has been cleared and exposed, under the direction of Messrs. Berbrugger and MacCarthy. The clearance occupied eight months.

The plan which I give you is copied from one made by them during the excavations, but, curiously enough, no drawings seem to have been made of the details. The monument is 200 feet diameter, placed on a platform 210 feet square, and on this is a circular range of engaged columns, projecting rather more than $\frac{3}{4}$ diameter. They rest on very bold mouldings, which, with their bases, remain pretty perfect. The bases are the well known attic, and above them the shafts are continued for about 16 or 17 ft. high. Thence the exterior of the monument has been destroyed, and no capital or portion of an entablature remains in situ. But at about the height at which we might expect to find the blocking course above the cornice, a series of gradini commences, ending with a level platform 38 ft. diameter. Whether the monument was continued higher or not there is nothing to show; but, even as it is, the height from the base to this level platform is 108·3. The whole of the courses of stones throughout are of nearly the same height, averaging about 1 ft. 8 in., somewhat that of the cubit, and this height is just that of the continued base mouldings, and also of the bases to the columns.

At the four cardinal points are four doorways, the doors being panelled and having bold architrave

mouldings. All these doorways are false, the doors themselves being each formed of one enormous stone about 15 ft. high, 6 ft. broad, and 14 in. thick, backed up by solid masonry. All the upper part of these doorways is broken away.

The shafts diminish as they rise, and, although none of their capitals remain in situ, many are to be found on and about the platforms. They are Ionic, coarsely though boldly worked, and all have the flat level face to the volutes, which is generally found in Greek work, and all have, likewise, a band all round, under the volutes, enriched with roses, very boldly cut.

Generally, too, the line of moulding runs straight through from volute to volute, and then the capital is formed in the very peculiar way shewn. But a few of the capitals have the graceful fall or hem in place of the straight line, and this, combined with the enriched band, forming a necking seldom found in Greek work, reminds one strongly of the beautiful capital of the Erectheum. These capitals are supposed to have been on each side of the four doorways. They have another especially Greek detail in the honeysuckle, or, as the French call it, the Palmette. But a closer view shews that it is the general idea only of the Greek which has been taken.

The carving is coarse and untrue, and the delicacy of the Greek original is still less faithfully rendered, owing to the stone in which the whole work is carved being very coarse, and utterly unfit for cutting out such details as the Greeks used. I offer you a specimen of the stone, which will shew this at once.* The whole mass of the tomb is so immense as to make it almost certain that it must have been built to enshrine some precious corpse. But effort after effort, on a very grand scale, was made before the secret of its structure was discovered. The French first pierced the masonry right down from the top, and failed. The four doors were soon found to be false, and the real entry was discovered, quite by accident, to be directly under the eastern of these doors. In front of this is a level platform of large stones, tied together by stone dove-tailed cramps. In this platform, close to the door, is a flight of steps. which leads to a square recess blocked up by a massive stone. This proved to be a portcullis, and, after being forced, it admitted the searchers into a small chamber, to the right of which was another recess, also closed by a stone portcullis, over which is the carving of the Lions. I had heard of these long before, and remembering my feelings as I had once gazed on the famous lions over the gate at Mycenæ, was prepared for something equally archaic and picturesque. I confess my disappointment at seeing the little things some 12 inches high, and which one is sorely tempted to confound with dogs. But they *are* lions, and of great interest, too, when one has just got over the first feeling of disappointment. The sketches were made with extreme care, as all sketches of sculpture or mouldings ought to be, and supervised by an intelligent companion, so that I may fairly say, that they accurately represent their little originals. The lion to the right is decorated with, I imagine, a double collar, for the lion of the Atlas has no mane. From the doorway under these lions the gallery winds for some distance, following the contour of the exterior, and then suddenly turns towards the centre. Near the latter the way was abruptly ended by a portcullis. This broken, a chamber 13 ft. 1 in. by 5 ft. was found. Beyond it was another stone portcullis, and then the whole ended in a chamber 13 ft. 1 in. by 9 ft. 10 in., exactly in the centre of the monument. When the French entered these chambers, they were empty—no sarcophagus—no skeleton—no trace of sepulture or shrine. No record on the walls of

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* On being analysed by Mr. W. Henman, the stone, red earth and Moorish mortar gave the following results:—

	Stone.	Red Earth.	Moorish Mortar.	
Carbonate of Lime.....	86	8	24	
Sand and Clay	8	90	74	
Soluble Salts and Loss	6	2	2	
	100	100	100	per weight.

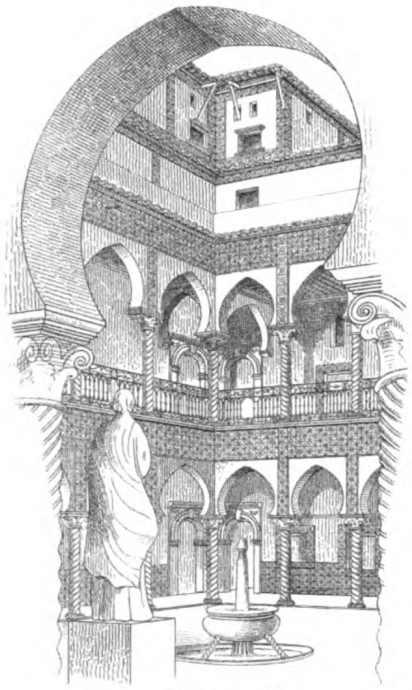
love or of ambition, and, for all that the monument itself enclosed or witnessed, it might have been built for sport or whim—for the soldier's trophy or the seaman's guide. The stones themselves must tell its purpose, for nothing within or without remains else to do it. A few beads of a coral necklace and some trinkets of Egyptian make were all that the most careful search could find. The floor of the galleries and chambers were bored throughout, but nothing appeared beyond the solid rock, so that if there ever had been a sarcophagus, the chambers must have contained it. But the openings broken in the portcullis are barely large enough to admit a man, and no sarcophagus could ever have been removed through them. We must, therefore, suppose that the chambers had contained the ashes only of the dead, easily removed and now scattered to the winds. The chambers and galleries are all arched with great stones, as shewn in my section, put together with tolerably fine joints. The rest of the structure is filled in with squared masonry also, but of a much ruder kind. This is capitally shewn by a cutting which was made towards the interior, by, I believe, the Turks. And this contrast of fine and rough masonry gives a good lesson in construction.

The lining has its fine joints filled in with liquid plaster, which has evidently been poured in after the stones were set. The backing, on the contrary, has been put together with very wide joints, bedded and filled in with a red argillaceous earth (specimen produced), which acts as a good bed to the stones, and is too tenacious to be squeezed out, even by the enormous weight upon them. This weight has caused to the backing a subsidence in which the fine joints of the lining could not participate; and the result is that its fine large stones have been split into countless pieces. I am sure that not more than three out of every four of the lining stones are sound, the rest having been shivered in all directions, and only prevented from falling by the tremendous weight which, whilst it has destroyed, preserves them in place. The external stonework is being destroyed by, I think, the same cause. But the weight is less, and so the destruction is not so great. Nearly every stone is, nevertheless, fractured more or less, and I must call your attention to the somewhat curious fact that nearly every fracture is at the *top* of the stone. My sketch, which was made with great care, shows this I hope clearly. The stones were cramped together, I learn from Mr. Berbrugger, generally with dovetails of wood, or of lead, or of wood covered with lead. The natives considered these dovetails to be specially provided for their use as bullets, and none were left for me to see. But in the platform several of the slabs are still very securely joined by dovetailed cramps of stone, one of which I have figured.

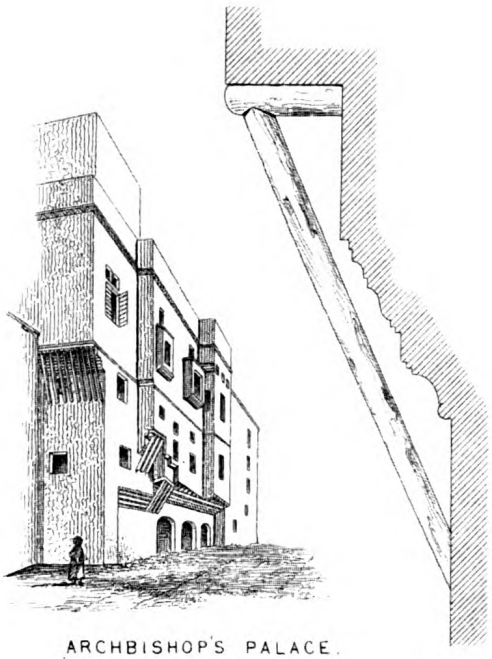
Now as to the date of this very grand work. The whole of the details give one the idea of their having been copied by Roman artists from Greek originals, and this is I think the opinion of Mr. Berbrugger, who assigns the structure to Juba II. (who died A.D. 19) and to his Queen Cleopatra, daughter of the celebrated Egyptian. This king was a tributary king of the Romans, but a Greek in habits and education and feeling.

Of a similar type to this, but of a somewhat smaller size, is the tomb (still it is thought unrifled) in the Eastern province, near Batna, known as the Medracen, a name of which no probable meaning or derivation has as yet been given. (*Vide* drawings.) The general description of the exterior which I gave of the Kbour will apply to this. Like the latter, it is circular in plan, with a range of 60 attached columns and with 24 gradini above. The whole stands on a square basement. But the details are much more curious and difficult to resolve than those of the Kolea monument. The columns (which diminish rapidly) have no bases, and in place of the Ionic capitals have little more than mere rounded blocks, with a square abacus. Much, in fact, as the rudest beginnings of the Norman cushion capital, before it was cut into facets. It has been suggested that these capitals of the Medracen are very rude copies of the Greek Doric. And above these comes a cornice which is little like Greek or Roman, and as much Egyptian in sections as one could find in Egypt itself (*Vide* large model in Museum of Algiers). The whole is in very much better condition than the Kbour, being in fact but very little injured, except in one place, viz. the entrance. Instead of being at the bottom, as at Kolea, this is at the Medracen, on the fourth step above the cornice (*vide*

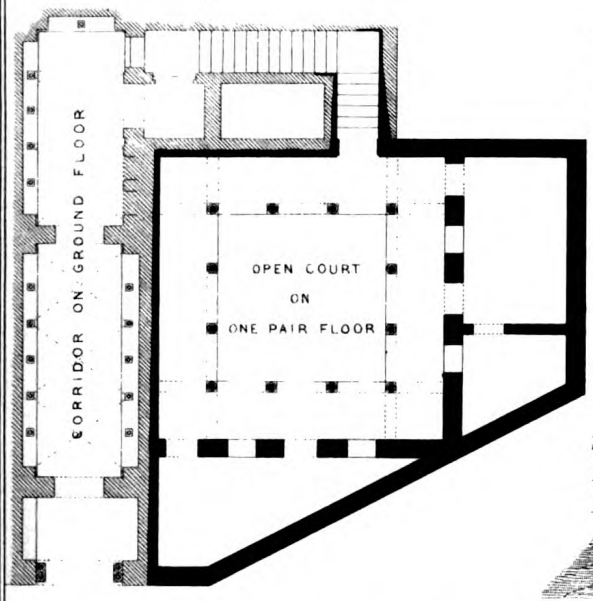
ALGIERS.

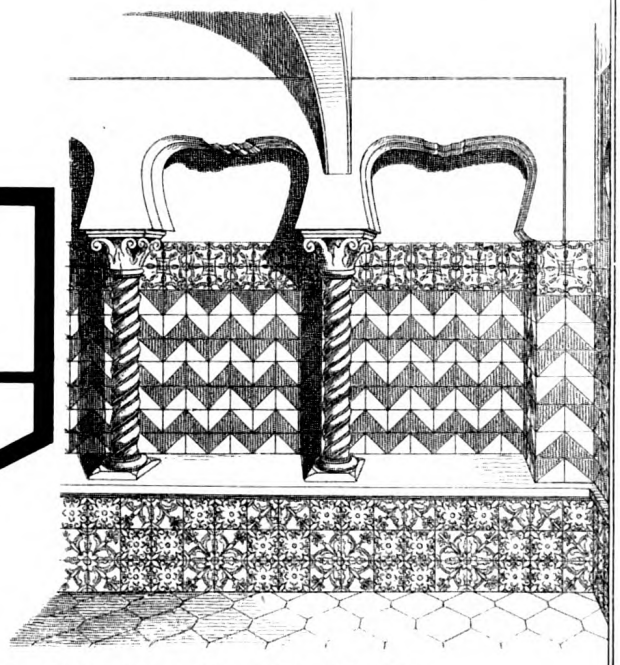


MUSEUM.



ARCHBISHOP'S PALACE.





PLAN AND ARCADING IN CORRIDOR OF A PRIVATE HOUSE.

Lithographed for the R.I.B.A. by Kell Bros Castle St Holborn

drawing). A sliding stone (forming part of the step) gives admission to a narrow staircase, which leads downward, reminding us much of the entry to a pyramid, and very shortly all further progress is stopped, partly by a wall and partly by the *débris* of the part which has fallen in from above. At this place there is no pavement, and it has been surmised that the real entry may be down a pit, much as was usual in Egypt. But this is all conjecture.

The monument is 184 ft. diameter to the projection of the cornice, 16 ft. 5 high to top of cornice, and 60 ft. 6 to top platform from base. The top platform is 39 ft. diameter. Like the Kolea tomb, it stands upon the top of a lofty hill, commanded for a long distance from the plain, and is utterly without inscription, or even tradition, to assign its date, or origin, or purpose. Between the columns, outside, are long ranges of sculpture, too decayed, I am told, to allow of their being assigned to any peculiar style, though their subjects can be well made out. They represent the elephant, hyæna, and other animals, but nothing has as yet been done towards deciphering the meaning of these strange decorations. The Medracen has been assigned by various writers, as may well be imagined, to various purposes and dates. The more probable seem to be that it served as a royal mausoleum for the kings of Numidia, as the Kolea edifice did for those of Mauritania, and the most likely period is that of King Sypha, who was captured and sent to Rome B.C. 203.

Somewhat of the same kind of structure as the above, but of square outline in plan, are the Djedar, a name which signifies a place surrounded by walls, in the south-east of the province of Oran. Their existence was not, I believe, known until 1842. They are three in number, built of large stones, on a square base, with a pyramidal top formed of steps, as in the Madracen and Kbour. The perpendicular part at bottom is 112 ft. square and only 11 ft. high. Above are 12 steps, 11 ft. high in all. All this is of squared large stones. But above the steps is a kind of pyramid, also 11 ft. high, and made of rude stones, as though broken or unfinished. One only of these structures has been opened. The entry was from the south-east, at some distance above the perpendicular part. The entrance thence descends at an inclination of 25 degrees, leading to a gallery which runs round three sides of the building, and has seven branches leading out of it, apparently for burials. The ordinary height of the galleries is only about 3 ft. 4, and they are ceiled with large flat stones. The dates of these works (which I know only from the descriptions of the local antiquaries) are also unknown. The Arab historians state that the Djedar were found, during an expedition, by the Calif El Mausour, who saw, on a stone in front of one of the edifices, the following inscription:—"I am Soliman, the Serdegos (στρατηγος). The inhabitants of this town having revolted, the King sent me against them. God assisted me to conquer them." Some fragments of such an inscription seem to have been found since, so that the story appears to be authentic. Now, Soliman was the Byzantine general who succeeded Belisarius. But the form of the monument resembles nothing that we have of Byzantine work, and all French archæologists, I believe, assign these monuments to a date very much more ancient.

The above are the only remains of Roman or earlier art, which seem to me to be so peculiar to the province as to require special notice. Were I to begin a description of such remains as were common in Roman times, my task would be well nigh endless. At the site of every large town, Roman remains exist to an extent which is scarcely credible. The whole coast, wild and desolate as it now is, seems strewn with their ruins; and, as you pass through the thick brushwood of the dwarf palm, evergreen oak, arbutus and thorn, you see above it, here and there, large masses of squared masonry, which mark the site of some long destroyed villa or village, never rebuilt, it is likely enough, since the time of the Vandals, and inhabited now by the scorpion, the jackal, or hyæna, or the dreaded wild boar.

Between the time of the Roman and Byzantines there is nothing architectural to remark. But amongst the records of this date in the museum are several of great curiosity. One of these gives, as an epitaph, an account of, I suppose, the earliest pilgrimage recorded, (and which must have been a

long one, as the pilgrim, a woman, speaks of having visited all the cities of the whole earth with naked feet). Another gives the earliest inventory, I suppose ever made, of the sacred vessels and vestments of a Christian church, it having been taken during the persecution in the time of Diocletian.*

The Byzantines have, I regret to say, left but few of their great works, although the marks of their connections with Africa are stamped indelibly in much of the work executed in later times.

At Tipasa are said to be the ruins of a large church, now filled up by the huts of an Arab village; but I was, by an unfortunate accident, prevented seeing them, nor could I meet with any description of them. At Bou Ismail I found the lower part of a building, which appears clearly to be the ruins of a very early church, with some curious features still remaining in a tolerably perfect state. The plan of the building was a parallelogram, about 68 by 43 ft. in clear of the walls. To the west were the remains of an arcade (narthex). The main body of the building is filled up and ploughed over, so that none of the piers can be seen. But, from various indications, I should judge that the floor of the Eastern part was several steps above the general floor level. At the east end is a large crypt, consisting of an apse, with a chamber on each side, now almost perfect, the whole built and vaulted in very good squared masonry. Remains of steps leading to the central crypt still exist, and in the centre of it is a singular excavation (made somewhat in the form of a coffin) in the solid rock, with steps cut in it at one end.

My drawing will show the whole, better than any description can do; but it is more rough than I should have liked, as the sketch and measurements were taken when the evening was fast drawing in, and amidst suggestions made in a very friendly but earnest manner that under each stone that we turned over it was likely enough that we should find a scorpion. We did not do so; but the hint was enough to cause our measuring to be somewhat less accurate than usual.

At Constantine there are the remains of a church said to be those of the original one founded in the time of that emperor. But the ruins are very scanty, and we have no assurance that the church had not been rebuilt over and over again, since its foundation. Some few other plans taken, I think, from Lenoir, are given in Mr. Fergusson's history.

I now come to the Arabs.—Their works, so far as I can personally speak of them, are in the town of Algiers. This was, as I mentioned, the Roman city, little celebrated, of Icosium, ruined in the late wars of the empire, and scarcely known to history again until 987. Its name is found in 1067, as being a small town with only one mosque,—that now existing, and called the Grand Mosque. At the end of the thirteenth century even this small town was in decay. It was not until 1532 that it was even surrounded by walls, and some years still elapsed before any great Government buildings were constructed (1552—6), so that the whole town is really comparatively modern, and its architecture, whatever its style, can date only from about the same period as that of the chief renaissance architects of Italy. It is built on the side of a steep hill, in a wedge-shaped form, starting from the harbour at the foot, and finishing with the Turkish citadel of the Kasba, at a height of 387·0 above the sea.

There is nothing in the Arab part that we could fairly call a street, nor any part through which a carriage of any kind could be driven. The thoroughfares are mere alleys, winding about the side of the hill in paths so tortuous and irregular, that a stranger has but one way of discovering his means of escape from them, viz. by persistently going down hill wherever that may lead; by which means, he must of course, at last find himself at the bottom of it. A more irregular walk it is, I imagine, almost impossible to realize.

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* The following is a copy of the record which I know only in its French translation,—2 calices d'or, 6 calices d'argent, 6 cuvettes d'argent, 1 casserole d'argent, 7 lampes d'argent, 7 petits candelabras d'airain avec leurs lampes, 11 lampes d'airain avec leurs chainettes. The Roman and other inscriptions in Algeria are very numerous, and, as they are discovered, are generally published in one of the Archæological journals of the province, under the able editorship of Mr. Cherbonneau.

The houses, mosques, and palaces, their domes and minarets, are white. Their roofs are flat, with no gable or slanting covering to mark them, and the windows are few and very small. There is, therefore, scarcely anything to mark from a little distance, one building from another, either in outline or colour, so that the general appearance of the city from the sea, is really that to which it is likened, as a stone quarry. Of all its buildings, one of the most ancient and interesting, is the grand mosque, The Djama Kebir. It stands close to the sea, and is common enough looking outside, being a simple square walled building, with a few small apertures in it for light. A small part of the centre of its sea wall is slightly raised above the rest, marking the place of the sacred niche fronting to Mecca. A lofty minaret alone proclaims to the stranger that this building which it crowns, is one of the great native edifices of Algiers. The plan is the usual one in a series of arcades, surrounding an open court, in which is a pretty fountain, shaded by a mulberry tree. All the arches are of the same height—all the avenues of the same width. There is no grand vault, no transept, nothing, in short, on plan, or section, or elevation—to show that the architect thought of bringing the whole edifice into one grand mass. There is no sculpture or ornamental work, except to the fountain, even to be seen at all. But just outside the door of the mosque, in a small entrance court, is a well designed, though simple building, in which is held the Cadis' Court (*vide* sketch). It is square in plan, and covered with a dome. In front of it, is a little colonnade with marble benches, and overshadowed by the luxurious branches of a Banana tree, the whole forms as picturesque a composition as could well be found; outlines and details being graceful alike. All this is genuine Arabic, as its date would shew, the mosque having been built in 1000, and the minaret in 1322. Close by is another mosque, that of the Fishery, or the new mosque Djaima Djedid. This is markedly different throughout. It has no open court; its fountain is in the mosque itself, as our fonts are, and the whole edifice is designed as one complete building, with high nave, aisles of a lower height, spacious transepts, and a dome boldly carried on pendentives, whose graceful outlines show pleasingly to the eye, even through the horrible daubings of paint with which the French have sought to please their Mahommedan subjects.

The whole edifice is evidently the work of a master-mind, and is well carried out externally (*vide* sketch) where the dome, nave and transepts have their outlines shown in a very marked and pleasing way. Bnt these same outlines are not Saracenic. Their history declares itself to the eye of the architect at once, viz. that they were designed by a Christian architect of Greek extraction, and whose recompense for the work, according to the stories told of him (I believe untruly) could scarcely have been countenanced by our Institute scale of charges, for the accounts, differ merely as to whether he was bowstrung or burnt to death, but agree as to the date, viz. the sixteenth century uuder the Turks. He seems to have furnished a mere outline of the design, and either to have had no workmen sufficiently skilful to execute the usual Byzantine details, or to have trusted to being able to encrust the walls with the equally usual marbles or mosaics, which, however, in this case has never been done. In these, except to the pulpit, and to the sacred niche, there are no ornaments, no mouldings, not even a capital, a base, a cornice to set off the plain bold outline of the mass. But the pulpit and niche show at once, that if the masters were Greek, the workmen were true Saracens. For the ornamentation is as markedly their work, as the design was his (*vide* drawing), and it would be difficult to find anything more delicate and graceful.

The scrollwork is not, as it appears at first sight to be, all on the same plane; but one parts sinks slightly beneath the other, rendering it almost impossible to obtain a clear rubbing of it. I ought to mention that the four angle cupolas were built at a late period by the Turks, and that my sketch was taken from an upper window of the Hotel, and so overlooked it, being, I believe, almost the only way in which a good view could be obtained. Among these mosques this is unique in design. Most of

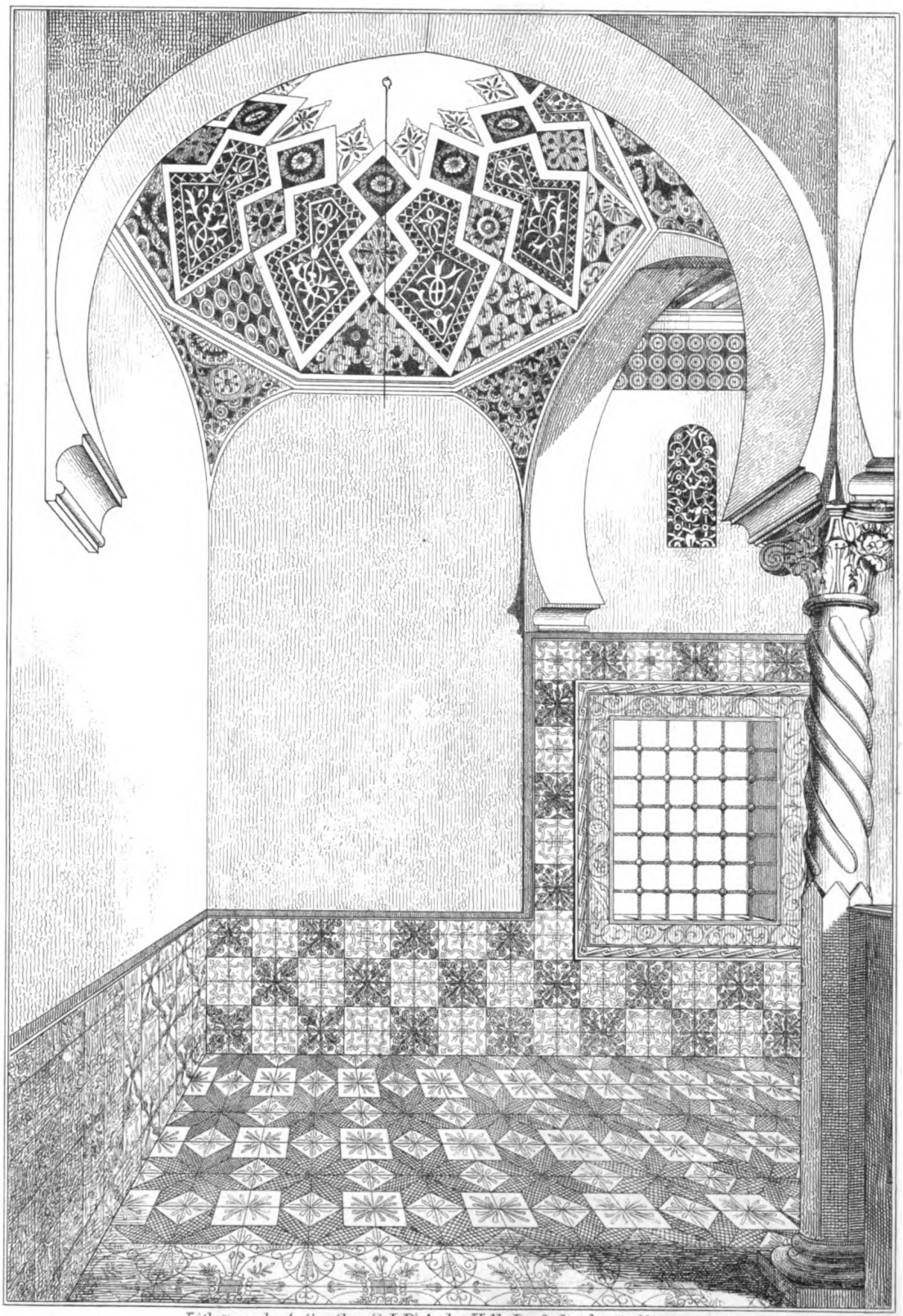
them are built much on the same general plan as the old one, but there are none with whose description I need detain you. The houses will, perhaps, bear a little more detailed notice.

In walking through the streets in the Moorish quarters one sees nothing whatever of the interior of the houses; and the narrowness of the streets allows little enough even of the exterior to be seen.

In the Jewish quarters it is different; there the doors of the houses are constantly left open, and in the various other parts of the town so many houses and palaces are now occupied by the French, for public and private purposes of various kinds, that a good idea of the old arrangements can be easily obtained. I have in the drawing attempted to show those of a house of a tolerably large size, it being taken from one the whole details of which I sketched. But the plans, &c., were not taken with any great accuracy, as what I desired was the general ideas and not the particular house. The section and plan, shew the chief features both of the ground and one pair story, the section following the lines of the corridors and staircases up to the arcaded court on the one pair. The exterior is of the plainest kind, absolutely without mouldings, and parts of it are projected wherever convenience may suggest in the most irregular manner possible, with no regard either to picturesque effect, symmetry, or proportion. A striking instance of this is shewn in the sketch of the Archbishop's Palace, whose interior is one of the finest Moorish ones in Algiers. In these exteriors I was thoroughly disappointed; knowing their utter irregularity, I thought to have met with some valuable hints as to how this might be worked into the picturesque, if not the beautiful. But I come back better satisfied than ever with our Pointed Architecture, which combines and forms out of apparently discordant materials, a harmonious whole. With the entrance door begins one's sense that Moorish work is not to be judged of at first sight: taking my sketch as an instance, you enter a long corridor having on each side a wide bench, which serves as a stylobate to a row of white marble columns, carrying arches of a very peculiar shape, but common enough in Algiers. The front of the bench is lined with coloured tiles, and the floor is of white marble hexagons; sometimes of tiles with which the walls at the backs of the columns are also lined. In the plan sketched, the corridor is 12 feet wide in clear of the benches, but in the larger houses it is very much wider, and sometimes the columns are two deep, so that the rich tints of the marble, contrasted with the vivid colouring of the figured tiles, subdued by the deep shadows in the recesses, produce a singularly pleasing effect. In some houses the corridors lead directly to the central court; in others to the staircase, the difference depending to a considerable extent apparently upon the level at which the house is entered; for the hill on which Algiers is built is so steep, that this entrance is a serious matter; generally the main court is approached by a staircase which invariably winds on plan, and has all its sides enclosed, so that absolute privacy is insured. The flights of stairs are arranged one over the other, but the soffites do not slant, as with us, but are horizontal, and follow the raking line by a succession of steps, which have an excellent effect. The treads are about 14 in. wide, and their rises are of tiles, with which the walls are also lined, some 3 to 4 feet high. The soffites have open timbers resting on a small plain cornice. The stairs lead into an open court yard, always square, on plan, and surrounded by colonnades, two stories high. I remember no instance of these columns being more or less numerous in height, though there are often one or more extra stories; these then recede to the range of the walls, leaving an open terrace over the colonnade, into which the windows on the lower stories chiefly look, as very few abut on to the street.

The whole work forms as singular a mixture of styles as is, I suppose, anywhere to be found. The central court with its galleries and enclosed stairs is, to say the least of it, as much Italian as Moorish, though admirably adapted to the requirements of the latter by the narrow outer windows and other details. The central doorway to each gallery, the little windows opening out of the small domes at the ends of the colonnades, the railings to the front, and some minor details, are Saracenic, and, in many cases, of exquisite beauty.

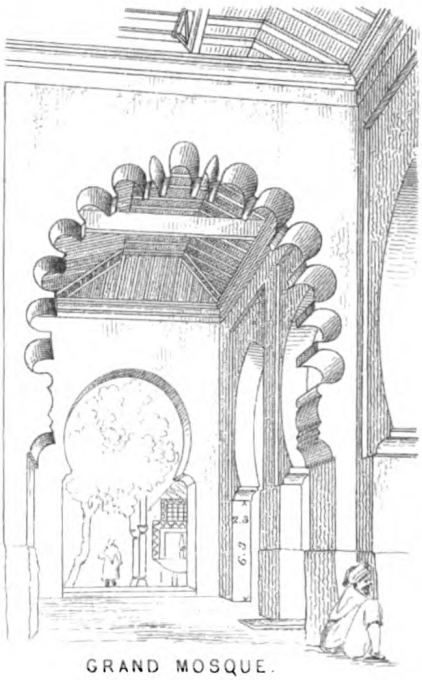
ALGIERS.



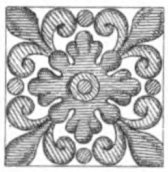
Lithographed for the R.I.B.A. by Kell Bros Castle St Holborn.

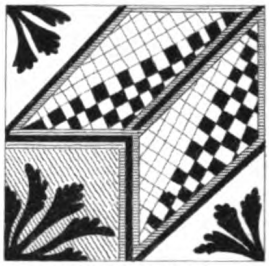
ARCHBISHOP'S PALACE

ALGIERS.

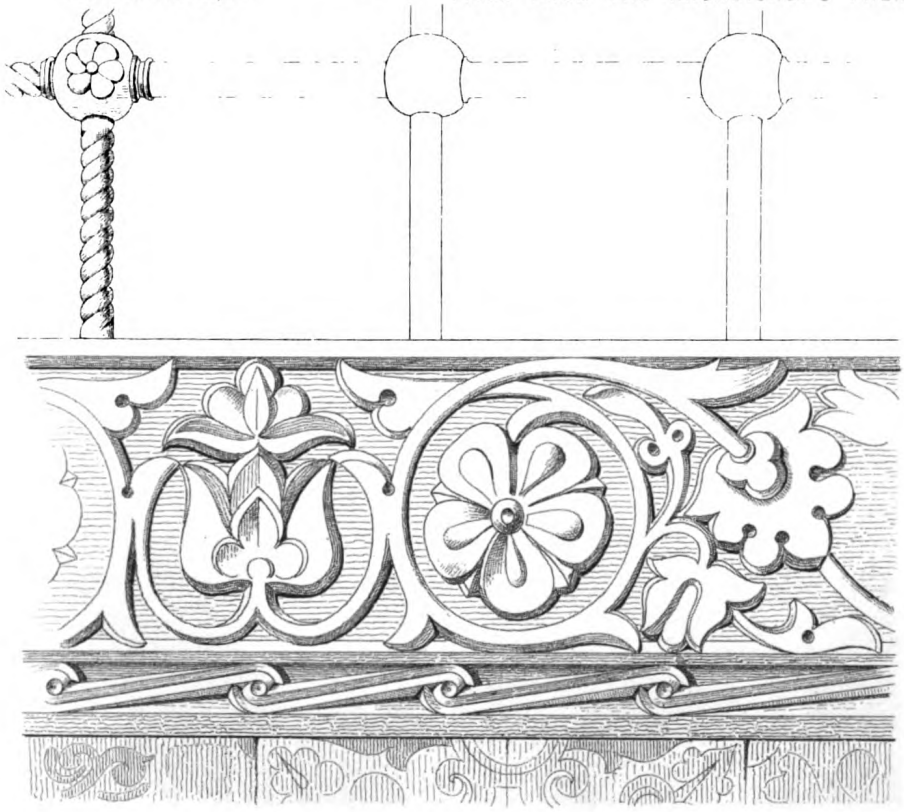


GRAND MOSQUE.





TILES FROM THE ARCHBISHOP'S PALACE, etc.



ARCHITRAVE FROM THE ARCHBISHOP'S PALACE.

Lithographed for the R.I.B.A. by Kell Bros Castle St Holborn

I know nothing more beautifully designed or worked out than, for instance, the small domes shown in my drawing of the Archbishop's palace, or of the beautiful palace of the Governor. Yet all the main doorways to the corridors and staircases throughout are Italian of a very debased kind, no doubt, as the sections of the mouldings show, though obviously copied from a very good example. But the curious part of the case to me is this—that nearly every doorway that I saw throughout the town inside or outside of the houses, no matter where, of what size, was of this same identical pattern, or so near to it as to show that it was copied from the same original. The columns are well nigh as curious. They are nearly always of marble, and the capitals and mouldings very well and boldly carved. None of them, that I could see, were antique, and few were copies of the antique. In the corridors the columns, which are necessarily short, have spiral shafts; so also have many of those to the colonnades. But the chief part of the latter are octagonal, about one-third up and spiral above, as shown in my sketch of the Archbishop's palace. Then there is a peculiar capital, as shown in my sketch of that to the Cadi's court, which is met with all over the town.

The same patterns of tiles, too, are seen everywhere; and these are recorded to have come from Leghorn, and to have been Italian, with one exception, which is said to have been English (though I hope not, as it certainly is the least pretty of the whole). The design of the large windows is equally curious with the other parts, as they are as invariably square as the doors are circular, and almost always have wide architraves with ornamental scroll work of the kind shown in my sketch of the Archbishop's palace.

Now this ornament, and a good deal of that on the capitals of the columns, is carved in the sharp, crisp, effective Byzantine manner, whereas those to the doorways are thoroughly Italian. We fix the probable date of a large part of the town as being the end of the sixteenth century, when the Turks had full possession of it; and I can only imagine that they had, amongst their captives, some master mind as architect.—that he gave the general outlines and sketched out the details of some one building which met the Turks' intense approval, and that the details of the numerous other buildings were worked out from his sketch by Saracenic, or Italian, or Byzantine workmen. But the facts, under this or any theory, are very curious, and such as are seldom met with.

The construction of the houses and mosques is simple enough. They were built chiefly of bricks, very hard, about $4\frac{1}{2}$ inches by $4\frac{1}{2}$ inches by $1\frac{1}{4}$ inches, (specimen produced), and are much better than the bricks now made. When the walls were very thick, each side of them only was of brick and the interior filled in with rubble. The mortar used was the red earth of which I have before spoken, with a large portion of lime (specimen), and the whole was plastered inside and out. The floors and staircases were formed of wooden joists, on which a kind of sound boarding or layer of reeds was laid. On this was a thick layer of the red earth—or concrete, then a flooring of stone, marble, or tiles. In common houses the joists were of round logs only—in the better class they were squared, and the chief beams were moulded. The joists projected through the walls to carry the overhanging parts, and the ends were supported by slanting poles which effectively carried down the thrust to a low level, but without any attempt at ornamental effect. The tiles are of somewhat peculiar make. They are of coarse earthenware of a light tint, which was covered with a very thick white. On this the pattern was painted, and then lined in (all by hand) and the whole glazed over. There is very little attempt at carefully outlining; but the whole pattern and lining are very free and bold.

In respect of modern Algiers, I need say but little; the whole of the buildings on the seaboard of the town are new, and most of them erected from designs by French Government Architects, by our countryman, Sir Morton Peto, to whose zealous officers, Mr. Jackson and Mr. Aikman, I was deeply indebted during my stay, as also to our English chaplain, the Rev. Mr. Ginsberg. The steep shelving shore,

which until lately existed, has been transformed by them into a series of magnificent terraces which rise boldly up from the harbour, and which serve as the roofs of warehouses of great size, the whole forming a combination of grandeur and utility unequalled in effect by that of any commercial town I know. And when upon these terraces you see the old mosques, the banana trees and the palms close by the side of the modern French streets, the whole backed up by the queer Arab town, a picture is presented which the stranger is not likely ever to forget.

I wish that, were it only in gratitude for the great good which the French have done in Algiers, I could say a good word for their architecture. But I really cannot, and those who wish to see good specimens of it need not travel so far. One thing, too, I ought to say in conclusion, for it holds good of all architecture of all countries. Whether the modern Algerian be good or bad, it is clearly French and no other; nor can any one who sees it doubt for one moment that the Frenchman has been there. Now, I am no lover of modern French work, but I think that, in carrying with them to a foreign land the architecture which, good or bad, is now their own, and in erecting works which, whether we like them or not, we can see at once are French, and none other, the Frenchman has gone on the right path, and will leave his mark to succeeding times, as the Turk, the Roman, and the Celt have done before him. But in their grandest and sacred buildings the French have given up this principle. The cathedral, erected on the site of an ancient mosque, and the costly Notre Dame D'Afrique, which overlooks the sea and the town from a most conspicuous eminence, have been built in the likeness, so far as the altered services of religion would allow, of the mosques which they have supplanted. They are not the old Mohammedan mosques altered and adapted to Catholic rites, and so signifying, as they well might, the triumph of the Christian. And whilst they are not Christian in any possible sense of the term as far as architecture is concerned, they are not French, nor European, nor have anything in them or upon them, beyond the chapels, the altars, and an inscription or two, to identify them with their actual country, or date, or religion. I hold that this is wrong altogether, and am glad to say that, in principle, it is quite unlike the French, who have done so much for Algeria. And for what they have done, none I think, ought to be more grateful than our countrymen, who may be secure there of a kindly welcome in a most interesting land. The names only of our Consul, Col. Playfair, and Vice-Consul, Mr. Elmore, will shew that both the scientific traveller and the artist are likely to meet with ready help from the representatives of our own government.

What I have given here is a mere sketch, and I could gladly have enlarged upon many parts of it, more especially the Byzantine, to me one of the most interesting eras of art. But I have already trespassed longer than I had wished to do upon your time.

Mr. JAMES FERGUSON, Fellow (responding to the Chairman's invitation), said—I shall have very great pleasure in proposing a vote of thanks to Professor Lewis for his valuable paper. If any fault can be found with it, it is that it contains too much matter and goes over a wider field than it is easy to follow. I am especially grateful to him for the first part of the paper, because that is a subject which I have been wanting to know more about, and I have found it difficult to do so. Strange to say, the French have done almost nothing with regard to these old Celtic monuments, and in Algeria they are more numerous and curious than in any other part of the world. There has been no consecutive or detailed account of them; but that they are tombs there seems to be no question, because, not only have bodies been found, but also Roman coins and relics, which fix their date at a more modern epoch than is generally supposed. In Algeria, also, we have all the three stages—the rude stones with the cromlech in the centre; the circle of carved stones, and then we have the Roman or Etruscan conical tomb. There are other examples to which Professor Lewis has drawn our attention which serve to connect the

whole in a complete series, and there is every reason, I think, to believe they are all of the same date. The same thing occurs in India: we have there the rude stone forms and the polished stone forms, and the domical-buildings, all of the same date; and it is to be remarked that the rude stone buildings continue to be erected at the present day, long after the polished stone circles are in ruins. It is a curious inversion of ordinary experience that the "rude stone" people should have continued to build in their primitive fashion after the "polished stone" people had taught them a better style of building. These Algerian monuments form a new chapter in the history, and I feel personally obliged to my friend for bringing the subject forward, because I hope it will be carried further, and that we shall come to know more about it. With regard to the Tomb of the Christian Virgin, the doors are four-panelled, and there is, consequently, a cross upon them, and from that cross is derived the name of the Tomb of the Christian Virgin. There was a model of it in the late Paris Exhibition, but no account whatever was given of it, and we have had to-night, the first information of what was found, or, rather, what was not found in the chamber. It is a remarkable fact that nothing should have been discovered there. The probability is that the body was not put into a sarcophagus, but merely laid within the chamber. The body, of course, would decay, and nothing would be left, but the fact is interesting, as showing the difference between their mode of sepulture and that of the neighbouring Egyptians. With regard to the other tomb, that of Madresen, the order which surrounds the lower parts appears to me to be almost identical with that of the Tomb of Absalom, in the Valley of Jehosaphat, at Jerusalem. The great point of interest, hitherto, has been to know what is inside these tombs, for this one has not yet been entered, though, as Professor Lewis says, the entrance has been found, but now that the other has been explored, we may safely assume that this also was a sepulchre. The whole, however, forms a history which it would be extremely interesting to see further developed, but to follow it out would require more time than Professor Lewis probably had at his disposal to devote to the subject. On the other matters referred to in the paper I have no special knowledge which would qualify me to speak, but they open out a wide and fruitful field of archæological research, and I hope it will be carried further by those who are qualified to enter into it. It is altogether a subject of great interest, and I am sure every one present must feel greatly obliged to Professor Lewis for having brought it before us in the very able way in which he has done to-night.

Mr. G. G. Scott, Fellow, in seconding the vote of thanks to Professor Lewis, expressed his obligations to that gentleman for the lucid manner in which he had treated a subject of great interest, and one on which few of them had opportunity of knowing anything about.

Mr. M. Digby Wyatt, Fellow, said—I can only echo what preceding speakers have said with respect to the gratitude we owe to Professor Lewis for his labours in illustrating the voluminous aspect of the art-remains of Algeria. Among them there are, however, two classes of antiquities upon which he has scarcely, if at all, touched, and upon which I, at least, am anxiously looking for more and more light. One is the mysterious question of the real character of Phenician design. Any detail which should illustrate the nature of the intercourse and commercial relations existing between the Phenicians and the northern and western nations of Europe would serve to illuminate a very dark page in the history of art. How the connection, which there seems little doubt existed, between England and the North of Africa, at a very remote period, affected early British, Celtic and Anglo-Saxon art and art-industry is a very interesting question—and one of which we can know little unless observers and students, like Mr. Lewis, may in time be enabled to give us some accurate information (based upon the careful study of Punic remains,) as to what Phenician, and especially Carthaginian art, really was. Whether the megalithic remains and tumuli, upon which Mr. Lewis has dwelt, have any and what relationship to similar remains in Britain and in Brittany are questions of import alike to the antiquary, the architect and the anthropologist. All this is at present little else than a sealed book to us. The

second point which specially attracts me, amidst the abundant evidences of the magnificence of their architecture which the Romans have left upon the soil of the Province, now known as Algeria, is the extreme beauty of their mosaic pavements. Among these is particularly noteworthy that of Constantine. Judging from the coloured engravings in the great work of the French Government, this pavement must be of the most beautiful description possible, and the finest, probably, of the kind ever executed. There are in these two subjects alone, ample materials for a second paper upon Algerian remains, and I shall esteem myself happy if this cursory allusion to them should be the means of eliciting further information upon them from our respected friend, Mr. Lewis.

Mr. WYATT PAPWORTH, Fellow, enquired whether Professor Lewis considered the large tomb he had described had been entered and rifled previous to the time at which it was discovered?

Professor LEWIS said there was no doubt but that it had been: also that the entrance was closed after the seventh century, and then lost. That it had previously been broken into was unquestionable. The only way of getting into the central chamber, at the time I was there, was through the broken part of the portcullis, where the hole was barely large enough for a man to get through.

Mr. JOHN P. SEDDON, Hon. Sec., said—I beg to add my thanks to Professor Lewis, who has been good enough to prepare this paper at my own request. I should like to ask two questions,—one is with reference to the sketch of panelled wood-work exhibited. I wish to know how the panels are constructed. As far as I am able to judge they resemble those in use in old cottage doors, which I have met with in Germany, and which consist of one thickness of wood planted on another.

Professor LEWIS explained the construction of the panels by a sketch upon the board. Every piece of the door, referred to, was fixed upon a back ground in the way he had described. Looking to the number of panels an immense amount of labour was involved in the work. He could not say whether the wood-work was glued together, for it was painted with so many thick coats of paint, that it was with difficulty he could make out the joints. There was first an open door framing, then a flat lining, and upon that the panelled work was put on. The panels which he had were the full size, and the smallest were in four pieces. They were probably cut in long lengths and then mitred, but great labour must have been used in the mitreing. It is what the old carpenters called "fortification" panelling, which entirely covers the original framing of the door.

Mr. SEDDON, with regard to the red mortar or earth, mentioned in the paper as having only a small quantity of lime with it, asked whether it had the appearance or consistency of mortar at the present time.

Professor LEWIS replied, that one of the specimens he had brought was from the Kbour, and which he believed contained no lime, and it could hardly be called mortar. But with the Arab work it was different; the brick which he had brought was from an Arab building, aud had some mortar attached to it. This was formed of the above red earth, with a good deal of lime with it.

The CHAIRMAN then put the motion of a vote of thanks to Professor Lewis, which was passed by acclamation, when the Meeting was adjourned till the 4th January, 1869.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 4th January, 1869, J. EDMESTON, Fellow, in the Chair, the following Papers were read :—

A COMMUNICATION FROM PROF. DONALDSON, PAST PRESIDENT., HON. SEC. F.C.

On the Archipelago, *en route* from Athens to Trieste.
21*st December*, 1868.

MY DEAR NELSON,—I am afraid that our colleagues and yourself will have thought me very negligent, in never having as yet, during my nearly three months' absence, written to you. But the truth is our cruise has been so rapid, that I have not been able to do more than take a superficial glance at any objects, and they have been so numerous and varied as not to leave more than confused images in my mind, with little or no time to mature them. I left home on the 1st of October, and proceeded to Paris, where our party of eight or ten met, and left on the 5th for Italy, passing the Mont Cenis over the Fell railway, which is a great success. With the swiftness of wind and a Titan-like strength, you are whirled along on the very edges of precipices, and turn sharp curves on the brink of destruction; your breath stops, but you are in such a hurry that you have not time to think of danger. We passed through Turin, Bologna, and by Rome, to Naples. Thence we recrossed the Appenines to Brindisi, where we embarked on the Italian boat for Alexandria. There we took the rail for Cairo, and visited the Pyramids, to the top of the greatest of which I scrambled; and we also went to the cemetery of Memphis, and at Saccara dived down into the Serapeion, all of which I described to the Institute after my last voyage thither. Since then another building of some extent, and richly covered with painted hieroglyphics, has been cleared of the sand. It is commonly called a temple, but it has hardly any special hieratic pictures, but rather domestic ones of the every-day uses of society—trades, animals, birds, and such subjects—and I thought it resembled a dwelling rather than a sacred edifice. We took occasion to go down the Suez Canal about half its length, from Ishmaela to Port Said, which is completely executed, with the sea-water in it. The southern portion between Ishmaela and Suez is excavated to half its depth only, and the harbour at the mouth has to be completed. It is a marvellous realization of a prodigious project, and does justice to the daring of its projectors; as you steam along its channel 300 feet wide, with sufficient depth to receive the largest merchant vessel, you cannot but feel impressed with the extent of this great sea channel. But its maintenance will be the greatest difficulty of all; to preserve the depth from being choked up by the sands, whether along the canal itself or in the port, is even now a matter of anxiety and care. While we were on the spot a French vessel of war was expected, and they were employing many gigantic dredgers to secure a channel. In the basin of the harbour there were several vessels of considerable size. The piers to enclose the harbour of Port Said are constructed of enormous concrete blocks, a couple of metres or more in each direction, thrown over and left to take their place "pêle-mêle;" but it has been found that this will not do, for the waves force themselves between the crevices and interstices with such force as to move them, and they are now considering how to produce more cohesion between the blocks than by their mere weight; if they are obliged to adopt the regular combination of the masses by regular construction, as in our Dover pier, it will cause an enormous expense, for the dykes or piers extend out

miles into the Mediterranean. The town, if I may so call it, of Said is composed of rapidly-built stores, one or two storeys high, like all settlements in new colonies, and the inhabitants consist chiefly of Maltese, Greeks, the refuse of the Levant, with very few respectable French. One who held a not very high position in the public service there said it was quite as an exile, without any society.

From Port Said an Alexandrine steamer took us on to Jaffa. These Egyptian coasters are fine vessels, chiefly built in Scotland, but so wretchedly officered and manned that there is great danger in trusting one self on board. Only last evening we heard at Syra that two had run foul of each other off the coast of Asia Minor, between Rhodes and Scio, and one of them had foundered with some 220 souls on board, four only of whom were saved. It was Ramazan, and at night, and they were little occupying themselves with the care of the vessel, but eating and feasting after the day's fast. As we approached Jaffa early in the morning, we could see our white tents on an eminence outside the town sparkling in the sun, all ready prepared to receive us by our dragoman, who had gone on before a few days to make all the necessary arrangements. Jaffa is picturesquely situated on the slope of the rocky hill, and its white houses give but too favourable an idea of the interior, with its narrow lanes—I cannot call them streets —miniature shops, and break-neck pavement. We found our horses ready for our selection, and the cook had prepared a capital meal; in fact, the eating and drinking of such an expedition are only too good, and it would be better for the traveller if they were more simple and less luxurious; a soup, a stewed dish, a roast, with vegetables, occasionally fish, and a plum pudding or other pudding, pie, or sweet dish, are daily served. Much care is requisite in the choice of the animal who is to carry you for some weeks over bad and dangerous roads. I left to others two or three of the most showy, and chose a very good-looking, but firm, solid horse, who served me well. We had only one tumble together, when he was passing over an inclined slab of slippery rock, which was not his fault nor mine; but he fell on the right and not the wrong side, and so we had an easy affair of it, and soon recovered ourselves. After some weeks' companionship, you get quite a regard for your faithful nag and his surefootedness, for he is at the same time spirited, with his Arab blood and *entirety*. The roads through Palestine and Syria are simply detestable, and, with only two exceptions, no care is taken of them. The geological structure of the country is generally of magnesian limestone of a cavernous character; the beds, whether highly or only moderately inclined, present large slippery surface, but the face of the country itself, whether mountain or plain, is as though strewn with large stones, so as to hide the soil, reminding me of the district of Connemara in Ireland.

We reached Jerusalem in a day and a half, but were not able to see its walls till after sunset. The ride was through a hilly, wild country, Kirjeath-Jearim alone presenting a fine old church of the time of the crusades, with pointed arches, and paintings still traceable on the walls, though long since abandoned and unoccupied. There is a nave and aisles, divided by three or four square pillars on each side and apsidal recesses at the east end. Jerusalem itself caused me the greatest disappointment and pain. It is a vast store for religious traffic, occupied by religionists of every shade of Christian doctrine, scrambling and fighting for the pre-eminence, and as to which can offer the most numerous and attractive localities and objects for superstitious reverence. Unsatisfied with the general consciousness of the solemn and stupendous occurrences which have here taken place, each sect seeks to appropriate as specially its own this or that spot as the true site of each sad event. There is a large space covered with olive trees, known as the Garden of Gethsemane; but the Latins and the Greeks have enclosed a special area as the scene of our Saviour's agony. The Holy Sepulchre could never have been where its representation is now located; but Latin and Greek, Armenian and Copt, fight and scramble on the soil, and the Turk, as guardian of the sacred spot (as it is supposed to be), is obliged with bastinadoes to keep the furious superstitious antagonists in order. The portal of the Holy Sepulchre

is a bazaar for the sale of relics, carvings, and other like reliques, and the very nave of the church at Bethlehem has the pavement covered with the curious objects, which some dozen of vendors have to show and tempt the traveller to purchase; and they ask twice or more than the things are worth, haggle and barter with you, and at length take your own reduced estimate of the worth. At Nazareth the Greeks and the Latins have a cave, almost identical in decoration and arrangement, where the worshipper is invited to kneel down, say his prayers, and deposit his offerings, or burn his wax taper, on the presumed site of the Annunciation; and they are in two distant parts of the village. Doubtless the Greek tradition is the more to be relied upon as that of the original inhabitants, but the Latins dispute their priority.

The Holy Land offers every evidence of being an accursed country, as foretold by the prophets. Covered with rocks and stones, with very little soil, scarce of water, and that rarely good, no stable parental government, the villages and towns devoid of all sanitary arrangements, the Jordan the only permanently flowing river. One feels quite unhappy to witness such desolation, and the conviction rests on the mind that, until the Almighty withdraws his wrath from this ill-fated land, no earthly power can raise its people, give its soil abundance, or restore it to be the land flowing with milk and honey which it once was blessed to be.

Having given you an idea of the moral aspect of my subject, and that I fear not a very attractive one, I will pass on to the architectural side, which is very difficult to treat as there are no very distinct features to trace. Jerusalem is, as you know, situate on the rapid slope of hills which rise from the valley of Kedron up to Sion. Its sanitary condition is the worst possible, for it is without sewers, and is supplied from cisterns which receive the surface waters, too often impregnated from cesspools and drains; the streets are narrow, and one-fourth arched over to gain space; with occasionally a malignant air, so that it is not surprising that European residents denounce it as very unhealthy. A great part of the city is occupied by the religious communities, which are numerous. Various new buildings have been erected of late years, as monasteries, churches, nunneries, hospitals, and schools. The ambitious Russians cover several acres outside the Jaffa Gate, upon a rising plateau which commands the city, with a large church not yet completed, residences for the clergy and others,—"*hospices et hospitaux*," in detached masses, surrounded by gardens. There is room to receive all the Christian population, if needs be, within the precinct. The structural part of the new Dome to the Holy Sepulchre is nearly completed, and the interior decorated with paintings, which, however, are of too pale a tone to be effective. The modern building that pleased me most was the Armenian Church, which, although evidently designed by an inferior mind, is effectively decorated in the interior with coloured tiles and fine iconostasis. But no edifice, old or new, equals in effect the Mosque of Omar. Simple in design, and treated in detail with majolica tiles, it has a sombre effect truly impressive, so far does the Turk outdo the Christian. The Holy Sepulchre itself is a most dramatic assemblage of churches, chapels, oratories, and sanctuaries; some on the general level, others going up, several going down into the rocky caverns; and, what with the ceremonies of the various religionists carried on at the same time, their processions and visits to every one of their twenty or thirty altars, their chaunts and tapers and vestments, litanies on one side, chaunts on the other, the mind becomes bewildered, and one wonders whether this can be a true temple for the worship of the living God, or a very Babel or House of Baal for the sacrifices of superstition; the silent, impassive Turk meanwhile keeping order, smoking his pipe, and sipping his coffee.

The Valley of Jehoshaphat is the only spot containing remnants of the classic times, Greco-Roman, but I saw nothing of decorative detail that can be called Jewish. Some enthusiastic minds seem to connect with that period some walls of fine construction, of large blocks of stone between 12 and

20 feet long and 4 or 6 feet high; but what are these to the stupendous courses we see at Baalbec, 60 feet long, and upwards of 12 feet high and 10 or 12 feet thick, of the time of the Antonines? The Wailing Wall of the Jews is a noble specimen of construction, but cannot, I think, be referred to an earlier period than the Herodian epoch. A mistaken technical expression is used by Lieutenant Warren and other non-architectural writers, in describing the blocks of some construction as having *bevelled* edges, whereas they are not bevelled or splayed at all, but have a slightly sunk margin two or three inches wide, sunk $\frac{1}{4}$ or $\frac{3}{8}$ of an inch from the general face. As I was riding with Lieutenant Warren, I observed about little more than half of a pure Greek Doric capital on the ground, reversed, and something like those of the tombs in the Valley of Jehoshaphat. He had not observed it before, so I called his attention to it, and he had it taken to his house. It is about 2 feet diameter, and I took the section, with the dimensions, to ensure accuracy of the profile, and left the sketch with him. He has discovered a new channel some 1,200 feet long, about 5 feet high and 2 feet 6 or 3 feet wide. It has several shafts, with steps leading down to it, about 20 or 30 feet underground; he cannot exactly explain its use, but thinks it served the purpose of a water conduit for the area of the Temple. It appeared to me that the ancients, having traced out the line of the conduit, sunk stairlike shafts, and then worked right and left till they met, and thus were able to have several sets of men at work at one and the same time. We went to Jericho, and bathed in the Jordan and the Dead Sea, and visited Mar Saba and Bethlehem. The last is a charming spot. Jerusalem, where the great crime of the Crucifixion was perpetrated, sits proudly on its hill, but desolation is all around. Bethlehem, where the Saviour was born, lies beautifully on *its* hill, surrounded by groves of olives, oranges, fig-trees and vines, the very embodiment of peace, and inhabited only by Greeks. The church is a large basilica, the transepts and the apse being alone devoted to public worship, and divided off by a lofty screen from the columned nave. Here the iconostasis is of vast size, of ill design, but pretty well carved in profuse ornament in wood, the whole gilt, which gives it a most magnificent and imposing appearance. Here superstition has also been outdone. The Stable is supposed to have been in a series of small, cavernous excavations, approached by a long passage about 2 feet 6 wide, till the Empress Helena, or some other, cut out two more direct accesses from the high altar.

Our main tour through the Holy Land and Syria occupied us three weeks, with a train of thirty horses, mules and donkeys, five tents, and numerous attendants. As I have already said, the country is extremely mountainous; the ground rocky, and covered with pebbles and stones, as though purposely strewed there; the roads difficult, wearying, and dangerous for man and his trusty beast. The length of the country does not exceed 200 miles, by 40 or 50 wide; I mean the Holy Land. Hardly any, if any, traces of Jewish buildings remain, but there are some noble ruins of the times of the Herods and the Romans. Samaria, among others, is a very striking place, situate on the top of a mountain, or rather hill, which rises in the centre of the plain. One of the city gates with a circular tower on each side. You enter, and two lines of shafts of columns (Corinthian) present themselves for a quarter of a mile in length, along the side of the slope of the hill. In various parts you are surrounded by shafts of columns still standing. There is a stadium in the plain, and evidences of a forum. All this Herodian. On the shores of the Lake of Tiberias there are considerable remains of walls of cities and columned buildings, but still uncertain as to which city—whether Capernaum or Chorazin, or any other. But they appear to be of the later period of the Roman empire. At the foot of Hermon, Syria may be supposed to commence; of Dan, the northern city of the Holy Land, only a mound and traces of mural construction remain. But at the very foot of Hermon, on the slope, is the site of Cæsarea Philippi, with its antique city walls, and various constructions and rocky caverns and niches sacred to Pan: Greek inscriptions cut in the face of the rock still legible, with some pains however.

Through the Holy Land, as I have before remarked, springs are very rare, and the land arid. But directly you approach Hermon springs rise up at every step, and the sources of the Jordan gush out, an ample river at once, with a deafening roar, into an impetuous current. Up above the ancient town of Cæsarea Philippi, about two hours off, and perched upon the top of a rocky precipitous spur, is a very grand mediæval castle of the Saracens. Two of our party went up to it, and describe it as of considerable extent, with large courts, keep, towers, and other suitable erections. Two days' ride from this brought us to Damascus, one of the world's paradises of the Turk and Moslem.

You may imagine the way-worn traveller or pilgrim coming from the Arabian Deserts when Damascus, with its glittering spires and minarets, bursts on his view, surrounded by groves and gardens, extending a couple of leagues one way and a couple of miles the other, watered by the abundant stream of the Abana, backed by a fine range of rocky mountains, and snow-capped Hermon rising above all, as a mighty protecting genius. Can we not, then, sympathise with the ecstacy of the wanderer seeing Damascus *ab externo?* Seen within, it yields to Cairo, I think, as to the nobility of its mosques, its fountains and schools; but it is superior in its bazaars, and khans, and street pavement, the last named here of stone, there of mud. Some of the columns that lined the street which was stated in the New Testament to be called Straight, and ran from one end of the city to the other, still remain; and others in one of a transverse direction, they are 4 feet in diameter, of the time of the Constantines. We saw a very fine specimen of a Turk's house, with marble courts and fountains, orange and lemon-trees, vines and fig-trees, beautifully designed and carried out in all its Arab details, and I hope illustrated by Coste, who must surely have been here. We paid a visit to Abd-el-Kader, who received us most kindly. He is 61, but appears older, unwell, and full of care, though with a mild and winning expression of countenance.

We thence visited Baalbek, crossing anti-Lebanus, at the foot of which it lies, in the plain which divides Lebanus and anti-Lebanus. I shall never forget the impression produced on our minds by the examination of these gigantic, powerfully, and grandly conceived groups. The execution is at once Titanic and exquisite as to finish. The study of Roman architecture is incomplete without a visit to these temples.

I must reserve to a future letter some account of our trip to Athens, which I happily accomplished with my nephew. I am happy to say that now I am quite well. I have been able, in God's mercy, to accomplish all we purposed, but it has been with great fatigue. At Damascus all were ill—travellers, dragoman, and servants—and only four of us went to Baalbek. Bad water, exposure to tent-life in wet weather, six to eight hours' travel in the saddle, had their effect on the whole party, though we have since recovered. Pray present my kind regards to the President, my colleagues, and all our Fellows, and believe me, my dear friend,

Truly yours,

THOS. L. DONALDSON.

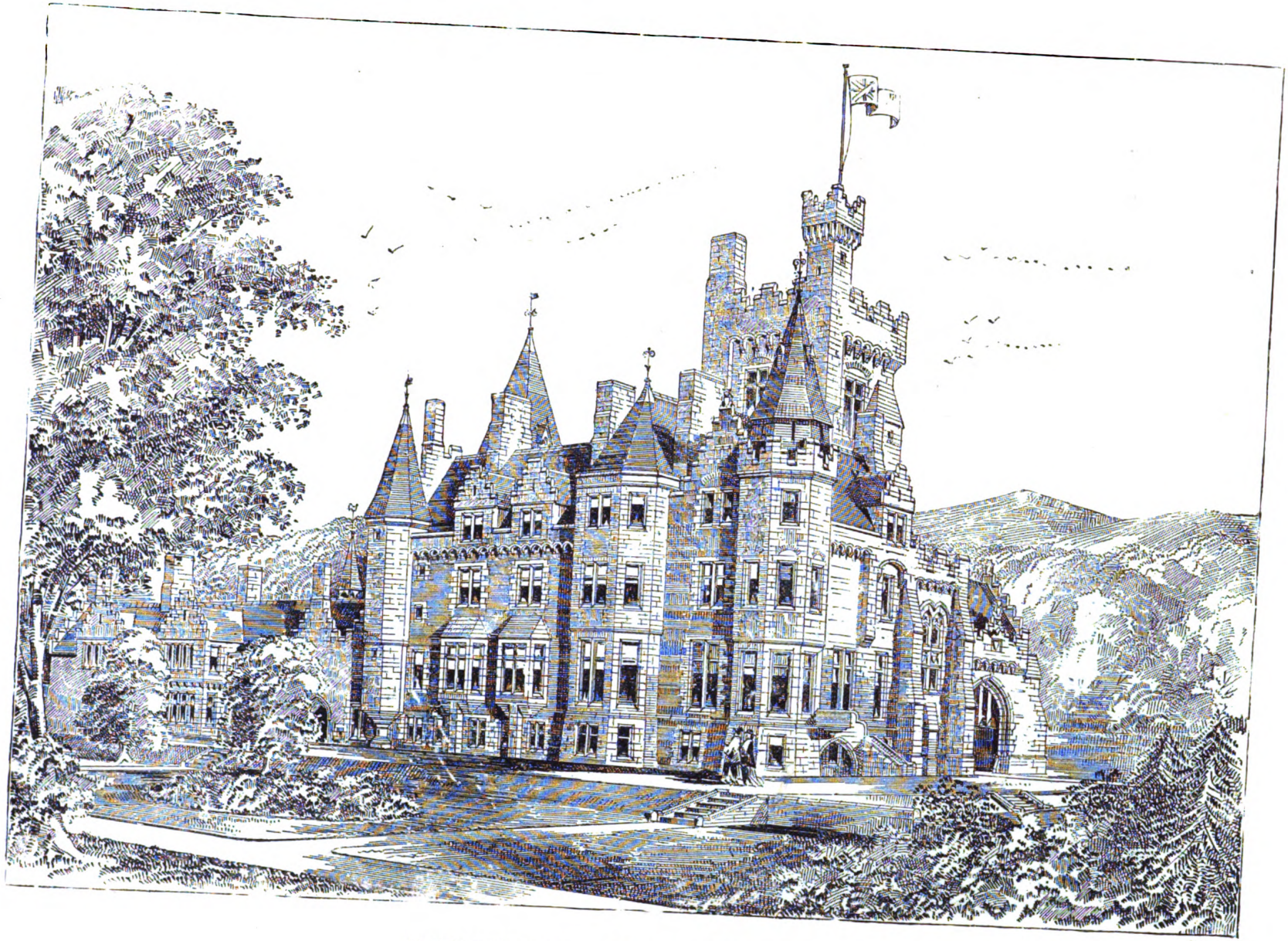
DESCRIPTIVE SKETCH OF A MANSION AT HUMEWOOD, COUNTY WICKLOW, IN THE COURSE OF ERECTION FOR MR. W. WENTWORTH FITZWILLIAM DICK, MEMBER FOR THE COUNTY.

By Wm. White, F.S.A., Fellow.

I have been requested to give you a descriptive sketch of a house called Humewood, now in the course of erection from my designs, in the county of Wicklow, Ireland. I have been unable to prepare my remarks with so much care as I should have liked, but I hope they will be sufficiently explanatory. The request to appear before you was made to me in the first instance, not so much on account of the importance of the work itself, or on account of its mode of treatment in regard whether of style or of arrangement, as from the full manner in which the details had been worked out, and from the completeness of the drawings—about half of which only are hung upon the walls, the greater part of the remainder being on the table—exhibiting I hope a certain amount of labour and thought, devoted to a work which did not aspire to be classed above the ordinary average of a small-sized family mansion. Those who know what work is will readily understand that the labour bestowed has been no slight matter, seeing that every detail has been the subject of special study, and exhibits, whether bad or good, the result of my own thought, which has been directed to making each feature appropriate to the especial purpose and requirement of the building. I have endeavoured to incorporate the idea of the Scotch baronial hall with certain Irish peculiarities in the battlemented detail—exhibiting the fusion of the good old Scotch and Irish families of Hume and Dick as now representing the estate; and together with this it has been necessary to combine the use of available material, and the adaptation of the design to all the requirements of modern English life.

The old house had to stand a siege in the Irish Rebellion, and its well-enclosed court resisted the attack till succour arrived. Several of its old doorways and gateways have been incorporated with the new work. Humewood is located about the centre of the western portion of the county of Wicklow. It is a place of note, as being the old residence of one of the leading Irish families. The present possessor, the son of Mr. W. H. Hume, formerly M.P. for Wicklow, took the name of Dick, with the arms and possessions of his ancestor, Mr. Quintin Dick, the wealthy Irish commoner. The pedigree of the family traces back to two Saxon kings, and there have been from time to time throughout the period many who have distinguished themselves, by military valour and otherwise, from that time to the present. The heraldic devices of the various branches of the family will be exhibited in a variety of forms on this building. Over the outer entrance arch of the carriage porch will be a sculptured shield, with Mr. Dick's own coat of arms and crest; within the porch, over the main entrance, will be the Dick and Hume arms side by side in an ornamented recess. The crest of the stag's head is to be sculptured on the corbelling of the western staircase turret, if the granite does not prove too hard to receive such treatment. In the interior it is proposed to exhibit a series of shields in stained glass, beginning with the hall and staircase, and branching each way, through the dining room on the one side, and the drawing room, library, and two adjoining rooms on the other. These shields will occupy only the small upper portion of the light of the window above the transom. This upper light, which is constructed to open outwards by means of hinges on its top rail, in order to give facilities for thorough ventilation, even in inclement weather, at the most available part of the room, will by this means still show the stained glass even when open; and it will subdue the strong glare of light in the upper part of the window without drawing down the blinds.

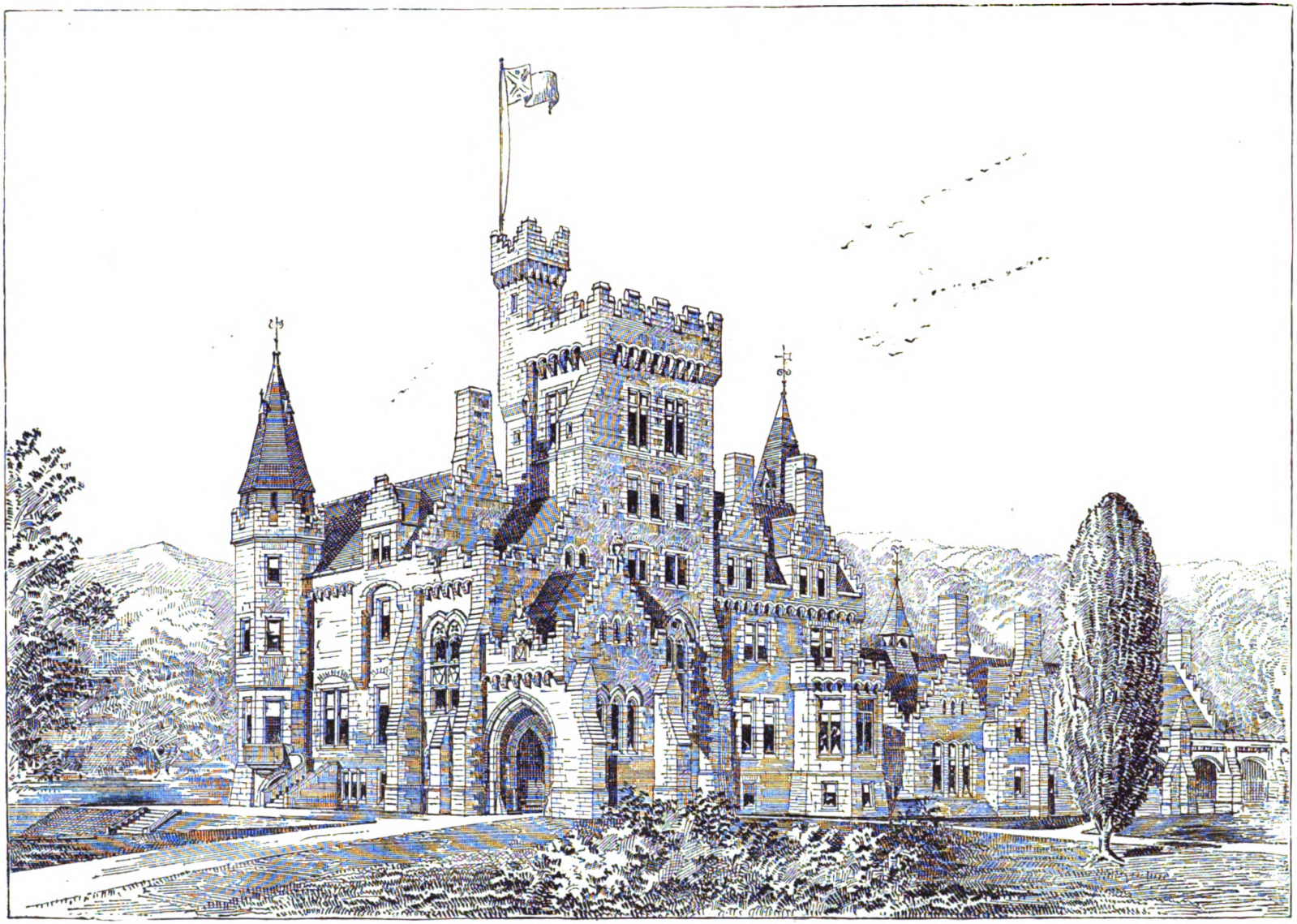
The house is built, not as the permanent residence of the proprietor, or it would have been on a



HUMEWOOD, CO. WICKLOW.

S.W. FRONT.

William White, F.S.A.

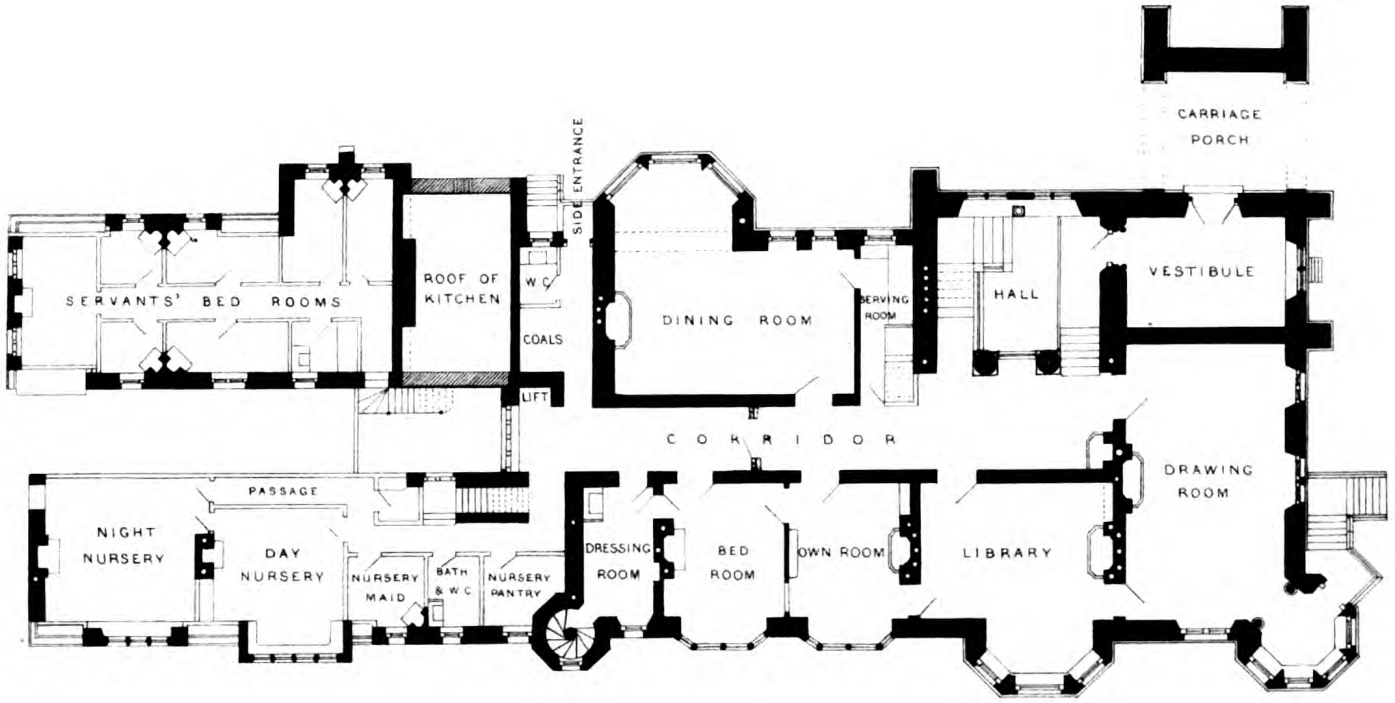


HUMEWOOD, CO. WICKLOW.

S.W. ENTRANCE FRONT.

William White, F.S.A.

Mansion at Tumewood : Co. Wicklow



Ground Plan

Scale 24 Feet to One Inch.

10 5 0 10 20 30 40 50 60 70 80 Feet

William White. F.S.A.

Bell Bro's Lith. Castle St Holborn

far different scale, but only as an occasional resort in the summer recess, or the shooting season; and hence, although it is required to be finished and furnished with every convenience for a residence, the sum placed at my disposal has been so strictly limited as to make it necessary to curtail expenditure in decorative detail, wherever it could be effected without great loss to the work at large. The work generally is simple and massive, and I think I have succeeded in making it tolerably handsome and good of its kind, notwithstanding that I have found myself obliged in execution to modify details which I had already worked out, in order to meet the inexorable requirements of economy. As to execution of the work, I am bound to add that, although there have been (as almost always must be the case in so large a work) some small instances of oversight or of defective work, I have not seen upon the whole a better piece of granite work, although I have lived in a granite country, or better joinery than that which has been carried out by the English contractor, Mr. Kimberley, of Banbury. The granite work has been executed by local masons, under an English foreman, and the joinery is made in England, and sent out. So anxious was the builder to make a good job of it, that he volunteered to use cut granite for the bands and corbel-tables, which I had, on account of expense, arranged to construct of brick.

Whatever of failure you may be able to trace in treatment or arrangement, I can truly say it will not have arisen from want on my part of thought and care in working out the design. As regards arrangement, there is often a great variety of opinion as to what is good and what is convenient; not more so, however, than there is as to what is good and true in style. But neither in style nor in arrangement would I ever allow adherence to precedent to such an extent, or in such a manner, to stand in the way of what is suited to modern requirements, although diverse, and even adverse, judgments may be formed as to my treatment in a comparison with the generality of ordinary modern work. In the treatment of constructional detail, the interior plan and general arrangement of necessity claim our first care; and for exterior effect our attention must be directed to the sky outline before expending it upon minutiæ; and this is of the greatest consequence in an undulating and picturesque country, if we would escape the effect of mere commonplace.

The general design, as it stands at present, was not completed without a considerable number of preliminary sketches, and it has been worked up to a form very different to that which I, at first, sketched, by gradual and successive stages of idea on my own part, as well as of requirement on the part of the proprietor. To some of you it may be interesting to know that most of these rough preliminary sketches are exhibited in two books marked A. and B., and in a glazed frame, the latter exhibiting the almost completed design. There is also hanging on the wall a sketch of the old house, which shows a long unpretending front, rough cast, with granite window and door dressings. The exterior of the new house is entirely of granite, and, so far as plain rubble walling is concerned, is the most available material of the locality, although it is somewhat expensive for the working of the dressings and mouldings. In the treatment of granite, especial care is required to make the mouldings of a broad, bold, and massive, rather than of a small or delicately undercut character, and to avoid as far as possible anything like minuteness and pettiness in the finish.

The walling is done, not after the common custom of disposing every stone as horizontally as possible, and filling up with one or more pinners (great or small) to form a bedding for the next stone; but it is packed piece by piece as the stones will best fit, leaving no joints large enough to receive pinners. The joints, again, are raked or indented to throw off the rain, and not tuck pointed so as to absorb as much as possible, and then to fall under the crumbling frost. The building is lined with brick, banded in with iron cramps. This sort of work requires occasionally bringing up to the level, in order to make a bed for banding the work and distributing the pressure. And to this end I provided the brick bands just named, as shown in the elevation, with cemented beds, thinking also that the colour might

tend to warm up the cold granite. Those bands, however, are now constructed of thin granite courses, and add an appearance of strength, in lieu of the colour, to the walls. The plinth is battered about 3 inches below the plinth courses, and adds greatly to the effect of the exterior by way of strength.

The new house, which is drawing towards completion, stands some 80 or 100 feet in advance of the old building. Its position is a little below the summit, on the south-west slope of the highest part of the estate, commanding magnificent views of the Wicklow mountains on nearly all sides, with a foreground of well-wooded park, leading down on the south-west to ornamental water. The entrance of the old house was to the west; but, seeing that it was desirable to make the principal fronts west and south, the offices are thrown away to the north, leaving room for an entrance on the east. These entrances will be approached by roads from three directions on opposite sides of the park. The stables are placed to the north-east; this is in every case the best position for stables with relation to a house. If placed at the south-west, the stable fumes are apt to be carried to the house by the prevailing winds at times when such fumes would be most offensive; under a north-east wind, all such places are in a state of purification.

The ground falling in the breadth of the house some 6 feet to the south-west corner, allows the basement to be formed about 4 feet below the general ground level at that point; and secondly, the living rooms to be elevated about 6 feet above the ground level. Objection is often raised against building a basement for servants' offices below the living portion of the house in the country. It is said that the ground being of comparatively little value, it is a pity not to distribute the arrangement more widely, as being more convenient for housekeeping and serving purposes. But apart from the great expense of spreading the ground line to such an extent as this would involve—for the keeping up the ground floor at a proper elevation gives almost enough for basement story—it is actually more convenient for purposes of attendance and housekeeping, by bringing, as it does, the servants' rooms into the centre of access to all the living rooms. In such a case, it is of course necessary to take the utmost precautions against the communication of noise and smell from the basement to the living apartments, and a vaulting in brick or stone becomes essential. In the present instance, however, it was of the greatest consequence to elevate the 'living' part of the house above the cold and damps of the country, as well as to give a greater command of the magnificent prospects of the neighbourhood, and also to give a greater importance to the exterior effect in a wild and mountainous district. But, besides all these considerations, it was desirable to build a house capable of defence in case of an attack; and although we may hope that such disturbances have now become a thing of the past, it is certainly most desirable to provide that extent of security which a moderate amount of arrangement and precaution will afford. It is evident that windows of the size required in the living room for such a house as this would be very insecure if not elevated from the ground. The windows of the servants' offices throughout are protected by massive, ornamental iron bars. Whilst speaking of the defensive provisions, it will be well to allude to the means afforded for the protection of the principal entrance, which is beneath the carriage porch, and therefore not to be commanded either by parapets or windows. This porch is vaulted in brick and stone, and over the vaulting is a room in the roof, approached from the principal staircase. Sufficient apertures will be formed in this vaulting for commanding the entrance. There is access also to various parapets from the interior of the roof.

Having now given these preliminaries, I will at once proceed to describe the general arrangement in detail. From beneath the carriage porch is an entrance into the stone vaulted porch on the ground level. From this porch a few steps lead down to the basement; turning to the right, we enter the principal hall, which forms the lower story of the tower. This hall is about 20 feet by 18, and 30 feet

to its vaulted ceiling. From this hall a stone staircase of twelve steps leads into the corridor of the principal floor, through the right-hand arch of the arcade. On arriving at this corridor, one can look through the middle arch into the principal hall, and a third arch leads, by means of a wooden gallery, to the principal staircase over the vaulted porch before referred to. Details of the carriage porch, of the vaulted porch, and of the staircases, arches, and large hall window, will be seen upon the walls. These form some of the principal features in the interior of the house.

From the main corridor, the principal doorway leads into the drawing-room on the left hand; next comes the library, private room, and bed-room *en suite*. There is access to these rooms from the side entrance and back corridor, the dining-room being on the opposite side of the corridor. The nurseries form a wing to the north, in continuation of this range of buildings on the same floor; beneath the nurseries is a room which will probably be used as a morning room or smoking room, accessible to the front terrace, with its closet and lavatory attached; and adjoining it is a gun room, with access to the kitchen court. There is also access from the front terrace towards the stable yard. A communication between nurseries, principal bed rooms, and boudoir over the library, is provided by means of a turret staircase, details of which are exhibited. The base and shaft of this turret consist of enormous blocks of granite. Upon the principal floor level is also a range of servants' bed rooms, placed above the kitchen offices.

The private room and bed-room are constructed to be capable of being thrown into one, so as to form a larger library; in which case the library would be the second drawing room. It will be seen that the access for servants to the front door is very convenient. The coat and hat lobby, adjoining, is also provided with a water closet. The main corridor, opening into principal rooms, is accessible from the servants' offices by a flight of stairs, which is near the servants' entrance to dining-room and serving-room. These stairs are furnished with a tram for running up the dinner. Dinner will be served from the kitchen by a rotating hatch, of which a detail is given: through it dishes can be passed from one side and served out at the other, without letting through either draught, noise, or smell; and the kitchen being far removed, beyond a glazed screen, from the main corridor, and having a lofty open roof, excepting the small portion under the vaulted passage of the side entrance, is effectually cut off from communication with the living rooms, whilst the distance for carrying the dinner is comparatively very small.

It will be seen that the footman's room lies very conveniently for the front entrance and coat lobby; and also to the living rooms by means of the staircase already alluded to, which also affords good access from the butler's and under-butler's rooms to the dining-room. The butler's rooms, with the plate closets, moreover, are sufficiently removed from the back thoroughfares to be quite safe from the intrusion of improper persons; they are provided each with a plate closet; and the cellar, which is down a few steps nearly opposite, besides binns and sink for washing bottles, is provided with a butler's outer cellar. The servants' hall lies next to these apartments, towards the back entrance. On the other side are the housekeeper's and housemaids' rooms, with linen room and drying apparatus; and opposite the housekeeper's room, but just beyond it, are the china room and still room. The still room is provided with a small hatch for serving tea on to the front garden terrace.

Beyond the kitchen there is a scullery court with offices, and in a line with the central corridor of the basement, to the north, is a range of buildings appropriated to washing, drying, and laundry purposes approached by a covered way from the house itself. Beyond the main entrance porch is the side entrance approached by a flight of steps for luggage, and near this entrance is a "lift" for luggage and for coals from the bottom to the top of the house.

Each of the principal living rooms is distinct in its form and proportions. The dining room is about

30 feet long and 18 wide, but is 28 feet wide into the angle recess at the further end. The drawing room is 35 feet by 20 feet, with an angle turret bay commanding magnificent views on all sides. The library is 24 feet by 17 feet, but its breadth is 24 feet into the recessed bay. The private sitting room and bed room are about 19 feet by 15 feet, having smaller and flatter bays corbelled out from the wall, but partially supported by a small central buttress. The ceilings are divided into panels by oak beams supporting the floors above; and the cornices generally are in various woods, intermixed.

The principal doors and shutters are similarly treated. For the principal rooms they are of red deal framing, with oak panels and sycamore mouldings, pinned on with black bog oak. An elevation shows the mode in which the wall panel is to be treated, with an intermixture of wood. There will be also some cedar intermixed in the panelling.

The lower flight of steps from the hall will be of granite, but upwards from the corridor they will be of oak and pine.

The chimney pieces are not yet finally decided upon, but it will be seen from the accompanying drawings what I have proposed. They consist of an intermixture of marble and stone, with stone and marble fenders, and glazed tile hearths, with frame-work of ornamental wood panelling over, some to receive paintings and others looking-glasses.

The chimney flues of the principal rooms are arranged so as to be swept in the basement. Probably on account of their height, they will have to be swept by means of a cord and shuttle let down from the top, and not by an ordinary machine.

The height of the hall extends from about 6 feet below what I call the ground floor to 7 or 8 feet above the first floor, giving it an elevation of some 35 feet. Upon the first floor there is a flying gallery of oak, merely as a feature and point of view for looking down. The bed rooms and dressing rooms, generally, are upon this floor; but the second floor, or what would be more properly called the garret story, supplies very nearly an equal amount of excellent bed rooms.

Water closets are provided on every floor, and there is a good supply of baths. The ladies' boudoir is over the library, near the top of the private staircase which leads from the nurseries.

The back portion of the garret floor will be used as servants' rooms. In the tower is a linen room and work room, and over this a bed room. Adjoining this is a lavatory and water closet for the billiard and smoke room, which occupies the upper story. This is lighted on all sides by long windows, and has a vaulted ceiling, covered with a flat, which is also accessible from the staircase, and commands a magnificent view.

The flag staff is fixed on the corner of the staircase turret. There is access to the parapets round the building.

In the tower, on the north side, is a large cistern, to be supplied by a permanent flow of water by means of a ram from a little stream coming from the mountain side; and adjoining this cistern is a hot-water cistern, which will serve the several sinks and baths. There will be in the basement a warming apparatus of sufficient power to keep the greater part of the house properly aired, during that portion of the year when the house will be unoccupied.

This, I think, completes the sketch of the general arrangement of the main part of the house.

I have said that the laundry is approached under cover from the basement floor. It is arranged for the washhouse to be at the furthest part from the house; then follow the drying room, mangling room, ironing room, folding room, and maid's dressing room, arranged in the order in which they will be required for use. The coal house is placed near the back entrance to the kitchen, but the boiler and apparatus which supply the wash house has a coal house of its own. The drying room is surmounted by a high pyramidal roof with louvres in the sides, and except in fine dry weather there will be no need for drying out of doors.

We now come to the stables. The stable court, about 130 feet long and 100 feet wide, is approached by a vaulted entrance, over which rises the gabled clock tower. As you enter the court there is a covered way,—forming a lobby to the several grooms' rooms, and a staircase to their bed rooms over,—and leading on the one side to the coach-houses, and on the other side to the range of stables, the whole of which are in communication by means of this covered way. There is a back entrance to the stable yard. For the stables there are two ranges of boxes, with cleaning room between, and stalls for visitors' horses beyond. The clock will have two dials, one towards the town and the other towards the stable.

That is all the general description, I think, which I have to give; but there are a few items of detail to which I would call your attention. The first of them is with regard to the openings of the windows. It is one of the first questions always asked—"How do your windows open?" These windows are opened by casements, those in the larger rooms opening inwards, and the others outwards. There are very full details of all these on the table or on the wall. Then there is the top light of the windows, which I referred to just now, namely, the space above the transom. This opens outwards, and is hinged on the top rail. This is a very available mode of ventilation even in inclement weather. The frames of the principal floors are constructed of oak, and the casements of mahogany. Then in most of the rooms there are window seats with back linings, and these are panelled with diagonal boarding. All the basements are vaulted in brick. The paving of the basement is not yet completed, but it will be either of paving tiles or asphalte.

One of the things to which I may call attention is the construction of the gutters and the drain-pipes. I have made the gutters of blue Staffordshire solid gutter bricks. These are covered with a snow board, so as to prevent their clogging when snow falls and thaws; and the drain-pipes are of large socketed glazed earthenware pipes, down through the middle of the wall; but I have provided, in case of stoppage, an overflow at the top, and also an overflow or "warning" pipe at the bottom of the plinth, so that in case of stoppage it will be readily seen, and the water will run away, thus preventing the possibility of damage to the house.

The roofs are covered with brown plain tiles, with red valleys, some made in England and some in Ireland. The ridges are covered with red crimped tiles. The turret staircases, of which there are two, one to the main tower, and the other in the western front already referred to, are of wood with a wood newel. This is a simple and inexpensive mode of constructing them, and is better for general use than the ordinary one, though it does not possess the advantage which stone has of bonding in the newel, and giving additional support to the building. The turrets generally are covered with slate, some of them green and grey, in bands. On the mullions and jambs I have introduced a very slight moulding. On the jambs, which are deeply recessed, there is a round continued from the straight of the newel with a single low fillet at the edge; and the mullions have in addition a small rounded quirk, giving it almost the effect of an ogee moulding. I know some people say they prefer leaving granite with its crude sharp edge. I confess I do not agree with them; I think we want some of the softness of art combined with the sternness of the material. Then there are the corbel tables under the parapets, of which there are details. I had proposed, as I said, to build these in brick, but they have now been made of granite, consisting of slightly arched spaces in the rounded corbels. I had also proposed to put a coping of tiles on the steppings of the gables, simply for the sake of economy. These also have been executed in granite, to the great improvement of the substantial look of the building, even though it has not quite so much colour to warm it up as it would otherwise have had. The chimney tops I have treated in a much simpler way as regards the upper part, but with a greater number of single plinth weatherings, as shown in the illustration, finishing the top with a hollow and half round, instead of a projecting cornice, which I found would work out far too heavy for the general effect of the building.

I do not know that I have anything further to refer to, but from remarks which have been made upon the drawings, perhaps it will be interesting to those present to be told that the set of plans and elevations, which are bound together in the folio, are not drawings, but are executed by photo-lithography, reduced to one-twelfth from the one-eighth scale drawings. I may add that they were not printed in colours, but were tinted afterwards in the office, the outline only being printed, and those were executed by Mr. Bessent, of Essex Street.

In reply to inquiries, Mr. WHITE explained that before building the parapet, or laying the gutters, there was a good bedding of cement put in quite independent of what was to come over it; and then the gutters were bedded and jointed in cement over that, in two levels, one bonding over the other. The parapet was of granite, and the coping also. There was a little bit of upright tile to form a sort of frieze under the eaves, and there was a plain tile in cement overhanging to form a drip. [Mr. White, by means of a sketch, explained the position of the snow board, from which, he said, the accumulation of snow would run off as it thawed, instead of sinking into slush and freezing in a mass]. There was one detail, he said, which he had omitted to mention. This was the construction of the central flat between the two main roofs. It had first of all a course of slates or tiles dry laid upon the joists. He called it a flat, but it was in fact a fall to carry off the water. First there was a course of slate laid dry; upon that was a course of cement, and upon that was a course of plain tiles swum in cement; this was repeated, so that altogether there were three courses of tiles and one course of slates, with a bedding of cement between each, and being finished in tiles on the surface it made a most excellent and durable flat. His own experience was that there was no greater nuisance in any building than large lead flats. They were constantly requiring repairs, in which the proprietors were subject to petty peculations on the part of those who did them. The cost of the building was £15,000. The reason of the joinery work being executed in this country was that the contractor had his sawing and planing mills, and other machinery for joinery here under his own eye, although, no doubt, excellent work could have been procured in Dublin.

Mr. JOHN P. SEDDON (Hon. Sec.).—I beg to propose a cordial vote of thanks to Mr. White for his very interesting paper. I feel personally obliged to him for the way in which he has brought before us the details of this work, and for the profuse illustrations with which it is accompanied. I regard it as one of the most useful practical papers that we have ever had. In a work of this kind of course there are always a number of points which may be very profitably discussed. The whole subject has been brought forward without the slightest reserve; the details are numerous and thoroughly worked out, and I feel that Mr. White is entitled to our best thanks.

Mr. T. ROGER SMITH, Fellow.—I am very happy to support the vote of thanks. This is a very beautiful collection of drawings, and well worked out. It would be a pity on a subject of so much interest to separate without discussion on one or two points on which difference of opinion may arise. One such point is the treatment of granite. It seems to me a great advantage for an architect to work in granite, for he cannot allow himself to be run away with by fancies, the material is so refractory. A good deal of the excellent effect of the recent works in Dublin seems to me mainly due to having been executed in material which will only bear treatment of great breadth and simplicity. I would point out that the buildings at Mont St. Michel, in Normandy, are all granite, and the mouldings are very simple and occasionally little more than a splay; yet a good deal of the effect is charming, because the material so treated comes out with dignity. I think any description of fine moulding is out of place in granite, unless polished, and then you get into great expense. I should be glad to hear the criticisms of gentlemen present with regard to Mr. White's arrangement of placing the kitchens and

other domestic offices under the principal floor of the house. [Mr. WHITE: The kitchen is beyond it.] You have the basement occupied by offices beneath the ground floor. We have been accustomed to associate basement kitchens with town houses; but the moment you escape from town, and have more space at command, the general idea is that it is best to have your offices on the level of the ground floor; and the drawback of a long corridor is compensated by the freedom from noise, and likewise from smells rising out of the basement. At the same time, no doubt there is economy in placing the offices beneath the principal floors. I should be glad to know whether gentlemen have found such an arrangement satisfactory in houses they have built. It is often the case that in buildings we rarely know how our arrangements turn out until after they have been in use some time.

Professor KERR, Fellow.—I beg to join in the thanks of the meeting to Mr. White for bringing the details of this building before us, because it shows at least great moral courage on his part. It is quite impossible for us, with anything like good taste, to enter into a criticism of the arrangements of plan, because we must remember that our remarks might reach the owner of the house in the form of professional objections. I for one have only to say, therefore, that I consider the work to be extremely meritorious in many respects. However, it is quite fair for us to discuss in the abstract one or two questions of scientific interest that have been already raised. Thus, with regard to basement offices in a country house, it may be said that whilst on the one hand they are objected to by very many persons yet on the other hand there are some who may on reasonable grounds prefer them. There is a certain kind of compactness involved in the principle of basement offices under almost all circumstances; and the arrangement, when "classically" managed (I refer, of course, to classical *plan*) certainly allows you to have all the four fronts of the house disembarrassed from adjuncts, which affords in many cases a considerable advantage with regard to the exterior design. At the same time, looking at it strictly from that point of view, dictated to English country families by their peculiar habits, there are obviously serious disadvantages to contend with. For instance, it is difficult to have offices in the basement without a sacrifice of privacy in what is called the garden front. In this building it is obvious at a glance that the lawn must be overlooked from the servants' hall and other such offices. Mr. White's client, we presume, does not object to this; but many would object to it very much. With regard again to the interior convenience of this arrangement, much is to be said on both sides. The carrying of dinner up and down stairs is highly objectionable to some people. I observe that Mr. White does not provide against this by a lift: the one which we see on the plan is apparently only a luggage lift; he prefers the use of a dinner stair, to which I make no objection, except that the servants may possibly think otherwise. The question of the casements of the windows is a second point which we may pause to consider. I myself always think that in this climate we may take the sash window as the only known contrivance which will keep out the weather. This is the reason of its universal application. No casement that I have ever heard of is so effectual against thorough wet weather in England; and I should think it must be the same in Ireland. In my own practice, I venture to introduce sash windows in every case, even in mullioned and transomed windows; and the suggestion which may occur to some minds that the sash window in such a case has an unpleasing effect externally is not I think borne out in fact, if you contrive accordingly and make sufficiently deep reveals. I would next ask Mr. White to oblige us with a little more explanation with regard to his gutters and flats. When he says there is nothing more odious in a house than a lead flat, we must take that with a considerable reserve. The construction of this tile and slate flat upon timber joists is a thing which at any rate is rather novel. If Mr. White says it keeps out the wet, no doubt it does so; but I do not think he will succeed in persuading many people to prefer such a thing to a lead flat. With regard to the gutters, they are perhaps as remarkable as the flat. The construction of these two gutters side by side I do not quite understand; but I would

more particularly ask Mr. White to say how the down pipe acts, which is built inside the wall. It is an invariable old-fashioned rule to have the down pipe outside the wall. I remember in my younger days putting such pipes inside the wall, for the sake of outside appearance; and some time afterwards, when I visited the house again, I found that some local builder had very sensibly put up new pipes outside. I am much inclined to think, in spite of all our friend's ingenuity, overflowing must be the portion of his pipes. In some unexpected circumstances it may be found that they have been standing full of water, and that the water has worked through some unexpected place in the wall. At the same time, I have no doubt that Mr. White's undoubted ingenuity has provided as far as possible against such a contingency. Then, again, he has not favoured us with his views—perhaps he thinks it unnecessary—about his ornamental ironwork. The peculiar curves and twists which he gives to the hinges, the demonstrative determination with which he avoids what we are accustomed to consider a true contour, the firm and muscular resolve on his part to make a thing crooked, I cannot help seeing, and knowing his artistic creed, cannot help admiring. The ornamentation on the joiner's work is also in like spirit, and worthy of being called original. The mouldings are such as I never saw before; they may possibly look extremely well. I say this because I have seen Mr. White's work in execution elsewhere, and have admired it, and this even when I could not approve it. One cannot ask him to explain the principles on which he chooses to design; but there is a unity running through the whole which permits no doubt of his feeling perfectly satisfied in his own mind. It is quite evident that Mr. White has taken very great intellectual pains in the multitude of contrivances which he has adopted. I hope he will find them all successful. I beg to join most cordially in the vote of thanks which has been proposed.

Mr. C. F. HAYWARD, Fellow.—I have pleasure in supporting the vote of thanks for the treatment of this important subject, though it is an extensive one, and, if we chose to go fully into it would occupy much more than this evening in discussion. We have not all of us to build cathedrals or law courts, but we are all interested in the details of a house and the best arrangement thereof. The practical answer to Mr. Smith's enquiry as to basement is simply this,—if the position warrants it, and the proprietor agrees to have basement kitchens, there can be no sufficient reason to urge against it. Servants are obtained who do not object to that arrangement. But if you have to build in the country, for persons accustomed to the kitchens on the ground level, they are sure to object to the arrangement which generally obtains in London houses, and, in my opinion, with good reason. But it seems a practical answer to the whole case to say, If circumstances warrant the adoption of either plan, put the advantages against the disadvantages, and the balance will be on the side which is most agreeable to the proprietor, so easily is the matter to be adjusted. With regard to this flat roof constructed in tiles, I feel the full force of the disadvantages in a lead flat mentioned by Mr. White. One is the frequency with which it is obliged to be repaired, the liability to fire, and the little purloinings which go on during such repairs. I should also be glad to know the comparative cost of this construction.

Mr. J. BROOKS, Visitor, thought it objectionable that the servants' offices should command the view of all the principal garden fronts. He did not know what means Mr. White had taken to prevent the overlooking of the family and company in their daily walks in the gardens, or whether rough plate glass was put in to shut out the view. The numerous drawings exhibited were deserving of special remark. It was evident they were all the conception of one mind, pervading every detail, even the most minute, down to the iron work which had been criticised this evening. He thought the iron work was as characteristic in its style as the other parts of the work.

Mr. J. MORRIS, said he might point to a costly residence, in Leicestershire, where the necessary elevation of the ground floor was obtained by a series of arches or vaults built up to the desired level.

In the present case economy was an object, and it was a natural application of the basement to use it for the servants' offices. Nothing was easier than, by planting shrubs and by forming terraces or other constructions, to shut out the view from the offices. There could, he thought, be but one feeling of admiration of the manner in which Mr. White had produced his drawings. It must be interesting to any client to see so many as were here produced; and when they were told that these were only a portion of the number actually prepared, it carried them to the question not only how architects earned their commissions, but as to whom the drawings should belong to.

Mr. WHITE.—I beg to express my thanks for your kind appreciation of what I have done. I will say a very few words upon the several points which have been referred to. With regard to the arrangement of the basement for the kitchens and other offices beneath the living rooms, and whether the dinner smells or not, I suppose I shall be better able to give you a more decided opinion in two or three years time, when I shall be happy to tell you what the experience of the house is. But the question here was this,—There must of necessity be a basement of 8 or 10 feet,—first for the sake of getting up out of the cold and damp, and next for the sake of the prospect, and it would have been a most enormous waste of that 8 or 10 feet if it had not been used for the servants' offices; and the kitchen, placed as it is, cannot give rise to any inconvenience. As far as any noise is concerned, I apprehend it would be shut out by the vaulting, and the dining room is over the housekeeper's room. The kitchen itself is beyond the whole suite of living rooms, and the entrance to it from the long corridor is at the very farthest point and beyond a glazed screen. So that any odours escaping from the kitchen would be cut off, and rather go out in the opposite direction, and the open roof of the kitchen rises beyond the main building. I consider all this part being brought into such very available communication with the living part of the house is a great advantage; but on a smaller scale I do not think I should ever build the kitchen but on the ground floor. I have built a house for myself, and have placed the kitchen on the ground level; but my neighbour, also an architect, has built the kitchen down below. With regard to the overlooking of the garden from the servants' offices, it is to be remarked that the portion occupied by the housekeeper, and work rooms, overlooks a part of the grounds which will not be much used by the family or visitors. It is not a private part at all. It is the way to the stables and entrances and different parts of the estate. With regard to the other front, it is true these windows do look upon the private garden terrace, which would be used by the family. There, I must confess, that for securing privacy, I have had recourse to that barbarous means of putting up rough plate glass to above the height of the eye, the upper part of the windows being of plain glass. Then as to the lift for dinners, I believe that a lift for dinner purposes is only a lift for smells all over the house, from what I have heard in other places. There is another point with regard to the question of sashes and casements. I have seen as much rain and felt as much wind come through sashes as casements, and I have seen casements which were impervious to wind and rain in the most exposed positions. I have also seen sashes which do let in a vast quantity of both. But my chief reason for adopting casements—and it is a point to be strongly insisted on with reference to casements and sashes—is, that if you have a sash it is a great labour and bother to raise it from sill level to such a height above the eye as to get a good clear view of the sky and scenery without trouble; whereas, if you wish to open your casement to this height at once, you do it easily, and you get your entire field of scenery and prospect, a thing which I feel very strongly upon myself, as I have a great liking for looking out of a good open window when I can. As to the down pipes in the walls, I am afraid my friend, Professor Kerr, must have put in very small pipes, insufficient for the water, and without overflow or warning, for I have myself used them in this way before with great advantage. The diameter of these pipes is 6 inches. Besides, the outer wall is

independent of the inner casing of brickwork, which lines the house. With regard to the employment of true curves for mouldings, it is a matter open to question. True curves can be constructed with little trouble or cost: they may be common-place, or may not be. Of course it is impossible to explain or define why one moulding is better than another,—why one point which is simply artistic, and not scientific, should have a result more pleasant to the mind than another. All we can aim at is a result which shall satisfy ourselves.

THE CHAIRMAN.—I am sure it is not necessary, but, as a matter of form, I will now put the motion of vote of thanks to Mr. White for the very liberal way in which he has brought before the Institute the details of so interesting a work.

The vote of thanks was then passed by acclamation, and the meeting adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 18th January, 1869, CHARLES BARRY, V.P., in the Chair, the following Discourse was delivered:—

A DEVELOPMENT OF THE THEORY OF THE ARCHITECTURESQUE.

By Professor KERR, Fellow.

IT is well known that during the last five-and-twenty or thirty years one speculation after another has been submitted in England to the public, and the architectural profession, with the view of determining the proper principles of architectural art, and of supplanting the government of certain other principles which are alleged to prevail universally, and to be erroneous, and indeed pernicious. Those who are old enough to remember the time will recollect that, at the commencement of the period "Fitness," for example, was very largely dwelt upon; "Unity with Variety;" "Simplicity with Harmony;" and so on. All these principles were, of course, in themselves extremely vague; but, practically, they only proceeded upon the supposition that we were previously possessed of the material to which to apply them,—that is to say, that the rules and examples of antiquity, and the "precedent" derived from other accepted practice, were to be accepted as a completed volume of fundamental *data*, beyond which we needed only the guidance of such general principles as I have quoted. Later in the day we had very different principles set up. We were called upon to appeal to "nature," and set aside precedent; we were asked to repudiate the mere custom of design, as an unworthy standard; we were invited to devise off-hand any number of novel forms, and even new styles, to suit passing circumstances, as if there were no limit to the resources of our ingenuity. But little came of all this; except it be that more recently still we have had an entirely new character of speculation set up, which I may call an appeal to mere sentimentalism, poetic and romantic. We are now continually called upon to discard all common and everyday notions, and to apply to a sublimated and refined imaginative sense, which they who consent to exercise it do not seem to possess, and they who suppose themselves to possess it do not seem able to communicate.

In order to illustrate my meaning, and in a manner to start the argument I am about to pursue, allow me to contrast the *dicta* of two very celebrated doctors of architectural reform. I find, in the lately-published new edition of the Gwilt of our early days, what is apparently a very excellent dissertation on Mediæval architecture; and it commences with an incidental statement of certain principles,—those of the late Mr. Pugin, on the one hand, and some of those of Mr. Ruskin on the other. Mr. Pugin's rules are the following; and you will readily perceive, although they are now somewhat old-fashioned, what a great deal of truth there is in them,—more than enough to cover a little want of precision and completeness in the scheme, with indeed occasional redundancies also:—"I. There should be no features about a building which are not necessary for convenience, construction, or propriety. II. All ornament should consist of enrichment of the essential construction of the building. III. The smallest detail should have a meaning, or serve a purpose. IV. The construction itself should vary with the material employed. V. The design should be adapted to the material in

which it is executed. VI. Pointed architecture does not conceal her construction, but beautifies it. VII. Plaster, when used for any other purpose than coating walls, is a mere modern deception. VIII. A flat roof is contrary to the spirit of the style. IX. A splayed form is necessary for piers, arches, base-moulds, strings, and copings. X. All mouldings of jambs are invariably sunk from the face of the work. XI. Large stones destroy proportion. XII. The jointing of masonry should not appear to be a regular feature. XIII. A joint in tracery should always be cut to the centre of the curve where it falls. XIV. The external and internal appearance of an edifice should be illustrative of, and in accordance with, the purpose for which it is destined. XV. It is a defect to make the two sides of a design correspondent, if their purposes differ. XVI. The picturesque effect of the ancient buildings results from the ingenious methods by which the old builders overcame local and constructive difficulties. XVII. The elevation should be subservient to the plan. XVIII. Details are multiplied with the increased scale of the building." And now for Mr. Ruskin. That very different writer's principles are stated in these terms:—"I believe that the characteristic moral elements of Gothic are the following, placed in the order of their importance:—I. Savageness; II. Changefulness; III. Naturalism; IV. Grotesqueness; V. Rigidity; and VI. Redundance. These characters are here expressed as belonging to the building. As belonging to the builder, they would be thus expressed:—I. Savageness, or rudeness; II. Love of change; III. Love of nature; IV. Disturbed Imagination; V. Obstinacy; and VI. Generosity." Now here we have two writers, both supposed to be of the same tendency, both of most muscular character, and both well versed in strong language, and notably hard-hitters; but in the one we have the practical architect, while in the other we have the mere speculative enthusiast. The contrast is suggestive in many ways, and will at least serve the purpose, I hope, of showing the need for some such endeavour as I have now to make before you.

Some of us may be reminded, perhaps, that not much more than half-a-century ago a somewhat similar bewilderment existed with regard to the art of painting; and it is a well-known fact that this was in a singularly large measure dispelled by the apparently simple proceeding of the introduction of a new phrase. We are told that words are of little value except as names of things; granted; but it often happens that a word, when it formulates an idea, and is accepted in one particular sense as expressive of that idea, does very much, not merely to bring a disputed point to a distinct and definite issue, but to clear up positive misunderstandings; and I think that in the present condition of architectural philosophy, if I may so call it, we are in a position to introduce a formulating phrase corresponding to that which was so successfully adopted in the case referred to, and, by the use of the word "ARCHITECTURESQUE," if we could agree upon a thorough understanding of its applicability, to simplify our position as regards our art of architecture, as much as the word "picturesque," introduced into this country something more than half-a-century ago, has served the same purpose with regard to the art of painting. In other words, although it is well known that this term had been used in their own form by the Italians for generations, and also by the French following them; yet, nevertheless, the effect of its acceptance in English art was much greater than might have been believed possible to attach to the mere introduction of a new word; and my proposition is, that if we will now try the same simple experiment in architecture, it will be found to succeed equally well.

The question I have to propound to you may be first put in the following form:—Is there, in our art of architecture, a certain artistic essence which is peculiarly its own? Look, for instance, at a work of mere building. Suppose it to be in point of structure a perfect work, in respect of contrivance all that could be desired, and as regards science faultless; yet, when looked at by the artist, this building shall be simply dead; devoid of everything like vitality; helplessly dumb in anything like speech. But the artist shall put his pencil over it; and, like the enchanter's wand, this shall produce at every touch

a manifest transformation. That which was dead becomes instinct with increasing life; that which was dumb speaks an intelligible and fascinating language. Now what is it that the artist has thus added, to produce so marked a change? That upon which the process has been performed was *Building;* that which is the resultant of the process is *Architecture.* Something has been added to Building; it is now Building plus something, equal to Architecture. That something I say is the Architecture-essence, and I call it "the Architecturesque." What is it? We may designate it dress. Not that I desire you to suppose that architecture is to be described as a material clothing. It is all immaterial; but we may for the present call it by the name of dress, or ornament, or embellishment, or beauty, or what such word you please.

A few months ago I had occasion to give a lecture to the junior society of our profession, and chose this as my subject. I then contented myself with endeavouring intelligibly to suggest the necessity for the recognition of this special artistic quality, and the possibility of our adopting this phrase for the sake of formulating the idea involved; and I preferred to introduce the subject in this way, in order to see whether I should be at once and with any authority contradicted, before presuming to develop my theory to this more advanced society. Well, I have not been contradicted. I do not venture to suggest that I shall not be contradicted here; but I consider I have, by my previous argument, at least entitled myself to your indulgence, if I claim permission to use the new phrase in the rest of my discourse as negatively accepted, if no more.

Let me therefore at once endeavour to find a few simple examples (and the simpler the better at present) in which to trace the initiation of the architecturesque treatment of building; (see Diagrams); and I will merely premise, by way of a general proposition, that the introduction of such a quality would be the direct result of that desire for ornament which is inherent in the human intellect—that desire which in itself, more than any other conceivable consideration, separates the intelligence of man from that of the lower animals.

On the first line of illustrations I have exhibited what I consider to be the architecturesque development of the column and entablature; not historically traceable, perhaps, but æsthetically so, which is the same. First, there is the mere trunk of a tree, set up as a pillar. It rests upon a plain horizontal sill, and supports a plain horizontal lintel; and both are squared, almost of necessity. In the second drawing the tree trunk becomes an upright stone. It is squared, and simply vertical as before; the lintel is of stone, horizontal and squared; and the sill is of stone, horizontal and squared. The third drawing shows, elementarily, the introduction of the idea of ornament, of course of the simplest possible kind. The upright pillar is furnished at the summit with what we shall call a mere projection; which is the simplest form of ornament; and the capital is thus initiated. The sill is converted, we shall for the present say, into steps, and a simple stylobate results. The lintel has a projection—I do not yet say a moulding—along its upper edge; and the architrave is initiated. A further course is added; and perhaps a third. At all events, a projection like the rest is made to crown the summit of the whole (more particularly for another reason to be afterwards explained), and initiates the cornice. Indeed, we have the entire entablature; the entire order; all the parts suggested, as I think, in the simplest manner. (Observe that the crowning projection, or cornice, is suggested with additional force if there happens to be a sloping roof above.) The next in the line of diagrams represents the full Greek Doric order in its proper proportions; and one sees at a glance how small is the step from the simple and crude result lately arrived at, to that which we are accustomed to consider as the most striking exhibition the world has ever produced of a refined architectural effect based upon the smallest possible expenditure of ingenuity in respect of forms or features. The Greek Doric is, as matter of fact, and of merit, this: the earliest and the simplest of all finished archi-

tecturesque compositions; and strange to say, with all this primitive character, in its finish so refined that it still maintains its hold as one of the most perfect works of the art. The next figure represents, not the Ionic order;—I pass by the Ionic as a mistake. I say so with all reverence for the designers of the matchless Doric and Corinthian. And in what I have presented as the typical Corinthian, I have intentionally introduced supplementary features,—for instance, especially the pedestal,—in order to show that the essential features of the order are still precisely the same, only in more ornamental development. The capital is adorned with the leaves of a plant, which happened to offer facilities for architecturesque treatment; the mouldings are carved, for greater embellishment, on a similar principle; and that is all, except that in the pedestal we have perhaps an example of what I shall presently call the Spurious Architecturesque. The last figure on the same line represents one of the Egyptian columnar compositions, and indicates a different principle of design. Observe the bell capital, originating so far in the same elementary notion of ornament as before. It does not, however, form the real summit of the shaft; there is a squared block above it, under the lintel, not easily accounted for, I think, on any very simple principle. But what is more peculiar still is, that the line of profile returns inwards at the foot of the shaft; and this, coupled with a sort of crude leafwork which is introduced at that part of the column, and also on the bell capital, gives to the whole shaft the character of being imitated from, or, more properly speaking, suggested by, some vegetable object, as if it in fact were made to grow out of the ground; a notion ingenious and interesting enough in connection with so early a period of human progress, but as an architectural, or rather architecturesque contrivance, a very inferior production beside the columns of the Greeks, a well meant, but clumsy and mistaken act of design, and so far spurious architecturesque. At the same time, observe that the elementary development of stylobate, column, and entablature, as a complete order, is the same as before.

The next line of drawings represents the development of the architecturesque in the arch. The origin of the arch is not generally properly understood. Most people suppose that the curve of the circle, as a form or shape, originated the structure of the arch. So much for our education in shapes: but nothing can be a greater mistake. The origin of the arch is simply in the disposition of timber struts, as in the first figure on the line; and accordingly, in the second figure, we have the same principle applied to stone struts, on a plan well known to have been carried out in primitive building, and by the Greeks themselves, and differing from timber-work in no respect except in the material. In the third figure we have the plain semicircular arch, and in the fourth the pointed arch, both merely structural; and I am quite of opinion that, in accordance with what I have just said, the pointed arch structurally speaking, that is, in principle of building although not in the development of art, is older than the semicircular arch;—that it is stronger, every one knows,—which affords another reason for coming to the conclusion. At any rate, there being no ornament in this line of diagrams thus far, when we begin to introduce the ornamental we go in two directions, as suggested by the remaining two examples. The one is the classic arch, with a simple architrave; and it seldom has much more in that style, which does not encourage arcuation. But the other, as an instance of Gothic tracery, I have represented in an intentionally elaborated form, to afford an opportunity for remarking that I look upon Gothic architecture as the special development of arched art, in which, throughout the whole of the most intricate of its ornamentation, there runs the structural principle of arcuation as the essence of its artistic effects.

The next line of drawings represents the development of the architecturesque in what is called a cornice. First, there is a shelf on the top of the wall. No matter for what reason in the meantime, one of the first notions which come to be suggested by way of ornament is this shelf, and it is the simple foundation of all architectural cornices. The desire to ornament the shelf would take the form

of one of two things ;—either the interposition of some sort of bed-mould underneath, or the formation of a projection, or fillet, or nosing, along the top line of the shelf itself. The Greeks proceeded chiefly upon the latter principle ; the Romans accepted both. The Egyptians adopted the former only, and in a way of their own. The Mediævalists may be said to have done very much the same. Now, if you give me leave to suppose a nosing, however simple, as in the second figure of the line, observe how readily we get to the Greek Doric cornice, as represented in the third figure. The next, again, is the Greek Ionic cornice ; in which the bed-mould certainly appears, but in the form of little else but a nosing to the frieze. In the following diagram we have the initiation of ornament in the second form of a bed-mould ; and, adding the nosing, we reach without much further intricacy of development, as the next step of the series, the ordinary typical cornice of everyday use ; from which we advance by mere degrees of ornamental detail until we arrive at such a design as that by Vignola, the last figure on the line. This, again, I therefore consider to be a palpable process of architecturesque treatment.

The remaining series of drawings represents the development of the plinth, and of the cornice necessarily in conjunction with it. The first diagram represents the upright wall and the horizontal ground, and no more. We presuppose the desire for ornamental or graceful form. That desire will first, and in the simplest possible way, suggest that the abrupt junction of the vertical with the horizontal shall be what we call eased. Accordingly we effect this by forming a connecting curve, as in the second figure. The next step is this : a profile of grace being thus initiated, and the eye not being satisfied with the abrupt termination at the summit, we desire to complete the curve ; and the simplest way, perhaps, is to return it outwards, as in the next diagram ; and this will be suggested the more readily if there be a sloping roof at the top. Another illustration, in the following figure, is the case of the ordinary profile of the Egyptian temples. The Egyptians inclined the wall itself considerably, and therefore dispensed with the plinth ; but they still required the return of the curve above, and the well-known form of their crowning cornice was the result. In the next instance but one we have the Eddystone Lighthouse, one of the most perfect designs of the kind which could be selected ; and in it we perceive a remarkably complete development of that principle of the curve of profile which I have been endeavouring to explain, and almost on structural grounds alone. The diminution from the base upwards, in the form of a perfect curve, and the return of the curve at the top, serve as completely the purpose of artistic grace as they do that of scientific resistance to the waves. Turning now to the diagram immediately before, we see again the profile of the Greek Doric order ; and I think it must be plain, that the simple development of architecturesque treatment which I have brought up to this point is precisely exemplified in this example. The stylobate gracefully connects, as with a curve, the vertical with the horizontal. The upright profile then inclines a little. The curve returns slightly but sufficiently in the capital of the column. The vertical line, however, is pursued above in the entablature, until again the curve returns, and of course much more boldly than before, in the crowning cornice, which thus becomes what I have called a shelf, suggested, perhaps, more decidedly still by the sloping roof above. And all this I say is architecturesque treatment.

The last two sketches are merely a representation of the mode of applying the architecturesque to the imitation of natural form. The one represents a cluster of common ivy leaves, the other a diapered surface embellished by the imitation of these ; and the principle in view is the well-known and sound rule that, in these imitations of nature in architecture, the forms ought to be conventionalized ; this conventionalizing being, as I formulate the matter, their subordination to architectural purposes ; that is, the application to them of the architecturesque principle.

We must next endeavour to take a somewhat historical view of the architecturesque. Permit me to observe at starting, that what we have been accustomed to call the principles of architectural design

are, if I am right, simply the principles of architecturesque treatment. Good architecture is true architecturesque, and bad architecture spurious architecturesque. And I cannot help feeling that this term, "spurious architecturesque," may possibly commend itself to thoughtful minds, as indicating in a more emphatic than complimentary manner the radical fault of our present practice in design. Here, in fact, lies the misfortune, by reason of which so many new brooms in succession are brought to bear upon the sweeping of us away altogether. There can be no mistake about it, and there need be no denial. It is our universal reproach; and what is the reason why we are in such a position? Simply this: we have been so educated. We have been educated in superficialities rather than substantialities; in the study of mere shapes, semblances, and surfaces of draughtmanship, rather than forms and features of structural art. Finding ourselves in this position, however, there is this, at least, to be said, that it is altogether a harder task to escape from it than some thinkers appear to suppose; it may take ages yet, and many ages if we do no more than we are doing.

Looking, then, historically at the development of the architecturesque, let me point out the circumstance—with which you are all perfectly well acquainted in some form or other—that there are three great schools of architecture. These are, of course, the Ancient, the Mediæval, and the Modern. Let me offer you, however, further terms of classification; although not definitively, perhaps, so much as suggestively. The ancient would be Oriental; the mediæval would be (to use an old term) Boreal; and the modern would be Occidental;—the ancient exhibiting all the repose of the eastern intelligence, the mediæval all the rude force of the north, and the modern the fickle and flexible "many-sidedness" of western civilization. Again, we call them Classic, Gothic, and Eclectic. Once more, the classic uses great stones; the Gothic uses small stones; while the modern uses any stones, and sometimes, I regret to say, no stones at all, but such a thing as compo. Then, again, the classic is effected by what our old friend Leeds called Trabeation—that is, lintel-work; the gothic by Arcuation, or arch-work; the modern by (let me coin the word) Superficiation, or surface-work. The trabeation is structural enough; the arcuation is structural enough; but the superficiation, that to which we are accustomed—and we must not attempt to deceive ourselves—is post-structural, and very often counterfeit. Once more, if I do not weary you, let me say that the ancient might possibly be designated as Philosophic, the mediæval as Cleric, the modern as Laic; and the philosophic might be considered Rational; the cleric, Poetical; and the laic, Scholastic, or Archæological, or the like; mostly imitative, and consequently shallow. We might further say, perhaps, that the ancient is Real, the mediæval Ideal, and the modern Conventional. And lastly, the ancient has, upon close observation, proved to be more peculiarly and simply Architecturesque, and the mediæval more peculiarly Picturesque, whilst the modern is simply Academic—anything that comes into request. The ancient—the more architecturesque—is spirited, although composed, and perhaps subdued; the mediæval—the more picturesque—is spirited, although discomposed, and perhaps undisciplined; but the modern, in so far as it is so largely conventional, imitational, and academic, has its materials in portfolios, not in quarries and forests, and therefore is too often spiritless and speechless; subdued enough, and disciplined enough, but dead, and that is the truth of the matter. And if we are ever to recover the life and spirit of design it can only be in one way—namely, by structuralism supplanting superficialism.

Turn now more to detail; and let me first speak of Greek design. Of the marvellous felicity of the ancient Greeks in all kinds of art I need say nothing. In the order of the arts, the first developed in any nation being sculpture, the second is poetry, and the third is architecture; and these three run often very closely together, as they did with the Greeks; painting being considerably behind, and music very much more so—not having, in fact, become developed at all in perfection until the fifteenth century of our own era. At any rate, we perceive that architecture, with the Greeks, was very early

developed; and accordingly—as, indeed, I have already incidentally shewn—it was made to deal with very simple elements. Taking, therefore, as a whole the architecturesque of the Doric order, we see that it is so purely structural as to be Spartan in its simplicity, but for its exquisite Athenian proportionment. Not only do the suggestions that are adopted in its design appear positively to avoid everything like the imitation of natural objects (obviously the royal road to ornament), but these are invariably accepted in only the simplest forms, and their treatment is of the simplest also, to the last. In a word, these Doric details are, perhaps, the simplest that it is conceivable for the human mind to put together; and yet, owing to the exquisite delicacy of the architecturesque treatment, the result, as a whole, is so marvellously perfect, as to render it almost difficult to discover how simple and prosaic are the parts. Compare with this the Egyptian subject which I had occasion to exhibit, and the contrast in simplicity, in structural propriety, and in proportion, cannot but strike every one as almost unaccountable. The one is a thing of clear and abiding beauty; the other a coarse and clumsy contrivance at the best, the column as meretricious as the entablature is meagre. In the Corinthian, again, (the pedestal of my example excepted,) the elements are precisely the same; with all its ornamentation, the features are still simple, and architecturesquely correct. The base which is now added to the column puts it at no variance with the Doric, to which, in its exquisite simplicity, no base moulding has ever proved welcome. The more developed character of ornamentation has merely applied in another item the same original principle; and the column, as a design in itself, has accepted the completed curve of architecturesque grace. The capital, again, has primarily the same architecturesque principle, which we found in the Doric; it is further embellished, but nothing more. The entablature, also, is more enriched, but the members are precisely the same in principle. The very pedestal of our rejection is in itself quite in accordance with the same rules of outline. In the Ionic we have next a design which the critic might dwell upon at great length; asking how it happens that the Greeks could have persuaded themselves to adopt the suggestion (wherever they got it) of the voluted cushion for a capital; and asking again how, having adopted it, they contrived to make so much of it. I myself have long felt satisfied,—and I am interested to find Mr. Ruskin of the same opinion,—that this Ionic capital is essentially a fallacious work, or, as I should now say, one of demonstrably spurious architecturesque; and yet it is marvellous with what completeness of artistic skilfulness it was treated in detail, so that an Ionic colonnade is made one of the most graceful things in all architecture. If I were to go on next to speak of Roman architecture, designated in general terms as the debasement of the Greek, I would say that what we ought rather to note is this: that the Greeks left their system in certain respects incompleted; that so far the Romans most successfully carried it on to further completeness; but that wherever the Greeks had completed their system, it had no further to go, and so decayed. When an architectural style, or a system of the architecturesque, has reached its culminating point, there is no resting, it must go into decadence. It is the same with any other art, as the history of all the arts alike has too often proved; and accordingly, if the spirit of the Greek architecturesque came to be lost in Roman practice, it was merely becoming exhausted in old age; and the effect was not so much the work of the Roman intellect as the work of time.

I must now turn to Gothic architecture; and here I will freely admit that I am on somewhat unfamiliar ground. Nevertheless I see clearly enough that the architecturesque in Gothic is substantially the same artistic essence with which we have been dealing in the more ancient examples. I have said that in arcuation I find the sole basis of the entire system of sound Gothic architecture. It is true that the mediæval architects began with the round arch, and used it effectively enough previously to the twelfth century; but they thus far only began to follow a then customary form of building in initiating a novel principle of art; and when this was carried further afterwards, the introduction of

the pointed arch became, not a chosen fashion, but a structural necessity. I have said that the pointed arch is in one sense of earlier date than the round arch. I mean that it is a simpler contrivance; because it retains so much of the simple form of stone struts. It is stronger, also, because of its keeping to this form; and the more pointed, the stronger it is, just as the round arch is the weaker the more it is flattened. When, therefore, it came to be realized by the comparatively unscientific mind of the twelfth century, that arcuation was to be the rule of art, to be carried out to an unlimited extent as the be-all and end-all of a style, it became an obvious consequence, I say, that the weak round arch should be given up, and the strong pointed arch used in its stead. And accordingly, accustomed, as we are, to be taught to think of arches as mere semblances or shapes, and to be plausibly told that the pointed arch originated in the interlacing of round arches, or in the copying of what the Crusaders saw in the East, or in some other idea of mere form, I still think it is a far more intelligent and reasonable theory which traces such a principle to honest structural considerations, and in no way to that mere superficialism which happily had little authority then. Thus there arose the lancet arch. The subsequent gradual depression of its form, and the introduction of more and more elaborate tracery and panelling, I consider to be simply the progress of the principle of arcuation through the process of architecturesque treatment, which continued until that particular kind of architecturesque, still seeking novelty after novelty, at length exhausted itself. And therefore, when we speak of the debased Gothic of the later periods, we are but referring, as in the case of the Romans before, to another ordinary instance of the law of nature, whereby all strength passes gradually into decay. I wish it therefore to be understood that the artistic essence in Gothic, as in Classic, architecture was based on structural principles, and not superficial.

The introduction of pointed arcuation brought with it incidentally a correlative principle of great importance and interest,—that of verticalism. For, although it is obvious that this characteristic is not primarily a condition attached to the use of the Gothic arch, yet that it became such a condition—not merely incidentally, but necessarily—seems equally obvious. In other words, arcuation being in itself of vertical tendency more than otherwise, pointed arcuation becomes *à fortiori* vertical; and thus it was that Gothic architecture become a thing of two conditions, namely, the use of the pointed arch, and the general tendency to verticalism of design; these two working harmoniously together, because the one was in fact the parent of the other.

Now I have said that the architecturesqne is still on the same ground as before—that of construction,—and, of course, proportion or shapeliness. I might cite a great many instances from the ordinary features of mediæval remains, but the volume of Gothic architecturesque is too vast, and my acquaintance with it is too small, to give me confidence, even if I had time. A mere reference, almost by way of catalogue, is all I can attempt, but it may prove sufficient to impress upon better informed minds, if they will follow me reflectively, this great principle, that building plus the architecturesque is architecture. Throughout the whole volume we can readily see how a system of definite art-treatment was gradually developed, in this feature and in that;—in pier and shaft, base and capital;—in arching, in vaulting, in groining,—all structural in essence, and none merely superficial; in the buttress, the flying-buttress, the pinnacle—still structural as ever; in plinth, string, parapet, and panel, mullion, moulding, and rib, and tracery infinite; in splay, weathering, and corbelling; in cusp, pendant, finial, crocket, boss, and foliation infinite; always resting upon suggestions of structure and grace; in carvery and sculpture, a whole volume of imitative art, extending from the heights to the depths of nature, using all forms and ideals of being, from the Deity to the creeping things of the earth, from the smile of the blessed to the scowl of the lost;—in wood-work, metal-work, glass-work, and even occasionally textile work;—and in all this the architecturesque, manifested in

certain essential principles and practices of treatment, universally governing each other in the one purpose of producing an immaterial artistic dress, the essence of all being that particular essence of art which makes of building architecture.

All that I can say of this kind must, however, be of little use until after I have attempted to lay down something like a system or scheme of the architecturesque; and I am prepared, therefore, with such a scheme, at least in a tentative form. If I cannot enlarge upon its details as I would desire, I may be able to give you sufficiently definite indications to provoke reflection and inquiry.

I. The *subject* is Building.

II. The *purpose* is Embellishment, or Dress; in pursuance of the intellectual law, which demands ornament in everything.

III. What is the *limit* of that purpose? Nothing short of infinite novelty. The mere instinct of ornamentation itself involves this further principle, and there is no escape from its authority,—the very desire which forces the human mind to the effort of ornamenting the works which it produces, forces it into the perpetual effort after novelty in so doing; in proof of which, as we all know, the most perfect device, once accomplished and fully enjoyed, soon palls upon the sense.

IV. The *means* by which material for the architecturesque is to be obtained are, I think, four:—1. Structure ornamentalised, or rendered in itself ornamental; 2. Ornament structuralised, or rendered in itself structural; 3. Structure ornamented (more or less superficially); and 4. Ornament constructed.

V. For these means we must have *sources of suggestion*, to furnish the supplies of thought; and accordingly to supply primarily features, and secondarily forms. These forms and features, I may say, arise, (1) by structural considerations, such as used to be called fitness,—namely, considerations of various materials, of their various applications, and of the various ends in view in their use. And they arise (2) by considerations of proportion, in which term I must include all shapeliness, whether superficial, solid, or linear—all order symmetry, and harmony, and whatever else of the kind there is to name. Again they arise (3) by imitation of the forms of natural objects, whether from the vegetable world or the animal, or indeed from any other natural source.

VI. There must next be *influences of control* by which these suggestions, as crudely supplied, shall be governed. These I think must necessarily be the same principles as the last, looked at as co-operating, or as acting upon each other. 1. Structural considerations will control the suggestions of proportion, and will conventionalise the imitations of natural objects. 2. Proportion and order will give to everything structural and imitational what we call scale, and array, and shapeliness of every kind throughout.

VII. Lastly, the *conclusive effects* seem to be three. 1. Grace; using the term in the old-fashioned sense, to signify any one kind or another of pleasantness, or what is indefinitely called beauty. 2. Style;—an effect with which we are all familiar, and which it is less difficult for you to understand than for me to explain, but which I may venture to define as an accord of all the parts, a unanimity of artistic expression. 3. Character;—that multiform result which one can scarcely describe except by a few hap-hazard instances. It may be, for example, the character of power, or dignity, or grandeur; that of elegance, or lightness, or richness; the character may be fanciful, or severe, or symbolical, or devotional; or religious, in accordance with any one of many ceremonial systems; it may be domestic in various forms, civil and rural; it may be ethnological, as regards race; or geographical, perhaps rather climatic, as associated with different countries; and lastly, it may be a character more or less exclusively architecturesque, as in Greek work, or more or less intentionally

picturesque, as in Gothic work, or as in some of our modern work, it may be occasionally more or less unintentionally grotesque.

But when I have thus set forth my principles, it is too plain that, whatever amount of illustration and experiment they demand, I have no opportunity on this occasion of trying their effect in criticism; indeed it would require a book, and perhaps not a small one. I can do no more than attempt a few special applications of the architecturesque principle, which may only after all be more suggestive than instructive.

First, take the old problem of the steam engine. The very mention of such a thing nowadays provokes a smile; but some of us are old enough to remember when it was a grave and serious question how to make a steam-engine ornamental by means of architectural treatment. I think the phrase went literally thus:—"How to apply the five orders to the steam-engine?" The first question was, which of the five orders was the most suitable; and this I think was generally decided in favour of the Greek Doric; and accordingly, hollow castings of the most perfect Academical pattern—six diameters high and three-eighths of an inch thick—were solemnly set up to begin with. That they were not columns at all, but empty rinds of columns was never thought of, and the next question was how to adapt the entablature. If I remember aright, the pediment was given up, as a bad job: but architrave, frieze, and cornice (or rather, still the mere rinds of them) were all turned ingeniously to account, and the arrangement very much admired. But how entirely absurd all this was I need not say. In a word, a steam-engine is a subject which of course it is impossible to architecturalise. One might just as well think of applying architecture to a speech or a song: all alike and almost equally are illustrations of that to which the architecturesque cannot possibly be applied.

Take, however, as a second instance, a bridge; and here we find ourselves on very different ground, although at the same time, it has to be acknowledged, the application of architectural features has not been much more successful here than before. A bridge is considered a work of engineering, but that means nothing: it is a work of building, and the principle of building-ornamentation, the same architecturesque which we have been dealing with, has to be applied to it. Occasionally, where extreme simplicity has been adhered to and affectation thus escaped, a bridge has been somewhat suitably treated; but what shall we say of the new bridges on the Thames? They are ornamented after a fashion, and almost elaborately; but I fear we cannot say the treatment has been architecturesque. Even if they have abandoned the old nostrum of setting up a pair of columns, like sentinels, at each successive pier, yet they have got little of anything that is better. That treatment which should be applied to them is, as I have said, the architecturesque and no other; but it must be the architecturesque of a bridge, arising out of the conditions of a bridge, and not the copy of something else which has nothing to do with a bridge.

Again, what shall we say of a wharf or quay wall? Looking at the Thames embankment, for example, from Westminster Bridge, one cannot help feeling what a noble composition it might have been made, in all its simplicity, massiveness, and unaffected majesty, if it had been fairly treated in an architecturesque manner. The landing stages and other such features appear to exhibit a certain muscularity and power of design: but at the same time, we may suggest that there is an opportunity lost in that noble, simple work of weighty building—an opportunity which might have endowed London with one of its most impressive ornaments, one that might have been pronounced worth the money in art as well as in utility.

And now let us look for a moment at the Crystal Palace—not with reference to the building itself, but more particularly with reference to its particular mode of construction. The Crystal Palace was not meant to be an ornamental structure; but why not? The question of ornamentation had not been

disposed of; it had been merely avoided,—no doubt for special reasons; but the circumstance serves to raise the whole question of the application of the architecturesque to iron work. Now, when we hear declamations about new styles, and feel that the declaimers little know the real question, we ought at least to remember this,—that a new material requires a new style of architecture; and, to my mind, if there is one circumstance which more than another attaches discredit to us—(you will, I am sure, excuse me if I state such a case boldly, because amongst ourselves there is certainly nothing like frankness) if there is one fact which more than another tells against us with the common sense of the public school of critics, even when they are not able clearly to understand the principles by which these matters are governed, it is this,—that whilst we have been in possession of this new material—especially in the form of rolled iron—a considerable number of years, we have yet to take almost the first step towards the treatment of that material in an artistic manner! We have been applying mere superficialist and spurious principles all the time, and have not at all grappled yet with iron in a properly structural and architecturesque way. But we may pause to reflect, on the other hand, that this shows how slow is the growth of a new style; for, educated as we have been, even when the fair field is offered to us of new materials,—and we may have many before long,—it is plain enough that we can do very little in a generation. Perhaps I ought to say that it has taken ages in every instance to effect a real change of style. Even with the Greeks, when the world was young and fresh and unsophisticated—great as was their felicity in all arts, and comparatively rapid as was their attainment to perfection in all, it required, as matter of fact, a considerable period even for them to arrive at what they did.

I should like to mention next, more particularly for the consideration of our younger members, two problems which I think must puzzle them. The first is the Egyptian pyramid. When those of us who are not yet old were boys, reading the old-fashioned form of architectural history, they all began, we remember, with a description of the Egyptian pyramids,—they were of undetermined age, of inconceivable bulk, of incomprehensible purpose, at once the earliest and almost the noblest works of architecture, and so forth. But now, looking at them from a more properly architectural point of view, we know better. Their builders, we say, may possibly have applied to them an average amount of skill in proportioning their form, but beyond that there is no architecture whatever in their composition, they are works of mere building. Now, if it is possible to make all building artistic by applying to it the treatment of the architecturesque, I should like to see some of you try to make the Egyptian pyramid architecturesque without sacrificing its peculiar character, and especially avoiding the sacrifice of scale.

The second puzzle I refer to is the common roof-truss. I think few subjects are more difficult than this to treat artistically. We must bear in mind that the structural conditions must be adhered to, and indeed expressed throughout; that nothing is to be disguised, but every point of purpose properly exhibited. I have no doubt the architecturesque has forms and proportions at command to apply to this particular case; but it is a fresh instance of our false education if we find it so difficult to discover them.

Let me now refer to a few cases of another kind, not purely architectural, but sculptural, involving the question of architecturesque treatment. First, if we take our old friend the equestrian statue of the Duke of Wellington, upon the gateway at Hyde Park Corner, we find that subject still as unpopular as ever. The reason, I submit, is that the statue is architecturally treated, but not architecturesquely. Artists universally protested at the time against the statue being placed where it is; and probably their representations might have succeeded, but that the government of the day were unwilling to deprive the great soldier of the pleasure which they somehow imagined he would feel in

looking at it from his own windows. That a more inappropriate pedestal could scarcely be contrived is admitted on all hands; but the reflection how easily the proper treatment could be effected seems to me to increase the absurdity of the case. A statue of that type and of colossal size ought to be treated, I think, with a special eye to simplicity, or the grandeur of the sculptor's motive is lost. The complete subordination of the pedestal to the figure is another self-evident essential. That the character aimed at should at the same time be that of magnitude, enhanced, if possible, may also be taken for granted. Let us suppose, then, this statue to be placed in an open space; elevated, but not too much, on a massive block of masonry, rectangular and plain, not too large, of course, but not so small on plan as the usual proportion. Around this majestic base let a stylobate of many steps descend to the level ground, and let there be nothing more. I venture to think that this simple mode of true architecturesque treatment might be found, not only to dispossess London of an eyesore, but to supply in its stead an exceptionally noble monument.

The Egyptian statuary, the Assyrian, and the Persian, appear to me to be remarkable for their peculiarly architecturesque treatment. In early times not only was the treatment extremely simple, but the somewhat crude and eminently conventional forms in which the figures were designed have always seemed to my judgment to accord with the character of architecture better than any superior or more natural work I know. When the Egyptian sculptor modelled, for instance, his colossal lions, we must not suppose that he conceived himself to be imitating the natural lion faithfully. I think he was, on the contrary, expressly conventionalising the lion, for a purpose. That rigid stony repose, the stiff symmetry, and the lack-lustre expression, he was accepting as conditions of building; he was architecturalising the lion, he was treating him architecturesquely. Again, if we look at the spandril sculptures of Persepolis, and certain early instances of the treatment of figures like the heraldic supporters of later times, we can scarcely fail to see that what I may call their peculiar stiffness is an architecturesque intention of the designer.

I need scarcely say that the Caryatides of the ancients are also notable instances of architecturesque treatment. I think no figures have ever been devised since the Greek age so well suited to the special purpose of supporting an entablature as those belonging to the Erechtheum. There is a certain muscular rigidity, a weight-bearing repose, even in the fall of the drapery there is an expression of structural resolution, which gives a sort of columnar vitality to these figures, so different from deadness of any kind, and all the while so stone-like, that a better instance of the skill of the Greeks in positive architectural effect is scarcely to be found.

If I speak next of the Gothic grotesques, passing in a manner to the very antipodes of architectural sculpture, I feel that I am still able to describe them as being architecturesquely treated. It is true they are not always to be admired; but when a building of picturesque character is so designed as to sparkle (if you will allow me the word) in the peculiar way that I will venture to designate as *Gothique piquante*, these oddities seem to focus the attention,—especially if they are made to occupy the precisely right points,—and the charm of the picturesque treatment is legitimately accentuated and enhanced.

One more illustration, and the last, shall be our celebrated lions in Trafalgar Square. These figures are, I believe, universally admitted to be not only successful, but successful in the highest degree; and they will serve our purpose therefore all the better. Of course we know that the lions were expressly designed as part of an architectural monument; and what we have to consider is the process by which the artist gradually brought the subject from the purely natural condition to the conventional condition in which we find them. Fortunately, also, for this illustration, Sir Edwin Landseer happened to be professionally more of a painter than a sculptor. Lastly he was a painter of the common sense school. Accordingly it is understood that when he received the commission to model

these lions, instead of diving down into the depths of his inner consciousness, like the typical German, to grasp the idea lion, he went like a Briton to the Zoological Gardens, and sat down to contemplate the beast himself. I daresay when he came to look long enough into the amiable if not vacant countenance of his subject, the conclusion was forced more and more upon his mind that the animal was irrecoverably demoralised. He had been lying more or less hungry behind those iron bars for year after year, seeing unlimited supplies of his natural food passing continually by, but daring to hope for nothing better than a stale beef bone to be supplied to him at a certain hour in the afternoon, with a regularity in itself as irksome as everything else. No wonder then that this lion was so different from one's ideal of the king of the desert in the freedom of his natural condition; but there he was, and all the artist could do was to have him stirred up now and then, in order to force a little more life into his eyes, and a little more of Mr. Ruskin's Gothic "savageness" into his fangs. At any rate, the artist, being a painter, no doubt made sketches of the lion on paper; (had he been no painter, but a sculptor, he would have made sketches, not on the flat at all, but in the round alone;) and so sketching the animal as he found him, the sketches were no doubt faithfully *naturalesque*. But these the experienced animal painter could readily enough transpose into a more expressive form; he substituted for the listlessness of the cage the ideal animation of the wilderness, and the amended sketches became *picturesque*. The next step, no doubt, was to make a sculptor's sketches in the clay by help of these painter's sketches on paper. In so doing, he was manifestly transferring his subjects from the picturesque to the *statuesque;* and there would come into the work more and more of that repose which is so essential to the statuesque character. The artist would then probably take into consideration,—at any rate more definitely than before,—a new question, namely, how to render this the merely statuesque figure suitable for its architectural purpose. This was applying to it at length the *architecturesque*. Now that part of his theoretical purpose I consider he has not performed at all fully; the lions are by no means, I think, completely architecturalized; and I, for one, quite approve the shortcoming; for this reason. If the artist had conventionalized his figures as perfectly as the Egyptians did theirs, people would not have understood him; he would, in this country at least, have been ridiculed for ages,—caricatured and lampooned in Punches yet unborn. Whether he could have accomplished the perfection of architecturesque treatment I do not say. But, considering how much safer it was for him to stop at the point of statuesque success with a slight, but very slight application of the architecturesque,—just a sufficiency of symmetry and rigidity to adapt them to their position and no more,—I venture to say that he has produced works which are perfect for their purpose, as appealing to the ordinary common sense of the British intellect. I am willing to believe that so great an artist has in this way intentionally restrained himself, accepting the risk of the ultimate censure of the dilettante rather than the certainty of the immediate dissatisfaction of the passer by; and I do not hesitate to repeat that, in my humble judgment, this does him all the greater honour as an artist of sound and simple common sense.

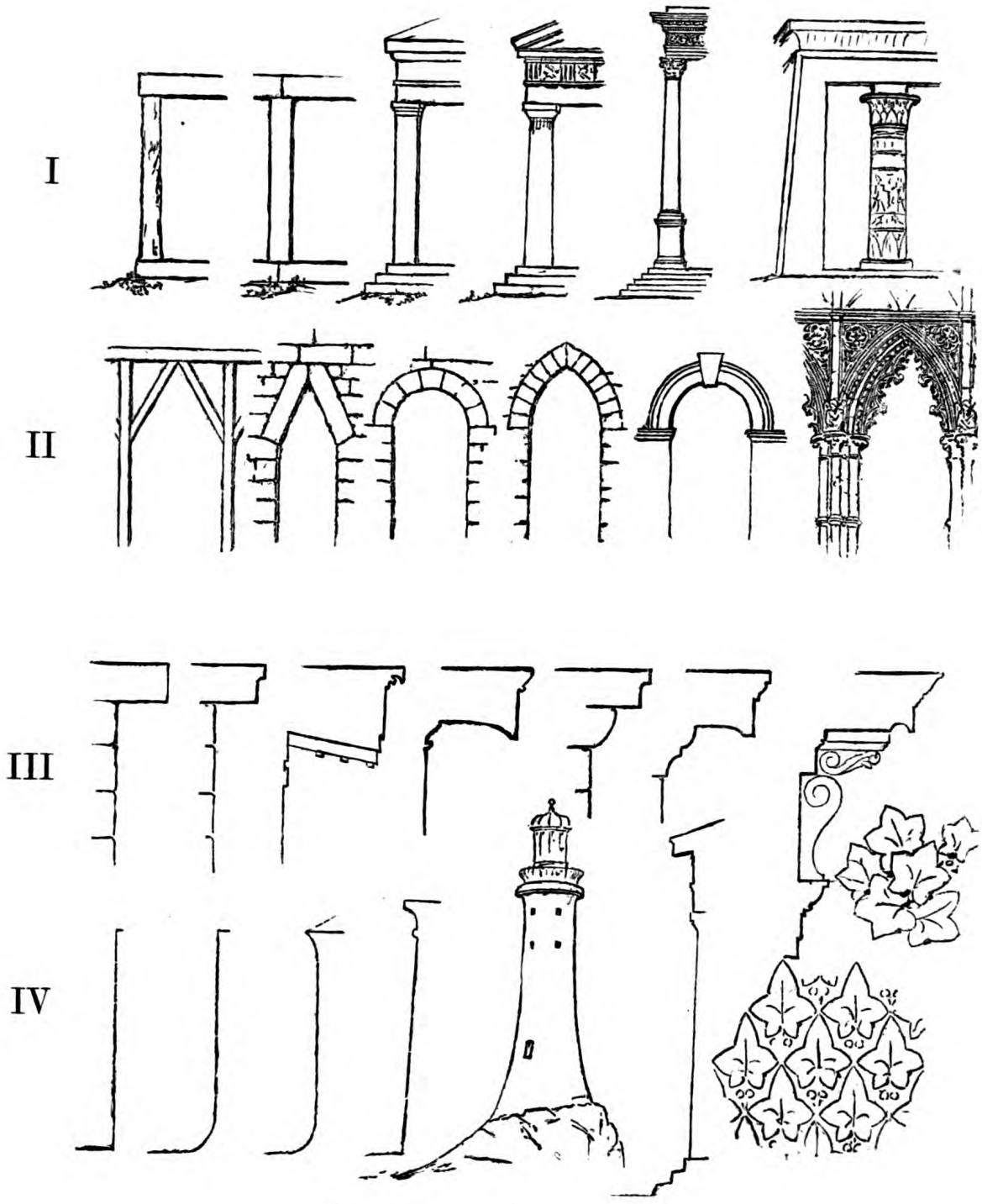
If I had had time, I should have been glad to enter somewhat at length upon the important question of what I have called the spurious architecturesque. I fear you will be inclined to say that I have taken upon myself to confess a great deal on your behalf without asking leave; you may think I have, as matter of fact, confessed too much. But let it be even as I have hinted, we have still a word to say. If we architects are thus guilty of so much that is spurious in artistic principle, there must be for this effect a corresponding and equivalent cause. Is there not here and there, in matters besides architecture, and in perhaps, much more important matters, a good deal of more or less spurious sentiment? Do we not live in the very age of spurious sentiment? History, philosophy, law, politics, poetry,—is there not but too much of spuriousness in every one of these? Faith, hope, even charity,

are they not conventional to the core? And if we, as the custodians of an art whose essential attribute it is to reflect the character of the time, reflect this character all too faithfully, what less than this, and what else than this, could we be expected to do?

After a few remarks from the chairman on the exhaustive and elaborate character of Professor Kerr's discourse,

Sir M. DIGBY WYATT, while remarking that the lateness of the hour rendered it out of the question for the present to enter upon a discussion of the subject of the discourse, could only now express generally, his admiration of the rhetorical skill and subtlety of thought with which the subject had been treated, and so move a vote of thanks to Professor Kerr.

Mr. SEDDON seconded the motion in a few remarks of the same import, and the vote having been passed with acclamation, the meeting adjourned.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Royal Institute of British Architects.

At the Ordinary General Meeting held on Monday, February 15th, 1869, JOSEPH CLARKE, V.P., in the Chair, the following Paper was read:

ON THE SCIENCE OF COLOUR.

By W. BENSON, ESQ.

I PROPOSE in this paper to devote myself mainly to point out some particulars in which it seems to me, after a long and careful study of the whole subject, that the theory of colour usually maintained is not exactly what it ought to be. I will not dwell, therefore, on those accepted principles which are undoubtedly true, nor upon those useful rules and directions which have been deduced either from theory or from practice and observations, by the authors of several admirable works on colour, which have appeared of late years, to whom we are indebted for the evident improvement which has recently taken place in all sorts of colour decorations. And if I venture to dispute some doctrines which have, I think, been taken on trust too hastily by the same authors, and have acquired thereby an authority which they do not deserve, I hope I shall not be regarded as an opponent, but rather as assisting in the same work in which they have so earnestly and successfully laboured. For it seems to me that much of the value of what has been ascertained about colour is lost through a misconception on some essential points; and that important discoveries have been fruitless for want of being known and understood by those who should use them. Though nature affords us a marvellously beautiful and easy mode of instructing and directing the eye in colour, its use has been hitherto ignored in art. Fancy has been often substituted for reason, and authority and positive assertion for evidence; and even when experiment has been appealed to, it has been without understanding its meaning. Hence principles have been laid down as fundamental truths which have no foundation in nature, and are of course useless in art.

If, by elucidating some neglected points, I can succeed in bringing them into the notice they deserve, and induce artists to apply them in practice, and thus aid in establishing correct principles in the world of art, I feel sure that their value will soon be acknowledged, and that no lover of art will have reason to regret the attention which is needful in this, as in every other study, to emancipate the mind from erroneous first impressions, to understand the truth, and to know why it is the truth. Even the increase of interest and beauty in the subject he studies will repay his trouble, without regard to the practical advantages which always attend the right application of science; and the disinclination which many feel to the union of science and art, arising mainly, no doubt, from the felt inutility of spurious science, will be quickly exchanged for congratulation, and desire for more of that good fruit which commends itself to our taste.

In this assembly it will, I suppose, be generally admitted that colours are nothing but sensations excited in the eye by light; nor will it be necessary here to state the proof of what has been believed by all scientific men ever since the era of Newton,—namely, that there are innumerable different kinds of light, each distinguished by its peculiar refrangibility, and the peculiar sensation of colour with which it affects the eye; and that the colours of all objects are combinations of the colours of those particular kinds of light which the same objects may happen to send to the eye.

Now if this is true, and there is nothing in science better established, then assuredly the knowledge of that splendid series of colours which constitutes a perfect prismatic spectrum, and contains in fact the colours of all possible kinds of light arranged in the order of their refrangibility, and therefore the elements of all colours in nature, must be the foundation of the science of colour, or at least a very essential part of that science. For, to take that fundamental question on which so much has been written, What are the simple or elementary colour sensations? if we can show that there are some two of these prismatic rays which, when they enter the eye together, uniformly produce a sensation exactly the same as that produced by a third alone, it is reasonable to conclude that the latter sensation is compounded of the two former; and if we further show that the two former sensations cannot be produced by the mixture of any other rays, then it is reasonable to conclude that they are either simple uncompounded sensations, or at least that they present the nearest possible approach to such simple uncompounded sensations. If, in short, we can prove that some of the prismatic colours are capable of producing by mixture all the rest, whilst themselves are not produced by mixture of any of the rest, we may, for all practical purposes, treat them as the real elements of colour, and dignify them with the appellation of primaries, in preference to all the rest; for if these prismatic colours, when mixed, can produce the other prismatic colours they can *a fortiori* produce all the colours in nature which are merely mixtures of the prismatic colours. The great difficulty and difference of opinion that has prevailed about the question of primary colours has arisen partly from ignorance of the cause of the colours of pigments and other bodies, and partly from ignorance of the nature of the prismatic colours. Here lies the peculiar complication which proves a stumbling-block to many at the threshold of the science. A double analysis has to be made of the colours of natural objects before we can arrive at the real elements of colour. It seems difficult to analyze them into their component prismatic colours, but this is not enough; the prismatic colours themselves must also be analyzed into the real elements of colour. We must find out whether the sensations excited by the simple homogeneous rays are themselves simple or compound, and which are simple and which compound.

Newton, with marvellous skill, effected and proved the first analysis, by the aid of a prism, and called the prismatic colours primary colours, because he did not go on to investigate the relations of these prismatic colours to each other, but assumed, as it seems, that they were all equally simple and uncompounded, notwithstanding that in some of his admirable experiments he found that adding together parcels of the prismatic rays produced colours which were identical with those of other simple prismatic rays.

About a century after Newton, the great German astronomer, Tobias Mayer, observing that it was possible with mixtures of red, yellow, and blue pigments to produce an imitation (though but a poor one) of all the prismatic colours, concluded, too hastily, that these three alone were simple colours, and deserved the name of primary colours. We do not read that he tested his conclusions by any cross experiments, or, in the manner of Newton, investigated the way in which the colours of pigments and of their mixtures were produced,—otherwise he would not have failed to find out what Newton had clearly stated before him, over and again, that pigments act by destroying light, and that the colour of the mixture of two pigments is not a mixture of their separate colours, but merely the colour of those prismatic rays which both of the pigments leave undestroyed, some colour, in fact, which is common to the colours of both of the separate pigments. But Mayer's views were plausible; they seemed obvious to the eye; the illusion they concealed was not easy to make so clear; they were adopted and laid down authoritatively by Scheffer, in his 'Art of Painting,' and by other writers; and, therefore, without any scientific examination, they were, and are to this day, received by people in general as undoubted truths, and form the foundation of that system of colour doctrine which is now taught even in our Schools of

Design, under the authority of the Department of Science and Art; and which also prevails on the continent.

After the lapse of another century, however, some accurate observations have at length been made upon the prismatic colours, which, though they have remained for now eight or nine years almost unnoticed by practical men, will, I doubt not, in future be regarded as having established the true theory of colour, and as having relieved the student in this department of art from the difficulty or impossibility of reconciling the requirements of a false or defective theory with the approval of a refined taste or a nicely discriminating eye. The experiments I refer to are those which were made by Professor James Clerk Maxwell, on the proportions in which different sets of three rays taken from different parts of the spectrum must be combined in order to produce the sensation of white, and will be found detailed in the Transactions of the Royal Society for 1860, to which I must refer those who would fully understand the process employed. They constitute a sort of trigonometrical survey of the spectrum, on a principle which determines the relations of the colours of all the prismatic rays to each other. These experiments were made with a refined apparatus, and repeated many times over by different observers, to ensure the correctness of the results; and they distinctly prove that three of the prismatic colours, namely, the best red, the best green, and the best blue, which occur near the beginning, the middle, and the end of the spectrum, when mingled altogether, produce white, like the mixture of all the prismatic colours; and when combined in pairs produce all the intervening prismatic colours in the full strength which they possess in the spectrum: that is to say, the prismatic red and green, when combined in different proportions, produce the prismatic orange, yellow, and yellow-green, which lie between them in the spectrum, and the prismatic green and blue, when so combined, produce all the intervening seagreen hues. Hence it is evident that all the colours in nature may be exactly imitated by mixtures of the prismatic red, green, and blue; and this is not true of any other three prismatic colours. If, for instance, we take certain proportions of the prismatic yellow, seagreen, and violet, we may be able to produce white by the mixture of all three, and we may also be able to produce a pale red by a mixture of the violet and yellow, a pale green by the mixture of the yellow and seagreen, and a pale blue by the mixture of the sea-green and violet; but we can never so produce the deep red, green, and blue, which strike the eye so powerfully in the spectrum. For those three prismatic colours exceed all their intervening colours in strength of hue, and therefore cannot be produced by mixtures of their intervening colours. It is because of their superior strength that when we look at a tolerably pure spectrum it seems, at first sight, to consist of bands of red, green, and blue, alone; and only on a more careful inspection does it appear that the red passes through a regular gradation of colours to green, and the green through another regular gradation to blue. Thus the natural judgment of the eye perfectly accords with the results of these refined philosophical experiments, and the observation of Aristotle, the first observer of nature whose writings have come down to us, and one of the greatest that the world has ever seen, that scarlet-red, green, and violet-blue, are the colours of the rainbow, has been confirmed, after the lapse of more than twenty centuries, by the refinements of modern science.

There is perhaps no better way of exhibiting the meaning of the numerical results obtained by Mr. Maxwell, than the curves which he used for that purpose, enlarged copies of which I have prepared to illustrate this paper.

In fig. 1 the positions of the colours of the spectrum are laid down in such a manner that the colours produced by mixing any two of them shall lie in the straight line joining those two. The form of the curve approaching to two sides of a triangle, whose corners are red, green, and blue, shows that the intervening prismatic colours may be produced by mixtures of these, as yellow by red and green; and the position of white being also marked indicates the nature of all other mixtures, as the light

green produced by mixing the colours at *e* and *i*; and also points out the pairs of complementary colours, namely those which lie in any straight line drawn through the place of white, as yellow and blue, at *d* and *l*.

In fig. 2 the relative intensities in which the colours of the best red, green and blue rays exist in every part of the spectrum, are indicated by the ordinates of the three intersecting curves. The italic letters in these two diagrams mark the places of the particular rays at equal distances apart, on which Mr. Maxwell experimented, the colours of which are described by him as follows:—

At *a*, red.	At *e*, yellow-green.	At *i*, blue green.	At *n*, blue.
b, scarlet.	*f*, green.	*k*, greenish blue.	*o*, indigo,
c, orange.	*g*, green.	*l*, blue.	*p*, indigo.
d, yellow.	*h*, bluish green.	*m*, blue.	*q*, indigo.

The capital letters in fig. 2 mark the places of the well-known Fraunhofer's lines in the solar spectrum, which serve to identify the rays experimented on.

From these facts, then, it is scarcely possible to doubt that the prismatic red, green and blue give the nearest possible approach to simple sensations of colour. What simpler explanation can be given of the wonderful sequence of colours in the spectrum, than that the eyes of all persons who possess the ordinary faculty of discerning colours* are capable of three colour-sensations alone, and that one of these, red, is excited most strongly by the less refrangible rays; another, green, by the rays of mean refrangibility; and the third, blue, by the more refrangible rays: intermediate rays exciting the first and second, or the second and third sensations simultaneously, with a more or less near approach to equality? But here it should be observed that these three simple sensations are not excited with equal depth, that is, with equal approach to purity, even by the rays which are best of each kind; the deepest in colour of the three rays is the blue, which is far the least luminous in proportion to its strength of hue; the next deep is the red, and the least deep the green. In other words, the prismatic blue is less diluted than the red, and the red less than the green. While, therefore, there is no evidence that even the sensation of blueness can be excited with perfect purity, it is certain that that of redness cannot, and still less so that of greenness. It is well to bear in mind these essential distinctions in the depth of colours, not only because they give the reason why so many blue and red pigments, flowers, and other coloured surfaces, excel in depth and power the best of a green hue, but also because, if I am not greatly mistaken, the depth of a colour is almost as important a consideration as the strength of hue, or even as the hue itself, in any composition of colours.

I will now pass on to the exposition of the colours produced by throwing together different continuous parcels of the prismatic rays, and excluding the rest, which seem to me to constitute a very interesting part of the science of colour. For the methed of exhibiting these, I must rely on experiments devised by myself. These colours are the most distant of all possible colours from that neutral gray, which is the mean or average of all colours, and are therefore the most striking colours that the eye can behold. This follows from the circumstance that the prismatic colours (which are all the best of their respective kinds) change gradually from one into another in every part of the spectrum; so that if we want the best possible colour of any given hue and brightness, we must collect the rays which fall on each side of that point in the spectrum where the given hue predominates, until we gain the given brightness; or if it be a mixture of red and blue, we must throw together rays from the two

* An extraordinary dichromic vision is more frequent than is usually supposed, in which yellow and blue are the only distinctions of hue, the red and green rays not appearing to differ in hue from the yellow.

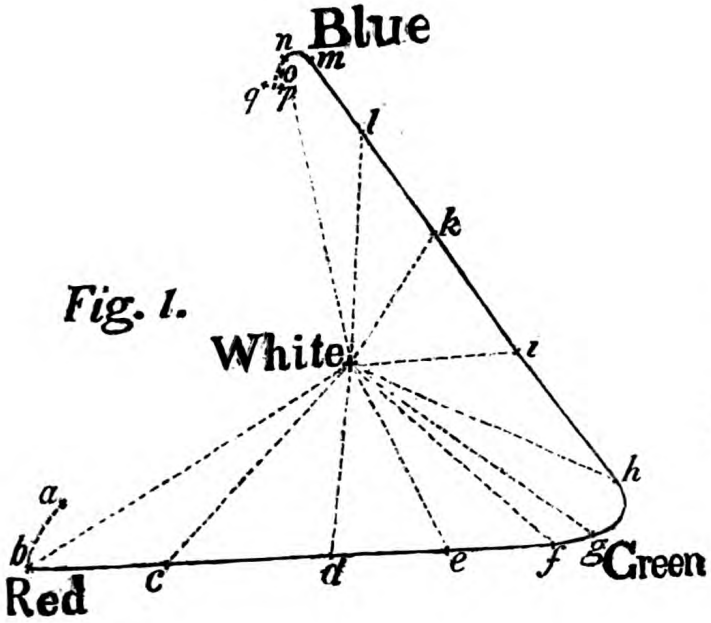


Fig. 1.

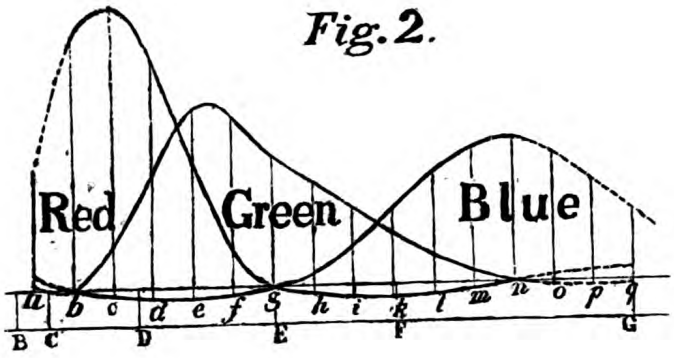


Fig. 2.

Fig. 3

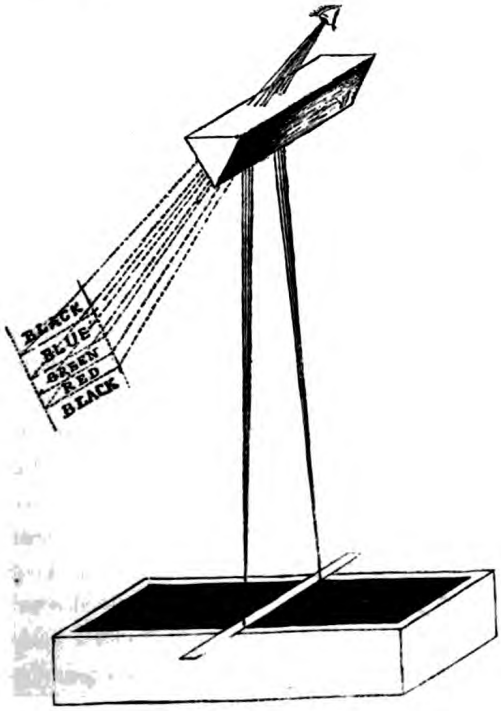
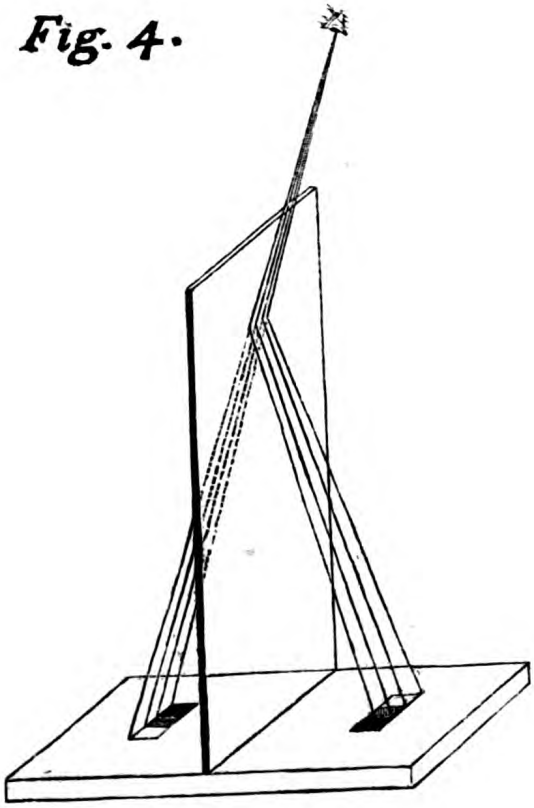


Fig. 4.



ends of the spectrum, omitting the rest. The colours of the most vivid pigments, flowers, or solutions, do not equal those of perfect continuous combinations of the prismatic rays, because no substance whatever sends to the eye all the rays of one part of the spectrum, and utterly destroys all the rest. It is, however, easy to see these beautiful colours by means of artificial combinations of the prismatic rays; every one, indeed, who has amused himself with looking at the edges of white and black spaces of different breadths through a prism has seen them: and the study of them is very instructive—I mean the intelligent study of them, not the mere bewildered admiration which they excite when their cause and their meaning is not known.

When we look at the spectrum of a broad band of white upon a black ground, the prism being parallel to the edges of the band, and held so near to it that a white space shall appear in the middle of its spectrum, we have in that spectrum, on its nearer side, a series of all the colours produced by adding together different parcels of the prismatic rays, beginning from the least refrangible or red end; and on its further side a series of all the colours produced by adding together parcels of the same rays, beginning from the most refrangible rays.

The first series begins with red, the deep dark red of the beginning of the spectrum; then brightens into the most intense red which the eye can be affected with (in that degree of light of course out of which the spectrum is produced) by the addition of all the red rays together. This then turns to a still brighter orange by the addition of the orange and yellow rays; then to a still brighter yellow, the most powerful the eye can behold, by the addition of all the green rays. This becomes a still brighter but paler yellow, like that of lemon-yellow paint, by the addition of the seagreen rays, and finally by the addition of all the rest of the rays (the blue and violet) it is converted into the full white. The observer cannot fail, however, to notice here three prominent bands of colour corresponding with the three of the pure prismatic rays, namely, (1), the red; (2), the yellow, produced by the red and green bands of the simple spectrum being thrown together; and (3), the white, produced by the red, green and blue bands of the simple spectrum being thrown together.

The second series begins with the extreme dark blues; which changes into full blue by the addition together of all the blue rays of the simple spectrum; then changes again into a brighter seagreen-blue, and still brighter seagreen where all the green rays are also added to the blue, and then to a still brighter but paler seagreen where the yellow rays are also added; and, lastly, becomes full white, where all the red rays also are included. Here, too, may be seen three prominent bands of colour—(1), the blue; (2), the seagreen, produced by the blue and green of the spectrum being thrown together; and (3), the white, produced, as before, by the blue, green and red of the simple spectrum being thrown together.

If we look at the spectrum of a broad black band upon a white ground, the same colours are of course seen, but reversed in position; the prism being held sufficiently near to leave a black space in the middle of the spectrum. All these colours are plainly combinations of different parcels of the pure prismatic colours, beginning always at one end or at the other end of the spectrum. This is easily seen, when we consider that the effect of the prism is to displace to different distances the several prismatic colours of which the white band in the one case, or the white ground in the other is compounded, thus causing different parcels of them to overlap each other.

If now instead of holding the prism at such a distance from the broad band of white that white is seen in the middle of its spectrum, we hold it further off, or if we look at a narrower band of white (which amounts to the same thing), we obtain combinations of limited parcels of the prismatic colours, beginning either from the ends, or from some points within the spectrum; and the further off we hold it, or the narrower the band is, the smaller the parcels of rays that are combined, and the nearer the

colours approach to the pure prismatic colours. The distance of the prism from the band may be easily so adjusted to the width of the band, that all the green rays are thrown together; and then we have the most vivid green the eye can behold; and the same adjustment will give us also very nearly the most vivid red and blue, so that in this spectrum we have the three primaries in almost their greatest strength—losing, indeed, somewhat of the depth of hue which they possess in a pure spectrum, but gaining more than they so lose in the strength they acquire by the addition of more light.

If we turn to the black band again, and either make it narrower, or put the prism at a greater distance from it, we obtain combinations of two limited parcels of the prismatic rays taken from the two ends of the spectrum, and it is not difficult so to adjust the distance of the prism in reference to the breadth of the band, that all the red rays shall be thrown together with all the blue in the middle, and produce the brightest and best pink which it is possible to present to the eye. The same adjustment will also suffice to throw nearly all the red and green together, and also the green and the blue rays, so as to give us the best yellow and seagreen, producing a beautiful series of the secondary colours, seagreen, pink and yellow, about twice as bright as the spectrum of primaries last described.

[Coloured diagrams of all these four spectra were exhibited, showing the gradations of their colours. In the plate accompanying this paper the chief colours in each of the same spectra are represented without the intervening gradations, which cannot well be printed. These are taken in the upper part of the plate, from the spectra of the narrow white and black bands, namely,—

Blue.	Yellow.
Green.	Pink.
Red.	Seagreen.

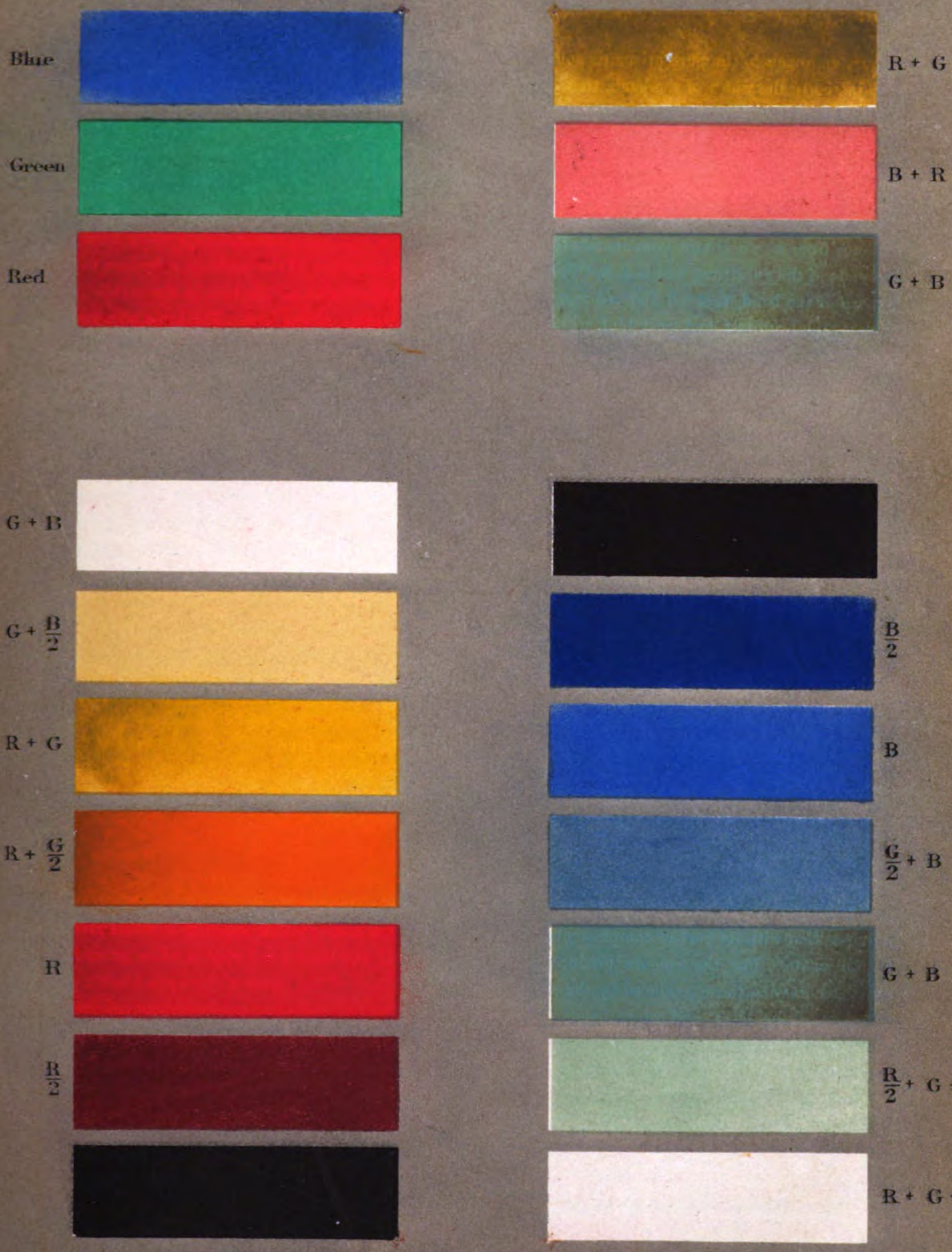
And in the lower part, from spectra of white and black edges (forming half of the spectra of the broad white and black bands), namely,—

White.	Black.
Light Yellow.	Dark Blue.
Yellow.	Blue.
Orange.	Seagreen Blue.
Red.	Seagreen.
Dark Red.	Light Seagreen.
Black.	White.

The constitution of each compound colour is shown on the margins.]

There is one grand advantage in these beautiful combinations of prismatic colours, which greatly increases their utility, which is that every one of the colours thus produced may at once be placed in juxtaposition with its perfect complementary colour, that is, the colour which added to it would produce the full white. For the colours produced in the spectrum of the black band upon a white ground are complementary to those produced by the spectrum of a white band of the same width upon black; and, therefore, if the black and white bands are placed together, end to end, the complementary colours are seen to admirable perfection, without a possibility of any mistake. In that case, it is easy to see, (as I have explained in my treatise on colour), that the opposite colours are really perfect complementaries; for if the white band is superimposed on the black band, its spectrum is superimposed on that of the black band, and the result is the full white. The best and easiest way to see these colours is to view through the prism the object cut out in white paper, laid over a dark cavity, whilst itself is illuminated, if possible, by the direct light of the sun. The prism should, of course, be opposite to the middle of the object, and parallel to it, and the refracting angle should be so directed that the spectrum deviates as little as possible from the position of the object. It should also be shaded from light, which might otherwise be reflected from its surface, and interfere with the view of the spectrum.

DIAGRAM of the PRINCIPAL COLOURS, and some of their MEANS, as seen by the aid of a Prism.



W. Benson, inv.t

Lithog.d for the R.I.B.A. by Kell Bros. Castle St. Holborn. E.C.

Fig. 3 is intended to aid those who have not been accustomed to use a prism, to place it in the proper position.

The principal prismatic colours and their combinations constitute the very alphabet of the science of colour, and are as essential to any intelligent acquaintance with it as the system of notation is in arithmetic, or the scale of notes in music. It is a most fortunate circumstance that we are able so easily to produce an invariable exemplar of colour, which, though not actually perfect (since even the colours of a pure prismatic spectrum, as I said before, are, in some degree, diluted or mixed), yet excel all others in depth; and are, therefore, the best which it is possible to find, to exemplify the nature of colours, and to teach the eye to distinguish, at first sight, the true complementary colours. How far the uneducated, or falsely educated eye is liable to err may be seen by taking the diagrams of primary colours, and their complementary secondaries, usually given in popular works on colours, and comparing them with the series of nature's painting. The former are in general so extremely diverse from the truth, excepting blue and red, that they scarcely present an approximation to it. Blue, for instance, is usually opposed to a very red orange, instead of to yellow; green to red, instead of pink; red to a warm or yellowish green, instead of to the colour which I have called seagreen—a colour that would, by some, be thought nearer to light blue than to green. When we consider how easily these colours are produced, how striking they are to the eye, how simple the explanation of them is, it is surprising that hitherto no attempt has been made to make use of them in educating the eye, to distinguish the true primary and secondary colours, by accustoming it to the inimitably beautiful productions of nature's unerring pencil. The student may see here in a moment how near the colour of a pigment is in hue to the true red, green or blue, or to their complementary colours; for nothing can be easier than to compare the colour of a pigment with any of these combinations of the prismatic colours. He may also see how far any pigment, though correct in hue, falls short of the standard of perfection in the depth or in the clearness of its colour. And there is no difficulty in learning how to use a prism; indeed it may easily be fixed in the right position, with the white and black objects of view, above described, so that the student will merely have to apply his eye to it whenever he would see the colours it produces. But, in truth, a very few inspections of these colours, and comparisons of them with the colours of pigments, will generally be enough so to impress them on his mind that he will have no difficulty in referring the hue of any bright pigment, afterwards, very nearly to its correct place in the whole circle of colour.

It will perhaps be objected, however, that in practice we have not so much to do with these deep and clear colours, as with the pale, dull and grayish colours, which are commonly designated tertiaries, though the one true and perfect tertiary is, of course, white, including in that term its every gradation in brightness, from black up to the most brilliant. There is much reason in this objection, because the weak hues of these colours, endlessly diversified as they are in strength, are not at all easy to identify, unless the eye has been educated aright in this point also. But here we see one especial excellence of the method I have recommended (which I regret to find I omitted to mention in my treatise); it is capable of being easily and perfectly adapted to the exhibition of these pale, dull and grayish colours also. Let a gray, darker or lighter, be substituted for the black parts of the figures to be viewed through the prism; all the colours of the spectrum will, of course, be diluted with white, and the more so the lighter the gray is made. Again, let a gray, lighter or darker, be substituted for the white parts; all the colours will be reduced in brightness accordingly. And if both these changes are effected at once, a darker gray being put for the black parts, and a lighter gray for the white parts, the colours being at once diluted with white and reduced in brightness, will approach to a pure gray, and the more nearly, the more nearly the two grays are alike.

All these variations are deserving of attentive study. To the decorator, for instance, what can be

more important than a correct idea of the real hues of those pale, dull or grayish colours which he so frequently uses to cover large surfaces; for though weak in respect of intensity, they are powerful in respect of their extent. He may wish to introduce their opposite hue, in small extent but great intensity, to balance them, or he may wish to relieve them by using some border of a similar hue in greater strength; but how can he do either with certainty unless he is sure of the nature of these weak hues? What means has he at present of learning? Supposing he knows the true hues of his bright pigments, he may, indeed, often make weak hues by mixing those bright pigments with white and black, and so judge of their nature; but it must still be very advantageous to be able to judge aright of such colours, independently of empirical methods; and for this, I think, no means so certain and so easy as those which I have endeavoured to point out.

The results which I have thus endeavoured to deduce from the study of the prismatic colours are fully confirmed by all sorts of experiments made with the colours of pigments. For instance, we may test the colours of pigments with the prism in a beautifully simple way. We have merely to cover a small part of a strip of white paper with the pigment, and view it over a dark cavity through the prism, and we see the spectrum of the pigment-colour adjoining to that of the white, and detect at once the rays which are absorbed or extinguished by the pigment, and those which it sends to the eye, to which its colour is due. Thus, with respect to yellow, which many will still maintain, I suppose, to be a primary colour, unconvinced by the experiments on the combination of the prismatic rays (which show that the best yellow is produced by throwing together all from the first red to the last green ray); if we analyze the colour of aureolin, of chrome yellow, or of king's yellow, or the petal of any bright yellow flower, we uniformly find that, the better and clearer the yellow, the more perfectly the object reflects all the red and all the green rays, absorbing only the blue. Hence, if blue is a primary colour, it is difficult to see how it can be supposed that a colour produced by all the other rays of the spectrum is not made up of both the other primaries combined, whatever those primaries are. Some strips of paper, coloured in parts with different pigments, will be found on the table amongst the objects for prismatic observation.

Again, we may determine correctly all the intermediate colours between any two given colours, and ascertain the accurate mean between two given colours, without the slightest difficulty or possibility of error, by the beautiful method which was first used by the celebrated Lambert in the last century, and which I have, in my late treatise on the Science of Colour, endeavoured to improve and apply to this purpose. We have merely to hold a slip of clean polished glass, perpendicularly, between spots of the given colours, so as to see the near spot reflected from that part of the glass through which we see the other spot, as shown in Fig. 4. If spots of white and black are placed opposite to each on alternate sides of the given colours, the position of the eye, in which half the light is reflected and half transmitted, is readily found, and the result there observed must be the mean of the colours. When the reflection is more oblique, the reflected light will be in higher proportion than the transmitted, and the contrary with a less oblique reflection.

Those who suppose that they can get the colours intermediate between the colours of two pigments by mixing the pigments, should compare the results obtained by that fallacious method with those obtained by this elegant and easy experiment. Gamboge and Prussian blue, for instance, make, by mixture or superposition, a green, darker than either the yellow or the blue of those pigments; the scientific method gives, as their intermediate colour, a gray of mean brightness, in agreement with the results obtained by our experiments on the combination of the prismatic rays. So, also, it does with the colours of king's yellow and cobalt, or lemon yellow and French blue or ultramarine.

If we avail ourselves of the well known property of Iceland spar to give double images of two coloured spots, and arrange the spots so that one image of both shall fall together, which is easily done, we obtain

the same results. And so, also, if we excite the sensation of the two colours in rapid succession on the same part of the retina, as by the well-known method of rotation. But neither of these methods are so convenient in practice as that of the slip of glass; and I only mention them to show that, in whatever way we can mingle two different colour-sensations, we obtain the same results. Small spots of the colours of vermilion, emerald green and cobalt, of verdigris, rose madder and king's yellow, with the requisite appliances, have been prepared for the purpose of illustrating these methods of finding their means; and any one who will examine the matter will see that the latter three pigments are very nearly complementary in hue with the former three; that is, the means between vermilion and verdigris, between emerald green and rose madder, and between cobalt and king's yellow, are very nearly neutral grays. The results of all our experiments with colours of pigments, therefore, plainly agree with those of our former experiments on the combination of the prismatic rays, and confirm the opinion that red, green and blue are the primary, and seagreen, pink and yellow the secondary colours.

In perfect agreement with the facts I have stated about the complementary colours, are all those apparent changes of colour which are perceived when the retina, having been strongly excited by some one or other colour, becomes less sensible to it than usual, and every object to which we direct the eye, appears, therefore, more or less tinged with the complementary colour, as if a wash of that colour had been laid over it. For it is always found that in an eye excited by red, by green, or by blue, objects appear tinged with seagreen, with pink, or with yellow; and the reverse; and that by intermediate colours, intermediate effects are produced.

I am aware that some of these effects have been otherwise described by several writers: it is usual, for instance, to hear it said red tinges the adjoining colours with green; but this is not correct, unless the one be a pink-red, or crimson, and the other a seagreen-green. So again, it is usual to say, that blue and orange mutually deepen each other; but for this to be true, the blue must be of a sea-green-blue or azure hue, and the orange must be yellowish.

The most careful experiments, made by looking stedfastly at spots coloured with those pigments which best represent the principal compounds of the prismatic colours, and brilliantly illuminated upon a black ground, and then suddenly directing the eye to a perfectly neutral gray ground, will always clearly show the gray surface darkened and modified in hue in accordance with what I have already pointed out as the real or natural complementaries. Thus, an eye affected with bright red or scarlet, like that of vermilion, turns the gray into a grayish seagreen of the hue of verdigris; one affected with green, like that of emerald green, turns it a grayish pink, of about the hue of rose madder; one affected with blue, like that of cobalt, turns it into a grayish yellow, of the hue of king's yellow, and the reverse. The same effects are seen in the shadows cast by a sunbeam which has passed through strongly-coloured glass, upon a gray surface otherwise illuminated by a neutral light; and in many other ways, if due precautions are used. And no doubt, the peculiar improvement in depth, which is evident in truly complementary colours when viewed in juxtaposition, the eye glancing rapidly from one to the other of them, arises from the same cause. It is evident, therefore, that the eye itself is so constituted as to agree in this respect with the deductions of science concerning the actual relations of colours.

The attempt to reconcile these obvious ocular effects with the common doctrine as to what colours are complementary to each other, has led some to regard the deep prismatic blue, which Newton called indigo, as being violet in hue, and the deep prismatic red as being an orange red. It is a great incidental advantage in the system I advocate, that it abides by the invariable colours of the spectrum as the standard by which all the colours of natural objects are easily tested: for if we

depart from these, we may widely alter the hues of our simple colours one way or another, and be quite uncertain what is right, having nothing but the general vague idea of redness, blueness, &c., to guide us. The terms used to distinguish colours are among the most indefinite in all languages; and the loose way in which they are applied, and the different meanings attached to them by different authors, would lead one to suppose that our colour-sensations are so different in different persons, and so variable in the same, that they are more fanciful than real, and that no certainty is attainable in them. Yet, in fact, if we except the comparatively few persons who are only capable of the sensations of yellow and blue, and those whose eyes are less sensible than they should be to red, there is a wonderful uniformity and certainty in the sensations excited by light. Only let the rays which enter the eye be the same in quality and quantity, and let the eye be in the same normal condition, without any present or very recent strong excitement, and we may rely upon the results being the same.

But the difference between the new doctrine and the old is more than a difference of terms, for the utmost latitude of interpretation cannot reconcile them.

In a diagram, intended to represent in its lower part the effect of three luminous beams, red, green, and blue, falling in partly overlapping circles upon a reflecting screen otherwise dark, I have endeavoured to imitate as well as I could the natural complementary colours, as seen in the spectra of white and black bands and edges, which perfectly accord with the ocular effects I have just alluded to. These coloured lights produce, where the red and green lights fall together, a yellow of double brightness; where the green and blue fall together, a seagreen of double brightness, and where the blue and red fall together, a pink of double brightness; and lastly, where all three overlap, a white of triple brightness. The upper part of the diagram, on the other hand, exhibits the effects of taking away from white the same three colours, as if by laying over the white, in three overlapping circles, transparent washes of some perfect seagreen, pink, and yellow pigments, producing red where the pink and yellow washes overlap, green where the yellow and seagreen overlap, blue where the seagreen and pink overlap, and lastly, black where all three overlap.*

By comparing the colours in this diagram with the commonly received primary and secondary colours, as shown in the accompanying large and small diagrams sold for the use of the Schools of Design, which give the best representation of them that I could find, the essential differences between the two systems are made very apparent. Except red and blue, which both admit as primaries, all the other colours differ materially. The middle primary is deep green in the one, and bright yellow in the other; the first secondary is bright seagreen in the one, and yellowish green in the other; the second is bright rosy pink in the one, and dark bluish purple, or even violet, in the other; the third is bright yellow in the one, and a very red orange in the other. In the one it is endeavoured to get all the colours as nearly as possible of their full strength, in which they must be as nearly as possible of equal strength, so as to neutralize each other in equal quantities. In the other, their strengths are supposed to be proportioned according to certain arbitrary rules laid down by Mr. Field upon no sound reason whatever, and which moreover are not and cannot easily be fulfilled. In the one, by the enlightened study of the prismatic spectrum, and the use of satisfactory methods of testing the hues and the strengths of the pigments used, we make a tolerable approach towards correctness, or at least can ascertain pretty nearly how far we err; in the other, by following rules which a mistaken theory derives from the results of mixing pigments, or superimposing coloured glasses (regardless of the fact, that such a process gives neither the sum nor the mean of their separate colours) not one of the pairs of nominal complementaries neutralize each other; for the red and green compound a dark orange yellow

* This diagram was an enlarged copy of one in the author's treatise on the "Science of Colour," page 14.

or citrine; the yellow and purple produce a reddish mixture, and the mean between the blue and orange is a good purple—much stronger and better than that given as the colour complementary to yellow.

The comparison of the natural and conventional systems of colour seems to me to much be to the advantage of the former. There is a certain beauty in combinations of colour devised under the latter, such as those in the diagrams for the Schools of Design; but this is attained without completeness of range or compass;—without including the most powerful colours of all the several kinds, which surely ought to be included in a scheme for showing the relations of colours;—and no reason is apparent in the included colours themselves why they should be placed in that particular order. The peculiar congruity of the true primaries in darkness and depth, and of the true secondaries in brightness and clearness, also tends to give, as it seems to me, a chastened richness and charm to any orderly combination of those colours, which must be essentially wanting in similar combinations of the conventional primaries and secondaries.

I think then I am not wrong in asserting that an approach to scientific truth will be advantageous to art, and that the best natural taste may be directed and improved by understanding and observing the laws of nature. In colour, however, true science has hitherto scarcely been in the field at all, and taste has in fact had the battle to itself, not only unaided by true science, but even misled by false or pretended science. No wonder, then, that writers on taste in colour should be inclined to repudiate science altogether; and that Sir J. Gardner Wilkinson, for instance, in the beginning of his valuable work on that subject, should make such remarks as the following:—"Every one willingly admits the great utility of rules; but we must first make ourselves masters of the subject, and be contented to seek for facts to guide us in their formation." . . . . "It is of more importance for the proper arrangement of colours to ascertain which harmonize in juxtaposition, than to occupy ourselves with abstruse questions respecting their properties, or the laws by which they ought to be regulated; which, though they may display great thought and scientific knowledge, are here of little practical use, and which, like the constitutions of certain wise professors, appear as plausible on paper as they are impossible in practice. From facts and actual experience we may obtain something positive and useful: from theory nothing can be expected, so long as the subject itself is not thoroughly understood, except the most vague and contradictory conclusions."*

As to the impossibility of rightly treating red, yellow, and blue according to the same rules as primary colours, the same writer also well observes (pp. 61, 62):—"Though red and blue in juxtaposition have the appearance of purple, and yellow placed next to red gives it an orange hue, the same illusion is not caused by the contact of the other two primary colours, blue and yellow, and these do not look green when in juxtaposition, except in certain cases. Nor is the change then so marked as when blue and red, or yellow and red, are in contact. And this is one of many proofs that all the three primary colours are not under the same conditions in relation to each other. It is not therefore necessary to lay down the same general and invariable rule respecting the three primaries, that "in making new patterns or ornaments, red and blue should not join, nor yellow and red, nor yellow and blue," as though the three combinations were exactly similar, and subject to the same laws. For yellow and blue do not deceive the eye to the same extent as the others, when in juxtaposition. Nor has red with green the same effect as red with blue and yellow, and still less have red blue and yellow the same effect as these three colours when united in one"—that is, according to the theory which the author received, they have not the same effect as white.

* Sir J. G. Wilkinson on Colour and Taste, pp. 6 and 8.

Such anomalies as those noticed in this extract are the necessary consequences of an erroneous theory. Of course blue and yellow cannot be treated in composition by the same rules as blue and red: for blue is complementary to yellow, and not to red. Still less can yellow and red be treated by the same rules as yellow and blue; for yellow harmonizes with red, itself containing the full red in conjunction with the full green, whilst it contrasts as the opposite colour to blue. No wonder that red, yellow, and blue together have not the same effect as red and green together, nor yet the same effect as white; for the mean of the first combination is always reddish, and of the second yellowish, and neither of them white or neutral, whatever proportions are taken.

I believe, however, that if we dispense with false theory, and admit scientific truth, we shall lose these anomalies, and introduce no new ones. We shall be enabled to treat red, green, and blue under the same rules as primary colours, and seagreen, pink, and yellow under the same rules as secondaries, if only we bear in mind the differences in the depth and clearness of the pigments we use to represent them; these, of course, modifying the effects in a large degree. Two primaries of similar depth may please the eye when side by side, while the same two, equally true in hue but not alike in depth, may fail to do so. A great step will assuredly be gained, if we establish correctly the hues of the three simple colour-sensations, and of their complementaries. For these, together with black and white, will give us the eight principal colours upon which to work, and will enable us to determine all the intermediate colours correctly, and to arrange them all with due regard to their natural gradations and contrasts of every kind.

Did I not fear to exceed the limits proper for this occasion, and to stand in the way of that expression of the views entertained by others which I hope this paper will elicit, I would add some remarks on the true limits of colours in strength of hue, which, when ascertained with some approach to correctness, might be substituted with great advantage for Field's doctrine of chromatic equivalents; on their limits in depth and clearness; also on gradations and contrasts of colour, and on the means which I have proposed as a key or directory to the endless natural harmonies of colour; combinations of which, in one form or another, must be (if I am not greatly mistaken) the groundwork of all that naturally delights the eye in colour-compositions, and makes them praiseworthy as works of art.

In the hope of being able to describe what I call the Natural System of Colour, I prepared an enlarged copy of one of the coloured plates in my treatise on the science of colour, in which the same twenty-seven colours (that is, the eight principal colours with the mean between every pair of them) are arranged (as you see) in three different ways in groups of nine each, according to the quantities of the three primaries which they contain—the three on a black ground containing the full red, the full green, the full blue; the three on a light gray ground, half the full quantity of each; and the three on a white ground, no red, no green, no blue. I prepared also a large diagram in which the same twenty-seven colours, together with one mean between every pair of them—a hundred and twenty-five in all—are arranged in groups according to their absolute brightness or luminousness, from black to white, beginning with very dark primaries and ending with very light secondaries. They constitute a series of sections of a supposed cube of colours, at right angles to the diagonal drawn from the corner of black to the corner of white. The evident irregularity of the colours of these spots in brightness, depth, and clearness, much hinders the effects that ought to be produced in these diagrams; yet they may serve to show that those who know better than I do how to mix their paints and to handle the brush, might make such representations of natural harmonies on this system as would be worth the study of the artist, though perfection can never be attained.*

* The coloured diagrams referred to in this paper were exhibited by the aid of the ingenious magnesium lamp constructed by Mr. J. Solomon, of Red Lion Square—the brilliant whiteness of the magnesium light bringing out the colours nearly as they appear by daylight. It should be observed that the green on the chromo-lithograph facing page 110, is very deficient in richness and depth.

But time forbids to enlarge on these points; nor, indeed, would it be becoming in me to do so, without giving an opportunity for the statement of any objections which may occur to the novel doctrines I have ventured to advance.

I hope, however, that I have said enough to convince you that the views I have advocated are sustained by deductions from experimental science on every side, and give a promise of usefulness, whilst the points objected to in the common doctrine are not only destitute of such support, but are tainted with obvious and mischievous error, and that therefore the correction and improvement of our theory of colour deserves the consideration of all those who are interested in the advancement of art in this direction. It would afford me much gratification, if with your aid my attempt to introduce this reform should succeed, and especially if our country, which in matters of art has too often been content to follow at a humble distance the lead of the continent, should be first in removing from her public schools of art the reproach of ignorance in the science of colour.

Mr. G. J. CRACE, Contributing Visitor, responding to the chairman's invitation to open the discussion, said,—You have called upon me, Sir, to make some remarks upon the very interesting paper which has been read to us. In doing so, I cannot but observe that it is an exceedingly difficult thing to speak upon a question that enters upon so many details. I fully realize the great talent, great perseverance and intelligence which have been brought to bear upon the system of colour advocated by Mr. Benson, but yet I must say he has failed to convince me, that green is a primary colour and that yellow is not. I have read his book carefully, and also the various letters he has written in which he advocates these principles, but I have failed to perceive any argument adduced in conclusive proof of his theory. After all, Mr. Benson addresses himself to the question of light, which is rather a different one to the question of colour. I will begin with this question of light. If we go to a southern clime we meet with a pure blue sky, we see that sky illumined by a yellow sun casting its yellow rays over the surface of the ground which it illuminates; when we see that sun as it sets casting its refulgent rays upon the ascending vapours of the earth, and giving a series of magnificent colouring, verging from the most brilliant gold to the most intense carmine and beautiful purple, how can we think that yellow is only a secondary colour. By means of the prism many most interesting experiments may be made, bearing intimately upon this question. I take a sheet of note-paper and looking at it at a proper angle through the prism, I find on the upper edge a space of about one inch of pure yellow, fringed at the top with deep red: then there is a broad blank of white, and at the bottom edge is a band half-an-inch broad of blue, fringed with violet. This I have copied faithfully in colour on the piece of paper I now exhibit. Now, if you see these colours so separated and so declared, it seems difficult I, think, to imagine that yellow is not a primary, but merely a secondary composed of green and red. Again, I take the prism, and look through a window upon a grass-plat: the window is divided by a sash-bar about an inch wide: the grass-plat terminates upon a white stone walk. The grass-plat as seen in the prism, has a yellowish green tinge, with a sort of opal effect of yellow and red and other colours upon the points of the blades of grass; and the sash-bar itself gives a most beautiful and brilliant line of deep blue above and of deep red below; when we come to the edge of the stone-walk there is a little line of carmine: next there comes the broad band of pure yellow: then a broad piece of white; and then the blue, precisely as shown on the sheet of paper. Leaving the abstract question of light, we come to the more practical question of colour. How can Mr. Benson's theory stand the test here? In considering harmony of colour we are accustomed to call certain colours primaries, because they cannot be compounded of other colours. We find that yellow, red, and blue, fulfil these conditions. We know that when these colours are mixed one with the other, yellow and blue form green, blue and red form violet, and red and yellow form orange. Hence orange, violet,

and green are called secondaries, and these three primaries, or the three secondaries mingled in due proportions, form tones of grey verging to black according to their intensity. I have here a coloured diagram showing yellow from gamboge, blue from Prussian blue, and red from vermilion with a little carmine; mingling these same colours, I obtain the green, the orange, and the violet as they appear, and all combined form the black centre. Here is another diagram following Mr. Benson's theory, showing green from emerald green, blue from Prussian blue, and red from the same colours as before. The green mingled with the red only gives a dingy purple, with no trace of yellow, and the whole mingled together form a less neutral black than that obtained where yellow forms a part. Next experimenting with transparent colours; I take various pieces of coloured glass; here are two greens (holding them before a lamp) one exactly resembling the other; one is green glass, the other composed by a piece of yellow glass placed over blue glass. I place light red glass over green glass, the result is dingy purple—you cannot obtain an approach to yellow. Thus you see that neither by the mingling of any known pigments, nor by the mingling of transparent colours, can green be proved to be a primary as affirmed by Mr. Benson in the paper read to us. It is asserted that it is so; but although theoretically advocated it is not proved. There are certain colours given by the prismatic spectrum which, commingled, form white light. Now we have to consider that though in this spectrum, as in the iris, the colours are so blended as to appear to the eye soft shadings of red, yellow, green, blue, and violet; yet the yellow is most of it formed into green by its strong affinity for blue. Probably there are only two fundamental colours in white light; yellow representing, as it were, the active or positive, and blue the negative principle. In conclusion, I think that before the present system of harmony of colour be set on one side, far stronger arguments and more direct proofs of the truth of the opposing theory should be advanced, more conclusive than what have been offered to us this evening. I state these opinions, hoping they may stimulate others to join in this discussion; but I by no means wish to depreciate the great talent and industry shown in the very interesting paper read to us by Mr. Benson.

Professor KERR.—Am I right in understanding the main difference between Mr. Crace and Mr. Benson, to be this:—that the one is dealing with the results of mixing coloured rays of light, the other with the results of mixing pigments?

Mr. BENSON.—Certainly; and I contend that a true theory cannot be formed from the results of such experiments as mixing pigments. Every pigment destroys those rays of light which do not produce its own colour.

Mr. CRACE.—Colour has a certain degree of absorption of light. The greater the intensity of colour, the greater is the tendency to the absorption of light. If you put the prism upon a black object you get a greater intensity of colour than if you put it upon a light object.

Mr. WM. WHITE.—I rise with the greatest pleasure to propose a vote of thanks to Mr. Benson for his communication. I have myself for a long time paid some attention to the study of colour, although not in the scientific and experimental way which Mr. Benson has done; but I wish to observe that his theory perfectly accounts to me for a conclusion which I came to very early indeed, viz.: that red, blue and green were much more harmonious than red, blue and yellow; and as regards Mr. Crace's observations with reference to the mixture of colours by means of glasses, and the question which Professor Kerr has asked, it seems to me to be perfectly explained by the fact that, by putting pieces of glass together in the way described, you have the blue and the yellow plus the black (*i.e.* through means of the shadows of the colour), and not plus the white. I do not say that explains it scientifically, but practically to me it would explain the fact that you cannot put together pigments in that way with the same effect as rays, because of their opaque nature. It is a body as it were of colour, instead of light; and it has been proved by all experiments hitherto made that it is impossible to mix pigments in the

same sort of way as you can mix the rays of light. Then, as regards the lighting up of scenery by the yellow rays of the sun, I think we must differ from Mr. Crace in that, because I believe the rays of the sun are rather what would be intense blue than intense yellow [Mr. CRACE.—I spoke of a southern clime]; and when the rays of the sun fall upon the evening sky, there is a secondary introduced which you had not before. I say I believe the rays of the sun give the blue element rather than the yellow. I know the rays of the sun form the actinic power in photography; and if you put yellow between the rays of the sun and that which you wish to produce, you simply have no effect, red would have about as little effect as the yellow; but blue rays, on the other hand, would rather intensify the effect. I would only further express a hope that on some future occasion Mr. Benson may be induced to carry out to practical illustration that which he has alluded to in his paper, viz. the limitations and harmonies of colours in accordance with the theory he has given us.

Professor KERR seconded the vote of thanks, pointing out again that Mr. Benson and Mr. Crace were really dealing with different subjects, the one with light and the other with pigments.

Mr. J. K. COLLING, Fellow, said—I have been in correspondence with Mr. Benson on this subject, and it appears that the great difference between his theory and that which is generally received is that he makes yellow a secondary colour and green a primary one. In my correspondence with him I have been endeavouring to point out that there is a certain phase in nature which shows that green is not a primary colour, but that it is formed of other colours; and I have brought before his notice the sky-green colour of sunrise and sunset. Mr. White says the rays of the sun are blue; but there is no doubt the rays of the sun are yellow. [Mr. WHITE,—Pure white, probably]. They are yellow. If you take a sheet of paper, and expose it half in shade and half in full sunshine, you will see that part which is in the sun light has a warmer colour than the other. More than that, in the evening, before the sun sets, by refraction the colours of the rays of the sun are exaggerated, and then become an intense yellow, and when the sun sets, where all is blue sky you may see gradations from yellow right through yellow-green, blue-green into the blue sky. What is it that causes that green in the sky? Is it not the mixture of the yellow and the blue? In the sheet of paper which Mr. Crace showed there is no green whatever. The top edge is blue and the bottom edge is yellow, and there is no green; but the way Mr. Benson produces the green is to reduce this to a narrow strip of paper, and then the blue overlaps the yellow and produces the green. You may do the same thing with the sheet of note paper, by holding the prism and turning it on its axis, by which you foreshorten the prismatic colours and bring the yellow into the blue, and you form the green. Again, with Mr. Benson's diagrams, when it is looked at straightforward you see the colours as they are shown here on the sheet of note paper. If you look at that diagram * you have blue in the one edge and yellow in the other, but place the diagram diagonally, and when viewed with the prism, where the colours intersect, there they produce the green again. Now again, look at a yellow piece of paper through the prism instead of getting blue, as in white paper, you get no blue; it will be green. To-night we are viewing everything in a yellow light; if you look through the prism now you will see no pure blue: it is all green, because it is tinged with yellow light, and therefore it is green you are seeing to-night and not blue. I ask what do you see—blue or green? I have put the prism into the hands of a number of persons and they have said "green decidedly." I brought before Mr. Benson's notice the formation of green in the leaves of vegetation. Everyone knows that when the bud first issues forth in spring that it is yellow, very slightly tinged with green, but it gradually becomes greener, and the more it is exposed to the light the greener it becomes, and the leaves most green and most blue-green are those longest exposed to the light. For instance, those which belong to ever-greens are usually darker than those of any

* The angles of two pieces of paper placed together so that the top edge of one is in a line with the bottom edge of the other.

other plant; as in the ivy, yew, and many others. That shows that the light does not colour the vegetation green but colours it blue; and the yellow, as it were the normal colour of the plant itself, is added to the blue and produces a green.* There is another thing—many plants and leaves, and fruits are covered with a bloom which is quite independent of and separate from the colouring of the plant itself. That bloom in every case is blue, not green. Take the leaves of the pink tribe. You are aware they are a very blue-green. If you take your finger you can rub off the bloom, and then it becomes from a blue-green a yellow-green, showing that the bloom has altered the nature of the green from a yellow-green to a blue-green by being deposited on the foliage.

The celandine is a little plant impregnated with an intense yellow sap, and therefore the leaves would naturally be of a very yellow green; but there is a coating over them which is of a blue character, and that blue is the outer skin or cuticle of the leaf. On splitting the leaf you may strip that off, and you see then merely the yellow green that is underneath, showing, I think, that the light acting upon the outer skin has made that bluer than the other part, and by that means affects the colour of the plant. Of course, if yellow is a compound colour, I think it is only fair that Mr. Benson should tell us what it is compounded of. I have asked him, and he says that it is composed of all the rays, from blue right away to red; or, in other words, yellow light is formed of red and green. How that can be I must say I do not understand.

Mr. BENSON (in reply to the foregoing remarks) said.—With these pieces of glass I think I can explain Mr. Crace's difficulty. These blue and yellow glasses placed together in front of the candle produce a green, like this green glass, alone; the green being produced where the blue and yellow glasses overlap each other. You will observe that the green is much darker than the yellow or the blue separately. What causes this yellow we must first consider. The yellow glass absorbs or destroys the blue rays, but allows the greater part of the green and red rays to go through it. The blue glass absorbs the red rays and destroys them, but allows a great quantity of the green to go through and nearly all the blue. The two glasses together allow green rays only to go through, and that is the green you see when you place one glass over the other; but the same green is really in the colours of both the separatc glasses. It is the same with all these cases. With regard to the remarks of Mr. Colling in respect of the green of vegetation, yellow and blue substances always have that effect, because the yellow substance allows the green rays to go through, and the blue substance also—unless it is of a very pure blue—allows some green to go through. This blue glass of Mr. Crace's is not so much a blue as a sea green.

Mr. CRACE.—By daylight it is the most beautiful blue you can imagine; the yellow flame of the candle gives a greenness to it.

Professor KERR (to Mr. Benson)—Have you any practical improvement in view with respect to the use of pigments as the result of your theory?

Mr. BENSON.—I merely show the effects of combining the different rays of light. Mixing pigments does not give true results. Mr. Crace says you get the mean colour by the mixture of pigments, which I say you do not get. You only get some colour which is included in the colour of both of the pigments.

MR. WYATT PAPWORTH.—I think in Field's experiments he came to the conclusion that a proportion of his primary colours, 3 of yellow, 5 of red, and 8 of blue, made a white. Has Mr. Benson the same kind of proportion with red, blue, and green?

MR. BENSON.—I consider we may take the red, blue, and green of the spectrum in about equal proportions. About the same luminosity of each produces white; at least the red and green rays are nearly equal in brightness; the blue are darker, but more intense in hue.

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* It is a well known fact that a plant under yellow glass will not become green, in consequence of the glass stopping the blue ray.

Mr. WYATT PAPWORTH.—Rotating a circle of equal spaces of red, green, and blue, would that produce white?

Mr. BENSON.—If the pigments are equally strong in hue, but you cannot easily get them equally strong. It would make a grey and not a white. You would not get white, for that is adding the three colours together. You would not get the same white, as if you throw three rays of these coloured lights one upon the other. If I could throw three circles of red, green and blue light in equal strength upon a white screen, I should produce a very beautiful effect, as is here shown in my diagram, which represents circles of blue, red and green overlapping and producing white.

Mr. CRACE.—This can be tested by two prisms, by bringing the colour of one prism upon that of the other. Bringing the green rays of the one upon the red rays of the other, you neutralise the colours.

Mr. BENSON.—No; you would produce yellow.

Mr. WYATT PAPWORTH.—I recollect some experiments made by Professor Lewis on the same question, which shewed that he had gone through a large number of those described by Field which came to the same result, but in the proportions of 5 yellow, 3 red, and 8 blue.

Mr. BENSON.—Probably he did not use the same pigments. Field relied upon the thicknesses of his superposed coloured glasses, not upon pigments. You will find the description in one of his works.*

Mr. A. J. BAKER.—Mr. Benson's experiments appear to me to be perfectly compatible with the ordinary theory; that shewing the reversed spectra passed over each other is a confirmation of the received doctrine of complementary colors. Although I cannot agree with Mr. Benson's deductions, I consider his experiments are valuable and deserve to be carried further. For practical purposes, however, I am of opinion that the results obtained from mixtures of pigments, confirmed as they are by those observed in colored glass, are more useful than those exhibited by the spectrum.†

The vote of thanks to Mr. Benson having been unanimously adopted, the meeting adjourned.

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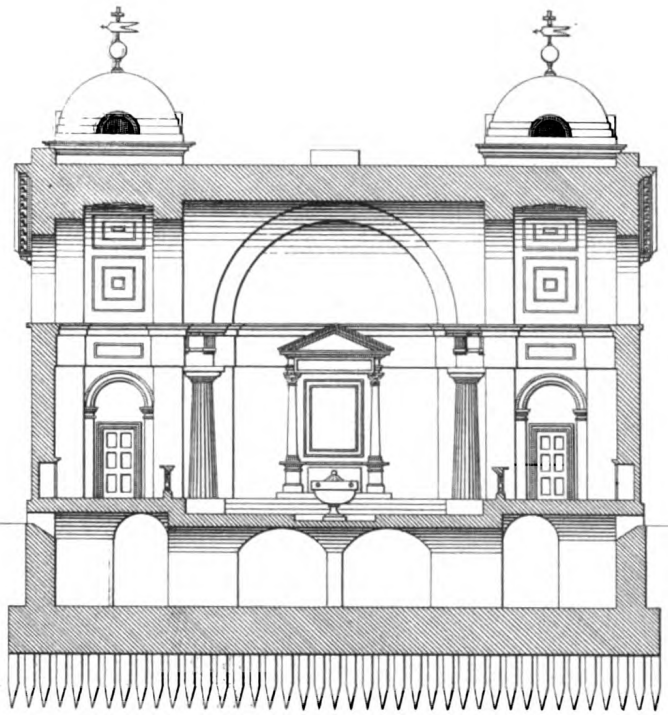
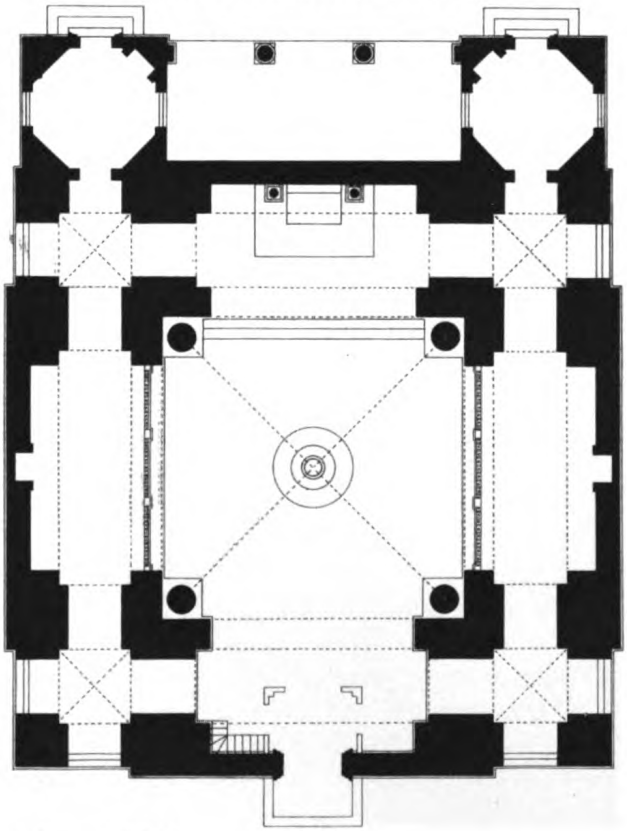
* His 'Chromatography' (1835). On reference I find that he did not use coloured glasses, but hollow glass wedges, filled with a solution of sulphate of copper, for blue; with diluted liquid rubiate, for red; and with aqueous tincture of saffron, for yellow. When thin, these solutions give tolerably good examples of what I have endeavoured to show are the true secondary colours, seagreen, pink, and yellow. When thicker, they approach to blue, red, and orange. When very thin, their thicknesses may be adjusted so that all together shall be pervious to a nearly equal proportion of all the prismatic rays, in which case the resulting colour is a neutral gray. Field determined his chromatic equivalents by measuring the thicknesses of the superposed wedges where this result was produced. He doubtless supposed, as it seems some still do, that colour is something that resides in the object; and therefore assumed that the colour did not vary in hue with the thickness, but only grew stronger—the thicker and darker the solutions, the greater the quantity of colour; an assumption upon which it might be argued that three blacks would make the strongest white. Field's system of primary, secondary and tertiary colours, and their equivalents, has, in fact, sprung from a process of subtraction being mistaken for one of addition.—W. B.

† In comparing combinations of color produced by the spectrum with those of pigments, care should be taken to allow for the difference of the effects produced; complementary colors of the spectrum mixed together produce white light, while in pigments they result in grey or black. It is incorrect to speak of the spectrum producing any grey tone, for grey is a shade between white and black, which the spectrum cannot produce; hence one of the disadvantages in its use is that none of the neutral tints, neither russets nor browns can be shewn. Many difficulties arise from confusion in the names of colors. Vermilion is by no means a pure red, as it inclines strongly to yellow; while ultramarine and many of the brightest yellows are tinged with red; hence the impossibility of mixing them with satisfactory results. If crimson lake, Prussian blue, and gamboge are taken as the primary colors, although they are not absolutely pure red, blue and yellow, yet they form satisfactory mixtures, marred most perhaps by the opacity or milkiness of the gamboge.—A. J. B.

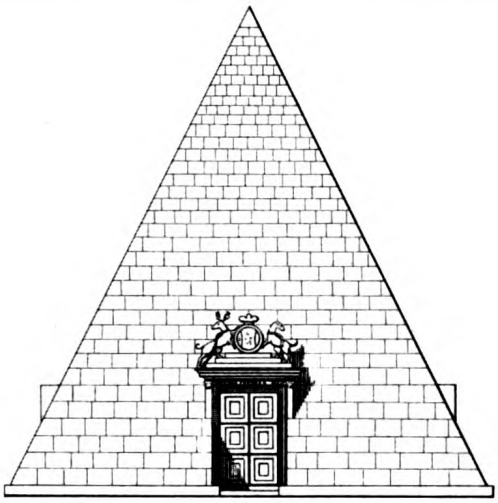


SECTION

PARISH CHURCH AT GREAT PACKINGTON, WARWICKSHIRE
ERECTED FOR THE EARL OF AYLESFORD, 1789-92.



PLAN



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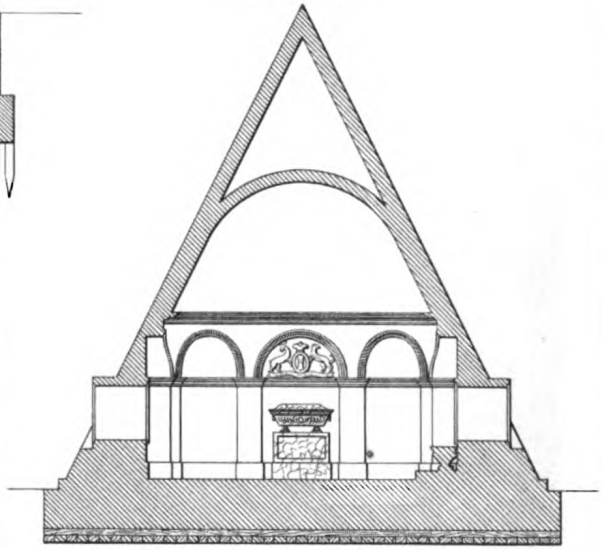
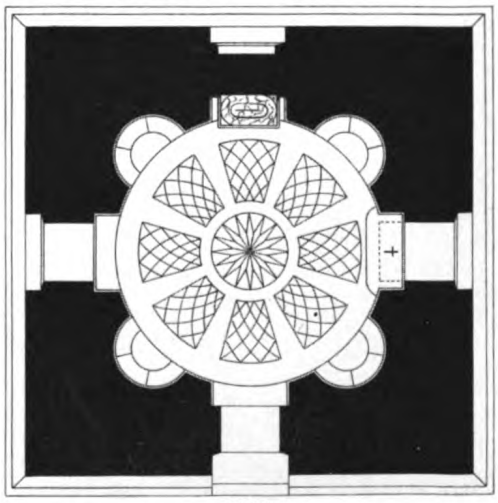


SECTION FROM WEST TO EAST



PLAN

MAUSOLEUM ERECTED TO THE MEMORY OF THE EARL OF
BUCKINGHAMSHIRE, BLICKLING PARK, NORFOLK, 1794-96.

Joseph Bonomi A.R.A.
76, Great Titchfield Street

10 5 0 10 20 30 40 50 FEET

Lithographed for the R.I.B.A. by Kell Bros. London, E.C.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 1st March, 1869, Wm. Tite, M.P., President, in the Chair, the following Paper was read:—

MEMOIR OF JOSEPH BONOMI, ARCHITECT AND A.R.A.; WITH A DESCRIPTION OF SOME DRAWINGS OF HIS DESIGN FOR ROSENEATH, ERECTED FOR THE DUKE OF ARGYLL.

By Wyatt Papworth, Fellow.

The occasion of my occupying the attention of the Institute this evening with a memoir of one of our professional brethren who practised during the latter half of the last century, arises from the circumstance that our late esteemed honorary member, Mr. C. H. Smith, had often before his decease intimated to me his intention of presenting to this Institute a roll of Original Drawings by Mr. Bonomi (comprising those now before you) as soon as he had arranged them, and somewhat repaired the dilapidated condition into which they had fallen during the many years they had been in his possession. This is the fate of most architects' drawings if not at once bound up into volumes for preservation: to such a precaution I owe the opportunity of having studied, many years since, the original drawings made by William Wilkins, R.A., for the erection of the National Gallery; and I should gladly hear in whose possession are the two large volumes which contained them. Mr. Smith's last illness prevented his giving the drawings this necessary attention; but soon after his decease the family placed them in my hands; they have been cleaned and repaired; and I desired to take the advantage, while making the presentation in their name, to offer a biographical notice of Joseph Bonomi, the talented author of them. The foundation for this paper has been obtained from among the manuscripts in our library; it may probably have been read at some very early meeting, but no record is found to that effect in the minute books, nor has it been printed. As the present manuscript has received several interesting additions from the pen of Mr. Ignatius Bonomi, the eldest son of the subject of this memoir, and as I have been enabled to add other remarks, besides some notice of the chief structure from the memoranda or specification written upon the working drawings, my work for this evening may be accepted as a new contribution recording the "Life" of one of the chief architects who have practised in England; a good collection of these memoirs is still a desideratum in our language.

Joseph Bonomi was born in Rome on the 19th of January, 1739. The family from which he sprung held a good position in society; and his brother, Don Carlo Bonomi, was distinguished as a theologian, being Professor of Divinity in the College of the Propaganda. Others of his relatives have occupied, and now occupy, dignified stations in the Church and in the Civil Departments at Rome. The subject of this memoir received a liberal education in the Collegio Romano; and, choosing architecture for his profession, he became the pupil of the Marchese Girolamo Teodoli, a Roman noble of Greek descent, who from taste devoted himself to the theory and practice of architecture, and of whom it is recorded by Milizia (*Memorie*, Bassano 1785, ii, 257), that he took pleasure in selecting for his pupils young men of decided talent, at the same time zealously promoting their artistic improvement. Joseph Bonomi arrived in England in 1767, when about twenty-eight years of age, upon an invitation from the celebrated architects, the brothers Robert and James Adam, both of whom probably had

remarked the merit of the young architect during their visits to Rome. Robert Adam was staying in that city in 1756, and there made (it can scarcely be supposed without some assistance in so much work) most of the magnificent drawings contained in vol. 1 of the collection of works by those brothers, which is fortunately preserved amongst the treasures (too rarely ransacked by students) in Sir John Soane's museum. This was before Robert went in 1757 to Spalatro with the celebrated Clerisseau and two expert draughtsmen, who may be suspected to have been Zucchi and Bonomi. The other brother, James Adam, after working at Venice in the summer of 1760, went to Rome, where he was living in 1763. The original sketches for his design for New Parliament Houses, in vol. 7* of the same collection, were made during the interval; and at that time he visited Pæstum, taking with him Clerisseau and certainly Zucchi, if not Bonomi also. I must request you to remember the two words Pæstum and Zucchi in connection with later events in Bonomi's life. Just after 1767 the brothers Adam were building the Adelphi and Mansfield Street, and in 1778 they began the construction of Portland Place. I am inclined to consider that many of the beautiful drawings of internal decoration which occur in Sir John Soane's collection of their works, and many of the drawings for their great book, the two first volumes of which were published during the years 1773 to 1778, were special objects of Bonomi's employment, because the Register Office at Edinburgh appears to be the only great government work which was at that period under consideration in their office. Few architects have any notion either of the style or the merit of the polychromatic decoration which those drawings—especially of ceilings—offer to inspection. There is, however, no record of the period at which Mr. Bonomi quitted the studio of the Adams, and commenced business on his own account.

Among his earliest and most attached friends in London was the celebrated Maria Angelica Kaufmann, at that period in the full enjoyment of her fame and of its substantial rewards, being as much esteemed by the great and powerful as she was cherished by her brother artists, especially by Sir Joshua Reynolds: she was nominated one of the original thirty-six members of the Royal Academy. In 1775 Mr. Bonomi was married to her cousin and ward, Rosa Florini, and would seem to have paid a short visit to his native city, as hereafter noticed. Six years later Angelica married the Venetian artist, Antonio Zucchi, before she quitted England; to the last hour of her life she continued to cherish an affectionate regard for Bonomi and his wife, and to evince an unfaltering interest in the welfare of their young family. This affection for her relatives naturally prompted a wish to have them near her; and within two years after her return to Rome, Mr. Bonomi was induced (1783) to return to Italy, with his wife and three children, probably with some view to a permanent establishment in that country. Owing to the loss of a son, a residence at Rome became so painful to his wife, that in 1784 they returned to England; a tradition exists that Mr. Lambton, the father of the first Lord Durham, during his travels on the Continent, made the acquaintance of Bonomi and brought him with him to England. From this period we must consider Mr. Bonomi fairly engaged in the pursuit of his profession in the metropolis. During his visit to Italy he received the diploma of Associate of the Clementine Academy at Bologna, and was also elected a member of the Academy of St. Luke at Rome. On the 12th of November, 1789, being then fifty years of age, Mr. Bonomi was elected an Associate of the Royal Academy of Arts in London. As this circumstance is connected with a remarkable passage in the life of Sir Joshua Reynolds, it is noticed at some length by James Northcote, R.A. (*Life*, 2 vols. 1818, ii. 251) in his biography of that illustrious artist. The facts are briefly these: Sir Joshua, highly appreciating Mr. Bonomi's talents, was very desirous to have him connected with the Academy as Professor of Perspective. As a preliminary step, he endeavoured on more than one occasion to procure his admission as an Associate. In the first instance his endeavours were unsuccessful, owing to some informality. On a subsequent election taking place in 1789, the candidates being Mr. Bonomi and Mr. Gilpin, the votes of the Academicians were equally divided, but the election

was decided in Bonomi's favour by the casting vote of the President. This step having been gained, Sir Joshua was next solicitous to obtain for his friend the first vacancy of an academic chair. This took place in February of the following year (1790), and every exertion was used by the President to secure the election of Mr. Bonomi. A resistance was evinced to this by the Academicians, owing to some informality or misconception, and eventually Mr. Fuseli was elected by a considerable majority. Sir Joshua, imputing this result to a cabal, immediately sent in his resignation as President, and withdrew his name from the list of Academicians; but, after a full explanation of the circumstances, he consented to resume the chair, for which he received the authority of the King; but his *protégé* was never afterwards successful in obtaining a seat in the higher class of the Academy.

In 1804 Mr. Bonomi received from the Congregation of Cardinals entrusted with the care of St. Peter's at Rome, an honorary diploma, constituting him architect to that fabric. So long previously as 1776 he appears to have been consulted on the subject of the sacristy which Pius VI. proposed to erect as an appendage to that edifice. A copy of the design furnished by Bonomi on that occasion is in the possession of his family. The composition is singularly elegant and appropriate; and, had it been adopted, would have imperishably connected his name with that wonderful edifice.

Though attached to England as the scene of his professional labours, and fully appreciating the patronage and friendship which his talent and merit had obtained for him in this country, Bonomi yet ever cherished an unaltered devotion to the land of his birth; the desolation of Italy by the French revolutionary armies, which involved many of his dearest friends and relatives in danger and suffering, was to him a source of deep grief and anxiety. After many years of eminence in his profession, Mr. Bonomi died in the midst of his family on the 9th of March, 1808, aged 69 years, and was buried in the Marylebone Cemetery, on the south side of Paddington Street, where a headstone with the following inscription to his memory still exists:—

D. O. M.
JOSEPHUS BONOMI
ARCHITECTUS PERITISSIMUS ROMANUS
CUJUS CINERES HIC JACENT
IN ANGLIAM VENIT ANNO M.DCC.LXVII
ATQUI ILLIC PLURIMA ARTIS SUAE
MONUMENTA POSUIT.
VIR PROBUS PIUS,
ET AMICITIAE CULTOR DILIGENTISSIMUS.
ACADEMIAE REGALIS LONDINENSIS
SOCIUS AB ANNO M.DCC.LXXXIX.
VIXIT ANNOS LXIX
MENSEM I DIES XIX.
DECESSIT DIE NONO MARTII
ANNI REPARAT. SALUT. M.DCCC.VIII.
MOERENTES UXOR FILII ET FILIAE
LAPIDEM POSUERUNT.

ANGELICA ET PETRUS
EJUSDEM FILIA ET FILIUS
QUI AB HAC VITA
TENERO AETATIS PERIODO DECESSERUNT
PATRIS CINERES COMITANTUR.

His attached friend and relative Angelica Kaufmann, had preceded him to the grave by a few months only, having died at Rome, on the 5th November, 1807. Mrs. Bonomi lived only a few years after her husband's decease. Of their numerous family, three sons and three daughters survived their parents. One of the sons is since dead: the eldest surviving brother, Ignatius, practised for many years as an architect at Durham, and retired from the profession a few years since: Joseph, the younger brother, embraced the profession of a sculptor, and was the pupil of Joseph Nollekens; he subsequently resided several years in Egypt and Syria, ardently engaged in the study of the ancient monuments of those interesting regions; and is now known to us, more especially, as holding the important and trustworthy office of curator of Sir John Soane's Museum.

Having thus noticed very briefly the general tenor of Bonomi's life, I shall now mention a few of the more important works executed or designed by him. Of these, a complete list cannot be supplied; but it is a source of much gratification that on such an occasion as the present, so large a number of his original drawings could be brought together, by means of which the character of a design can be so much more satisfactorily conveyed to the mind than by the verbal description of even the most practised writer. In 1784, the year of his return from Rome, he made a design for a country residence, Dale Park, in the parish of Madehurst, in Sussex, for Sir George Thomas, Bart.; in 1826 it was in the possession of John Smith, Esq., M.P. It appears to have been completed in 1788; a view is given in Neale's *Collection of the Seats of the Nobility*, (1828, second series, vol. 5) who states "that from its numerous and well-arranged apartments, it may justly be considered one of the finest and most commodious seats in this part of Sussex." The house is of a plain Italian style with a colonnade along the chief front, the body of which presents seven windows, and there is also a wing at each side of lower height with two more in each. In 1786, he made a design for the Library at Lansdowne House, Berkeley Square; the existing edifice, however, is from the hand of George Dance, junior; Bonomi's design, an interior view, was subsequently exhibited at the Royal Academy, in Somerset House; this drawing being now in the possession of his grandson Mr. George Goldie, one of our members, he has kindly sent it for our inspection this evening; it is an elegant composition in a pure style of Italian architecture and a brilliant specimen of interior perspective. In 1789, a design for a Gallery to have been erected at Townley Hall, in Lancashire, was made for the late Charles Townley, Esq., to contain the celebrated collection of Sculpture now in the British Museum. This elaborate drawing, likewise in the possession of Mr. Goldie, presents an interior of elliptical form crowned with a vaulted ceiling and lighted from the centre of the vault. The floor and walls are entirely covered with various coloured marbles, and the vault painted with arabesques on a light-red ground; the whole exhibiting a beautiful and harmonious specimen of polychromatic ornamentation. There are beautiful specimens of Roman vaulting in Giambattista Piranesi's work, which may have suggested to Bonomi's mind this constructive form of cupola. In that year also, he made designs for the restoration and completion of Sutton Place, Surrey, for, I presume, John Webbe, Esq., who took the surname of Weston (the name of the original owner of the property) on the devise of the estate to him in 1782. The proposed elevations of the east and south fronts still remain hanging in one of the upper rooms of that house, and were projected in consequence of the proprietor having pulled down the tower gateway with its wings forming the front; for this structure was originally a quadrangle: it is one which is, no doubt, well remembered by the members as exhibiting the very interesting example of the use in 1530 of brick and terra-cotta work in England. At this period (1789) Bonomi appears to have been fully engaged in practice, for in the same year, Longford Hall, Shropshire, for R. Leak, Esq., was undertaken by him. This mansion (as seen in the perspective view lent by his son, the landscape of which was put in by the celebrated J. M. W. Turner, R.A.) presents a front of good proportions, having in its centre a portico of sufficient projection

to allow carriages to draw up under it; this instance is perhaps the earliest adaptation of the portico, too often an unmeaning ornament, to that useful purpose. The edifice was completed in 1792. Two other designs were also commenced in that year: a gallery at Great Packington, in Warwickshire, the seat of his early friend and zealous patron, Heneage Finch, Earl of Aylesford, to whose bounty the parish was indebted for their Church, also built by the subject of this memoir. Mr. Ignatius Bonomi has favored me with a tracing of the drawings of this very interesting structure, (*see* Plate), and has lent a good perspective view of the interior colored in Indian ink, with some other drawings of the edifice, which should have more particular notice then I am able at present to give, as the whole building is solidly constructed in stone without either wood or iron. Its form is a Greek cross enclosed within a square; the central portion is groined and rests upon four columns resembling some of those at Pæstum, which from their massiveness appear well adapted to support the vault. The interior is arranged to produce a grand and harmonious effect; it is lighted by three windows of a semi-circular form, concentric with the great vault and springing at a considerable height from the floor; the effect obtained by this admission of the light is said to be exceedingly beautiful. The exterior also exhibits much architectural character though of a plain description; it manifests the interior form with that remarkable fidelity which is a great merit in the opinion of some leading critics, and so often declared to be now rarely found. Each front is surmounted by a pediment flanked by small cupolas over the lower vaulting of the corners. The measurement of the building outside is 61 feet 6 inches square. The first stone was laid 23rd April, 1789, by the Earl himself; and the building was completed in 1792.

In 1790 his design for a Saloon or large Drawing room for Mrs. Montagu, in Portman Square was exhibited at Somerset House. This carefully executed colored perspective is lent by Mr. Bonomi, together with a small drawing of it in Indian ink. In the same year, Mr. Bonomi designed and superintended considerable additions to Langley Hall, in Kent, the seat of Sir Peter Burrell, Bart. In 1792, he erected the Chapel for the Spanish Embassy, in Spanish Place, Manchester Square; it is a building of moderate dimensions, about 55 feet long, 21 feet wide, and 27 feet high; the interior presents a graceful composition of nave and aisles; the Corinthian colonnade supports a vaulted roof, and the nave terminates in a sanctuary in which a somewhat richer, yet chaste, style of decoration is introduced. Originally it had no architectural pretensions externally, but about the year 1846, a campanile of good design was added by our fellow Mr. Charles Parker. At this time, 1792, John Vardy, an architect attached to the Board of Works, had been commissioned to design Uxbridge House, Burlington Gardens, for the Earl of Uxbridge. It appears that he was assisted in the disposition of the south front by Bonomi; it is engraved in Britton and Pugin's *Public Edifices of London*, (1825, vol. i. p. 80) in which publication the writer of the account of the edifice makes the following critical remarks:—" On an inspection of the plans of this building, it will be evident that some particular and favorite object governed the arrangement of the whole design, in addition to the momentous one of aspect, and the advantage of view, which the spot afforded to the southward over the Burlington and Melburne Gardens. This arose from his Lordship's highly cultivated taste for music; and the object was to afford the means of its enjoyment, and to provide for the accommodation of his friends, who participated with him in a love of this elegant and scientific amusement, but without trespassing too much upon the family apartments. The architect's attention to this point is not only evident throughout the plan, but also that it tended to confine the architectural embellishments almost exclusively to the south elevation, converting that into a mere façade,—an error into which the architecture of the metropolis had fallen, but which cannot be too severely censured. Uxbridge House, therefore, like all insulated houses so circumstanced, appears to be an unfinished one, caused either by the consideration of expense, or the unwillingness of the architect to encounter the difficulties of adjust-

ing the external proportions and embellishments to the disposition of his plans—difficulties that were certainly great in this instance, but not superior to the power of the architect to contend with and to overcome; and being neglected, the spectator views this otherwise admirable mansion with a feeling that it is less dignified than it might have been, and he leaves it with the regret that it has not been carried so far as to become altogether a fine example of art, when so much was done towards it, and so excellent an opportunity afforded by its magnitude and situation. The façade exhibits the fact of the architect's endeavour to accommodate a greater number of windows than the length of the building would properly admit, for the parts are all narrower than just proportion requires; and pedestals are resorted to in aid of the pilaster's length, whose height would otherwise have required much greater width, and consequently more ample piers, in the rusticated basement by which the order is supported. It was, possibly, on this account also, that the modern practice of placing an aperture in the centre of all elevations gave way to the pilaster that now occupies its place: it might, however, have been the result either of his judgment or his research, for it was invariably the judicious practice of the ancients in their temples, to place the pillars of their lateral intercolumniations in odd numbers; for, wishing to give a peculiar dignity to the portico, they carefully prevented the peristyle from demonstrating a centre, thereby preventing, in part, a conflict with the importance of the entrance, in which a centre was assiduously marked by its intercolumniations, its pediments, and its portals." These just remarks are the words of my father, written very nearly fifty years ago; and it may be doubted whether the views of sound criticism have advanced a further stage after all the essays that have been since written. The employment by Bonomi of a central pillar or pilaster will again be brought under your notice in the subsequent portion of these remarks.

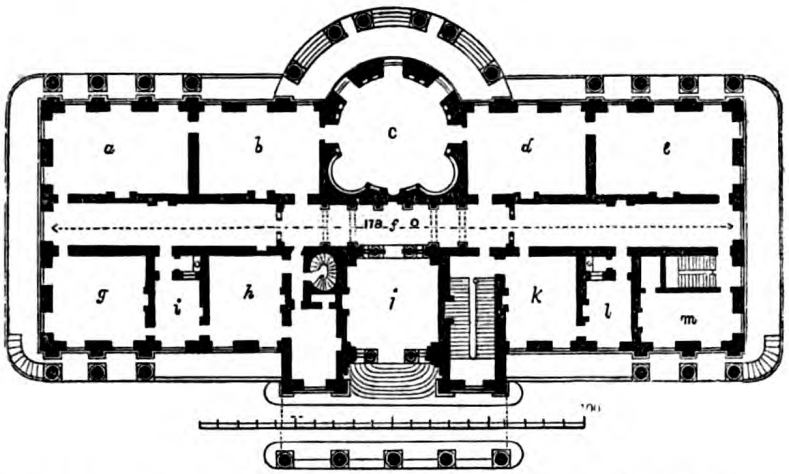
From 1793 to 1799, Mr. Bonomi was engaged upon the construction of Eastwell House, Kent, for George Finch Hatton, Esq., the father of the present (1843) Earl of Winchelsea. It is a mansion of considerable extent and of noble proportions. In the following year (1794) he designed a pyramidal Mausoleum in Blickling Park, Norfolk, to the memory of John, second Earl of Buckinghamshire. This mausoleum (*see* Plate) contains an elegant chapel, vaulted in the hollow of the pyramid. In 1795 a house for R. Knight, Esq., in Warwickshire; and in 1797, a mansion at Laverstoke, near Whitchurch, in Hampshire, for Henry Portal, Esq., were carried out; and between 1798 and 1802, he was engaged upon the erection of various offices, with additions, to unite the old east and west wings, at Lambton Castle, in the county of Durham, for the Earl of Durham. This mansion was further enlarged and completed by Mr. Ignatius Bonomi, and now presents a magnificent appearance in its towers mounting one above the other, being itself placed on a height above the river Wear. Of late years it is said to have suffered much damage from the works carried on in excavating the seams of coal beneath it. A view from the pencil of Mr. Thomas Allom is given in Rose's *Durham Illustrated* (4to. London, 1832). He also erected houses at Sandling, near Hythe, in Kent, for W. Deedes, Esq.: a noble Saloon paved with marble, and an elegant winding Staircase at Piercefield, near Chepstow, Monmouthshire, for Sir Mark Wood, Bart.: and exhibited designs in 1809-10 for intended improvements to Skelton Castle, Yorkshire, for J. Wharton, Esq. Mr. C. H. Smith noticed at one of our meetings (Session 1855-56, p. 11) that a house erected by Bonomi at Brighton, for Mr. Prince Hoare, the well-known art-critic of the end of the last and the beginning of the present centuries, had the joiner's work only varnished; it was in a very good condition many years afterwards, and the varnish had acquired a dark rich colour.

One other of Bonomi's carefully made drawings presents a section of St. Paul's Cathedral placed within that of St. Peter's at Rome, exhibiting their relative sizes. Many more drawings for the buildings I have described, together with others of designs as well those executed as not, are still in

the possession of his sons. Among the thirty-seven drawings which have been presented to-night to the Institute by the family of our regretted friend Mr. C. H. Smith, are five sheets, comprising seven plans, an elevation, and two sections, which exhibit a very chaste design for, apparently, an extensive Sepulchral Memorial, consisting of catacombs in the basement and of three square domed chapels, placed one above the other, and having a circular staircase in each of the four massive angle butments. The stories have on each front a large open arch flanked by coupled columns of the Doric order 5 feet 6 inches diameter to the lower story; coupled engaged three-quarter columns of the Ionic order to the middle story, and pilasters of the Corinthian order to the top story. The design is figured 93 feet square on the plinth under the lower columns, and is figured 203 feet high to the upper member of the crowning balustrade, and with an additional height of 30 feet to the top of the pedestal which surmounts the whole design. It shows evidences of having been very thoroughly considered, the elevation being carefully figured in all its parts as if for execution, and the steps in each height of staircase quoted with great exactness in number and dimension. The drawings are executed with bold ink lines, on very coarse paper, as we should now consider it; the section taken through the angles of the edifice showing the two sides of each chapel in a foreshortened manner, is well worth careful inspection. Mr. Bonomi's family are not aware for what purpose this design was prepared so elaborately, even to the dimensions; but it is scarcely possible that it can exist unknown to them, in execution, either abroad or at home.

The remainder of the drawings, twenty-seven in number, arranged on nineteen sheets, consist of plans, elevations, sections, and some few details, relating to the celebrated villa at Roseneath, in Dumbartonshire. This, Bonomi's last design carried into execution, is also his best known work. In 1803 the then Duke of Argyll commissioned him to make a design to replace the old house which had been burnt to the ground in the beginning of the previous year. This graceful building was erected in about three years, but some of the apartments continued incomplete till at least as late as 1822. We are more fortunate in respect of illustrations of this edifice; for not only have we many of the original working drawings before us, but a plan was engraved in the "Treatise on Civil Architecture," written by the well-known Thomas Telford for Brewster's *Edinburgh Encyclopædia* (p. 651, plate 181), wherein it is given for "an example of modern design." A good perspective view of the chief front is also engraved in Neale's *Collection of Seats of the Nobility*, (vol. 6). These two illustrations had just been engraved for my additions to the section "History of Architecture," in the new edition of Gwilt's *Encyclopædia*, when these drawings before us were placed in my hands: Messrs. Longman, the proprietors of that valuable publication, have kindly lent the blocks to illustrate this memoir with Bonomi's *chef d'œuvre*, the woodcuts will thus afford an opportunity for realising a somewhat more detailed description of the edifice than would have been desirable without such aids to interpret the words.

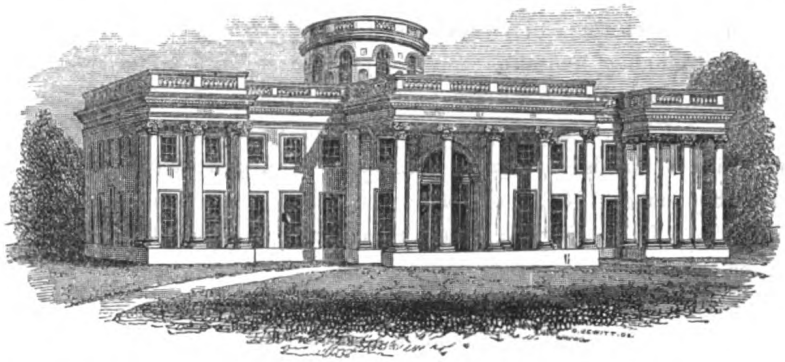
The plan of Roseneath consists of a parallelogram 184 feet in front by a depth of 66 feet, four stories in height, the basement being sunk in the ground. The entrance front, placed towards the north, consists of a *five*-columned portico, projecting 15 feet 6 inches clear between the shafts of the columns, which are 3 feet 2 inches in diameter, 10 feet 10 inches apart, and having a recess under for the ten steps leading up to the entrance door. On each side are three windows 5 feet 6 inches wide, and the angles are ornamented with two similar windows between three detached columns having pilasters behind. Each end façade has five windows without other decoration. The south front has a bold circular portico of six columns, behind which is the library; two windows on each side; and three windows between four detached columns with pilasters at each of the angles.



The rooms are arranged on each side of a central passage 178 feet long, by 11 feet wide, lit at both ends, being to the east and west. The north side has (*j*) the entrance hall, which is groined, 25 feet 6 inches square, with (*h*) the Duke's bed-chamber, dressing room, (*i*) ante room and (*g*) study; on the other half are the principal staircase, (*k*) a bed-chamber with a (*l*) dressing room, and (*m*) the butler's pantry, with a back staircase leading also to an entresol over the last room. To the south is (*c*) the library in the centre, 29 feet 6 inches diameter clear of the bookcases; (*b*) the drawing room, 31 feet 6 inches by 22 feet, and (*a*) the music room, 36 feet by 22 feet. On the other side of the centre are (*d*) the billiard room, and (*e*) the dining room, of similar dimensions. The basement, consisting of the usual offices, was intended in the first instance to be lit only by an area of 5 feet 7 inches wide in the front and rear, and 10 feet wide at the ends, as shown in the woodcut. To this arrangement an addition was subsequently designed for cellarage at each end; and this was also enlarged by a design for a much more extensive open sunk courtyard at each end, semi-circular in form, with arcading; the yard at the east end having an opening into a vaulted "Street," 156 feet 9 inches in length, leading to the sea, as a covered means of access for bathing, &c., from the house. The engraving, from a view made about 1820, would tend to show that these later suggestions had not been carried out. The first floor consists of the central "gallery," and of the butler's bed-room and nine other chief bed-rooms, each with a dressing-room, nearly all of these having a large closet or "wardrobe," as it is called on the original drawings. The upper floor, which does not show on the exterior, and the curb roof of which is set back 5 feet 2 inches from the inside of the balustrading, consists of a central "great passage," from which sixteen bed-rooms and several closets are entered. Over the library rises a Cupola; it contains a large bed-room, with a dressing-room, a closet, and a staircase giving access to the first floor.

The north or principal elevation exhibits the portico of five columns, 30 feet high, the shafts being 25 feet, bearing a Corinthian capital with one row of leaves. The entablature is 7 feet 6 inches high with modillions; over it is a balustrade 7 feet high, behind which are the dormer lights, the total height from the ground being 51 feet. The windows, to each of the two floors have plain moulded architraves. The chimnies are finished as plain shafts with a simple coping-stone. The basement is 12 feet 9 inches high in the clear; the principal floor, 16 feet 6 inches high; the bed-chamber floor 12 feet high; and the garrets 9 feet 6 inches high. The south elevation exhibits similar features, as already described, and is crowned by the circular building or cupola, which is 23 feet high above the balustrade, and is divided by decorated windows with plain niches between them. The end elevations require no further description. It is specially noticed on the drawings that "it has been thought proper to elevate the building both for appearance and convenience, especially of the Offices

elbow; so six steps of 6 inches each will ascend to the south front; and ten steps to the north front, the ground being lower there, than on the south side;" and directions are added for sloping the ground



on that side to prevent the wet lodging against the south front. Bonomi placed the Offices of this country residence in the basement; as the advantages or disadvantages of so placing them was under discussion at one of our late meetings, I will make no comment on their position.

The other drawings, now submitted for your consideration and acceptance, show alterations that were made to the first design. These are near the servants' hall, consisting of an oval stone staircase, with re-arrangement of rooms adjoining, a cold bath-room in the basement; and a vaulted strong room on the ground floor, with a vaulted "intersole" over it, having an inner iron door and frame to it, probably as muniment rooms rather than as plate-closets. A large plan exhibits the arrangement for the sunk court at each end of the house, as already noticed, with the entrance from one of them to the subterranean street to the sea. Another large plan exhibits the ground-plan of the "New House," showing the proposed enlarged areas or courts, 58 feet 6 inches clear semi-diameter, forming a noble addition at each end. Another drawing exhibits these additions in the basement, showing the system of arcades or vaults around them—the steps up to the surface of the ground—the "dead area," or "dry area," 3 feet 9 inches wide on the south front, and 3 feet 9 inches to 5 feet 3 inches wide on the north front, with walls 18 inches thick;—the lines of drains—and also the "Subterranean Street," 11 feet 9 inches wide, formed into a series of arched vaults, each also 11 feet 9 inches long, and 18 feet 9 inches wide, including the curve to resist the pressure of the ground. This street is figured 156 feet 9 inches long from the back of the arcades or vaults, but the drawing does not now show the termination of it next the sea.

Telford in giving this edifice "as an example of modern design," adds that it "displays originality of genius and a disposition to simplify truly laudable." He notices that the principal staircase, 32 feet by 12 feet, has its access ill-arranged and is too confined; the back stairs is placed inconveniently at one extremity of the passage; "the entrance portico consists of five columns, which would be an absurdity if the driving way was not designedly along the front and under the portico; and that the front stair (the steps up to the entrance door) had better have been straight than elliptical." Not only does the entrance portico project to cover carriages from the inclemency of the weather, but it is the more remarkable as consisting of five columns only, a column being placed in the centre of it, the better, it is said, to express that the portico is intended for the protection of carriages, and not for a grand entrance, when a central space would necessarily have been required. There being no pediment, a support is also obtained by the use of the column for any appropriate sculpture. This heresy, as unthinking critics might call it, of a central column is also exhibited at the wings, where three columns decorate the angles of the façade but with a different intention. Another instance of such a treatment of a façade by this architect, has been already commented upon; and perhaps but one other in Great Britain can be

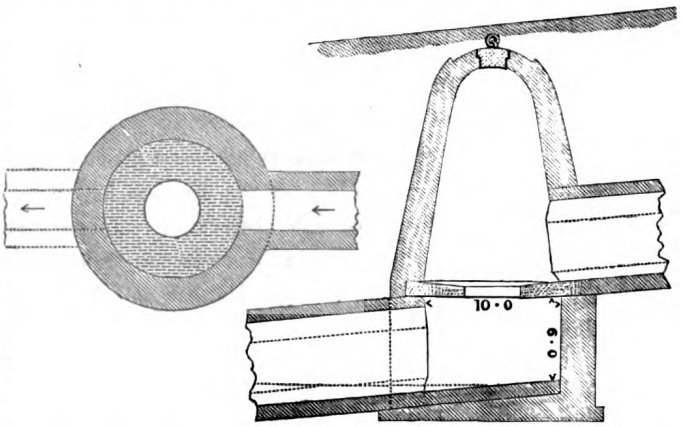
cited, namely, in the five-pilastered front of the centre houses on the *south* side of Bedford Square, designed by the late William Leverton, but the intention of which is defeated by the pediment above them. My original document adds that this building is "of moderate elevation, and covering a considerable space of ground; its chaste and elegant architecture, carried out in the Italian style, combines admirably with the surrounding majestic scenery to produce an enchanting picture, and cannot fail to attract the notice of travellers in the western part of the county, wherein it is situated between Loch Long and the Frith of Clyde, nearly opposite the town of Greenock. The fate of this building and the property on which it stands, as regards the family of Argyll and Lorn, was announced in the newspapers of 15th September, 1866, in the paragraph, that "a Glasgow sugar merchant, well known for his extensive dealings in Mincing Lane, has, it is stated, purchased the Roseneath Estates of the Duke of Argyll, for 170,000."

On the plans of Roseneath is written a short general description or specification. The recital of a few of the more important directions will be interesting as recalling in what manner good work was expected to be done about sixty years since.

Stone was to be employed for all the external walls and decorations; for the inside of the hall and vestibule; for the stairs; and for the chimney pieces in some of the lower rooms: those of the principal rooms and bed-chambers to be of marble. The basement floor to be paved. The internal walls to be of brick. The entrance door and the screens in the vestibule and passage to be glazed. The windows to be in mahogany and patent sashes. The doors of the ground floor to be deal painted, and to be double to each opening. The basement to be arched, for which very minute directions are written, and to be done after the house is roofed in. No bond timbers, wall plates, or lintels to be used in any floor, as all openings are to be solidly arched over in three half-brick arches. Only a few wooden bricks, to which to fix architraves and other fittings; "the greatest care to be taken in avoiding any timber or any wood to be nearer to any flue or chimney than 9 inches at least." All the flues to be 9 inches wide and 18 inches long in the clear. The floors of the three upper stories to be bridging floors. The girders to be trussed as shown, and to be secured with irons, as sketched. All the ends of the binding joists that go into the walls to be secured with an iron strap spiked to them and turned up into the wall about 2 feet. The ends of the girders and binding joists to rest upon a piece of stone and a small arch turned over them, that no dampness of the green walls should be in contact with the timber. All the ends of the timber that go into the walls to be daubed with pitch and rosin melted together in equal quantity. All the walls to be well grouted every twelve or thirteen courses of brick, or every 3 or 4 feet. On the floors of the lobbies and over the strong room will be trap-doors to go down to the counter flooring, in which places may be secreted some valuables, &c.

The small barrel drains to be 1 foot clear diameter, made water-tight by 6 inches of clay well rammed round the brickwork, which is to be 9 inches thick in two half-brick rings, and well cemented. The main drain to be 18 inches diameter. Their fall to be at least 6 inches in 10 feet. As the depth would increase very much by the fall, a sesspool is to be made about 10 feet diameter, and 15 feet deep, without a bottom if the depth of gravel still continues there. The drain from the sink of the scullery is to have a small sesspool in the area made water-tight, with a trap to the outlet drain with a stone cover to lift off "when it is to be cleaned, which is to be done very often, as the greasy particles will adhere within this sesspool, and very often choak the drain." The soil of this spot being gravelly there will be required but few drains; therefore each area is to have a dry well about 4 feet deep and 3 feet diameter in the clear, steened round and a gravel bottom. Stone skirtings 9 inches high to all paved places; and the doors to be hung with hooks fixed in the stone jambs. One drawing notices "that from the north front to the sea at high water, is 420 feet. At 160 feet is to be placed a "Cone" (*see* Woodcut) to prevent the water rats coming up into the drains which will

absolutely be obtained by the projecting stone shelf at the bottom of the cone; the upper drain from the house is let into one side of a cone 10 feet in diameter at the level of a shelf projecting 3 feet all round the cone, which leaves a space of 4 feet diameter in the middle, down which the sewage would pass into a cylinder under the cone, also 10 feet in diameter, and 6 feet 6 inches high," from which passes the lower drain to the sea. The level dotted line at the bottom of the woodcut proceeding from the centre of the cone, shows the level of the highest tide coming up the sewer from the sea. A very useful addition is made in the



" N.B. A plan of this drain and of all the drains of the house should be carefully preserved to find at once the avenues to any of them in case of any accident. There should be plenty of water running down all the drains to cleanse them very often, and to prevent the bad effluvia."

It may be further noticed that the arrangement of the floor timbers are very carefully marked on the plans. The roof plan shows only six water-pipes to carry off the rain water from its extensive area; and only one is marked to relieve the roof of the circular portion, and its water comes down upon the lower roof; their diameters are not marked, but they enter a 6-inch drain. Slating on boarding is used. One of the sections shows that the bedrooms in the circular portion are warmed by the fireplace being formed under the window-sills, a position we should imagine to be a much more modern introduction.

Such is the best account I have been able to produce of the principal works by which Mr. Bonomi established his reputation in this country. They are comparatively little known, but at the period of their erection they were considered as having contributed to the diffusion of a correct taste in the adornment of private mansions, and to the embellishment of English rural life; indeed, the name of Bonomi occurs in the best novels of his day, as that of the architect who necessarily was to be consulted in all matters concerning a country residence. Mr. Bonomi's talents as an artist of high rank are beyond dispute; we have sufficient evidence of them in the contributions before us, which very fairly exhibit his originality of design, combined with peculiar skill in delineation and in colouring; these Drawings, we are assured, were his own handiwork, and not the production of an assistant employed to make an " Exhibition drawing." His theoretical knowledge and practical skill in Perspective procured him many pupils. Among these were several branches of the aristocracy, by whom that department of the art was more often studied that it is at the present day; and some of them, it may be presumed, promoted his subsequent success as an architect. The style adopted by him was the Italian or modernised Roman; and he sought to obtain the characteristic effect appropriate to the object of his design, rather by just proportions and good details than by unnecessary ornamentation and littleness of parts, thus exhibiting his preference for the " Architecturesque " over the " Picturesque." Excepting his son Ignatius, I am not aware that he had any pupils. In his professional conduct, Mr. Bonomi was distinguished by a high sense of the honor and dignity of the liberal art he professed. Proud of its connection with science and literature, both of which his education as a gentleman had taught him highly to value, he had little disposition to tolerate presumptuous ignorance and vulgar pretension; nor could interested motives ever induce him to depart from that high and honorable course which he felt to be alike prescribed by self-respect and by the dignity of his profession Superior to the paltriness of professional jealousies, he was ever a candid judge of contemporary merit. His engagements led him into

frequent intercourse with the rich and powerful, but nowhere did he feel so contented and happy as in the bosom of his own family, or in the society of a few chosen friends. Among these he delighted to number several distinguished artists. The gifted but unfortunate James Barry, found under Mr. Bonomi's roof the shelter which soothed the last moments of his aspiring (but in a worldly sense) unsuccessful career. Being taken suddenly ill at the Ordinary which he frequented, and unable to obtain admission into his own desolate dwelling, he was conveyed to Mr. Bonomi's house, No. 76, Great Titchfield Street, where he received every necessary attention, and expired on the 22nd February, 1806. Grammatical correctness in the use of the English language, an accomplishment most difficult to a foreigner, appears from the autograph observations and remarks inscribed upon the drawings to have been thoroughly acquired by Bonomi; hence we may infer, that it was not ignorance of the difference between the meanings of similar words in English and Italian, but a sense of his personal character and established position, which authorized him to address strangers who wished to be his clients, in the independent tone shown in his printed "Scale of Charges;" that statement I shall have the pleasure of reading to you as characteristic of the man.

TERMS OF JOSEPH BONOMI, Architect, No. 76, Great Titchfield Street, London, January, 1794.

No. I.

Five per centum commission upon the whole expense of the Building, labour, and materials, at London prices;

For which B. makes the design, furnishes all the necessary working drawings, and four fair drawings, two plans, one front, and one section; makes the necessary estimate; and attends the execution of the work.

If a clerk of the works is required (as he should be), he is to be paid by the employer.

All the journeys, *to and from*, to be paid at the rate of eighteen pence per mile.

If it should be desired, after the building is completed, to have it measured and valued; the expenses attending such measurement and valuation are to be paid by the employer.

If the expense of the building exceeds the estimate given, then B. demands no more than the commission upon the amount of the given estimate; provided though, that the overplus is not caused by additions and alterations in the design.

No. II.

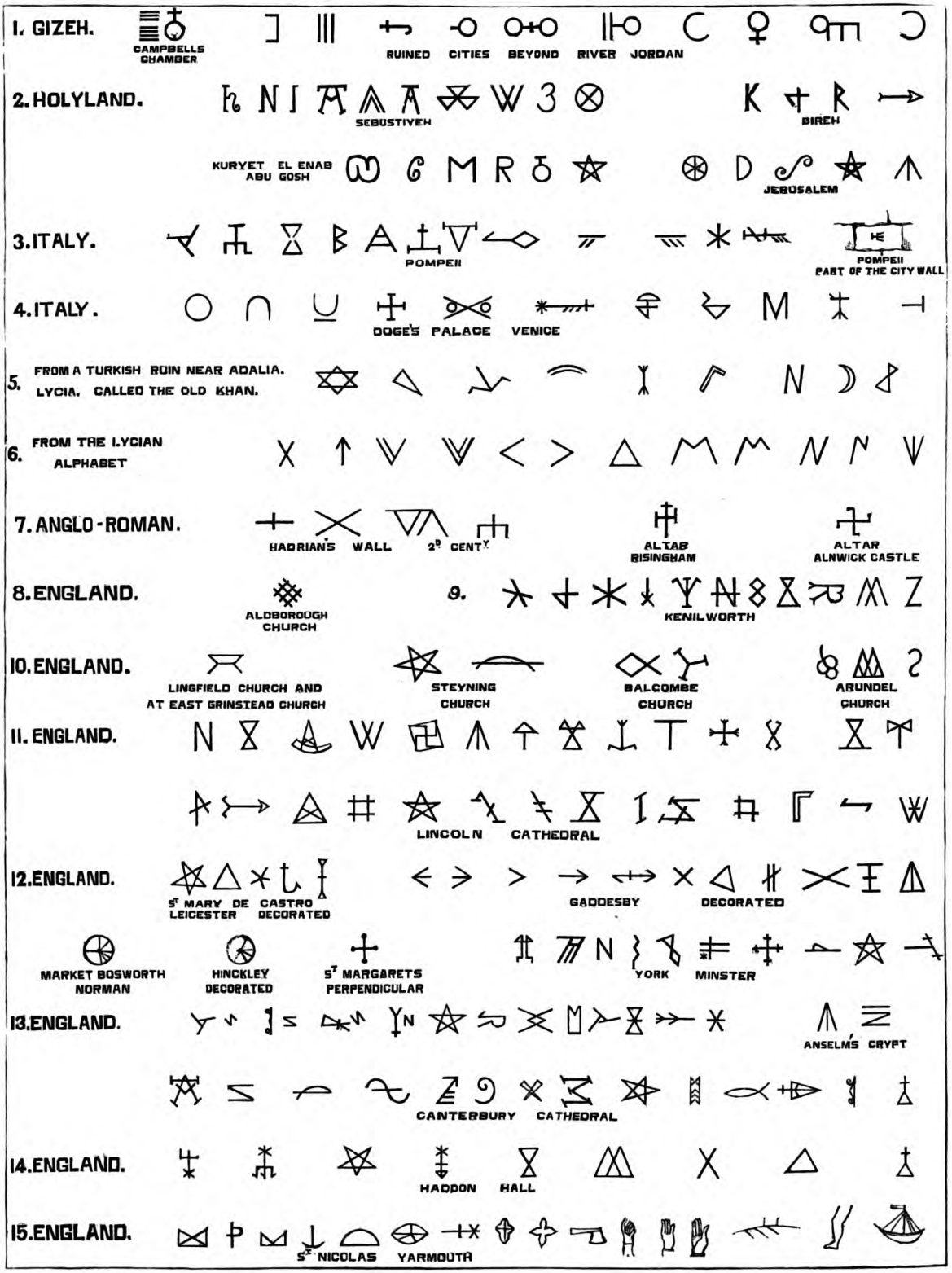
When it is only desired to have a design, with the necessary drawings for execution, &c., and an estimate, but without any attendance to the execution of the building, then such design, drawings, and estimate, are to be paid at the rate of three per centum upon the amount of the estimate, at London prices.

No. III.

If B. is called to settle some business, to give advice, to make additions, or alterations, &c., then B. demands five guineas per day, besides the journeys, paid as above; and, if any drawings are wanted, after B's departure from the place, such drawings, valued at the rate of five guineas per day, are to be paid extra.

After the design has been approved of, if any alterations, additions, or diminutions are required to be done, the necessary drawings, requisite in making such alterations, &c., are to be paid extra, at the above rate.

In case that a design has been made, complete, and approved of, and another design in lieu thereof ordered to be made, then the former design is to be paid at the rate of three per centum, and the second at five per centum commission, upon the whole expense, as above, when executed by B. If not executed, then such second design also is to be paid at the rate of three per centum, as expressed by No. II.



Collected by George Godwin.

SOMETHING ABOUT MASONS' MARKS IN VARIOUS COUNTRIES.

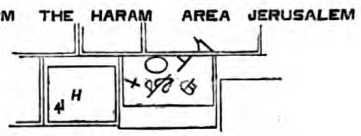
By GEORGE GODWIN, Fellow, F.R.S., F.S.A., &c.

IN early days I noticed the fact, now well known, but not so then, that the stones of many old churches bore peculiar marks, the work of the original builders; and, so long ago as 1841, submitted a communication on the subject to the Society of Antiquaries. This, with a second memoir on the same subject, and transcripts of 158 of the marks from England, France, and Germany, was printed in the 'Archæologia,' vol. xxx, p. 113. I believe I may take the credit, such as it is, of having first brought these signs under public observation, and for several years I never met any person who had independently noticed them. It is curious how long a thing may remain unseen until it has been pointed out. I remember the observation of an old French priest to whom I had shewn the marks with which the walls of his church in Poitiers were literally strewn:—"I have walked through this church four times a day, twenty-eight times a week, for nearly forty years, and never noticed one of them; and now I cannot look anywhere but they flit into my eyes." Since that time I have made very large collections in various quarters, and when at a recent meeting of the Institute a memoir was presented by the Chevalier J. P. N. da Silva, 'Sur la véritable signification des Signes qu'on voit gravés sur les anciens Monuments du Portugal,' it occurred to me that some account of that memoir, with such additional matter concerning masons' marks generally as I had collected, might not be uninteresting. I am sorry I cannot carry out this intention completely, and as I should desire. The notice given me was short, and the mass of matter in my hands is so large that I find it impossible to do more than bring together a few disjointed observations, and a selection from the marks in my possession. These are now before you, and range over many centuries.

In the great Pyramid of Gizeh many of the stones present symbols, either quarry marks or masons' marks, in red ochre, apparently made before the stones were placed. Some of these are published in Vyse's book. Masons' marks have been found, too, on ancient buildings in Lycia and Mesopotamia, and in various parts of India. In 1846 some marks were accidentally discovered in St. Mary's Church, Leicester, (on removing the great west window), one of which is almost identical with a mark found by Colonel Vyse on the walls of Lady Arbuthnot's Chamber in the Great Pyramid.

No. 1 shews marks found in Campbell's Chamber at Gizeh.

The accompanying diagram represents the marks on stones recently discovered by Lieut. Warren in an excavation at the south-east angle of the Haram area in Jerusalem. The H form, and the mark below it, and a cross + on an upper stone, are deeply cut in; the rest of the marks are in red paint.



No. 2 gives other marks from churches in the Holy Land,—Sebustiyeh (or Samaria), Bireh, Jerusalem, and elsewhere. These are unquestionable masons' marks of the Christian period, probably of the eleventh or twelfth centuries (although I have no precise knowledge of the buildings from which they were taken), and, with two exceptions, have been widely used, as may be seen on reference to the other illustrations. The exceptions are one at Samaria, somewhat like the Arabic numeral 3 (though it is not a numeral), and one at Kuryet el Enab, which is apparently the double of the last alluded to. The mark at Jerusalem like the broad arrow (the present mark of our own government) occurs in St. Anselm's crypt (the earliest portion of) Canterbury Cathedral, Furness Abbey, Bosworth Church, Lincoln Cathedral, and many other places.

Through the kindness of Miss Mary Eliza Rogers, I have obtained from the ruined buildings of deserted cities in the Badouin-haunted districts beyond the river Jordan, a number of marks scratched on the stones. (No. 1.) Mr. E. T. Rogers, our Consul at Cairo, has copied many of these signs, and connects them with the Bedouin wanderers, who pitch their tents from time to time in the neighbourhood of these ruins. Each tribe has, he says, its distinctive mark; and tents and cloaks are embroidered and camels are branded accordingly. Some of these forms, collected by Mr. Rogers from tents and camels, are like those on the ancient walls of which I have given representations, but I am inclined to consider the latter quarry or masons' marks.

In Price's 'Journal of the British Embassy to Persia,' with a Dissertation upon the Antiquities of Persepolis (published by Kingsbury & Co., 1825), the author gives specimens of what he considered to be the Antediluvian character, and adds,—"It is rather remarkable that signs resembling these should be used by stone masons, as distinguishing marks, in every part of the globe where I have had opportunities of observing; which signs, in all likelihood, have been used by stone-cutters ever since the confusion of tongues."—Vol. I, p. 32, of the Dissertation.

The trident-like mark on the stones of the wall in Pompeii is very curious (No. 3). Nearly every stone bears it. Dr. Barlow, who made the sketch for me, says, "The wall, if I remember rightly, is not very far distant from the Porta Romana, or the gate of Pompeii towards Rome. I have since drawn and measured much masonry of ancient structure, both in Greece and Italy, but have never noticed any marks on the stones like these, or indeed any marks at all."

No. 3 shews other marks from Pompeii, chiefly from the inner face of the town walls. With reference to marks found on these walls, there are half a dozen lines in the work on Pompeii, published by Chas. Knight, which may be worth quoting. The author says, "On many of the stones certain characters are found, intended, apparently, as directions to the workmen, which are said by M. Mazois to be either Oscan, or the most ancient forms of the Greek alphabet." Various theories are propounded on this, very much ante-dating the build of the walls, which probably have not a very high antiquity. The characters are evidently masons' marks, carrying on the early forms which Mazois recognized. The Etruscan alphabet includes forms used as masons' marks to this day. So, too, the Lycian alphabet, as given by Sir Charles Fellowes in his 'Lycia,' p. 442. Some of the letters will be found at No. 6. While speaking of Lycia, I may point to No. 5, which shows the marks on the stones of a Turkish ruin, called the Old Khan, not far from Adalia, on the road to the Gulelook Pass.* These marks are precisely similar to those found on Mediæval buildings in other countries. Before quitting Italy, reference may be made to marks from the Doge's palace, Venice (No. 4). These were found on the spandrels of the lower arcade (at the end nearest St. Mark's), usually dated about 1350.

No. 7 represents marks from some Roman altars found in England. The mark known as the Fylfot, seen on one now in Alnwick Castle, has been pointed to by Lord Broughton as denoting the hammer or mace of the Scandinavian God, Thor. It is seen with Thor on various medals and on Runic monuments. It also occurs in the Minster at Basle. With reference to the connection of the Scandinavians with Italy Sir William Betham ('Etrurio Celtica') shews an Etruscan coin with this symbol on it. No. 7 includes also the cuttings, resembling masons' marks, which occasionally occur on the stones of the Roman wall in Northumberland (2nd century). Sometimes they consist of a single or double stroke; sometimes of a diagonal cross; sometimes a rectangular cross. The other marks which are represented are less frequently met with.† Search has been made on the Saxon portions of Monkwearmouth, Jarrow, Sumpting, Worth, and some other churches of that period, but no masons' marks were detected.

* Spratt and Forbes's Travels in Lycia, 1847. Vol. I, p. 227.

† See Dr. Bruce's Book on the Roman Wall.

16. ENGLAND.
LATE INSTANCES

GODDARD'S COMMENCED 1625 — ALMS-HOUSES FINISHED 1628 — BRAY

BRAMBLETYE HOUSE SUSSEX 1681

17.

BOOKS OF BRICKLAYER AND TYLER'S COMPANY — ABOUT 1580

18.

FROM RUINS OF UPSAL CASTLE NEAR THIRSK YORKSHIRE

19. SCOTLAND.

GLASGOW CATHEDRAL — CRYPT

ON A STONE FOUND IN A TUMULUS, ISLAND OF BRASSAY ZETLAND

20. IRELAND.

ST MARY'S YOUGHAL — 13TH CENTURY PORTION

21. FRANCE.

STRASBURG CATHEDRAL

STRASBURG CATHEDRAL

22.

CHURCH OF ST MICHAEL, DIJON

23

NOTRE DAME PARIS

SVANIKE, DANISH ISLAND OF BORNHOLM

24. THE TYROL.

OUTSIDE — INSIDE

BOTZEN

25. SWITZERLAND.

CATHEDRAL LAUSANNE — CATHEDRAL GENEVA

CATHEDRAL GENEVA

26 SWEDEN.

UPSALA CATHEDRAL — 13TH CENTY

27. GERMANY. MÜNSTER. ABOUT 1500

CATHEDRAL

ST LAMBERTS ABOUT 1390

28. AUSTRIA.

ST STEPHEN VIENNA — 14TH CENTY

29. SPAIN.

SAN: YSIDORO. LEON

SAN: YSIDORO. LEON — SANTIAGO DE COMPOSTELLA

SANTIAGO DE COMPOSTELLA

SANTIAGO DE COMPOSTELLA

Collected by George Godwin.

No. 8 shews a mark on a stone containing an Anglo-Saxon inscription, Aldborough Church, Holderness, Yorkshire.

No. 9 gives marks from Kenilworth.

10. „ Sussex.

11. „ Lincoln Cathedral.

12. „ Leicester, Gaddesby, York Minster (early English basement, now in crypt).

13. „ Canterbury Cathedral (earliest, Anselm's crypt).

14. „ Haddon Hall.

15. These marks, from the Church of St. Nicholas, Yarmouth, are from the stones of the pinnacles of the two outer turrets at the west front. The Rev. R. M. Musgrave, who sent them to me, says, "These pinnacles, erected about 1230, were taken down in consequence of being unsafe. The proportion of marked stones seems to be about one in four." As to the use of outlines of limbs and other objects of that kind, Mr. Musgrave suggests that they may be "referable to a lower class of labourers not entitled to use the more strictly masonic characters." I found the outline of a leg used as a mark in the spire tower of Strasburg Cathedral.

No. 16 shews some of the latest marks that I have met with in England on the face of stones.—Goddard's Alms Houses, Bray, 1625 to 1628, and Brambletye House, Sussex, 1631.

No. 17. Before dining with the Court of the Bricklayers' and Tylers' Company, some years ago, I was enabled by the then Master to glance through some of their old minute-books. In the year 1580, nearly all who attended and signed the book used a mark or initial, the name being written at the side of it. I give a few of these characters; some of them are known masons' marks.

No. 18. England: Yorkshire.

19. Scotland: Glasgow Cathedral, crypt, 1175 to 1233; Zetland Isles.

20. Ireland: St. Mary's, Youghal, 13th century.

21. France: Strasburg cathedral.

22. „ St. Michael's, Dijon.

23. „ Notre Dame, Paris; Danish Island, Bornholm.

24. The Tyrol: Botzen.

25. Switzerland: Cathedral, Lausannne; and Cathedral, Geneva (part 11th century).

26. Sweden: Upsala Cathedral.

27. Germany: Cathedral, Münster; and St. Lambert's, Münster.

28. Austria: St. Stephen's, Vienna.

29. Spain: San Ysidoro, Leon; Santiago de Compostella.

30 & 31. „ Sta. Maria, Benavente, Segovia.

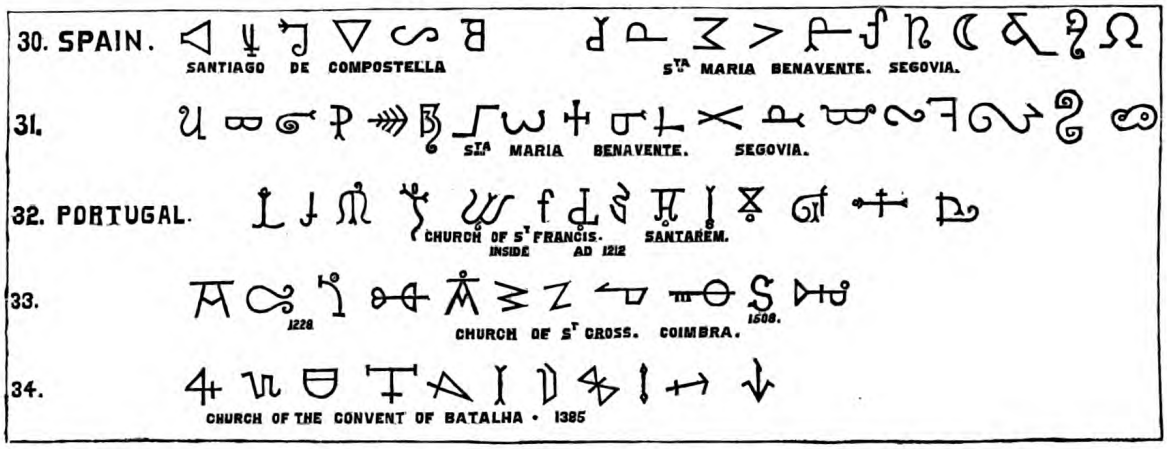
32. Portugal: Church of St. Francis, Santarem.

33. „ St. Cross, Coimbra.

34. „ Convent of Batalha.

I have drawn up with more pains perhaps than the end repays, lists of various places in different countries whereat the same mark, selecting those most widely used, may be found. I must content myself, however, with placing only a few of them before you:—

The hour-glass form has been found on stones on the site of Carthage. Postern, Hastings Castle, 11th century. Cathedral, Geneva, 11th and 12th centuries. Lausanne Cathedral, 11th to 13th century. Turkish ruin, "The Old Khan," not far from Adalia, in Lycia. Kirkstall Abbey. Roche Abbey. Furness Abbey (12th century, part). Gloucester Cathedral (inside nave).



Malmsbury Abbey Church. The Church du Bon Dieu, Setubal, Portugal, 1489. Church of St. Francois, Santarem, Portugal, 1242. Lincoln Cathedral, 13th century. Kenilworth Gateway. York Cathedral, 13th century. Canterbury Cathedral, columns, nave. Salamanca, Old Cathedral (Spain), before 12th century. Cathedral, Lréida, Spain, 14th century. Mauresa Church, Spain, screen round coro, 15th century.

The **N** form, in Anselm's crypt, Canterbury Cathedral, end of 11th century. North aisle of nave, ditto. Church, Samaria, Holy Land. Norman Tower, Bury St. Edmunds. Crypt, York Minster. St. Mary's Abbey, York, Chapter House, 12th century. Maison Dieu, Brechin, Scotland, founded 1264. St. Pierre, Poitiers. Cathedral, Geneva, 11th and 12th centuries. Old Cathedral, Salamanca, Spain, before 12th century. Kirkstall Abbey. Roche Abbey, 12th century. Lincoln Cathedral, 12th century. Fountains Abbey, 12th century. Strasburg Cathedral, 12th century part. Leon Cathedral, Spain, 13th century. Cathedral at Santiago de Compostella, Spain, before 1200. Friburg Cathedral, 14th century. Sir John de Creke's Monastery, Westley Waterless, Cambridgshire, about 1325.

The pentacle  at Kuryet el Enab, Holy Land. Church in Jerusalem. Malmsbury Abbey Church. Furness Abbey (12th century part, and 13th century). Dunstable Church (12th century). Steyning Church, Sussex, 12th century. (A suit of armour in the Museum at Turin is powdered with this sign, coronet and letter F.) Cathedral, Geneva, 11th and 12th centuries. Gloucester Cathedral, 11th and 14th centuries. Lincoln Cathedral, choir, 12th century. St. Mary's Abbey, York (north aisle, nave), 1270. Ditto, Chapter House, 11th century. Fountains Abbey. Strasburg Cathedral, 12th century portion. York Cathedral, 12th and 13th centuries. Glasgow Cathedral. Brechin, Cathedral Tower, Scotland (supposed 1354 to 1373). Canterbury Cathedral, north transept, choir. Church of San Ysidoro, Leon, Spain, choir, 15th century. Santiago de Compostella Cathedral, Spain, before 1200. Lérida Cathedral, Spain, 14th century. (On a Saxon fibula, found at Harnham Hill, near Salisbury, date supposed 646 to 672).

The topped **A** at Church in Samaria, Holy Land. Gloucester Cashedral, 11th and 12th centuries; also on later part. Fountains Abbey, 12th century. York Cathedral, 12th and 13th centuries. Church of St. Martin, Cintra, Portugal, 1147. Church of St. Croix, Coinibra, Portugal, 1228. Church of the Convent of Belem, Lisbon, 1500. Cathedral, Leon, Spain, 13th century. Lerida Cathedral, Spain, 14th century. Cathedral, Segovia, Spain, 15th an 16th centuries.

The horizontal  form at—Canterbury Cathedral, north transept, choir. Fountains Abbey, Chapter House, 1165. Gloucester Cathedral, inside nave. St. Pierre, Poitiers, outside. Freiro da

Espada, Cinta, Portugal, 1214. The Convent at Thomar, Portugal, 1323. Several churches in Spain.

The  at—Church Samaria, Holy Land. Cathedral, Münster, Germany, (south transept), 1500. Glasgow Cathedral. Canterbury Cathedral. Kenilworth, Cæsar's Tower. York Cathedral, choir. Fountains Abbey, 12th and 15th centuries. Bolton Abbey. Lincoln Cathedral, 12th century. Roche Abbey. Soulbury Church, near Woburn, (perpendicular nave).

The cross with stopped ends  at Furness Abbey (12th century). Gloucester Cathedral, 11th and 14th centuries. Fountains Abbey, cloisters, 13th century, and Chapter House, 12th century. York Cathedral, 12th and 13th centuries. Church du Bon Dieu, Setubal, Portugal, 1489. Freiro de Espada, Cinta, Portugal, 1214.

The length of the marks, it may be as well to mention, ranges from one inch to five or six inches. The greater number, however, are from two to three inches long.

The majority of the marks I have given from Spain are taken from Mr. Street's 'Account of Gothic Architecture in Spain.' Speaking of the ancient buildings there, the author says,—"The masons seem to have worked together in large bodies, and the walls are marked in all directions with the signs which, then as now, distinguished the work of each mason from that of his neighbour; but I have been unable (save in one or two cases) to detect the mark of the same mason in more than one work; and from this it would seem to be probable that the masons were stationary rather than nomadic in their habits, a deduction which is fortified by the difference of general character which may, I think, be detected between the groups of marks in different buildings. Occasionally the number of men employed on one building seems to have been unusually large, and it is clear, therefore, that there were great numbers of masons in the country. In the small church of Sta. Maria, Benavente, there are the marks of at least thirty-one masons on the eastern wall; as many as thirty-five were at work on the lower part of the steeple at Lérida; whilst in one portion of Santiago Cathedral there appears to have been as many as sixty"

Looking through the marks given in Mr. Street's excellent book, I find the same mark repeated a little oftener than might perhaps be inferred from the writer's remark. Thus the universal N form occurs in Lérida Cathedral, Leon Cathedral, the Cathedral of Santiago de Compostella, and the old Cathedral of Salamanca. The pentacle appears in Lérida Cathedral, the Cathedral of Santiago de Compostella, and the Church of San Ysidora at Leon. The hour-glass form is in San Ysidora, Leon; Lérida Cathedral, and elsewhere. The same form without the bottom line, occurs in Lérida Cathedral, Cathedral of Santiago de Compostella, San Marcos at Salamanca, Terragona Cathedral, Segovia Cathedral. The horizontal ⋉ form is in Lérida Cathedral and Segovia Cathedral. The topped A is in Lérida Cathedral, and the Cathedral of Segovia, and so with some others, I mention my impression in this respect, not by any means as seeking to contradict Mr. Street, but because the inference drawn, namely, that "the masons were stationary rather than nomadic in their habits," is of consequence, and it is desirable that those who may have to discuss it should be agreed as to the premises.

The marks from Portugal, to which reference has been made, are chiefly taken from the Chev. da Silva's Memoir, to which I will now briefly allude. It gives 508 marks from ancient buildings in Portugal, besides a supplementary plate containing 14 marks from the great Aqueduct of Lisbon, built in 1733, and 22 "ancient Masonic Hieroglyphics," where used is not stated. They are, in fact, nothing more than a "secret alphabet" of our school days; and so transparent that no one would think of trusting a secret to it. The marks in Portugal are feebler and coarser than those of some other countries, but include many of the latter, as I have already pointed out, such as the hour-glass form, the topped A, the N form, and many others. The earliest given are dated A.D. 1102.

In my second letter to the Society of Antiquaries on the subject, I said, "The marks, of which we

are speaking, it can perhaps hardly be doubted, were made chiefly to distinguish the work of different individuals. At the present time the man who works a stone (being different from the man who sets it) makes his mark on the bed or other internal face of it, so that it may be identified. The fact, however, that in the ancient buildings it is only a certain number of the stones which bear symbols, and that the marks found in different countries (although the variety is great) are in many cases identical, and in all have a singular accordance in character, seems to shew that the men who employed them did so by system, and that the system, if not the same, was closely analogous in one country to that of the others."

In Portugal, however, going farther than this, it would seem to have been urged that these signs were symbolical, and were used as means of recognition by the freemasons, who, as some believe, travelled over central Europe exercising their art. The principal object of the Chevalier's Memoir is to shew that the opinion of those who have believed that these marks have a masonic signification, cannot, for a moment be admitted. Although English Archæologists may not need any argument to convince them that the marks are not symbolical, they may be willing to hear what he has to say on the point.

"Why should the freemasons," he writes, "who travelled to execute their labours in a body, each accompanied by his family, have placed these signs upon the stones, since each one knew the other for his partner? For none but those initiated or affiliated to their lodges, were permitted to help in the construction of those beautiful edifices; thus enabling them to protect each other reciprocally as loyal brothers, *and above all to keep amongst themselves the secrets of their art.* Why then shew these marks to all the world, if (as it was said) they were simply used with the intention of making themselves known as freemasons, when every workman knew the other as a brother? And, besides, would they have been permitted to make public these signs, if they were really those of the order into which they had been admitted! Again, if these signs were really characteristic of the masonic order, they ought, without doubt, to be identical on all buildings, because the hieroglyphic alphabet, or scale, being composed of a limited number of figures, and masonry having at the commencement but a single rite, the sign would have been reserved for the most urgent cases for recognition or correspondence, and never employed uselessly or exposed to the observation of the profane."

"An attentive consideration of these objections," the writer proceeds, "and the great diversity of the signs seem to us to afford tolerably convincing proof that they are by no means symbolical, and can have no perfect meaning; for, in order to attain this, it would have been necessary to use them with something like order, whilst in none of the buildings that we have examined, and of which we annex the marks, has this been observed. On the contrary, the marks are found on stones at various heights, totally void of connection one with another, and many are placed in inverted positions, although similar in form."

After speaking of the religious feeling that prevailed during the Middle Ages, and the spirit that animated the builders, the writer goes on to say:—

"In order to execute such important works, it was necessary to have large numbers of workmen, the more so as similar buildings were in course of construction in more than one country, and even at the same time, for the execution of which preference was given to the cleverest workmen, and these, being always of the Society of Freemasons, were much sought after everywhere.

"Although the number of the adepts on the spot was considerable, still more were needed to complete the numerous structures then in course of execution, and they were therefore summoned from all parts to work at the buildings in Portugal before and during the construction of the church and convent of Batalha.

"There is still another and stronger reason to confirm the opinion we are about to give on this

question; which is, that the works progressed but slowly, not only on account of the enormous size of the edifices, but more especially because cut stones of small dimensions were employed, and all buildings being constructed with stones faced on every side, the hand labour was greatly increased; the only means available to avoid this inconvenience, and hasten the works, and at the same time to benefit the workmen, was to make them *cut the stones as piecework*, according to dimensions given and designs drawn by the architect. To enable payments to be made to so large a number of workmen without mistake, to know exactly those who had done the various duties assigned to them, the workmen shaped their blocks one after another, and, to avoid confusion in their work, were in the habit of marking each block with a given sign as representing their signature, so as to shew how much was due to them. This, in our opinion, is the reason why we find so many different marks, not only on the same building, but on others which exist in different provinces in Portugal, and why they are met with in different parts of the building."

"The use of these signs," continues M. da Silva, "passed from father to son; and as it was usual (then as in many families of the present day) for sons to follow the same profession as their fathers, from the similarity of marks seen on buildings in the provinces of Portugal, we may learn that the stone-cutters of a certain locality took part in the constuction of other buildings in the same style in different places, and by the date of the construction we may even find out where the workman was first employed.

"Our supposition on this point carries us still farther, for it shows us how many workmen of the same family, that is to say, bearing the same surname, have worked together on the same building at the same time. To find this out, it is sufficient to observe, the second mark, added to the special sign used by them, which will always be the same for the whole family; those marks are usually a zero O, a triangle Δ, a disc ⊙, or a small cross +."

In the examples from Portugal given, this second mark is chiefly a circle (see 32 and 33); so it is also in Spain. In England I have generally found the N form and the acute angle < so used, (see No. 13, Canterbury; also Dijon, 22). My own opinion, expressed long ago, is, that the second mark probably belonged to the overseer; and I see no reason to change it; although this, like other points in connexion with the marks, is by no means certain. I have met with four stones in one wall, nearly close together, each bearing two marks, and the whole eight marks different. In the south transept of York Cathedral there is a stone with three marks on it, and so there is in Strasburg Cathedral (see 21).

M. da Silva finally asks how it can be that these signs are those of Freemasons, when we find them on the stones of several monuments erected before the organization of these fraternities. Here, however, he assumes two things; first, that the marks found on the earliest buildings are precisely similar in description to those of the middle ages; and, secondly, that the date of the initial organization of such fraternities is really known. Moreover, he leaves out of consideration the probability, or, I should rather say, the fact, that the guilds adopted existing forms and symbols. Without considering the marks symbolical, we may yet believe they owe their wide diffusion to the existence of associated guilds. The general similarity which they present all over Europe from, at any rate, the 11th century to the 16th, and indeed to the present day, points to a common origin and continued transmission.

M. da Silva fully admits the existence of the building guilds, and his quotations go to affirm that they were maintained as an opposition to the monastic associations, which were depositaries of old theological traditions, and could be met only by other associations organized with sufficient strength to endure, and in time to become themselves guardians of traditions, and with enough mystery to avoid rousing dangerous resistance.

"Towards the end of the 12th century, when their numbers had become considerable, a special cor-

poration of intelligent architects, stone-cutters and labourers was instituted, who, uniting together, formed a secular body, which acknowledged royal authority alone. Notwithstanding the absence of written proofs and historical documents, it is probable that societies of lay builders existed in Germany as far back as the 13th century. In the year 1275, the Emperor Rodolpho granted a special charta to builders, established in Strasburg, and in 1278, the Pope Nicholas III. delivered them a brief of indulgence, renewed from time to time by his successors."*

The precedence of the Freemasons of Strasburg came to be recognized by neighbouring states, and at a meeting of various lodges held in Ratisbon in 1459, the head of the lodge at the Cathedral was acknowledged the head of the Freemasons in Germany. The statutes of this date of the Strasburg Lodge, from which lodges branched to many places, have been published. Two boards whereon are delineated the marks of the masons who were engaged are still preserved, or were so a few years ago, in the Cathedral.

As to the earlier guilds, in classic countries, of which there are traces, I cannot now pretend to speak; nor will I do more, with reference to our own country, than briefly remind you that a College of Masons is mentioned in a Latin dedicatory inscription, dating from about A.D. 52, and which was found in Chichester, in 1725. A bull was issued prior to 1200, giving authority to heads of churches to build churches, and attaching to them a certain number of "*liberi muratores*," or Freemasons, to direct and execute the ornamental parts of the structure.†

Much might be, and something has been written on the actual origin of many of the marks. I have already pointed to some of them in the Lycian alphabet. Others are apparently Runic letters. In the later works several of the Roman capitals are used, and may or may not be the initial letter of the user's name. The alpha on some Greek altars found in England, near the Roman wall is shaped thus  and has been in common use as a mark for centuries. It may be worth note, too, that the letter M in some Latin inscriptions found on the site of the Roman wall and figured by Dr. Bruce, (one of them dated A.D. 216) is thus shaped  giving the hour-glass mark when set upright. The top and bottom lines in the letter are curved instead of straight, and I have seen the mark in more places than one (Malmsbury Abbey Church, for example, as figured by me in the *Archæologia*), with the ends thus rounded.

The hour-glass form, however, has been found on stones much more ancient than the inscription referred to. I simply mention the similarity. The hexalpha, or double triangle, was a mystic mark in India centuries ago. The N formed symbol appears on the coins of the Ariarathes, a series of Persian kings who lived before Christ: also on a coin of Amyntas, King of Galatia in the time of Strabo, 50 years B.C. The topped A, as you have seen, has been very widely used. Dr. Clarke mentions that in the walls of the Castle at Paros, butt ends of columns are seen marked with the letter A near the Lewis hole, and suggests that it may be a mark to adjust by, or the initial of the architect, not to be discovered until the building was in ruins.‡

Mr. J. E. Dove, in a series of papers published in *The Builder* some time ago,‖ attributed recondite meanings originally to many of the forms used as marks, and supported his views with erudition and ingenuity. Some of them were in use amongst the Egyptians, and then, doubtless, had signification. The circle and triangle, later taken to symbolise eternity and the Trinity, had earlier a different significance. The acute angle, or V form as used by the Egyptians, he found reason to believe was a

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* M. Daniel Ramée, 'Histoire Générale de l'Architecture,' quoted by M. da Silva.

† Sir R. Westmacott, 'Archæological Journal,' Vol. III., p. 198.

‡ Travels, part 2, sec. 2, ch. 10. ‖ See vol. for 1863, April 4th, April 18th, June 6th, and July 11th.

feminine symbol, and that the same form reversed ∧ was a male symbol. Into this part of the inquiry, however, I am not now entering. Whatever may have been the original signification of the forms adopted, I find no evidence to lead me to believe they were viewed by the masons other than as signatures, given to them, in some cases, on joining a lodge, or otherwise regulated. The Scotch lodges gave marks till very recently, if they do not do so now. In St. Ninian's Lodge at Brechin every member had to register his mark in a book kept for the purpose, and he could not change it without certain formalities.

I must now end. The subject is probably more curious than useful; but I hope you will consider it sufficiently interesting to justify me in again bringing it before you. In my first communication on the matter to the Society of the Antiquaries, and afterwards to the Institute, I ventured to express my belief that "no circumstance which promises to throw even the smallest additional light on the early history of those wonderful men to whom we are indebted for so many magnificent buildings can be deemed insignificant or unworthy of consideration;" and I think so still.

At the conclusion of the reading of the papers,

The PRESIDENT, in inviting remarks upon them, observed with regard to Bonomi, that he was sorry to say his name had almost gone out of recollection, except in connection with their kind friend the curator of the Soane Museum, and he was not aware till now, that that gentleman was so nearly related to the eminent man who in his (the President's) early days, was brought a good deal before the architectural world. The memoir was an extremely interesting one, and it would be well if all architects acted upon the recommendation of Mr. Papworth to have their drawings bound up. He was afraid life was too short for individuals always to adopt that course, but it occurred to him to mention that a striking instance was afforded by the late Sir Robert Smirke, who, with that carefulness which was part of his character, bound up all his drawings, and he (the President) had seen a great number of volumes of drawings of the Post Office, Custom House, and other public buildings, executed by Sir Robert, all indexed and bound with the greatest care. He supposed they were in the hands of his brother, and they would form hereafter a curious record of the enormous amount of work which that great man carried out. Adverting for a moment to Bonomi, he (the President) was not aware till now that he had so complete an acquaintance with perspective as to lay claim to the professorship of that branch of the Royal Academy; and the anecdote of the struggles of the then President of the Academy to obtain that appointment for him was very curious indeed. He recollected when he was himself a student at the Royal Academy, Mr. Turner, the great painter, was professor of perspective there, and gave six lectures annually, in a highly amusing way. The lectures were sometimes illustrated by a number of very beautiful drawings, but in the absence of instructions to the porter they were exhibited without any reference to what the learned lecturer was speaking of, and the whole affair was a singular instance of the misappropriation of a great man's talent. As far as his own experience went, notwithstanding the merits of Turner, he thought his perspective was often wrong and careless; perhaps he became more experienced afterwards, but the truth was that in his later pictures, with their flood of colour, perspective was not a matter of much consequence. With regard to the paper of his friend Mr. Godwin "on Masons' Marks," it was one which elicited a good deal of information and supplied a certain amount of instruction. He supposed the fact of the origin of freemasonry could not be much doubted, viz. that it arose from those bodies of masons who congregated in places where they were building, though he did not join the fraternity in believing that they built Solomon's Temple, and that through the murder of one of their number they constituted themselves into a distinct fraternity. The marks referred to he had never noticed on the face of the stones;

he had often seen a mason make a mark on the stone he was working; but it was generally put on the top bed, so that it could be seen till the next course came upon it, and that might in some degree account for the fact mentioned, that a very small proportion of the stones showed a mark and others none. He thought, in the latter case, the mark was on one of the other faces.

Mr. GODWIN said—In some cases these stones had been taken down, so that they could be examined all round; and it was seen that only a certain number of them bore marks.

No further remarks being offered upon the papers,

The PRESIDENT proposed a vote of thanks for the loan of the drawings illustrating the paper, lent by Mr. Ignatius Bonomi, and Mr. Goldie, one of their members, also to the family of the late Mr. C. Smith, for the presentation to the Institute of the drawings exhibited executed by Joseph Bonomi.

This was unanimously agreed to.

The PRESIDENT said—Their next duty was to express their thanks to Mr. Wyatt Papworth for the care and pains he had taken, and the success which had attended that care and pains in presenting them with an extremely interesting memoir of an eminent member of their profession long since passed away; also to his old friend Mr. Godwin, for the care and pains which he had bestowed upon a remarkable subject. Though perhaps it was a study more interesting to the archæologist than the architect, at all events they were bound to thank him for having devoted, amidst his numerous occupations, so much time and attention to a very recondite subject.

The several votes of thanks were unanimously accorded, and the meeting adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 15th March, 1869, C. Barry, V. P., in the Chair, the following Papers were read:—

A COMMUNICATION FROM PROF. DONALDSON, Past President, Hon. Sec. F.C.

(Addressed to the President, W. Tite, M.P.)

Rome, 58, Via del Babuino,
3rd March, 1869.

My Dear President and Friend,—I had dated a sheet from *Athens*, having intended to write to you thence, knowing the deep interest that you take in every thing that is Greek. But I was so much engaged during the few days I was there that I could not find time, and ever since I have been prevented sending you a letter, until at length shame makes me put aside every other consideration, and write to you from *Rome*, the second of artistic cities of classic art. I can only send you a few scattered observations at present, as I am collecting points of information, none of which are at present sufficiently complete for the Institute; and I must defer a more formal communication till my return, which will, I hope, be by the middle of April. I am seeking to inform myself of the principal works carrying on in Italy, and to know the leading men employed. There is a good deal of movement going on in Italy proper for the improvement of towns, and additions to some of the principal cities; and there are also works going on in Rome; but they are generally *roba di Chiesa!* The Pontifical government seems more intent upon restoring dilapidated churches, than upon works of municipal utility for the sanitary condition of the town or the convenience of the people. Sewage is sadly deficient; even the Cloaca Maxima still remains *full of soil*, on account of the expense to be incurred by the removal of the accumulation! and yet tens of thousands are spent upon the restoration and embellishment of basilicas or churches with scanty congregations, or in out-of-the-way situations. Very few streets have *footpaths*. My own is a very much frequented and wide thoroughfare, from the Piazza del Popolo to the Piazza di Spagna, and some thirty yards or so have alone a footpath of good width, but paved with coarse, hard, gritted, pebbly slabs. The carriage ways generally are kept clean, and are *well paved* with small basaltic blocks, in form, and almost size, resembling the "*opus reticulatum*," wedge-like, and pointed at the lower end. I must mention with great approval a very fine winding road, leading up to the Monte Montorio, in Trastevere, and to the Aqua Paolina. It rises so much above the level of the city, and has such a winding, that at every dozen yards there is a fine commanding fresh view; the whole city, with its public buildings of gigantic size, its cupolas and towers, its seven hills and palaces, the Capitol and Coliseum, rise up one after the other, till all come into the panoramic view, and you see the Campagna with its line of aqueducts, backed by the range of the Apennines, studded with villages, and by the line of Alban hills, with Frescati, Tusculum, Grotta Ferrata, etc., lying on the slopes, and dotted with fine villas. I think that this view is unequalled in the world; at least, I know nothing that approaches it, except it be (*lungo intervallo*) the new drive, partly completed and partly in progress, in the Trans Arno, at Florence, near the Poggia Imperiale. There you have the gradual winding ascent on the rapid slope, with Florence, and its cathedral, and Campanile, and fine edifices, backed by the Apennines also; the valley of the Po lying also under your eye towards Pisa. But there the antique associations do not equally mix themselves up with the objects in view, and the terrible middle

ages are substituted for the imperial centuries of the capital of the world—Roma Eterna. The Pope is slowly carrying out various excavations of much interest. The discovery of the Marmorata, or marble depôt of the ancients, on the banks of the river, is of much importance. A great length of the antique quay is exposed, with the landing-places, and the blocks of stone are perforated with holes to receive the cables by which the vessels were moored. Above 1000 pieces of marble have been uncovered. There is one cylindrical shaft, 18 feet 8 inches long by 4 feet 10 inches in diameter, of African marble, of light and dark green tints, and red and white (apparently quartz) veins. A cipolino block, 9 feet 6 inches by 6 feet 6 inches, by 3 feet 9 inches, on which is an inscription:—

EX. M. N. CAESARIS N. R. D. A. SVB CVRA. C. CEREALS. PR.
SVBSEQ. SERGIO. LONGO. I LEG. XXII. PRIMIG. PROB.
CRESCENTE. LIB. N. XVIIII

Ex metallis *n*ovis *Caesaris n*ostri *r*ationis *d*omus *a*ugustalis *sub cura* Caii *cerealis pr*aepositi *subseq*uente *Sergio Longo* centurione *Leg*ionis *XXII. primig*eniæ *prob*ante *crescente lib*erto *n*umero *IX.*

Such inscriptions seem to be on the principal piece of each cargo, and indicate the quarry whence sent; the names of the superintendent and freedman (who are noticed in Tacitus,) so that the series may be attributed to Nero's time. The number of pieces is also noted. This inscription and its amplification have been kindly furnished to me by the Baron Visconti, whom I accompanied to the spot, and who is superintendent-general of the excavations, and cousin of the celebrated Parisian architect, our late Honorary and Corresponding Member; and I am to go with him to Ostia. He has lately excavated the firemen's quarter in Trastevere, near the Monte di Fiori, which is sunk some 20 feet below the general level. The part laid open consists of a square court, 27 feet 3 inches by 24 feet 2 inches, with a seat along one side for the firemen to sit on, a fountain in the centre, and an ediculum on another side of the court. The walls were painted, and are covered with an immense quantity of graphiti, or scratched inscriptions, by the men, extremely curious. The floor is inlaid with an admirable mosaic, with black figures on white ground. Two large marine tigers, well drawn, and a marine goat, characteristically expressed, with the heads and bodies of those animals and tails of fish. There are two centaurs, less well drawn; one has a flambeau in one hand, to indicate fire, and in the other a trident, allusive to water for its extinction. The other has a vase with fire, and points to the trident to put it out. The ediculum is of brick, with Corinthian capitals, and bases cut out of terra-cotta. I reserve explanations of other pontifical excavations for a future occasion, particularly those of the palace—or rather the *palaces*—of the Cæsars, as the Mons Palatinus should be properly called.

The restoration of St. Paul's without the walls has been carried out most sumptuously and gorgeously, and with the strictest attention to the original basilica, by the Commendatore Poletti, who I hope we shall number among our Honorary and Corresponding Members. He is perfect master of our art, and designed and executed the column of the Immaculate Conception in the Piazza di Spagna; and I shall bring home for the Institute various of his works, which he has given me for the purpose of adding to our library. He has made a most important addition to the literature and history of our art, in two papers, read as President before the Academy of S. Luke's, on the primitive arts of Italy. He propounds the theory, that Italy was peopled by an indigenous race from the most remote times, and *anterior* to Greece: that we must regard as merely fabulous traditions that the Greeks originally emigrated into Italy; on the contrary, the Italians first emigrated to Greece, and there carried *their* civilization and *their* arts, anterior to—or, at all events, coeval with—the Greeks. He quotes passages from Virgil, Strabo, Dionysius Halicarnassus, Pausanias, Herodotus, Thucydides, Pliny, etc. He considers the Pelasgi, Tyrrheni, and Etruscans as identical; and points to their Cyclopean walls, their

tombs, and other remains, as indicating a civilization and artistic excellence quite independent of Greek influence, and *anterior* to it, individual, and characteristic. Such is a brief statement of his conclusions; and I must own that I have been much struck by the perusal of his elaborate papers, as elucidating some hitherto unexplained characteristics of Etruscan art. And the sight of the old relics exhibited in the gallery at Florence—which forms a communication between the Uffizi and the Pitti (like that between the Castle of S. Angelo and the Vatican), and now stored with ancient cippi—and the wondrous collection at Perugia, and the tomb of the Volumnii there (noticed formerly by our Fellow Mr. G. L. Taylor, in a paper read at the Institute), to my mind confirms the Cavaliere Poletti's startling theory.

There is considerable activity, as I have already said, evidently in progress in Italy. Turin, Milan, Bologna, and Florence, have large operations in progress. The Signor Coriolano Moriti, deputy to the Italian Chamber, engineer and architect to the municipality of Bologna, has been widening some of the principal thoroughfares, introducing an English square with a garden in the centre, and erecting a National Bank and other considerable buildings. Florence is engaged upon its new suburban extensions, which, however, in point of artistic treatment and convenient disposition, are ill-judged. Imagine series of very small, and comparatively low, rooms in such a hot climate; and windows so high from the floor, that there are three or four steps to enable you to mount, in order to look out and get a peep at the street.

I must reserve further details for another time. I trust all is getting on satisfactorily at our Institute, whose interests I am advocating here unceasingly. I hope you are pleased with the new appendix to the catalogue, and that it has been carried out in conformity with the resolution of the Library Committee just before I left England. I shall remain here another month, and should be delighted by a letter from you. Believe me

Ever your very sincerely attached friend,

THOS. L. DONALDSON.

ON THE CRITICISM OF ARCHITECTURE.

By E. Ingress Bell, Associate.

In submitting to you the following observations on the criticisms which architectural works at the present day receive, I feel that some apology is due from me at the outset for having taken upon myself to introduce to you so wide and difficult a subject; seeing that I neither possess nor pretend to any special qualifications for the task. But it is thought that the subject is one which may with peculiar fitness be discussed at this time. We are now, as it were, on the threshold of our new home; the galleries at Burlington House, which have been erected for the reception of our contributions to the annual Art-Exhibition, afford facilities for their display, and for bringing them to the notice of the public, which have been hitherto beyond our reach:—for the limited space at Trafalgar Square told more fully against architecture than against any other branch of art, and the Architectural Exhibition, which was established to meet this difficulty, has failed, so far as I am able to form an opinion, to reach the general public at all. The time appears to have arrived when our claims to the consideration of the public will be brought before them in such a manner and under such circumstances as will ensure a wider recognition: it is important, therefore, for us to consider by what means they may be best advanced, so as to ensure that a truer estimate of them may be formed. To this end I have ventured to offer you, with the greatest diffidence, the following observations; in the hope that if they be but of little value in themselves, they may at least clear the way to a profitable discussion.

It should be stated that the following remarks are not intended to apply to any of the able critical treatises which have from time to time appeared. It would be impertinent in me to criticise the works of those whom I recognise as teachers;—besides, I am not now concerned with the criticism of any particular system, but with the want of any system in criticism. My business is with the press-criticism of the day—the notice which the current periodical literature accords to architectural subjects.

It will no doubt be conceded that competent, honest, fearless criticism of architectural efforts is, if not absolutely necessary, at least desirable. Journalists are careful to tell us from time to time the enormous power exercised by them through the public press, and it is in art matters that this power is capable of being most usefully and widely applied. The majority of the public, glad to be relieved from the labour of independent thought, form their opinions, on this and many other subjects, second-hand, and follow implicitly the guidance of those who take upon themselves to exercise the functions of experts. Hence a wise application of the power which it is competent for able criticism to exercise will have a marked influence on the art progress of the age.

As a reward to conspicuous excellence, and an encouragement and stimulus to the ambition of younger men;—as a terror to evil-doers, and an instrument for the exposure and repression of charlatanism and incompetence;—as the means, and if not the only means, yet the readiest and completest, for disseminating and fostering an appreciation of art;—the value of just, scientific, wholesome criticism can scarcely be over-estimated.

It will not be without profit if we can discover in what degree the press-criticism of the day fulfils these conditions. We should divide the vehicles for the expression of critical opinions into profes-

sional and non-professional. The professional papers cannot, it is thought, be said to reach the public—their influence, such as it is, is confined almost entirely to the profession, and any influence they may have with the general public is indirect. The non-professional papers, it may be assumed, have but little influence with the profession, and for this some reasons will be given by and by.

And, first, of the influence of the professional papers on architects.

It must be remembered that the observations of the professional critic are addressed to men who profess a competent knowledge of their business; men who have passed through a course of training more or less severe, and who hold in many instances positions in the profession which have only been attained by the exercise of at least average ability. It is surely not too much to expect that in pointing out alleged defects in the works of such men as these, some reference to principles, and to received canons, should be made; and that the tone of courtesy which would moderate the verbal criticisms of a work expressed in the author's presence, would also, to some extent, appear in the anonymous notices which issue from the press.

I have now the honour of addressing an assemblage comprising many of the foremost architects of this kingdom; and I ask whether you accept, whether you profess to accept with confidence the utterance of those who week by week write for your instruction and guidance. What new lights have you gathered from their teaching? What errors have you abandoned at their instance? Have you felt constrained to bow to their decisions, and to accept their strictures as at the hands of teachers more learned, more practical, more practised than yourselves? Do you feel a sense of their superiority, their fitness as teachers from their calm and forcible exposition of principles, and their apparent earnestness and judicial impartiality? Are you able among the conflicting theories of the various art critics to deduce from their incompatible elements any reliable assistance, any fresh truths? Do the young receive sage counsel and guidance, and the more experienced gentle though merited reproof? Or do you not for the most part see only chance and hasty judgments varying with the fashions of the hour—following rather than leading the professional taste—off-hand—contemptuous—unsupported by reasoning, and wanting the weight of wisdom?

It must rest with you to say. If you recognise in them the able leader, the wise counsellor, the impartial judge, the considerate friend—these remarks will have been written in vain.

As to any beneficial influence of non-professional papers on the general public, I am afraid that the work has yet to be commenced. Has the criticism of architectural works resulted in inducing an admiration and appreciation of architecture apart from any qualities which appeal to the vulgar mind? Has criticism educated the public to a discriminating selection of unpretending, but meritorious efforts? The answer, it is feared, must be that at the present time the public care little or nothing for the architecture that has not some vulgar or startling attributes to recommend it. They do not enter into our discussions—they do not sympathize with our difficulties, nor appreciate the nice distinctions which disturb us so much. They leave us to our "Battles of the styles," and "Pleas for Gothic," and "Shall Classic have fair play," and contentions of all kinds, and being without the enlightened interest which would prompt them to enquiry, they conclude apathetically, that architecture is an affair beyond their province," and so they leave it. If this be so, if the vaunted power of the press has failed to remedy this state of things, the causes of its failure are worth considering.

Now criticism should, in the first place be honest. Well, I am glad to think that we may admit that, in the main, it is so. That we have seen able periodicals throw themselves into the heat of party contests, and insist on the merits of their favourite designs with an earnestness and perseverance, and that "pertinacity of partizanship," which points, perhaps, to some feeling stronger than impartial conviction; that we have witnessed occasionally attacks upon able works conducted with fierce and unre-

lenting ridicule indicative of the possibility of personal animosity, may be taken as the exceptions proving the rule. We may, I think, safely say that the expressions of critical opinion are generally honest, and admit that there is greater danger of their failing of their end through a want of plain speaking than an excess of it. But of the incompetence of the criticism of the day, we have had strong opinions from qualified judges. Mr. Lewis says that of criticism generally, it may be questioned whether it has not wrought more evil than good. Competent criticism can scarcely work for evil, so that his remark implies that for the most part criticism is incompetent. Mr. Dallas in his "Gay Science" says that even taking the *best*, and omitting the worst altogether, criticism "yields no where the sure tokens of a science," and that it can only be said to be a luxuriant wilderness, and he refers the notable failures to obtain great results in art-matters in this country, by the offer of large pecuniary inducements, to "the uncertainty of judgments, the waywardness of taste, the want of recognized standards, the *contempt* of criticism." It is as a house divided against itself. It does not speak with the authority of unanimity on the points on which it professes to teach, and while it is not accepted by the profession, which it is intended to guide, to encourage, or to restrain, it fails to educate the public, who would readily accept a reasonable and consistent doctrine.

One cause of this incompetency may be that for the most part the "gentlemen of the press," who amongst other duties take upon themselves, upon occasion, to provide the public with opinions on art-matters, are literary men and nothing more. Able, versatile, brilliant, enchanting writers but writers only. They deliver judgments upon art, science, politics, social questions, everything that comes in their way, with a glibness and self-possession which follow their assumption of infallibility. They call to one's mind, as the type of the class, no less a man than Oliver Goldsmith, of whom we know it is written that "he left no class of literature untouched, and touched nothing that he did not adorn" (nullum fere scribendi genus non tetigit, nullum quod tetigit non ornavit)," but they force one also to remember that of this same writer it was said by his illustrious friend, that "he would write a Natural History, as entertaining as a *Persian tale*, although it might be doubted whether he knew the difference between a horse and cow." Here knowledge of his subject is not a first necessity, with a writer of this calibre, for the production of a composition of surpassing beauty as a composition. But for the critic, the teacher, hear what Mr. Mathew Arnold, standing in the front rank of the thinkers of the age says. "*Judging*," he says, "is often spoken of as a Critic's business, and so, in some sense, it is: but the judgment which almost insensibly forms in a fair and clear mind, *along with fresh knowledge*, is the *valuable* one:—and thus knowledge and ever fresh knowledge must be the critic's *great concern* for *himself*, and it is by communicating knowledge and letting his own judgment pass along with it that he will generally do most good to his readers." I fear that we may look in vain for criticism of this quality, and that the broad and flowery path of "judging" is taken instead of the narrow and difficult ascent to fresh and ever fresh knowledge.

In forming this estimate of the writers in the public press, I do not pretend to have been aided by any acquaintance with the secrets of the craft. It is difficult to read the articles on architectural subjects which one finds in even the higher class of periodicals, without detecting certain slips, certain indications of an imperfect acquaintance with the technicalities of art. Certain tendencies to confusion of styles and periods, and a hesitating treatment of purely professional points, betray to the professional reader that the critic is not really "at home" with his subject. As an instance of the type of indications above referred to, I read the other day in the account of a new building, that it was in the classic style, that it was ornamented with a Corinthian order, consisting of two columns and two pilasters, and by way of additional information it was stated with a kind of "regardless of expense" sort of air that the columns would have "*ornamental* capitals." This is a trifle, but these

are the kind of "straws" which "show which way the wind blows" in criticism of this class. That they who sit in judgment upon our works are gentlemen of education and refinement is not denied; but that the majority have a sufficiently practical acquaintance with art questions to constitute them safe teachers and guides is open to grave doubt. They look at us and our works from the outside, partly, as we shall see, through our own fault; and they cannot render us full justice because they cannot appreciate our difficulties.

There is, in short, a tendency in their compositions to look too much to style, and matter is sacrificed to manner. Any scrap of thought or "fresh knowledge" is beaten out so thin, and enveloped in so much that is merely extraneous and ornamental, that the fancy is beguiled, whereas the mind is not fed. We are treated to delicacies instead of nourishment, and, as Goldsmith says, "they offer us ruffles when wanting a shirt." And this from their want of identity with us and our aims. The connoisseur, says a great living critic (would we had more such!), can recognise the *beauty* of Titian's flesh tints, but to the artist only, whose multiplied hours of toil have failed to reach the least resemblance to one of their tones, is the *value* of them known. The want of special art training, and acquaintance with the practice of art, may be taken as one cause of the failure of the criticisms of these days.

A second cause may be referred to the absence of recognised standards. There is a remark in one of Mr. Ruskin's works, although I cannot now lay my hand upon it, and his language will lose force by my rendering of it from memory, to this effect:—Mr. Ware writing from Italy, says of St. Mark's at Venice—"Mr. Ruskin thinks this a very *beautiful* building; I think it a very *ugly* building." Here the noticeable point is that Mr. Ware settles the matter with an "I think"—and, adds Mr. Ruskin, he is right:—"There is at present no other standard to which either he or I can refer." To estimate the force of this remark, let us set beside it an extract from a work of the most successful and accomplished architect of his day—Sir W. Chambers. "No subject," he says, "hath been more amply treated of than architecture, nor any by persons more capable; insomuch that few things remain either to be discovered or improved, every branch of the art having been maturely considered and brought very near to the utmost degree of *certainty* of which it is capable."

Reflect on the amazement which such a statement would cause if now uttered by any architect so distinguished in this day as Sir W. Chambers was in his, and you will feel how true it is that we are devoid of recognised standards of reference in disputes on architectural questions.

A third peculiarity in the press-criticism of the day is, that it expends itself almost exclusively on pictures of proposed buildings, designs, and projects; but that as soon as the projects become facts they seem to be no longer recognised. A series of designs, as we have seen over and over again, shall be hotly discussed by a considerable number of periodicals, and that too with an eager scrutiny which seems unaccountable when you reflect that no sooner does the building become a fact than it drops out of notice altogether. We have recently seen a collection of designs for works of unusual magnitude and importance enlist the sympathies and occupy the pens of numerous writers, and we have wondered at the crowds of curious visitors who for weeks thronged the galleries in which the designs were exhibited. We have also witnessed the completion of works of very considerable magnitude and importance; and it is instructive, and will I think corroborate the opinions before expressed, to reflect on the comparative indifference with which they have been received. It may be objected that the critics eagerly exercise their functions while there is still time to make their teaching felt, and give effect to their advice and warnings, and that an executed building, as it is beyond reclaim, is beyond their care; still this reason can scarcely be accepted as the true one. Trustworthy lessons can only be derived from executed works, which are, whether for imitation or avoidance, incomparably the best examples.

The real explanation is, that while the public care little or nothing for architecture, they care a

great deal for pictures, and they "do" these exhibitions (when they are sufficiently attractive) of architectural works with the Academy, Water-Colours, and the rest of the round.

If in the dull season, when the columns of the newspapers are agape for "padding," a building of sufficient importance is singled out for notice, we get little or no real criticism of it. Its excellencies are not pointed out for imitation; its defects, if not of the most glaring kind, are not dwelt upon. We trace no longer the hand of the masterly, brilliant writer, who gave us his views upon it when it was a mere possibility. It has now become a fact, and has passed out of his province. The wondrous tale is taken up by another, and a reporter's hand. We are treated no longer to the entertaining and discursive generalities on the art which the abler pen provided for us; but dry facts, statistics, the numbers and sizes of rooms, cost, names of contractor, gas fitter, &c. &c., so that the whole thing reads rather like an advertisement than anything else.

Whilst on this branch of my subject, I may perhaps be allowed to offer a few remarks on the anonymous character of criticism—a question which has received consideration on more than one occasion; and though the arguments for and against it have not wanted able advocates, no general election has yet been made between the systems of anonymous and avowed criticism. The majority of periodicals still adhere to the former; but some of the more able and recent ones adopt the latter. I cannot but think that art criticisms should be authenticated by the name of their author, and that those of the better class would thus gain in value. The opinions of men of acknowledged repute would command respectful attention, acd a check would be given to a good deal of irresponsible and offensive flippancy which is now too prevalent. One, and the strongest, objection to the avowal of the authorship of the articles in the ordinary newspaper and review is, that the writers hold positions which would be affected by their being acknowledged as journalists. It is said that barristers, looking forward to a great career in perspective, are, for the most part journalists; and that their hopes of future success in their profession would be dimmed if they were known to fill up their unoccupied time by contributing to the public press. This objection could scarcely obtain in art-criticism. It may be urged that it would be invidious for architects of acknowledged repute to provide the public with an estimate of the merits or demerits ot the works of their fellow architects; but I am not advocating the expediency of practical architects turning critics. I only want to point out the necessity of some practical acquaintance with architecture for competent criticism. We have a conspicuous example in the sister art of painting, of an accomplished artist devoting his energies to criticism, and the value of his critiques is due in great measure to the well-known fact that he has himself a practical acquaintance with all the capacity and all the difficulties of the art which he expounds.

And there are, as we know, architects by training who nevertheless devote themselves to the literature of art; to them both the profession and the public would be grateful for contributions to press-criticism, and their articles would certainly gain rather than lose by the addition of the authors' names. It is feared that under the contrary system their place is filled by men of small repute and ability except as writers, whose oracular utterances are delivered with a self-assurance inversely proportioned to their capacity. I have adverted to the suggestive fact that the critics of the day expend their energies upon the exhibition of architectural drawings rather than upon completed works. I may perhaps be allowed to enlarge briefly on this topic. The greater notice accorded to architectural pictures than to architecture, results, as it appears to me, in an encouragement to bestow more labour on clever representations, or misrepresentations, of architecture than on the production of admirable buildings. If this be so, architectural exhibitions as now constituted are amongst the foes to real progress in architecture. The demand for these exaggerated representations of architecture which lead to such disappointing results in execution, is fostered by the system of "competitions" which has now become almost

universal; a system which is, in many respects, antagonistic to the real interests of architecture. And the result is the production of drawings whose aim is to attract, by some specious attributes, which may catch the uneducated eyes of those to whom they are designed to appeal. If a building is too much cut up, the detail too busy and redundant, the professional colourist passes his broad wash over it, and conceals the objectionable ornament. If it is too tame and dead, he, by the aid of broken sparkling lights, weather stains, blots of body colour, &c., "cooks" it to attract the eye, and the drawing being pronounced satisfactory, no attempt is made to supply what is required to compass a similar satisfaction in the reality. The result is, what we are all complaining of, that the architecture of the day is characterized by "superficiality."

A practice arose in the 16th century of designing, what we call a façade, independent of the necessities of plan, and in fact frequently in direct opposition to them; the structural conditions of the building were rendered subservient to the exigencies of external appearances. And the construction of façades or false fronts became at last so entirely the first consideration that no compunction was felt; it was in some cases considered a merit to design them in a different *style* of architecture from that of the building. In a critique on the works of Palladio, I read "that a great amount of study was bestowed on the elevations of his buildings, so much so that they *mask* but indifferent interiors." That even when he had to contend with the *Gothic* at La Ragione, how skillfully has he screened its *barbarism*, by a Roman elevation. Compare Le Duc, who says that neither the ancients nor the architects of the middle ages, could conceive the idea of a façade. That to them it was unknown. They had no conception of masking a building by a screen which should be a composition independent of the structure and designed as a thing *per se*, and solely to please the eyes of the passers by. The elevation of a building, was as he points out, the result of the disposition of its component elements of plan, and it exhibited to the view gables and sides according as the various sections of the building were placed longitudinally or transversely.

Now, the practice of designing false fronts was even better, though somewhat akin to, our practice of deluding ourselves with false representations. But when, as it now sometimes occurs, we get a false representation of a false front, a sham view of a sham building, the evil is complete; and as art and criticism act and re-act upon each other, the possibility of such conjunctions as above hinted at gives rise to the possibility of such critical advice as the following being seriously offered.

"A piece of architecture in which there are any manifestations of genius is worked out in the same manner as a poem. *Invention* or the ground *idea* of the subject *must come first*, and it is to this conception of the *fancy* that technical skill is afterwards to be applied, so as to work it up, and to render practicable in construction what is originally the mere apprehension of beauty. *This is the only true* process."

It would be difficult to add a stronger illustration of the absurdities to which a mistaken conception of our art may lead, and of this pernicious tendency to regard architecture as a something apart from the outcome and development of true building.

And now, gentlemen, I confess, I feel sensible of the want of that literary art which I have perhaps appeared to depreciate unduly. I feel that the foregoing remarks have been put before you in an incoherent and fragmentary form, and without that roundness and completeness which I could have desired. I have attempted to show that our art criticism is without the weight it would have if scientifically conducted: that our critics are mostly literary men only, without proper training, and that their efforts are directed mainly on the shows of things which are more or less illusory, rather than on the realities, on the representations of projected works rather than accomplished facts. And, I now beg, in conclusion, to sketch in outline what I would have our architectural exhibition to be. I

would have them to possess some distinctive character which should remove them from the category of picture exhibitions only, and show that their contributors had a desire to earn a reputation for something nobler than that. I would have the arts of construction represented fairly and completely, so far as they are applied to architectural works. I would endeavour to find in them a vehicle for conveying to the public the idea that architects are, and ought to be, what has now come to be understood by "engineers," with the added faculty of rendering *comely* the necessities of building, and above all, to enforce the doctrine that architecture to be worth considering at all must be a refinement of the natural outcome of its structural conditions, embodying the requirements of the age.

A sound school criticism would greatly help to procure so desirable a consummation, but for such a source of strength and guidance, it is to be feared, we must look in vain.

Though young men are said to be sanguine, I confess I cannot look on the present and future condition of our art without apprehension. We are prone to be rendered insensible to our true condition by our own self-gratulations: but if we look about us what do we see? A living writer says that up to the 16th century, no instance can be found of any building having been erected in imitation of any other, and that since that date no building has been erected, except as a copy, open or covert, of some buildings or class of building that has gone before—a reflection as discouraging as it is unfortunately true.

In place of the health development of sound principles by concurrent action, and in logical sequence, we see great power, both individually and in the aggregate, working without discipline, object, direction, or restraint. We are, as men beating the air. The current of our lives is diverted and dissipated, and the strength is wasted in a ceaseless hunt after change, which should be concentrated on the achievement of definite results. When the Classic spirit decayed, the Gothic revival engaged our attention, and our buildings, as measured by the archæological standard, were sufficiently correct and satisfactory. A chance work of exceptional power and ability, turned our attention to the brick and marble architecture of Italy, and we threw ourselves *en masse* into the repetition of the details and parti-coloured decorations and brickwork of our models. They have now been relegated to the speculating builders; and France (the early Gothic of Normandy) has, mainly by means of a publication of meritorious sketches, being next pressed into our service. From Spain, lastly, we have received fresh inspiration, and the next weakness may be for Moorish or Indian art.

In this condition, is it not the most fatal step we can take to abrogate or suppress our claims to be considered *primarily* as able constructors. Architecture has long since been separated from painting, and although there may be now architects who could adorn their own buildings with frescoes from their own hands, the instances must be few. Let us not appear to abandon that scientific excellence which must be the foundation of all our art excellence.

An illustrious architect said not long ago in this room, speaking of a building of unusual magnitude now in course of construction, that he was only responsible for the decoration of the roof. There, in a small compass, is the danger of the tendency of modern architecture. There is growing up around us a vigorous sturdy profession of utilitarian aims, which is already encroaching on our prerogatives, and the ugliness of the most noticeable modern engineering structures is a witness at once to the bad taste of their authors and the apathy of the public. One by one the real opportunities for grand, imposing, noble architectural works, are slipping through our hands, and as we have abandoned the higher walks of art, and have been robbed of our arts of construction proper, our position suggests the story of the prisoner who, confined in a cell of which the boundaries were contrived to approach each other by imperceptible advances, was at last crushed to death between them.

If the views to which I have ventured to call your attention are sound, if I have succeeded in

showing that, firstly, our critics are mostly superficial and incompetent exponents of our art; that secondly, our exhibitions have a tendency to mislead rather than to guide ourselves and the public to a full acquaintance with the real aims of art; and lastly, that we find as a result the engineer is rapidly encroaching upon our proper domain,—I shall feel that, though I could heartily have wished that the task had fallen into abler hands than my own, yet, that your evening will not have been entirely wasted, and that my labour will not have been wholly in vain.

Mr. EDWIN NASH, Fellow.—The few observations that I will make will be quite inadequate for the support of the vote of thanks which I propose to Mr. Bell for his very able paper. Architectural criticism has always appeared to me to be one of the most difficult operations of the pen, and being so, I am sure that if some rules of criticism could be laid down, they would be very serviceable. I am not myself able to lay down those rules, but Mr. Bell has pointed out a few items in that direction, which I think are somewhat valuable. I am only going to notice one or two of the points upon which he has touched, and the first I will refer to is that of Architectural Exhibitions. It is true, as Mr. Bell says, criticism is spent chiefly upon exhibitions, to the neglect of executed buildings, which is to be deplored, because there are many fine executed buildings which would bear even a short and graceful essay upon them with advantage. Architectural Exhibitions can never, I think, become what exhibitions of paintings are. We are not executors of pictures, and I think there has been some mistake on that point. It is supposed by some, that architects are fond of making pictures for exhibition, but it is often very tiresome and inconvenient to have to do this when engaged in the practical work of an architect; and it is evidently found to be so, for more than half the architects never exhibit at all, and I believe it must continue to be so, because architects do not make pictures for sale as painters do. It is their business to exhibit pictures. It is not our business; nevertheless, I think it important that architectural exhibitions should be encouraged. Then with regard to engineering, upon which we have had some good observations, I may observe that, it is to me quite a mistaken idea to call architectural construction engineering. Building is not engineering; yet some writers, and a very accomplished one, who is well known in this room, publishes that sentiment—that construction is engineering. I say that construction is no such thing. Let engineers keep to their engines, and if they execute buildings, they are then architects, and not engineers. And an architect, if he has not sufficient practical education to make him a good constructor, is no architect at all, and the sooner we cease to call construction engineering the better. On another point alluded to, I do not quite agree, viz.: that the buildings of the present day are mere imitations of the old, for we have many buildings designed honestly and positively for the purposes for which they are intended, and irrespective of any other view, with the gusto of architecture thrown into them after they have been so designed. Therefore, I hardly think the observation is applicable at the present day, though it might have been formerly. I should have liked Mr. Bell to have laid down—he apologized for not being able to do so quite—some more definite method to be pursued in architectural criticism. It is the great difficulty of the subject that makes it almost needful that something should be done—some general rules, not absolute rules established, that would tend towards a proper system of architectural criticism. I beg, in conclusion, to propose a vote of thanks to Mr. Bell for his paper.

Mr. R. PHÈNÉ SPIERS, Associate, remarked that the subject of Mr. Bell's paper might be divided into three parts. The first part treating of Architectural Criticism; the second of Modern Architecture generally; and the third of Architectural Exhibitions. With reference to the first—architectural criticism, Mr. Spiers said, Mr. Bell has, I think, correctly observed, it is in consequence of the very small knowledge of architecture which is possessed by those who take upon themselves the

office of critic, that architectural criticism is bad. Of course, this is not only felt in architecture, but it is the same with painting and sculpture, that their exhibitions are indifferently received as a rule. The system of writing employed by critics is flippant and clever, rather than calculated to define what are the merits or demerits of pictures, and this has been noticed before at different times. With architecture there is still greater difficulty, because it has generally been allowed, although there are many who have some idea of what good painting is, and what good sculpture is, there are but few outsiders who have any knowledge of what good architecture is, simply because it depends not only on pleasing form and artistic expression, but also on its constructive qualities; and unless the criticism of buildings is taken up by those architects who devote themselves to literary work, I do not think we can look for much improvement in architectural criticism. At the same time, it is interesting to know that while in England we have reason to complain of such criticisms, in France such is not the case. Architectural exhibitions are held continually there, and for the last three or four years I have been in the habit of reading the criticisms upon them, and I have been surprised at the amount of knowledge displayed by men not practitioners, and who have acquired the power of criticising architecture from a long acquaintance only with architectural matters; so that it is a fact worthy of notice, that criticisms on architectural affairs abroad are immeasurably superior to those which we find here. One of the most noticeable points in French criticism is—that the style is not mentioned. It is not considered necessary to say what style a building belongs to. It never occurs to a French critic to say it is the style of Napoleon the Third, for instance. Of course there are cases in which a building has been produced in the Moresque or Turkish, or some other special style, where an attempt has been made to reproduce works of bygone ages; but this is only a freak of the client. I recollect a competition lately, here in London, in which after having an account of the whole building from the architect, the intending critic asked what style he was to say the building belonged to. The architect (whose name we will assume was Smith) replied it was his own style; we cannot very well say the "Smithesque" replied the critic. "Well, call it the French-Gothic, with early English feeling" and in accordance with his wish was the criticism written. No doubt this power of criticism in France is acquired in two ways. In the first place, any one who takes position in France is instructed in some way in art; therefore, so far as art is concerned, they can criticise it; and as a rule, the French attempt to invent constructive forms in harmony with good artistic expression and with the construction itself, and these critics mixing much with architects draw from them what are the main constructive principles to be observed. On the next point, viz. Why are our architectural exhibitions so defective? Mr. Bell says, what we see there are pictures, not architectural drawings. Why is that? Because, as a rule, architectural drawings sent for exhibition are not made by architects themselves; many are made expressly for competitions, and these drawings are coloured up by men who have sometimes a knowledge of architecture, and sometimes not. They devote themselves to architectural colouring, and the result is, the works they turn out are very beautiful, but exceedingly unarchitectural, and as a rule, exceedingly unreal. The reason why architects go to these men for their drawings is because, with certain laudable exceptions, they are not themselves sufficiently skilled in drawing; that is, they have not passed through that serious study of drawing (whether beneficial or not I will not now stop to enquire), which is passed through by the architects of France and Germany. Whether it is a serviceable thing that they should arrive at that perfection of drawing is not the question now; but it is the fact, that at the Paris Exhibition of 1867, all the French drawings were executed by the architects themselves, whereas the names of the English architects who executed their own drawings might be counted almost on the five-fingers. There must be some better system of teaching drawing and colouring than we have at the present moment. As long as architects trust to getting up a showy set of drawings in

order to obtain a competition, we shall have pictures and not architectural drawings. We have tried in the architectural exhibitions to get drawings and not pictures, and we have had great trouble to get them. In the first place, architects as a rule, do not make drawings that can be exhibited; they are on the one-eighth scale, and very roughly drawn for the builder. In the case of the French drawings, done to half-inch scale to the foot, they always make drawings of that kind for the purpose of study, and they have none to exhibit. Of course, the exhibition down stairs is not for outsiders. We have attempted to make it interesting to the public, but the result has been below our expectations, and as a rule, it is visited only by architects, and therefore it ought to be made as architectural as possible. Architects here do not study drawing by any system as they do abroad, and until there is some change in that we shall have indifferent architectural exhibitions, indifferent architectural drawings, and indifferent architectural criticism.

Mr. JOHN P. SEDDON (Hon. Sec.)—In my opinion, the one thing wanted is proper instruction of the public in art generally. Until that is given, there will not be the demand for architectural or other beauty which the profession is, or can make itself, quite competent to supply. The public is wofully uninterested in architecture, and it is only through art it can be reached. People must be taught to draw, and to know and appreciate what beauty is, and then they will look for it in buildings. With regard to criticism in architecture, it ought not to be expected from architects themselves. At present, however, it really does generally come from them in default of any other source. The public being indifferent to the matter, there is nothing to induce men to turn to criticism as a profession. Some amateurs, as Mr. Ruskin and a few others, have indeed taken up the study of architecture for the mere pleasure of it, and have devoted to it the time and energy requisite to fit them to undertake such a task, but it cannot be expected that they should turn attention to criticism as a profession. I would repeat, therefore, what I began with—that what is wanted, is instruction of the public in art. I trust, the efforts which are being made by the Society of Arts in that direction, will tend in some way to supply the deficiency.

Professor KERR, Fellow, said, The subject before us I take to be architectural criticism in particular, rather than artistic criticism generally, and we must at the present time, feel especially obliged to the gentleman who leads this Institute to the discussion of that subject. Let me remark, as a preliminary observation, however, that I regret to find in the paper, various quotations and allusions to authorities without any statement of the names of the parties referred to. This, I think, is a mistake, inasmuch, as it has prevented us from attaching to those opinions at the time, the precise value to which we are accustomed, in view of their authorship, and it moreover prevents us from judging of the accuracy of the interpretation which is implied by the lecturer, because of the allusion not being precise enough to enable us to check from memory the quotations. To turn, however, to the subject of criticism, and more particularly with regard to architecture, one may say there is no subject of a theoretical kind in which this Institute should feel more interest. What is criticism? It is the act of judging a finished work by the application to it of those principles which have governed, or onght to have governed its design or performance. In that primary sense of the term, nothing can be simpler in theory than criticism. An artist, for instance, in the composition of his work, is supposed to know the principles by which he is composing it; and accordingly another artist (and none but an artist can thus far criticise art) is supposed to understand equally well the same principles; and therefore, to be able to apply them from his own point of view, to the finished work, and thus to say whether it is rightly or wrongly, in his estimation, that they have been applied by the designer from his own point of view. Now, criticism being in short a process of trial and judgment applied to everything belonging to artistic effort,—and indeed, to effect of many other kinds,—if we confine our-

selves to art, we may say that in respect of painting, we are at the present moment in a condition which, as regards principles of opinion, leaves little to be desired. I apprehend no man is capable of painting a picture in the present day which shall be appreciated by critics, that is, persons experienced in painting, unless he has applied to the composition and treatment of the subject certain principles which, if not unanimously accepted, certainly are well understood; and his own apprehension of the subject can therefore be so perfectly appreciated by his colleagues, that it would be mere folly to pretend to disregard their decision and set up some new and unknown standard. It is the same with sculpture. Perhaps indeed, the criticism of sculpture may be even more definitely matter of law, almost of exact science, than that of painting. Then, if we resist the temptation to allude to music and poetry, these being arts from which our own is very distinctly connected, and so come at once to architecture, in which alone we have a direct interest to-night, I may point out at once that what are called the principles of criticism in architecture are simply those principles under whose government architecture is composed; and the act of what is called criticism is nothing more than the application of those principles in the form of direct examination of cause and effect; such criticism including, be it it observed, not fault-finding alone, or sentence of disapproval on all demerits, but approval, a much more difficult thing to deal with, intelligently pronounced upon all merits in their degree. To repeat once more, architectural criticism is literally an operation of trial, by recalling to view the correct principles of the work of architectural design in order to prove whether the artist has used them well or ill. I agree with the lecturer, that the condition of architectural criticism at the present moment in this country is lamentable. As for the criticisms, so called—for criticisms they are not—the flippant, vain and foolish witicisms which we so often see in the meaner order of newspapers, we architects can only wonder at the moral courage they display. Again, as for the remarks made in the House of Commons by gentlemen who, standing on their own ground, are open to contradiction only amongst each other, all equally uninformed,—as for those remarks, generally—too generally—of almost the same flippant and certainly most unlearned character, we can only say that whilst we must submit with a certain amount of respect, we at the same time can never accept them, as they are intended to be accepted, as evidence of accomplishment in the speakers. But when we come to the definite criticisms of the architectural periodicals upon architectural works, then, I think, we are entitled to expect something more than this, and to look for clear and intelligible explanations of the views of competent writers upon recognised ground. What then is the ground of architectural criticism? Primarily its principles are of course elementary; that is to say, there are certain motives lying at the root and foundation of the whole structure of architectural design, which motives are recognised and followed by the designer, although, perhaps, unconsciously. When I say recognised, I mean so far as his own operations go: he proceeds instinctively upon definite and distinct principles, of which he has acquired the spirit, and respecting which there could be no dispute if they were fairly systematised; and the elementary criticism of which I speak, would be the application of those primary principles as rules or natural laws to see whether the designer has really followed them in his work. Such are the principles which I ventured to indicate in some degree, or rather so far as the occasion admitted, to shadow forth in their nature and application in the lecture which I had the honour to deliver here a short time ago upon "The Architecturesque." Primarily, such is the kind of ground work,—the basis elementary,—which lies at the foundation of the whole structure and system of architectural design. But, as we cannot be always referring back to the simplicity of such elementary principles for practical criticism, we use secondly what may be called dogmatic or academical principles. These are general laws derived from long experience of the elementary principles,—affording rules which one can apply as a short road to the same result, which would otherwise

have to be reached tediously by going over the whole of the elementary ground in every case from the beginning. Permit me to say, Mr. Vice-President, that you and I, in our younger days, were made acquainted with some at least of such dogmatic principles. We both remember the time when *The Civil Engineer and Architect's Journal*, was the organ of the profession; followed by the early days of *The Builder;* and at that period, you will remember, there would be quoted certain accepted principles of architectural criticism, which did not admit of contradiction, and which are still accepted if they were not overlooked, by means of which the reader of the criticism could be led to form very much more intelligently than now, a judgment of the precise value of the work under review. It is, of course, still dogmatic criticism which is now applied; but it is merely archæological. I do not complain of it for one moment, when I recollect that it is applied to art based upon archæological purpose; archæological art of course brings archæological criticism. But, Sir, though you and I may not remember the time when art was not antiquarian, we do remember the time when art was not archæological; and it is to the credit of the old antiquarian *dilettanti* that their principles were certainly not of the same non-artistic school as those accepted in the present day. Such then being the nature of and present condition of architectural criticism, what is to be done in order to endeavour to establish a better state of things? It is clear, that designers cannot go upon the archæological system for ever. The time must come when it will prove to be exhausted; and the time, I think, is perhaps not far distant when, in this country at least, the archæological system will begin to be at least suspected of being a delusion. What is to happen then? This very much depends upon us. One thing at least we ought to do. We ought in the meantime to educate our youth in the principles of elementary criticism; and this indeed I think, is the only way out of the difficulties which the lecturer has enlarged upon. It is a pity that practical architects have so little leisure and inclination for writing on their art. The embarrassment with which a non-professional writer has to deal in speaking of architectural matters, is almost unparalleled in other literature. It is, indeed, specially manifest in the works or the two most prominent architectural writers of the present day,—Mr. Ruskin, and Mr. Fergusson. The writings of the former gleam and glisten with poetic imagery and fancy, but he never can reach the most essential *fact* in architectural knowledge, viz.—that architectural art is based upon mere building, that it has its foundation upon the apparently common-place and unimportant, but really philosophical conditions of material and labour. That is a thing which such an intellect as Mr. Ruskin's, and so trained, can never hope to descend low enough to reach. His thoughts soar high enough in the poetry of visionary art, because poetry is his business; but they cannot stoop down to the plain prosaic details of the structuresque, because building is not his business. With all his genius, therefore, his criticism of architecture is so far vain. To turn to Mr. Fergusson's works, we see not only a monument of industry, the most commendable, but an instance of success the most astonishing to my mind, compared with any other non-professional writings I have ever read. That a gentleman who, was never brought up as an architect, is able to classify the whole of the productions of the world in this recondite and difficult art, in the complete way in which he has done it, and to educe definite principles of classification, and exhibit as it were a panorama of this vast range of art, with such accuracy as characterises his work, is to my mind, perfectly astonishing. He is the only writer, certainly in England, who has been able to do such a thing with architecture. But still, he is no architectural critic, in the proper sense of the term. With painting, for instance, the case is different; the principles of criticism lie much nearer the surface, and therefore we find many writers who can criticise paintings with partial success, where we find not one who can at all artistically criticise architecture. But if you look closely at Mr. Fergusson's works, with every admiration for his remarkable powers of common-sense, you must acknowledge this,—that after all his labour, he does not descend to the plain foundation of the philosophy of building con-

ditions. His architecture is more or less surface work at the best. It is, in fact, impossible for any man who has not passed through the drudgery of practical architectural business, and the design of practical building, to understand in any adequate manner, the elementary principles on which architectural design ought properly to be based. They are not on the surface, but in the substance within. It is but little, I apprehend, that this Institute can do in the way of providing a better system of architectural criticism. I repeat, with regard to the criticisms of the ordinary press, that we can only say it is lamentable to see otherwise clever writers for the most part so deplorably ignorant of any subject upon which they take upon themselves to write; but the lecturer has also alluded to the well-known fact, that the better classes at large, the educated classes of society as a whole, remain, I may say, intentionally behind the practice of the Continent in respect of artistic, and especially architectural knowledge; and I think we may properly consider how far it is part of the social and educational character of the present day in England, to ignore art as a social accomplishment. We, as architects, may be led personally in our practice to moderate our aspirations in respect of architectural effect, in order to meet the conditions of the day in which we happen to live; but this is not the end. Whether anything can be brought to bear upon public education in the way of increasing the national appreciation of the elegancies and delights of art, I do not know. My own experience has been this,—that those persons taking a lead in public life who profess the greatest acquaintance with art, generally possess the least,—being in fact not only uninformed, but generally very much misinformed and mistaken as to the very elementary principles on which to base criticism; and this being so, I am still more at a loss to know what can be done to improve the architectural education, or indeed, in any form the artistic education of the people at large.

The CHAIRMAN.—I will now close the discussion. So much has been so well said as to leave but little to be added. We are all extremely obliged to Mr. Bell for leading us for an evening into somewhat close consideration of matters which must have often occupied our minds. We cannot help lamenting with him over the difficulties and imperfections which beset such architectural criticism as we are in the habit of seeing, and desiring with him to see it improved. Setting aside our own shortcomings, I cannot help thinking it is almost entirely owing to a want of interest and appreciation on the part of the public works of art in architecture. No doubt it arises chiefly from the difficulty of the subject, and from one peculiarity which attends architectural works, which is, that works of art in painting and sculpture become, as it were, personal property of value, are more easily handled, may be taken home and appreciated, and studied, by those who are wealthy enough to possess them. Such is not the case with art-display in building. That must be visited to be seen, often with some difficulty and cost, and appreciated for the sake of the art alone. With respect to the press, I think we have no great right to complain of it. It faithfully (unfortunately too faithfully) gauges the amount of information the public ask for and care to possess. If there was a greater want of more appreciative criticism, I do not think, with the ability which writers for the press display on nearly all subjects, there would be wanting the same ability in the higher ranges of the subject of art displayed in buildings; but where there is little or no demand for it on the part of the public, we cannot blame the press for not intruding it on its readers. There are other matters connected with the subject well worth deliberation and mutual council among ourselves, but which we cannot enter into at this late hour of the evening, and therefore, I will now ask you to pass the vote of thanks to Mr. Bell, which has been proposed, for bringing his paper before us, which, when it is in our hands, will enable us in a connected form to think over the subject at home, and as far as may lie in our power to endeavour to cure the lamentable state of things laid before us.

The vote of thanks was unanimously passed, and the meeting was adjourned till April 5th.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 19th April, 1869, W. TITE, M.P., President, in the Chair.

The preliminary business of the evening having been transacted,

The PRESIDENT said he would now proceed to the important and pleasurable objects for which the meeting had assembled – the principal one being the presentation of the Royal Gold Medal. The Queen's consent to the recommendation made to Her Majesty on the subject had been communicated in a letter addressed to him by Major General Sir Thomas M. Biddulph, Keeper of Her Majesty's Privy Purse, which was as follows:—

"Buckingham Palace, April 8, 1869.

"SIR,

"I beg to acknowledge the receipt of your letter of the 3rd inst., which I have had the honor of submitting to the Queen, and am commanded to inform you, in reply, that Her Majesty has been graciously pleased to approve of the Royal Institute of Architects' Medal being awarded to Professor Lepsius, of Berlin.

"I have the honor to be, Sir,

"Your obedient Servant,

"THOS. BIDDULPH."

Professor DONALDSON then read the following translation of a letter from Professor Lepsius:—

"SIR AND DEAR COLLEAGUE,

"Your kind letter of the 11th April informs me that the Royal Institute of British Architects have done me the honour to recommend to Her Majesty the Queen of England that the Royal Medal should be conferred on me this year, that Her Majesty has deigned to approve this nomination. Not being professionally an architect, and calling to mind the slight services I have been able to render in illustration of certain historical and antiquarian questions connected with the noble art whose progress and development is the great aim of your illustrious Institute, I cannot but feel deeply impressed with the responsibility attached to such a distinction as that conferred by your colleagues. I cannot but recognise the lofty aim and wise resolution to bestow the Medal alternately upon an artist, architect, and a learned man not an architect. It recognises that the perfection of art cannot be attained without science, and that architecture in particular belongs almost as much to science as to art proper.

"But with regard to the selection now made, the fruits of my architectural studies ought to equal at least the affection and interest I feel for this art—parent and chief of all the arts—in order to render me more worthy of the honour I now owe to your too indulgent judgment in my favour.

"I have already sent you a telegram to inform you of the impossibility of accepting your invitation to come to London, in order to receive the Medal in person. The principal reason is that the Easter vacation of the University of Berlin is over, and the courses of lectures are about to re-

commence. Be pleased to present my very humble acknowledgments to the members of the Institute, and accept the respectful compliments of

" Your devoted Friend and Servant,

" RICHARD LEPSIUS.

" To CHARLES, NELSON, Esq.,
" Hon. Sec. Foreign Correspondence."

The PRESIDENT again rose, and said that he had much pleasure in presenting the Gold Medal to the nobleman who was good enough to attend this evening on the part of Professor Lepsius, viz. :— Baron de Schmidthals, secretary to the Prussian Embassy; His Excellency the Prussian Minister, being unable to be present himself. It would scarcely be necessary to justify the choice that had been made, because the European reputation of Professor Lepsius was in itself a sufficient justification. Having been himself for many years a student of Egyptological science, he had all the more gratification in finding that the nomination of Professor Lepsius for this honour had met with the approval of the Institute, and with Her Majesty's gracious sanction. That accomplished gentleman had always been a man of eminence in the Prussian nation and among the Prussian people, and with respect to his acquaintance with Egyptology, it might be added that he was also very well known in England. The President added that a small tract, very ably written, and which he recommended to every one of his hearers, had been published by our own Tract Society, on " The Egyptians," by Sir Gardner Wilkinson, and on " Hieroglyphics," by Mr. Birch, of the British Museum. After speaking of the study of Egyptology, which arose in England at a period within his (the President's) recollection, and which Sir Gardner Wilkinson was among the foremost to introduce to our notice, the President read the following passage from the work referred to (p. 206) :—" In the meantime a new student appeared in the ranks, who, after already distinguishing himself by researches into the relation of the Coptic, applied his mind to the systematising of the labours of Champollion. This was M. Lepsius, who in the Annali of the Institute of Archæological Correspondence at Rome, founded by the Germans and English, and protected by the munificence of the present King of Prussia, published a letter to M. Rosellini, in which he critically analysed and arranged the structure of the language. It was the first step in the right direction since the death of Champollion. The study, indeed, had already found a great ally in the support given to it by the Chevalier Bunsen, who, struck by the talent of the young German student, warmly seconded his efforts. Colonel Mure had also entered upon ethnological researches connected with Egyptian history about the same time. In 1839 M. Lepsius visited England, and at a meeting for the purpose, in the rooms of the Royal Society of Literature, the Chevalier Bunsen and M. Lepsius had explained many points of chronological and philological interest." And again, at p. 209, Mr. Birch says :—" In Germany M. Brugsch has chiefly studied the Demotic, while Lepsius, now a veteran, continues steadily to advance various branches of the study."

It would thus be seen that Professor Lepsius had continued zealously to promote this very remarkable inquiry. They knew the value of these wonderful productions of the monuments of Egypt. Those monuments disclosed, as the result of Professor Lepsius' researches, two kinds of writing by the Egyptians—one being the *hieratic*, or shorthand form of inscriptions; the other, the *demotic*, or running hand, which, in the time of the Ptolemys they wrote with as much ease as we now write English. In these writings was contained the history of a people of almost unknown antiquity, a large measure of which they owed to the gentleman whom they desired to honour. But in 1842, and up to 1845, the Prussian Government, with the generosity that characterised that Government in contradistinction to our own, in all that relates to architectural and archæological inquiry, despatched Professor Lepsius

and a considerable staff of assistants to Egypt on a long journey of inquiry. Professor Lepsius was in Egypt for three years, and the results of that sojourn were shown in Berlin in the extraordinary collection of Egyptian antiquities which he had gathered together—remarkable monuments of the ingenuity and learning of the man and the liberality of his government. Our next acquaintance with him was in 1852, when he published his letters from Egypt, in which he gave a very distinct account of the countries which he visited, and a popular account of all that he saw. These letters were translated into English, and attracted considerable attention at the time. Since then he had given illustrations of the wonderful series of pictures on the tomb of Belzoni, or, as it was called, "The Book of the Dead." He had also written the very elaborate work mentioned in the report of the Council, "The History of Egyptology." All these things seemed to present so much interest that he was delighted to find that the Council (though he himself had been prevented by illness from attending their meeting) had nominated Professor Lepsius as the person upon whom the Gold Medal for the present year should be conferred. He (the President) had never had the honour of his acquaintance, though he saw him at the time spoken of in the first extract he had read, but he hoped he might live to see him again, decorated with this medal. He had now the honour to present the Royal Medal on behalf of the Institute to the gentleman who represented the Prussian Ambassador on this occasion, and to beg that in forwarding it to Professor Lepsius he would convey to him their sentiments of respect and esteem, as well as their great gratification and pleasure in the association with this Institute of so distinguished an archæologist and so eminent a man.

The medal having been handed to the Baron de Schmidthals, that gentleman said, after the letter which had been read from Professor Lepsius, he need only express his high sense of the honour which had been conferred upon his distinguished countryman. He was quite sure that nothing short of the discharge of important duties devolving upon him would have prevented Professor Lepsius from attending personally to receive the high honour which had been conferred upon him; and he trusted it would be a means of more closely uniting together the architects of this country and those of Berlin.

Professor DONALDSON remarked that he was in Rome when the intelligence of the award of the Medal reached him, and nothing gave him more pleasure, not merely for the sake of the gratification it would occasion the recipient individually, but on account of the compliment paid to the Prussian people in the person of one of their most distinguished literary men. This Institute had almost from its commencement been in most intimate connection with Prussia, and especially with the architects who had executed the great public works of Berlin. The Prussian Government, it was known, had published a great number of remarkable works upon architectural ornament, and other subjects, and they had always sent to this Institute copies of those magnificent folio volumes, including the great work of Lepsius on Egypt. Therefore, he felt in conferring upon Professor Lepsius this medal, they paid a compliment to one who had nobly vindicated his love of art, and had done much to promote that art; but it was at the same time a compliment and a respectful homage to Prussia herself.

The PRESIDENT then proceeded to present the Institute Medals and other prizes, after which the following Paper was read:—

NOTICE OF THE ARCHITECTURAL AND LITERARY WORKS OF THE LATE ARTHUR ASHPITEL, F.S.A.; FORMERLY VICE-PRESIDENT R.I.B.A.

By WYATT PAPWORTH, Fellow.

IT is no vanity on my part that leads me to attempt to recall to you the merits of the colleague and friend who has so lately left a void amongst us. This memoir from me is entirely due to the wishes of some of his intimate friends, who, considering that they were best acquainted with his life and works, and knowing that I had likewise had the pleasure of a familiar intercourse with him for nearly twenty years, solicited me to use my pen on their behalf in recording the life, character, and works of one so justly esteemed by all who came in contact with him. It was, perhaps, some little pride which induced me to accept the proposal, as I fancied that he would not have objected to my taking this place to-night for the purpose. The undertaking presents no little difficulty. Mr. Ashpitel, even with his extensive professional engagements, had not the opportunities of a Cockerell or a Barry; nor had he found occasion to achieve such a literary position as was held by a Müller or a Bünsen: an eminence of either sort would have rendered my duty more onerous, yet possibly more agreeable to yourselves: yet if the results of Mr. Ashpitel's short, but active, career in the profession appear to be less important than those achieved by such names as I have mentioned, they were nevertheless, numerous and useful: whether derived from his pencil or from his pen, they proved to be highly valuable as tending to promote Architectural Education; to facilitate the knowledge of Classic and Mediæval antiquities, as well as of mathematical and practical science; and to add to the history, theory, and literature of our art. Should my observations fail to enable you satisfactorily to realise the talents of the subject of my memoir, the fault will arise in some degree from myself, rather than from want of the materials on which to dilate. I have to acknowledge the assistance of Miss Ashpitel, the Rev. Francis Ashpitel; Messrs. John Whichcord, James Edmeston, Charles Baily, W. J. Thoms, and Mr. T. H. Porter, his clerk during the last few years; their interesting contributions have tended to enlarge the memoir beyond the usual limits of our papers.

The memoir divides itself into three parts; 1st. His life until 1853, when he left England; 2nd. His Tour on the Continent and its results; 3rd. His subsequent labours.

Arthur Ashpitel was the eldest of six children of William Hurst Ashpitel, of Clapton, an architect and surveyor of some eminence, who had been a pupil and principal assistant to Daniel Asher Alexander, (that clever architect in construction, of whose works we know so little), and had helped him in surveying and laying out the London Docks; he acted similarly for John Rennie, C.E., being concerned very largely in carrying out the Kennet and Avon Canal, and in the (then novel) work of tunnelling, at the city of Bath. For a few years he worked in partnership with the late James Savage, an architect of much repute; and subsequently designed some churches and other works; but quitting general practice at a comparatively early period, he gave his whole attention to improvements upon his property at Clapton, and elsewhere. He died on the 23rd April, 1852, in the seventy-sixth year of his age.

His son Arthur was born on the 14th of December, 1807. In 1816, when scarcely nine years of age, his attention to his lessons in drawing obtained a certificate of merit or "card of thanks," as it was

styled, from his teachers; yet he soon brought his pen to assist his active mind: his eldest sister's earliest remembrance of him was a child amusing himself on the carpet with writing, in an old ciphering book of his father's, a romance to be called "The Knight of the Sable Plume." About 1817 while jumping to catch the handle of a door-bell, he fell on the scraper under it, and so seriously injured the sinews or hipjoint of his right leg as to cause him to be laid up for some years; in fact, in 1818 he was able to sit up for a few hours only at a time, on which occasions a tutor (the Rev. J. Buddell) attended him. He walked with crutches for many months; and when stronger, attended during certain hours at Dr. Burnett's celebrated Academy at Hackney. There, when about twelve or thirteen years of age, he was engaged in a play-ground strife of parties divided upon the merits or demerits of Queen Caroline, a subject which then engrossed the attention of the public; and being thrown, his injured limb was again so severely affected as to cause a renewed prostration. During all this illness, his active mind called for congenial food; and while he was confined to bed and sofa, books from his father's well furnished library were supplied to him: there he gathered his ideas on heraldry, chemistry, architecture, and other arts: a few lessons at that time on the violin, formed all the instruction he ever had in music; yet it was then that he grounded himself in the theory of that art by studying Thorough base, which, with some after practice on the pianoforte, enabled him to become proficient in that instrument, though perhaps only his most intimate friends were aware of his performances. Dr. Oliphant, an old friend of the family, and a well-known surgeon of the day, used to sit by his bedside for hours listening to his young patient's doubts, and explaining facts to him. It was at this time (1821) that an uncle gave him a Hebrew Bible which he studied under the tutor who attended him. In 1824 Dr. Burnett was so pleased with an exercise submitted in blank verse, which was an imitation of an epigram of "Tymnæus," that he sent it to the "Weekly Literary Magnet," a publication commenced in that year (No. iv. February 21, p. 61). Those lines, Arthur's first appearance in print, were written when not quite sixteen years of age; and they were the precursors of a large quantity of literary work. As Dr. Burnett had grounded him well, his tenacity of memory, sound sense, and good application, concurred in making him a learned man on many subjects and in many languages. His acquaintance with Hebrew I have already noticed; he translated Greek with facility; was critical in Latin even to composing verses in that tongue; spoke French and Italian as well (or as badly) as most Englishmen who only use those languages on few occasions; and had perused carefully the characteristic English literature of all periods.

Specimens of his early addiction to rhyme still exist in the care of the family; one dated 1828, written on his 21st birthday; "Stanzas," dated 1832; and many more similar effusions show the bent of his mind: one of them "To a young Lady who asked the writer to calculate her Nativity," proves that he had studied Astrology; a subject he often mentioned in our conversations, but I was not aware until lately, that he had formed an unique collection of works on that art, which though absurd in itself, had enough of mathematics in it through its connection with astronomy, to interest his curiosity in its speculations and calculations, but of course he did not believe in them. In 1836, he published anonymously an octavo volume of eighty pages, entitled "The Reign of Humbug: a Satire": this work he described as an attempt to expose the wretched sophistry that pervaded, as it does still pervade, so many affairs public and private, the effeminacy, the inconsistency, the cant, and the rapacity, with which we are unfortunately too well acquainted. About 1841, he published with his name attached to it, a pamphlet in thirty-two pages, entitled "A few facts on the Corn Laws, defending the Agricultural Interest", which appeared in that year in a "Third edition with a postcript." In 1844 appeared anonymously "The year Ninety-eight: being another and a truer Ballad version of the

events of the year of the Great Irish Rebellion"; in which he relates with great truth (to use his own words) the trials of that fearful year of blood and crime, when, the world being all against this land, sedition spread the seeds of strife and death in Ireland, and caused many of her sons to fill dishonored graves. At the end of this work he acknowledges the parentage of the two previous productions.

During these later years while he was regaining strength, he assisted his father in the improvement of the family property; and so laid the foundation of his professional pursuits. I remember that the son once said a friend, wishing to erect a few houses, entrusted them to Ashpitel's direction. It also appears that he superintended the erection of four houses on his own property at Dalston Rise, buying all the materials himself, and paying the weekly wages. Finding his strength sufficient to enable him to give the attention required for such work, he was induced to establish himself as an architect and surveyor in one of his father's houses, No. 5, Crown Court, Old Broad Street, about 1843, when thirty-five years of age: he was joined there by Mr. Edmeston. One of his earliest works, 1844-5, appears to be the Hutchison Markets, the Palace Tavern, with between forty and fifty houses, in Gravel Lane Houndsditch, in the rear of Aldgate Church, for Andrew Kennedy Hutchison, Esq.; these were erected on the site of the house which had been the residence of Count Gondomar while ambassador to the Courts of Elizabeth and James 1st. Mr. Ashpitel endeavoured to keep the old structure standing, but it was too greatly decayed. (The "Illustrated London News", No. 136, 1844, has a view of it; and of the Market, vii. p. 268). The new church of St. Barnabas, at Homerton, was designed 1845, for one of the Church Commissioners, Joshua Watson, Esq., who defrayed nearly the whole expense. This edifice was erected in 1847 at a cost of £4,400., and is in the style of the Middle Pointed Period; and at the time "had the largest finished tower near London"; as the church was to be prepared for gas lighting, a novelty at that period, he had to design all the appropriate fittings. In 1848 he added the parsonage; and in 1852 the north aisle and vestry at a cost of about £1,200. A view of the church from the south-east is given in the "Builder," (vol. v, p. 278), and he subsequently published a coloured view showing the whole buildings. To his use of Kentish ragstone for the walls, is ascribed his introduction to the late Mr. John Whichcord of Maidstone, county surveyor of Kent, another pupil of Daniel Alexander, and so to his son, who had become an Associate of this Institute in 1844, and who gave it in 1846 a carefully written account of "Kentish Ragstone as a building material," which was subsequently printed as a pamphlet containing all that is known on the value and employment of this material, since then so largely used. Mr. Ashpitel was also engaged 1847 upon a new church erected among the ruins of St. Dogmael's Abbey near Cardigan (exhibited 1857); 1849, a memorial to Bishop Ridley, to be erected in Herne Church, Kent, (exhibited 1856); 1851, a new church at Vernham Dean, near Hungerford; schools at Lea Bridge near Clapton, on land presented by his family; large additions to Hackney Workhouse; a house for D. H. (now Alderman and Sheriff) Stone, at Sydenham; others at Shacklewell for C. Allen, Esq.; T. Lee, Esq.; and J. Jones, Esq.; others at Blackheath, for Stephen Smith, Esq.; Pelham Richardson, Esq., and T. H. Fry, Esq.; several model cottages for superior artisans, at Lower Clapton, for a small committee; a new church at Blackheath, on property belonging to the late John Angerstein, Esq., at a cost of about £7,000.; the London Silk Trophy and Ribbon Fountains for the Exhibition of Industry of All Nations, 1851; and 1853, for a Committee managing a public subscription, he designed the Wellington Testimonial placed at the Southwark end of London Bridge; this erection, having been declared an obstruction to the thoroughfare, was sold about the the beginning of 1868, and removed to the grounds of Mr. Dothrae, in the beautiful bay of Swanage, on the coast of Dorset, where the upper part only has been placed upon a plain Purbeck stone base of about 20 feet or more in height: in 1852, he added various works to the amount of £2,500 at the London

Orphan Asylum at Clapton, (the design 1823-5 of Messrs. Goldring and Inman) comprising an increase of dormitories, and a new infirmary. During this period he was largely engaged upon numerous compensation cases arising out of the formation of the North London Railway, and other Metropolitan improvements.

For the Exhibition of the Royal Academy, 1850, he well evinced his great artistic abilities by a drawing comprising "Selections from the Works of Palladio", which he grouped into one composition; all the buildings being drawn to the same scale. He had cause of complaint, he considered, in the position of this drawing on the wall (or rather on the floor I should have said) of the Academy, and in the "Builder" of the same year (p. 273) will be found ten clever Latin lines with a translation in English, which had been "affixed to the frame by some person unknown," but as to the author of them there can be little doubt. For the Exhibition of the following year he made a "Design for rebuilding Blackfriars Bridge, and throwing open the east front of St. Paul's Cathedral" which is worthy of more than a passing word, as it contained the following details; "shops on the bridge to pay interest on the cost; the expense of the new street to be little more than that proposed by the City: the obelisk to be that given by the late Pacha of Egypt to the English Nation: the wharves to be taken from the river, and to have a large sewer beneath them."

Almost simultaneously with his first architectural work he appears to have plunged into literary activity. In 1848 his friend Mr. C. J. Richardson requested his assistance in the first part of his projected publication, "Studies of Ornamental Design", for a description of a remarkable "Ancient Roman Glass Vase", of the same species as the celebrated Portland Vase in the British Museum, and a worthy rival of that gem of antiquity. The text marks his great acquaintance with ancient authors, and is the preliminary essay of important corresponding labours. A few impressions having been printed for private use, he favoured me with a copy. For the second part of that publication in 1852, he wrote a careful description of the elaborate "Gallery Ceiling at Blickling Hall, Norfolk," noteing the variety of the emblems as showing the feeling and education of our forefathers. In 1850 and 1851, for John Weale, the publisher, he nearly rewrote Nicholson's work on "Handrails and Staircases: a new and improved method of finding the lines for Handrails; also a Treatise on Staircases"; adding twelve plates of very interesting existing examples of Elizabethan and Jacobean architecture.

Although his name appears as a member of the British Archæological Association in 1845, the year after its formation, he attended the first Congress at Canterbury in 1844, where he made the acquaintance of Mr. C. Baily, F.S.A., and other archæologists. The *Journal* of the Association (vol. i.) announced his intention of giving a paper on the "History and Position of Organs in Churches", and another entitled "Suggestions upon Chancels"; these papers were to be read at the second Annual Congress to be held at Winchester in 1845; but as they were numbered 45 and 46, in a list of 62, they were probably not delivered, and I do not find them mentioned in the record of each day's transactions. In other volumes of the *Journal* will be found the discourses he delivered at several of the ensuing Congresses. In 1848 a lecture "on Worcester Cathedral," (vol. iv) was given extempore to supply the absence of Mr. Edward Cresy, but he had so investigated this subject as to produce on the occasion "a large collection of transcripts from original documents." His critical remarks on Saxon and Norman Architecture are very original and valuable. In 1849 he attended the Congress at Chester, and gave "Remarks on Chester Cathedral," (vol. v.) for which he prepared a very careful plan of that structure to a scale of six feet in an inch; he was also greatly assisted in the preparation of diagrams by Mr. C. Baily. He stated that his path had not been previously smoothened by others, for this Cathedral had not been

illustrated, and all the authorities he had to consult were in manuscript in the British Museum, for the most part very difficult to decipher. That he had gleaned very carefully from them is proved by the context. He was also requested to give an address extempore, on the fine old church of St. John, in the same city, which he concluded with an account of the "Origin and Use of Crypts." In 1850, he prepared "The History and Architecture of Manchester Cathedral," (vol. vi). This appears to be his first written paper of that nature, which much previous labour rendered necessary, by the difficulty of finding early reliable information. From various stray notes and traditions, he was led to visit two or three places near Manchester, at which he considered he identified the old oak framings forming the church, about 1350 at that city, they having been removed when the present cathedral was built about 1440-90. The other parts of the existing building being chiefly of late date, were easily identified. For the Congress of 1851 he undertook for another member, a paper on "The Priory and Church at Repton, in Derbyshire," (vol. vii). He claimed for this monastery that its investigation would lead to the discussion of theories the most important, and as yet uncertain in this branch of Archæology, namely, the settlement of what constituted the difference between Saxon aud Norman architecture. At the Congress of 1852 he gave a carefully considered account of "The Architecture of Newstead Abbey," (vol. ix.) formerly the residence of Lord Byron, and then of Colonel Wildman. This was illustrated by a plan: on a subsequent day he gave some particulars of the Cathedral at Lincoln, while the members were proceeding through it. For the meeting at Rochester in 1853, he prepared "The Cathedral," (vol. ix), a paper exhibiting great research into available documents. A discussion arising on Mr. Duesbury's paper on the Castle, it was appropriately terminated by Mr. Ashpitel, with general observations on Norman Fortresses; and on a following day he explained in a short essay many peculiarities belonging to All Saints Church at Maidstone. "We are indebted" writes Mr. Baily, "to Ashpitel for many discoveries made during his archæological investigations. Among these may be mentioned that at Repton, while superintending the excavations he found the entire foundations of the nave and transepts of the Abbey Church with the bases of the columns perfect and in situ; these were not previously known to be in existence. At Rochester, he proved that the original eastern end of the Saxon church had been of a square form, and not semicircular as had been supposed." His journey to Italy partly broke the charm which bound him to these annual labours; on his return in 1854, a difference of opinion among the members of that Association having arisen, many of them resigned their seats on the Council, Mr. Ashpitel amongst the number. Very soon afterwards an Archæological Society was formed for the City of London and County of Middlesex, when Mr. Ashpitel joined his old friends, took a lively interest in the new society, became a member of the Council and Vice-President, and it was not until his health failed that he ceased to attend the meetings. Although I am aware he had promised a paper or two, I think his time and ill-health combined prevented him carrying out the wishes of his friends.

In June of 1850, Mr. Ashpitel entered into partnership with his friend Mr. John Whichcord, and took offices at No. 8, Carlton Chambers, Regent Street, moving to No. 2, Poet's Corner in May 1853, the partnership being determined in 1855, owing to Mr. Ashpitel's declining health. It was on the 25th June, 1850, that being together at Swansea, South Wales, where they were engaged in laying out a large building estate, they descended the Coomdee Coal Mine at Neath, and while waiting in a recess they were shown the way in which the miners warmed their tea over a light; a passing workman gave a shout of alarm, and the guide discovered he was then holding over the flame a can full of gunpowder used for blasting purposes; the party quickly returned to the surface, thankful for their escape. At Swansea, the partners designed houses upon the St. Helen's Estate; Fynone, a villa; the Workhouse; and the Baths and Washhouses, to which class of erections they had specially turned

their attention in consequence of the passing in Parliament of the "Act to encourage the establishment of Baths and Washhouses," which received the Royal Assent 26th August, 1846. In 1850-51, they designed those for Maidstone (exhibited 1852), which cost £3,600, exclusive of the water-supply. This establishment was subsequently illustrated in a pamphlet printed for private circulation in 1851, entitled "Observations on Baths and Washhouses; an account of their History," with other details; a third edition of it appeared in the following year. The similar establishment in the Bridge Road, Lambeth, was designed 1852-3, for a Company, as the vestry declined to carry out the Act. This building (exhibited 1853), consisted chiefly of two swimming baths—the largest in the world it was then said, and perhaps they still deserve that designation—the first-class one having a water surface of 115 feet by 40 feet, and the second-class one about 100 feet by 45 feet; there were also fifty-five private baths; besides vapour and shower baths; with thirty-six washing compartments. This building is also noticeable for the ingenious adaptation of lattice construction to the roof of a wide span, similar in conception to the lattice bridges of America; it has also centre trusses supporting purlins of lattice construction; these prevent the chance of lateral settlements in the roof, and by enabling the principals to be placed at larger intervals, contribute to its economy. An infant school was designed in connexion with the washhouse, where children might be left in safety and with advantage to themselves, while their mothers were engaged close at hand in the domestic duties. A plan and interior view of this building, is given in the "Builder", (vol. xi. p. 628). Other similar establishments were designed by them, and in part executed under their superintendence;—1851, at Southampton; for the parish of St. Clement's Danes, Strand; at Kidderminster; at Gloucester; 1852, at Dudley, Worcestershire; for the parish of Clerkenwell; at Bilston, near Birmingham; at Tonbridge, Kent; at Hastings, Sussex; 1853, for the parish of Islington; at Leek, Staffordshire; at Tynemouth, Northumberland; at Salford, Lancashire; and another in France. In connection with this subject, they designed, 1851-2, the Water Supply at Kidderminster, and at Bilston; and took out a patent for an improved valve to fill, and to empty, the baths, an invention which proved very satisfactory.

The general practice of the partners, besides numerous cases of references and arbitrations, comprised the following works—1851, the Kent Ophthalmic Hospital, and the Kent Infirmary, both at Maidstone; the Kent Asylum Chapel, at Barming; a new Church at Postling, Kent; the restoration of Plaxtole Church, Kent; the Tower and Spire of Wednesbury Church, Staffordshire; the restoration of Iken Church, Suffolk; and that of the Duke Street Chapel, St. James', Piccadilly: the Parsonages at Maidstone, and at Lamberhurst, Kent: the Cemetery at Bridgewater, Somersetshire: Schools at Boxley; 1851, at Ipswich; at Birling, Kent; at Whialey; at Milton, Kent; at Shoreditch; at Rainham, Kent; at Pontardawe, Glamorganshire; and for Lord Abergavenny, at Birling Manor, Kent: the enlargement of the Town Hall at Maidstone; and the erection of the new one at Burslem: a Clock tower for Lord Abergavenny, at Birling: the Bridges at Godmersham, and at Teston; and the widening of that at Yalding, all in Kent: the Workhouse at Hull: Shops at Maidstone, for Messrs. Paine and Co., combining iron framing with tile filling in, a novelty of construction at that time; this was exhibited at the Architectural Exhibition; besides several others in London: Houses at Maidstone, for F. Scudamore, Esq.; Cob Tree House at Aylesford for T. Franklin, Esq.; two villas at West Hill at Wandsworth; a villa at Wanstead for W. Attwood, Esq.; a residence in Ladbroke Square, Notting Hill, for W. Bartlett, Esq.; a villa at Wandsworth, and another at Wimbledon, both for Dr. Finch: a residence for Lady Waldegrave: several Houses at Wimbledon on the Cottenham Park Estate: an Observatory near Swansea, for L. Dillwyn, Esq.; and a block of Dwellings for Artizans, in Lambeth, for a company formed for that purpose, in which the late Archbishop of Canterbury took a very leading part.

All these designs, with others by both the artists, were collected and formed in a picturesque manner into a large drawing, exhibited 1855, as "Works in hand or recently completed," which was the last one submitted as their joint production: but another publication was issued by them also in that year, entitled "Town Dwellings"; advocating the erection of fire-proof houses in flats; a modification of the Scottish and Continental systems, adapted to the smallest, or to moderate, means. This pamphlet contains statements of much value on the subject, with suggestions of the means to be adopted for improving the habitations of the lower classes in crowded cities; and statistics of the expenditure and income of lodging houses. One of the plans given exhibits blocks surrounding a square, of the form in which the Peabody dwellings are now being erected, but the arrangement advocated for the blocks has, I venture to submit, a defect in building up the angles of the square instead of leaving the block free at those parts, for effectual ventilation.

I have already noticed that the death of Mr. Ashpitel's father occurred in the early part of the year 1852: he then arranged the private matters devolving upon him as the head of the family, in a manner that, from what I have been recently informed (it was a subject to which he himself never adverted in any way) cannot but be deemed most generous and disinterested. Taking advantage of the slight increase of income which he reserved for himself, he prepared for a journey on the Continent, but more especially in Italy, a country long familiar to him as a student of Classic literature and art, and a land which we can imagine he had been most desirous of visiting to investigate its antiquities for himself. He left the English shores about 6th of October 1853, travelling through Paris and Marseilles, along the Mediterranean, and spending the first three months of the new year at Rome; for the next three months he was at Naples; being at Leghorn in the end of May; at Florence and Venice in July; at Milan early in August; that city he quitted after a few days' illness caused by an attack of the "Malaria" fever; perhaps he considered himself secure from a return of it, or did not know the evil effects of retaining even a symptom of it about him; but unhappily he was laid up with it for three or four weeks at the little village of Airolo in Piedmont. His recovery, he often stated, was assisted by the kind care of an English lady staying in the neighbourhood. Even there, while obtaining renewed strength, he sought for fresh food for the mind, and after many useless inquiries for "a Galignani of any number of weeks old," he heard of a library of the works of ecclesiastical authors which had been gathered many years previously by a clerical resident. The whole collection was at Mr. Ashpitel's service after a short interview with the curator, who was very thankful for some one to use what, in that locality, was considered to be mere lumber, and for the necessity of wiping off the dust of years from their bindings before sending them to the invalid. From Airolo, he journeyed homewards quietly through Paris, arriving in England again on the 24th of October, 1854, having been absent just twelve months.

For a Classic Scholar to be in Rome, and not to visit the Commendatore Canina, was next to an impossibility. Our friend found him in his studio—an interesting series of questions and mutual relations of views arose—resulting in their visiting each spot of interest, where with the Italian views urged on the one hand, he was interested in the remarks of the equally enthusiastic German antiquary Dr. Emil Braun, on the other side; the retentive memory of Mr. Ashpitel enabling him to refer to the words of the ancient historians and writers for necessary elucidations; he assisted their researches and came away, loaded with the latest information upon the various important discoveries in the excavations, and with various drawings, and levels of the sites of the Forum and of other antique buildings, prepared specially to enable him to carry out an object expressed to him by Canina. The pleasure and interest of this sojourn in Italy was greatly enhanced by the companionship of the late

David Roberts, R.A.; it was at the suggestion of that renowned painter of architectural subjects, that Mr. Ashpitel made most careful sketches of the site of the Forum in its then state, from the top of the Palatine Hill.

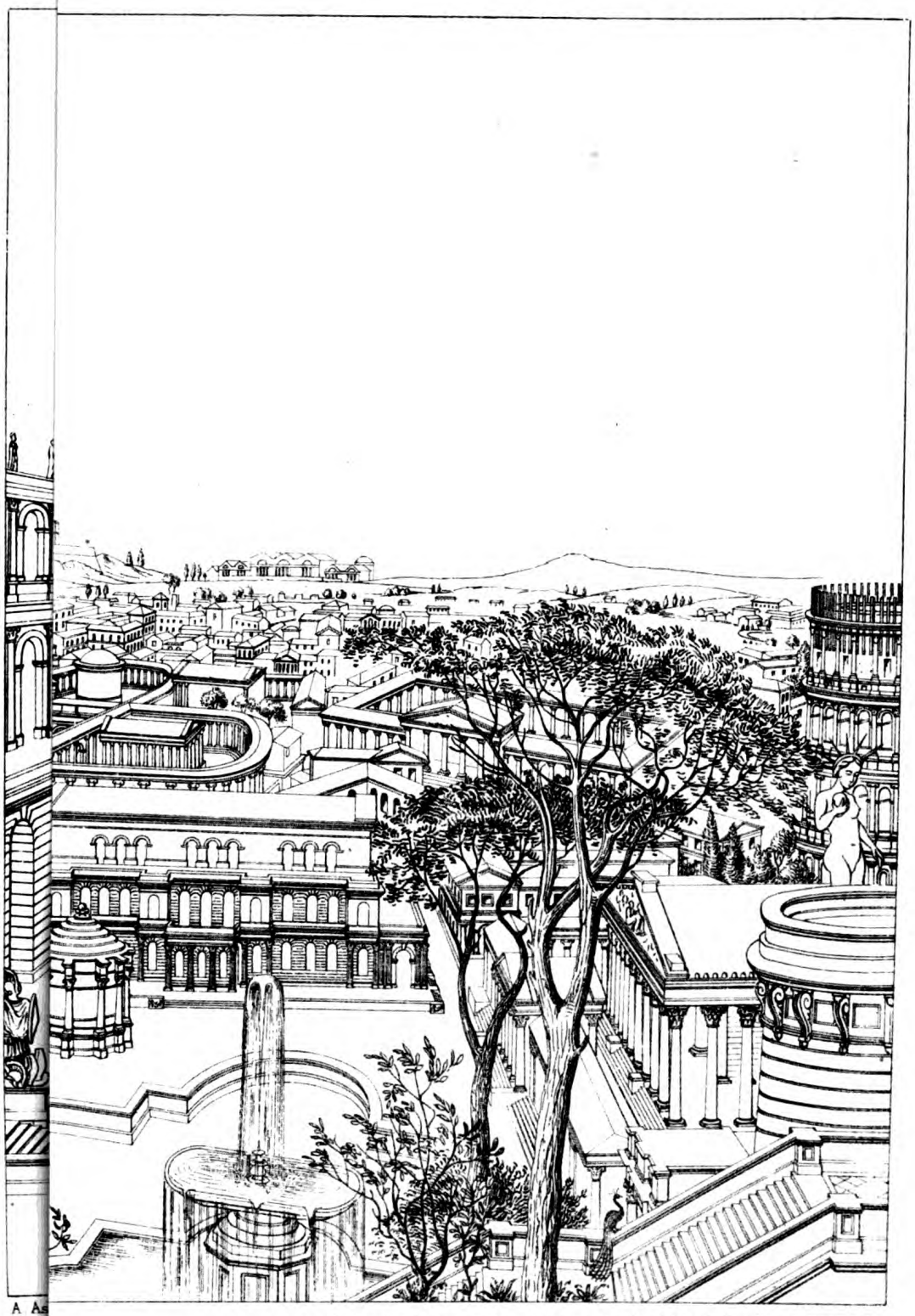
No result of this Continental trip was made public for some time; but Mr. Ashpitel was deeply thoughtful of his future work. In 1856 Canina arrived in England, on the special invitation of the late Duke of Northumberland, who had requested him to visit Alnwick Castle in order to put into operation certain works for the internal decorations that he had designed for his Grace's residence. This scheme, and the melancholy end of its author, who died at Florence on October 17th, while returning to Rome, were the subjects of Discourses in these rooms by Anthony Salvin and by Professor Donaldson in the month following; and therefore need no further reference. Although Canina professedly took up his residence at the hospitable quarters in the house of Professor Donaldson, then, as now, our Honorary Secretary for Foreign Correspondence, he spent a large portion of his time with Mr. Ashpitel at Poets' Corner, using the studio and the library, together with the Bachelor's unpretentious hospitality, occasionally enlivened with practice on the piano. It was, without doubt, during this period that Mr. Ashpitel worked out with the great antiquary the solution of those discoveries made during late years in the Forum, which greatly upset the theories usually received. Before noticing these labours, I must premise in due order that in January of 1857 (the following year) he contributed a paper to the Society of Antiquaries (in which Institution he had been elected a member in 1847), entitled "On Choirs and Chancels, particularly as to their use in the South of Europe." In this paper he sought to combat "a notion which has been lately promulgated, that the laity should not be allowed to enter the chancel," while on the other hand, "in our cathedrals, the people are all huddled into the chancel." Whilst in Italy, he endeavoured to observe the usages and practices, and to collect the traditions with regard to choirs and chancels. The result of his researches may perhaps be briefly stated from his concluding paragraph, that as the Church of England has but one altar (or table) in every church, and as that altar is moveable, so the small congregations, as in a cathedral, could be accommodated in the choirs, and the larger attendances in the naves. On the 18th of June in the same year, he read another Essay "On the City of Cumæ and the recent excavations there." It details the particulars of a very large Greek tomb which had just been opened, and into which Ashpitel at once descended; the guide rushed to his friend and stated the fact very hurriedly, making the friend believe that Ashpitel had fallen in; he ran to the opening in the roof, and was relieved when he perceived the architect busily engaged with rule, pencil, and paper, jotting down the size and peculiarities of this valuable example. His notes, thus hastily made, eventually proved to be important, for shortly after his return home, application was made from Naples for copies of the memoranda he had made, the ground having been hastily filled in again, a request with which he instantly and gladly complied. Both these papers are printed in the "Archæologia" (vol. xxxvii), published by the Society.

It was in March and April of the same year (1857) that our esteemed late colleague read his first paper at this Institute. It was entitled, "On the different theories respecting the Forum at Rome, particularly those of our late member, the Commendatore Canina." He opened the subject by stating that to him the subject had a peculiar interest, not only from its intrinsic value and importance, but because it was the favourite study of his friend, the celebrated Luigi Canina, with whom, and with another valued friend, Doctor Emil Braun, he had walked again and again over every part of the site, and paused over every stone, while he listened to their discourse and discussed every theory with them. Canina himself, just before his departure from England, urgently requested Mr. Ashpitel to take some opportunity of making Canina's views more generally known to English architects; to justify him, as far as he conscientiously could, from the attacks of adversaries; and particularly to enlist the sympathies

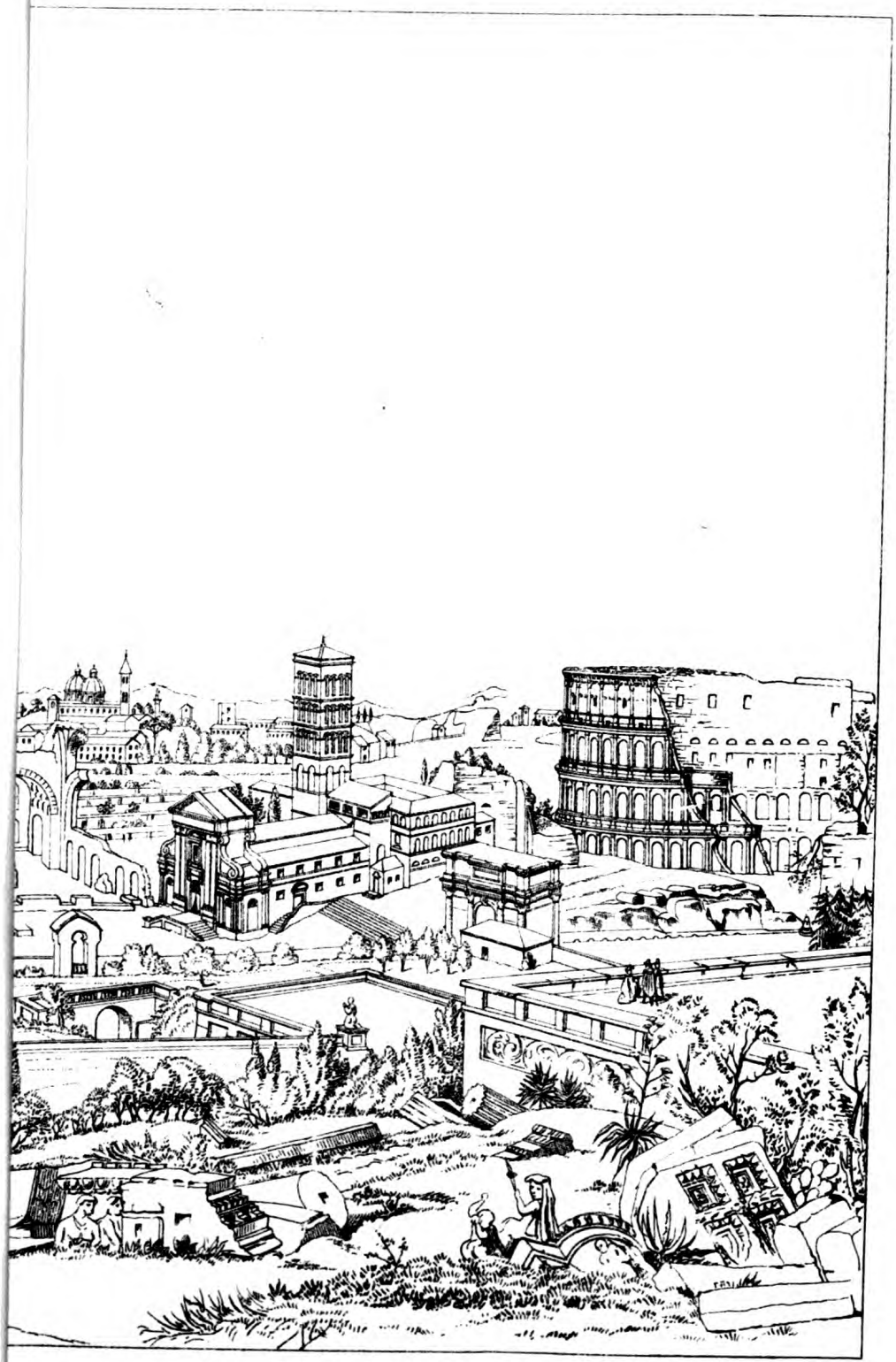
and support of his professional brethren in his favour. Mr. Ashpitel regarded his friend's last expressions to him as a sort of legacy, and endeavoured to lay before the meeting the most promising points of interest in the investigation. The minuteness of research into the writings of the ancient authors quoted by Mr. Ashpitel, and the careful interpretation of the (often very obscure) meanings,w hich required most considerate elucidation, took by surprise all those who were not well acquainted with the learning and research of the exponent of Canina's views. It is recorded in our "Transactions" that Mr. Donaldson stated he differed very materially in many points from the opinions of the authorities mentioned in the paper; and, that Mr. Ashpitel vindicated his positions. I fear although only a dozen years have elapsed, there are few present to-night who heard that lecture: our President, Earl de Grey, who was in the chair on the second occasion, with very many more have passed away; and others are feeling the weight of that additional number of years, leaving the welfare of the Institute to the Juniors of their day.

It was in the next year (1858) that appeared the climax of his researches, with the theories of Canina, in the production of the very interesting picture exhibited at the Royal Academy, entitled "Ancient Rome," a view from the Terrace of the Palace of the Cæsars on the summit of the Palatine Mount, of the Capitol, Tarpeian Rock, Forum, &c., carefully made from study of the existing remains, and looking along the Forum as he imagined it should be restored. The drawing was as attractive from its artistic talent as from the effects of his archæological research; and for the use of his friends he wrote a small pamphlet, forming a key to it (See *Illustration*). This production was paralleled in the next year's exhibition (1859) by a companion view of "Modern Rome" from the same eminence, but looking a little more across the Forum (See *Illustration*). His composition was obtained by putting together the careful sketches made on the spot, as before mentioned. Both drawings attracted much attention at the time; and he was so often solicited to publish them, that in the year 1866, after having been somewhat reduced in scale, they were carefully chromo-lithographed by Messrs. Kell, and were issued by Messrs. Graves of Pall Mall, together with a "Description and Key," contained in a pamphlet pointing out the various celebrated objects in both views, and shewing the authorities for the various restorations. In connexion with his researches in Italy, he read a second paper at the Institute in June 1860, "On the Origin and Development of the Use of Crypts in Christian Churches from the earliest periods." The preparation of this essay was no light task; he had to consult the ancient Greek and Roman writers that touched upon the subject, to compare his notes with the opinions of modern authors, and to combine them with the results of his own inspection of the catacombs at Rome and elsewhere. What he gave us then, was only the first half of the history of the subject; he had often promised the remainder, having studied the matter in his archæological tours, and as he had received curious particulars as to mediæval crypts of which he desired to avail himself. This is now left for some one else to carry out. His observations during a discussion in 1861 at these rooms, on "The Mode in which Light was introduced into the Greek Temples," as propounded by Mr. James Fergusson, form almost another paper, and may be characterised as equal to the previous one in value, from the erudition which he displayed, and from the care with which he quoted his authorities.

In June of 1862 he contributed his last paper to us "On the Italian Architectural Drawings in the Royal Library at Windsor," on which occasion several volumes of those original drawings were exhibited here in accordance with the expressed wish of the Prince Consort, then lately deceased, and under the care of the Royal Librarian, B. B. Woodward, Esq., F.S.A., who had obtained Mr. Ashpitel's assistance to decipher the Italian characters and phrases of the sixteenth century on these drawings; a task which was rendered easy to him by many long days reading in the libraries of Italy for the purposes of his studies. Mr. Ashpitel wrote out the notes which he made during his examination of the volumes; and



Lithographed for the R.I.B.A. by Kell Bros. Castle St. Holborn



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a copy of his manuscript, entitled "Summary Notices of the Architectural Manuscripts in the Royal Library, Windsor Castle," was made an exception to the rule in regard of gifts, and was graciously accepted by the Prince Consort, who is said to have discovered at the Castle, during some important alterations, this mass of valuable original measurements, restorations, and designs. In that collection was a very old and curious plan of an edifice which had covered a space equal to three times the area of Westminster Hall, and had been half as high again as that structure. It proved to be a record of the Basilica of Constantine and Maxentius (formerly known to archæologists and architects as the Temple of Peace) at Rome, which plan purported to have been made for the Cardinal Albani at the time of the dismantlement of that building. Mr. Ashpitel was so much impressed with its value, that he carefully studied it for his drawings in restoration of the existing remains, and produced exterior and interior views, which were exhibited respectively in 1864 and 1865 at the Royal Academy. These drawings were, I think, the last of the sort that he prepared.

Among his minor writings may be noticed 1856-57, the revision for Mr. John Weale, of another of Peter Nicholson's books, entitled, "The Carpenter's New Guide; or the Book of Lines for Carpenters, geometrically explained." The first division comprised the original work on "Practical Geometry and Carpentry"; the second, "On Practical Mathematics, Mensuration, &c." by the Editor; and the third division, "Practical Rules on Drawing, Shading, Perspective, &c." by George Pyne—the whole including 74 plates. In the April and June numbers of the "Gentleman's Magazine," 1858, he contributed a review of Dr. Birch's valuable work on the "History of Ancient Pottery." The notice, like his later ones on new publications, are not mere transcripts of the interesting portions with a few subjoined epithets of praise, but an elaborate examination of the subject, directing attention to the several essential portions, detailing his author's exertions in forming a standard work, and in fact making a condensed essay. It was about 1858 and 1859 that Messrs. Black, the proprietors of the "Encyclopædia Britannica," engaged him to conclude such of the biographical articles as had been entrusted, for the new edition of that publication, to Lord Macaulay, whose death had prevented the continuance of that nobleman's assistance. Mr. Ashpitel consequently wrote the notices (amongst others) of Vanbrugh, Wren, the Wyatt family, William of Wayneflete, and William of Wykeham. He visited Oxford to inspect the valuable collection of drawings by Wren; and in the last memoir he adhered to the traditional view of his subject; though he afterwards felt the force of, and advocated, the opinions contained in my paper on "Masons and Supervisors," read at this Institute shortly afterwards, opposed to the popular idea of Wykeham's having been an architect of anything besides his own fortune.

After the dissolution of partnership with Mr. Whichcord, he continued to reside at No. 2, Poets' Corner; and although he then retired very much from the active exercise of the profession, he carried out a few small edifices entrusted to him, and frequently acted as arbitrator in disputed matters. For the Rev. James Reynolds, a former schoolfellow, he in 1854 erected the residence to, and repaired, the Chapel formerly the Hospital for Lepers at Great Ilford, Essex, adding a Porch; and wrote a history of the building in 1858. In 1861 he ventured to Gothicise the façade of a Public House in Red Cross Street, City, probably the first attempt to render the mediæval style appropriate for such a business. It was executed in Bath stone after the Venetian Gothic fashion, at a cost of £250., with some good carved heads in bold relief: the upper part of the design, as too often the case, was not carried out. In 1861 he rebuilt Ripple Church, Kent, on the original Norman foundations, at a cost of about £1,600.; it consists of a nave and chancel with much carving, a tower with a spire, the latter covered with zinc, which has assumed the colour of old lead. In the Church he put up a rich monument to the memory of — Sladen, Esq., the lord of the Manor. He also restored Sutton Church, about a mile

from Ripple; it is one of the oldest churches in England; the circular apse with an arcade having about fourteen columns with moulded arches and carved caps; a double Bell cot was put up at the same time; the whole works costing about £400; it consists of a nave, chancel and porch in the Norman style, with seats for about 230 persons. In 1862 he built the Church at Aldborough Hatch, Essex, consisting of a nave, chancel and small tower and open timber porch, in the style of the Decorated Period, at a cost of about £2000. with seats for about 340 persons. In 1863 he made the drawings for a church to be erected at Oamaru in New Zealand, with sittings for about 350 persons; to be built entirely of timber; and was designed for a Merchant who became unable to carry out the gift; it consisted of a nave, tower, chancel and spire, all to be covered with shingles; the general idea he adopted from an old chapel near Pershore in Worcestershire. In 1864 he erected schools to accommodate seven hundred of the children of the District of Holy Trinity at Hoxton, at a cost of about £3000. In 1865 he rebuilt the Tower and Spire of Great Ilford Church, Essex, to contain eight bells; this spire is another of those which he covered with zinc; and the construction cost about £600. For the Hon. and Rev. H. W. Bertie, the incumbent, he in 1867 amended and enlarged this plain brick church (erected about 1825) inserting new stone traceried windows, all of different design, adding one bay at the East end with a half octagon apse to form a new chancel; the whole costing about £2000; the style adopted for both the Tower and the other new works was Venetian Gothic. A new Parsonage was built at the same time, in the same style, of brick with Corsham Down Bath stone; the house is large, having a frontage of 70 feet, and with the Stabling, Brewhouse, and a small Farm, cost altogether about £3,500. Among his other numerous designs, was one made about 1860 for the restoration of the church of S. Margaret, Westminster, for the parochial authorities, which had been in contemplation for some few years previously. In memory of the late Peter Borthwick, M.P., he designed for the family, an altar-tomb based on the memorials of the early Christians found in the Catacombs at Rome; it was erected in the West Brompton Cemetery, and cost £100. being executed in Portland stone, granite pilasters, and with four bronze statues in niches; it was illustrated in the "Builder" of 1867 (vol. xxv, p. 11). He designed the ornament cast on the Westminster Bell, so familiarly known as "Big Ben," which he undertook only after having obtained the sanction of Sir Charles Barry, R.A.: and he assisted Mr. E. M. Barry, A.R.A., in collecting the documents for a reproduction of what is called "Charing Cross," erected in the courtyard of the Railway Terminus in the Strand. His last work was a design for twelve almshouses at Clewer, near Windsor, to be built at the sole cost of one of his sisters; the foundation stone has been laid since his death, and the works are now proceeding under the direction of his friend Mr. Whichcord.

His later literary productions were two 'Reviews' for the "Fine Art Quarterly Review," edited by Mr. B. B. Woodward, the Librarian at Windsor Castle; one in 1866 of "The Principal Ruins of Asia Minor," published by C. Texier and R. P. Pullan; and in 1867, the first portion of a review on "Gothic Architecture in Spain," by G. E. Street, A.R.A. During the years 1865 and 1866 he was engaged for Messrs. Black upon a "Treatise on Architecture," which appeared early in 1867. This was not a completely original work, as it comprised several of the Essays published in the "Encyclopædia Britannica," being those on Architecture, Building, Construction, Joinery, Stonemasonry, Carpentry, Roofs, Arches, and Strength of Materials, originally written by Prof. W. Hosking, Mr. T. Tredgold, Dr. T. Young, and Prof. J. Robison. These form the staple of the work: Mr. Ashpitel, acting as Editor, revised those treatises to the limited extent allowed him; and supplemented them with entirely new sections on Egyptian, Jewish, and Assyrian Architecture; a chapter on Indian and Chinese Architecture; and a Glossary of Terms used in Mediæval Architecture; besides adding the article Acoustics, and supplementing those on Joinery, Roofs, Stonemasonry, &c., to bring their information down to the present

time: he also supplied the material for numerous additional plates of Illustrations to the Glossary, as well as to the Arabic, the Romanesque, the Pointed, and the Modern French, styles. A writer must have undergone a similar infliction of carrying out a new edition under the restrictions that publishers will put upon it, before he can fully appreciate the trammels that attend the labour of rectifying some of the mistakes and incomplete views of writers of previous days, when correct information on such subjects as the History and Theory of our Art were less obtainable than at present; for generally the trade is too fond of reissuing its old stereotype, alongside of the revised, matter. The last production of Ashpitel's pen was a contribution towards the history of the Great Bell of Moscow, now preparing by his old friend Mr. T. R. D. Tyssen, F.S.A.

I have already noticed the papers read by him at this Institute, and had almost been tempted to record each occasion when, in important discussions, he gave us the results of his learning or experience. These were not the only exhibitions of the interest he took in its welfare. What was he not ready to undertake either for this Society, or for its members individually? Elected in 1851, he served on the Council in 1856-58, and as Vice President 1862-64, and again on the Council in 1865-67, besides acting on Committees as often as the several Councils, or the members at any of the meetings, considered his services as essential: and until his strength failed him, he was constant in his attendance, for his name on a committee was not for sham services. During several years from 1855, when the Metropolitan Building Act first gave the labour to this Institute, he usually presided at the Board of Examiners of Candidates for certificates of competency to act as District Surveyors; and took great part in the preparation of the questions to be put to the candidates at each meeting. From what I have heard, I am sure that the candidates who may have failed to pass the first time of examination, will testify to the delicate manner in which he took unsatisfactory answers, striving to be sure that the points were missed by want of knowledge, and not upon "catch questions," or not arising from the unusual position in which they were then placed; probably an easier one, after all, to others entailed upon them while carrying out the arduous duties for which they were then seeking to be considered competent.

When, nearly ten years since (1860), the Architectural Association a second time asked this Society to institute a Voluntary Architectural Examination, a scheme was propounded by the Council after much consideration, in a form not acceptable to the members of the Institute, and a Committee was appointed to investigate the subject. The services of Mr. Ashpitel as chairman of that Committee were not confined to the duties of attendance at its numerous meetings, for his personal acquaintance with gentlemen officially connected with other public examinations procured to the Committee the results of their experience; and when, out of the rather discordant schemes which are understood to have been proposed, one was issued that secured the adhesion of all the advocates of such an examination, its appearance was due in great part to his example of that forbearing compromise of unessential points which is so necessary in the conduct of public business. His influence with those members whose dislike to a "Diploma" rendered possible the rejection of any scheme of examination, as well as with those who thought that an examination would not be acceptable without the "Diploma," offered an opportunity for his reconciliatory powers, which was happily used; and the ultimate acceptance of the Committee's plan may be fairly ascribed in great part to his subsequent energetic advocacy of it. After that plan for a Voluntary Examination had been adopted, he compiled the "Sketch of Form of Examination Paper," which was printed with attached Remarks. These exertions cleared the way for his colleagues, Messrs. G. G. Scott, R.A., and M. D. (now Sir Digby) Wyatt, in the labours of the first examination in 1863. The Report by these first Examiners; as well as that by the second Examiners in 1864, comprising himself with Messrs. Scott and T. H. Lewis; and again in the third Examination, by himself with

Messrs. E. Nash and J. W. Papworth in 1866; together with the revision of the regulations, proved that the rising generation could find none of its seniors more liberal, more helpful, or more earnestly practical, than Arthur Ashpitel. In the Examination Papers, which are mainly due to him, "he showed a true practical feeling, for when he talked over the matter with me," writes his brother, "I observed that he seemed chiefly solicitous, first, to set the more intellectual subjects in their due place, so that Latin should not be altogether pushed aside; and next, to give every question a real bearing on the main object of the Examination, making even pure arithmetic questions connected, in form at least, with professional life, and most carefully excluding all those showy and impossible questions with which some examiners delight uselessly to adorn their pages." No one more than himself regretted the apparent indifference in the succeeding years, shown by the younger members to the offer of subsequent examinations, an indifference which he was willing and eager to attribute to the requirements of office work not affording sufficient time to prepare for the task, rather than to any coldness to the advantages of a scheme originally urged so strongly by the members of the Architectural Association. He subsequently advocated the preparation of a course of Lectures on subjects in connection with the Examination, and the evening on which he devoted himself to the explanation of "Mason's work and Masonry" to the Voluntary Examination Class of the Architectural Association, will perhaps be in the memory of some few who are now present. In another matter of a somewhat similar character, namely a "School for Artistic Architectural Education," propounded by Mr. George Gilbert Scott in the rooms of the Architectural Association, the Council requested Mr. Ashpitel to act with others on behalf of the Institute. A scheme arranged with them by the various representatives of other Societies was laid before the Institute, and, with some few modifications, was recommended by it for adoption. But it is supposed that the many urgent calls upon the time of the originator of the scheme, Mr. Scott, has prevented him from taking the necessary steps for putting into execution the plan, which received the name of "The School of Art Accessorial to Architecture."

When in 1850 the Architectural Exhibition, founded by the Architectural Association, had taken a fair hold on public attention, and it was the desire of its friends to extend the field of its operations by the renting of better galleries, with the other necessary expenditures, Mr. Edmeston undertook the duties of Honorary Secretary, while Mr. Ashpitel provided the funds as Treasurer for many years, and both were greatly instrumental in saving that Society from a premature death: the result to Mr. Ashpitel's pocket was for many years a chronic deficit on the part of the enterprise. After the Exhibition had been established a short time in the Galleries in this establishment (which had been formed by the aid of the Architectural Union Company, in the foundation of which he took the same interest as in the other professional Societies I have named) he, as Treasurer, announced at one of the opening meetings that all the debts had been paid, and amused the audience by the declaration of the novelty of his position at having a small balance in favour of the Society at the bankers, and being in debt instead of money being due to him. To the Architectural Association, to the Architectural Museum, and to the Architectural Benevolent Society, his purse and time were fully opened, to the latter more especially, on whose funds there is inevitably a constant call from unfortunate members of our profession and their families throughout Great Britain and Ireland, that ought to ensure its being more warmly aided by successful architects than is the case even after its now twenty years of useful exertion. His private acts of liberality are of course beyond the objects of this Memoir. He also accepted the unenviable position of Treasurer, to a Committee for the production of a work of manufacture to be executed by 150 ladies for display at the Industrial Exhibition of 1851, assisting greatly in the design made by my brother, J. W. Papworth; and in the execution of the patterns to the full size by W. B. Simpson, of West Strand. This carpet was accepted, and eventually exhibited, by Her Majesty. His valuable assistance on that

occasion will be gratefully remembered by me as Honorary Secretary, and I am sure by all who were engaged upon its production.

Whilst on the subject of Societies, there is one other for which I can also speak, and personally speak, on the unlimited aid which he gave to it. Mr. Ashpitel joined the Architectural Publication Society upon its being first brought before the profession by myself in 1848, and it seems but as yesterday, that while waiting in the Library of the Institute in Grosvenor Street for the members of the Committee, I found a gentleman amusing himself in the meeting-room. As Honorary Secretary I addressed him; this was my first introduction to one from whom, from first to last, not an unkind word or action was ever received, even on occasions when it might be supposed that some irritation had been given to the susceptibilities of an author. In 1853 he contributed the "History of Ancient Baths and their development in the Modern Baths and Wash-houses," with various illustrations; he warmly supported the commencement, by the Society, of the "Dictionary of Architecture" in its integrity, no one being more aware than himself of the want to our profession of a work combining modern discoveries and facts, with references to authorities for obtaining fuller information on each article. At first he only occasionally assisted, but soon after his return from Italy, he (in 1855) wrote the article "Manufacture of Brick"; and from that time to within six weeks of his death that work received his zealous assistance as a contributor, and his earnest co-operation as a revisor: this last duty, like all duties undertaken by him, was no sinecure; a proof of each sheet is sent round to a certain number of members; and according to the subjects of the articles therein, I was certain of receiving from him one, two, or three pages of foolscap of criticism and suggestions, sometimes concluding with a poetical "Morial" on the consequences of passing over the carelessness of certain writers, the worthlessness of certain extracts, or the falsity of tradition or of dates. A few of these amusing lines found their way into the columns of the journals, and wil perhaps be remembered. Mere sickness did not prevent his attention to these sheets, for he evinced l. pleasure in the progress of the work by sending his remarks written in pencil whenever, unable from weakness to leave his bed, he could not write in ink; and when on the sofa, or indeed at any time that a visit for discussion on points that seemed to require particular consideration was demanded, he wa always ready to give up the necessary time to the conversation, which generally ended in discussin things done at the Institute and elsewhere, until the arrival of the small hours were too quickly announced by the Westminster bell. This was not the case with the last article he promised to write; it had been commenced; all the information was noted for it; but after two applications for "the latest time" for sending it, I had to call upon him to ask for it; his state of weakness allowed him to give only the time necessary to explain how he had intended to write it, and to beg for another week: but it had to be written by another hand. This was my last interview, and my last visit but one to Poets' Corner. Such intellectual evenings as we had together are neither easily forgotten nor replaced.

The effects of the fever and ague which he experienced at Airolo, were felt by him severely for several years, and once attacked him for some days when attending the Exhibition of 1854 at Manchester. With his mind always actively at work either in pursuing his professional or his literary labours, or responding to the numerous applications for advice or help, he did not pay that attention to his delicate constitution which one less considerate to friendly appeals would have done: in fact he overtasked his body, which was always ready to yield, from his early affliction, to changes of temperature. Even on the morning of the day I last saw him, whilst in so weak a state as hardly to be able to hold the papers in his hands, he had driven to Bayswater to correct a statement in a draft which he considered of importance to a client: most persons in his condition would have trusted to a letter. In late years he had occasionally resided for some weeks at Ramsgate for the advantages of sea air and of boating, from which he had always received benefit; and early in last year he took up his residence,

first at Reigate and then at Ramsgate, whence he was brought home in the autumn in the very weak state from which he never rallied. I think myself he held the opinion that he would not recover, for on the occasion of my last visit to him he handed to me a rare volume on Heraldry which my brother had lent him five or six years since, and which had been kept by him for the purpose of their considering together some passages long known as a puzzle to students in that science; up to that time he had always strenuously turned a deaf ear to any notion of returning it before the solution had been effected. A few weeks of lingering weakness ensued; and then his life ended in a quiet and peaceful sleep in the afternoon of the 18th of January last, in the 61st year of his age. On the 25th he was buried in the family vault in Hackney Church Yard, by his n. arest relatives and some of his friends, and literary, or professional, colleagues.

Having thus chronicled the exertions of a true "working man," a few moments may be allowed me to record his abilities and personal character.

His architectural talents were exhibited in the numerous works I have named, of a class such as usually falls to the lot of an architect in general practice, especially of one who does not enter into open competitions. He selected the Mediæval, or the Italian, style as appeared to him best suited to the subject in hand, and treated each with careful consideration. His ecclesiastical works were a credit to the steady development of Gothic architecture, and even met with general approval from the more severe class of critical writers. His designs were never pretentious; in rebuilding old churches he adopted the type of the former edifices, and conformed to their general arrangements as much as possible. Although his sympathies were decidedly with the Classic Greek, and Roman, and the noble Italianised Roman, styles, he felt that for such edifices as he had to design they were inapplicable. It will be remembered, no doubt, how on many occasions some years since, when the profession was more divided on the questions of Classicism and Gothicism than now, and it was urged on one hand, both by word of mouth and by writings, that an architect ought to practice only in one style, for only one style could he appreciate; Mr. Ashpitel's reply was expressed in the terms, "If I relish turtle, is that any reason I may not eat venison"? His liberal views on this point appeared to him to have gained much ground of late years.

I must not omit to record his minute and accurate knowledge of levelling, chaining, and mapping, land, and his facility in working the theodolite; his readiness in these matters was very remarkable, considering that an architect educated in London is not often supposed to acquire them, and the fact of his lameness might have excused him. He has often been out with Mr. Whichcord when surveying for railways years ago, and worked away at the instruments for days together for mere amusement. The elegance of each step of his mathematical investigations was remarkable. His creative faculties were less directed in the Fine, than in the Industrial, Arts: although he had as keen an appreciation of the beauties of nature as he had a quick sense of the ludicrous and sarcastic, yet painting and sculpture were not such familiar subjects in his talk as the rites of a printer's chapel, the mysteries of a shipbuilder's loft, the management of an estate, or the manœuvres of a builder's workshop. The bent of his inventive faculty seemed to be a rapid application of his familiarity with technical details; he made as little difficulty of entering into the confusing details of the balance sheet of a public company; as of explaining and exhibiting the use of a box of carpenter's tools to a lad to whom he had made a present of it. In his numerous important Rating, Compensation, Arbitration, and Professional cases, and when acting on Committees, this familiarity with dry details made very apparent its help to an understanding of the matter under investigation; assisted as it was by his clear insight into a case, his strict impartiality, and his unmoved temper. His knowledge of theoretical and

practical construction was highly prized; it was useless for a builder or workman to try to dispute a point with him, for he was as ready to explain what he meant, as to show practically how the work should be done if there was any appearance of not understanding what he meant. It was a source of great regret with him that the tenor of the education in and out of offices, was now more for artistic, than for practical, qualifications. No one knew better than himself the value of the former; but he always maintained that in the present day it was placed in too exalted a position by many of his confrères, and tended, by the lack of information it too generally entailed on the student, to place the designer in an inferior position to the constructor or builder in the mind of the public. His brother writes to me, "Mr. Ashpitel was essentially practical, although he greatly disliked the modern use of that word as it is employed to prefer mere mechanical expertness above theoretical science, whereas perfect practice, he maintained, must be based upon true theory. With this opinion, I think, we may connect his great interest in the Voluntary Examinations."

He spoke with precision, and generally with fluency, in public. "Mr. Ashpitel," wrote the editor of a Journal in 1849, "is one of the few architects to whom a Latin charter is no obstacle in an enquiry; and he speaks fluently and well." The strong memory which he retained through life gave him a remarkable facility of quotation in illustration of any subject of conversation, and he was always ready for any discussion: whether it was to suit the intellect of the boatmen when out for a sail at Ramsgate; or that of the agricultural labourer when receiving a prize from his hands at a Local Exhibition; or the encouragement of a junior member of the profession; or the exigencies of eminent members of our Art; it was always the same clear mind that expressed itself in language suitable not only to the occasion, but to the individual whom he had to address. Professors of the various Sciences found in him a conversible companion, who understood their terms and phrases, and could give valuable assistance in an adjudication upon a theory, an experiment, or an operation.

Nothing perhaps could illustrate more clearly the variety and extent of Mr. Ashpitel's scholarship, than the numerous articles on every variety of subject, which he contributed to that very useful journal "Notes and Queries." These comprised Classical illustrations and allusions; popular manners, customs, and supertitions; English and Italian art; archæology; Early English literature; discoveries, &c.; and indeed on every point of literary interest, the well-known "A. A. of Poets' Corner," was ready to put forth some curious note, suggestive query, or instructive reply. These contributions, supplied almost weekly for so many years, even whilst laid up at Ramsgate, would form of themselves, a very interesting volume.

Mr. Ashpitel has himself so well expressed what is expected of an Archæologist, that I may be pardoned for quoting a somewhat long paragraph. "The pleasure of antiquarian research, particularly into those matters which relate to architecture, is ever attended—as are most of the things which delight us—by some care. The fear that, after the most lengthened inspection, the most accurate comparison, the most careful measurements, the most laborious research among books and manuscripts, some little circumstance may have been overlooked, some short passage unnoticed, or some unusual character misread, gives anxiety and care to what otherwise is, to an educated mind, the most delightful as well as useful and instructive of human pursuits. It is for this reason we so frequently complain of the short period that has been allotted to our labours, and we wish we had more time to bestow upon them; not from habits of procrastination or irresolution, not by the way of excuse for the little we have collected, nor to form a graceful exordium to our address, but simply because we dread there is yet something behind we have not seen—some valuable fruit we have not plucked." To these appropriate remarks he subsequently added;—"Two great errors among architectural critics have been these: they have formed two distinct sections—the draughtsman and the black-letter man; the two qualities are

very seldom united in one person. The consequence has been, each party has brought preconceived notions to the field; and while one has laughed at the charter or chronicle as contradicting his views, the other has extended its evidence, and made it invade territories it never was entitled to possess." Mr. Ashpitel had a great repugnance to take anything on second hand authority. As one result, out of many, showing what may be obtained by a timely reference, he in his paper on Rochester Cathedral, noticed that "a curious mistake has crept into some books, and that is, that Prior Silvester built the refectory, the dormitory, and the hostelry; nothing can show in a stronger light the necessity of going to the fountain head, and consulting the original documents themselves. Only two words are omitted; but these make all the difference. Silvester did erect such buildings, but the MS. adds, "at Waletune"; and it then goes on to describe the works he directed at Rochester." Mr. Ashpitel quoted this discovery with delight. His pen was often in his hand for the pleasure of his young friends, as in writing a Valentine; or for his older friends (especially the "Cocked-Hat Club" of the Antiquaries), as in writing a doggrel account of a day's amusement in the country. He occasionally contributed an article on a subject connected with art or literature to the "Morning Post" newspaper: and was also a constant contributor, chiefly of metrical compositions both in English and Latin, to the pages of that anomalous publication "The Owl," nearly from its commencement, for which assistance he received from the proprietors, a short time before his decease, an acknowledgement in the shape of a very rare work of art, which he valued as a liberal donation for his literary exertions, as well as for its special merits. As far as I have been able to learn, he did not often contribute directly to the "Builder," or "Building News," but in one or other of them will be found many of his literary labours for the Societies to which he belonged. The authorship was transparent of a letter published in the "Builder," November, 1857, signed "Verax"; and as this met with a reply in a strain and with a title which he considered to misstate in a manner entirely unwarranted the views which he held, he was irritated, and could not refrain from writing a second admirable letter to demolish the misrepresentations of the previous writer, who I am sure, never subsequently experienced from Mr. Ashpitel any expressions of personal affront or injured feelings. These three letters are well worth the perusal of students, for the great research, practical character, and lively writing, displayed in them. Only on one other occasion did I ever hear him express himself annoyed, and in that case he was assailed for not having done something which he really had done; otherwise he was above the usual petty jealousies of writers, and always urged that all professional and literary men should "agree to differ" in their views. He had no jealousy in his disposition.

Of this great equanimity of temper, the best evidence that can be taken, is that of Mr. Edmeston who had known him for the twenty-five years Mr. Ashpitel had been in practice, during which time the most confidential and friendly relations had been maintained between them, although for many years disconnected in business; on quitting the bedside just before the final attack commenced, he could say, that no unkind word had ever been uttered; and that exceeding kindness of heart, great disinterestedness, and a disinclination to speak ill of any one, were main features of the character that had so long been subject to his close observation. "The high moral tone," writes Mr. George Dennis, author of "The Cities of Etruria," and an old friend of Mr. Ashpitel's, "which pervaded all his thoughts, words, and actions—such a combination of great intellectual powers, moral excellence, and attractive qualities of heart,—is rarely met with in this life; and his friends have the melancholy assurance that they will never see his like again. To myself his loss will create a blank I can never hope to fill." "Mr. Ashpitel," records Mr. Baily, "had a kind heart, and a most philanthropic disposition; he always took an opportunity to serve a professional brother, particularly if in trouble; his advice was always worth having. On the occasion of an accident in a large new building in the City, many years

ince, where a loss of life occurred, he immediately went to the spot and was engaged the whole of the lay and next night in assisting the architect by procuring scientific evidence of the causes of the accilent for the inquest which followed. This was only one of many such cases of assistance—and on those ccasions he would set aside profitable business of his own, with no other motive than to do a ind and benevolent action." He had cause to complain, however, that such exertions were not lways recognized.

He played well on the pianoforte, though very few of those acquainted with him were aware of t, for he never made a show of such talents; he revelled in the sublime conceptions of Beethoven, Mozart and Handel, of whose works he had a well-selected store. I have often been greeted, as an vening visitor, by a composition of one of his favorite authors, and the offer to continue playing is long as desired. Though quite able to improvise an accompaniment or a fantasia, he would rarely ave been asked to play a second time for a vocalist, as his hand was energetic and would have lrowned the song. " Once," writes Mr. Baily, " being in company with Mr. George Gilbert Scott, we were at Westminster Abbey examining that portion of the triforium known as the Muniment Chamber, which is over the eastern walk of the cloister; when on a sudden Mr. Turle touched the pedals of the organ in his best style. " What a grand *bass* that is," remarked Mr. Ashpitel, his musical feelings being influenced; " Yes," was the reply of Mr. Scott, thinking more of the architecture, " that *base* is remarkably fine, it girts nearly twenty inches." Music and books were his luxuries: he bought fine copies as if they were necessaries; had them bound for use; read and re-read them; and was extremely solicitous to obtain complete series of the writings of the authors in whom he delighted. It was this love of his library that greatly interfered with the necessary care of his health; he declined to accede to the recommendation of his physician made some time since to take a sea voyage, " for how could he go without his books." His movements were gentle, partly regulated by his lameness, which calamity may have perhaps been the cause of his choosing to have cats and kittens as familiar occupants of his studio rather than dogs: it was a similar partiality on the part of the Commendatore Canina that caused an early prepossession in each other's favour, which continued, as I have related, during the visit of the Italian archæologist to England. The difficulty of locomotion restricted his exercise in the open air, but he was enthusiastic in describing his pleasure in carrying a gun in a warren, and in steering a vessel. He delighted in boating, and wishing to promote the interests of the fisherman who generally assisted him, he made accurate drawings for a small vessel and astonished the man by the economy resulting from his drawing the sails to a large scale whereby the stuff was not cut to waste.

His features are left to us in an admirable photograph portrait taken not long since for exchange among the members of the Surveyors' Club, to which he had belonged for many years; and also in a medallion head executed at Rome by Signor Amici, sculptor to the Pope: his brother possesses a remarkably good portrait of him in oils by Frederick Walmisley, representing him sitting and sketching. Mr. Ashpitel left by Will his rare and valuable books (selected with much care and valued by him at about £3000.), with his collection of Etruscan and Antique Vases brought by him from Italy, to the Society of Antiquaries. To the National Collection at South Kensington he has committed the care of his two important pictures of " Rome." He was not unmindful of the Institute even in his last days, for he intended to found a prize to be called by his name; this object, members of his family have expressed a desire to carry into effect, as it is named in a document which he did not live to sign.

Such were Mr. Ashpitel's vigorous intellectual powers, pourtrayed in a faithful manner to the best of my ability, and such were their results in his short life of activity.

In closing this Memoir, I am tempted by some of his own *jeux d'esprit* to draw a "Morial" from his career for our benefit, and although I will not attempt to put it into verse as he would have done, I state my conviction that Ashpitel's error, after having suffered from the malaria, which he expected to outlive, was that of allowing his brain work to master the requisite care due to his infirmity.—That "Mr. Ashpitel sacrificed his life to his work" was the statement made to me by one in daily converse with him; work, whether bodily or mental, must have proper sustenance, the former without the latter is a certain premature decay. The death-ages of the members of his family led his friends to expect a longer life for him. It is, happily, unusual to feel that the death of a colleague is, for the time, irreparable to the surviving members of the profession to which we belong, and we soon find that the distinguished man whom we regret has left a post for which a successor can easily be found; but we must all feel that Mr. Ashpitel's loss to ourselves can only be expressed by the simple words, We have no one ready to take his place amongst us.

The PRESIDENT.—We have to thank our friend Mr. Papworth for an elegant memoir of our lamented fellow-member. I knew him for very many years, and I am sure not a word has been said to-night about him which we do not all re-echo with sincerity. His loss is a great one to me personally from the intimate acquaintance with him that I enjoyed. At the time of his decease I was myself ill, but I had a very kind letter from him, which, I believe, was almost the last he wrote. It was written from Ramsgate in a cheerful tone, and expressed a hope of recovery to his usual health, which hope, however, was unhappily not realised. It is a great gratification to have had placed before us such a memoir as we have heard of an excellent and distinguished man.

The usual vote of thanks having been passed to Mr. Wyatt Papworth, the meeting adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 24th May, 1869, E. I'Anson, Vice-President, in the Chair, the following paper was read :—

OUTLINES OF METRONOMY; OR THE SCIENCE OF PROPORTION.

By W. Cave Thomas.

The Science of Proportion is the master science, for being founded upon the fact that all knowledge is ultimately resolvable into the simple element of quantity, it gives us a power of analysis, and a grasp of understanding not otherwise attainable. I have called this science Metronomy—from *metron* (a measure), and *nomos* (a law). In my essay, the 'Holiness of Beauty,'* I attempted to trace the doctrine of measure in the Sacred Writings, and in that of the 'Science of Moderation,'† the metric principle in the larger phenomena of nature, as well as in ethics, politics, and education. I now return to that special department of the subject which led me to this extended investigation, the principles of art. It was in seeking some stable criterion of judgment in art, that I obtained the first glimpse of the metric principle of rectitude, and from that time to this I have given my best patience and powers of thought to bring the doctrine of measure or proportion into form. But it is one thing to perceive the truth, and another to communicate it. If, perchance, some of you may have read my previous attempts to elucidate the subject, and thought them obscure, perhaps this lecture, which deals with those first thoughts and principles which induced me to devote so much time to the investigation, will be more intelligible. I am fully aware that those previous essays were very imperfect, and that an inverted order of developing the subject has been pursued instead of the right, so that this portion, which should have been first, is last completed; and instead of forming the introduction, takes the place of a final chapter, or conclusion.

It was a fundamental conviction with Socrates that it is impossible to start from one true thought, and be entangled in any contradiction with another true thought; knowledge derived from any one point, and obtained by correct method, cannot contradict that which has been obtained from any other point. "Man is the measure of all things," said Protagoras; "and, as men differ, there can be no absolute truth." "Man is the measure of all things," replied Socrates; "but descend deeper into his personality, and you will find that underneath all varieties there is a ground of steady truth. Men differ, but men also agree; they differ as to what is fleeting, they agree as to what is eternal. Difference is the region of opinion; agreement is the region of truth: let us endeavour to penetrate that region."

If men were perfectly rational, logical beings, the progress of truth would be uninterrupted; but being for the most part influenced by passion, and prejudice, they are more often swayed by rhapsodical sophistry than science and wisdom. Through what ages have men affirmed that "order is Heaven's first law," and almost with the same breath maintained, unconscious of the inconsistency, that if there be one evidence of genius stronger than another, it is the want of that very order, balance, or moderation

* The 'Holiness of Beauty; or the Conformation of the Material by the Spiritual.' F. S. Ellis, 33, King Street, Covent Garden.

† The 'Science of Moderation.' Messrs. Smith, Elder and Co., Cornhill.

affirmed to be the principle divine; have they insisted that genius is heaven-born, whilst admiring some favourite impostor's defiance of, and revolt from all rule.

The great philosopher we have just quoted, thought it a kind of impiety to importune the gods with our inquiries concerning things of which we may gain the knowledge by numbers, weight, or measure; it being, as it seemed to him, incumbent on man to make himself acquainted with whatever the gods had placed within his power. And a writer in the 'Philosophical Transactions,' in a somewhat similar vein, says,—"There are very few things which we know, which are not capable of being reduced to a mathematical reasoning: and when they cannot, it is a sign our knowledge of them is very small and confused; and where a mathematical reasoning can be had, it is as great folly to make use of any other, as to grope for a thing in the dark when we have a light standing by us." And Plato, with his grand contemplative intellect, appears to have caught a glimpse of the universality of proportional relation, possibly that quantity is the fundamental form of cognition; for when questioned as to what he conceived might be the occupation of a Supreme Ruler, he replied, "geometrizing continually." The deeper we study nature, the more conscious do we become of a measured order pervading the universe.

Language itself affords abundant evidence that we instinctively recognise quantity as the fundamental form of phenomena: for instance, in the constant recurrence of metric expressions in our spoken and written estimates of all kinds of existence. Take up any critical work, and you will soon light upon words expressing a quantitative estimate of error in excess or defect, on the side of the *too* little, or *too* much of what it ought to be, or of the right. All our adjectives, without being framed to a preconceived theory, but in obedience to the irresistible influence of the deep truth, recognise the necessity and universality of a quantitative estimate of nature by those degrees of comparison which enable us to express the much, more, or most, or the little, less, or least of a quality. And when these facts are pondered over and well considered, they lead to this great generalisation—viz., that all criticism is virtually an act of mental measuration, to the conviction that all exact cognition is quantitative, and therefore capable of being considered under the mathematical forms of measure and number, and that rectitude and error, beauty and deformity, discord and harmony, must have their special measures and numerical expressions. As, then, a quantitative estimate is inseparable from exact knowledge, we should expect to find, as we do, not only that the forms of language, but that science and commerce—anxious to be exact—are solicitous to obtain standard measures of weight, capacity, force, duration, &c., &c., and that the mathematics are the most fundamental and ancient of sciences. It is said the Chinese studied them B.C. 3000, and that they were taught to the Jews and by them to the Egyptians 2000 years before the Christian era. A table of square roots* was discovered incised on one of the slabs unearthed at Mossul. The balance, as typical of a measured adjustment, has been the emblem of justice from time immemorial. On the famous sarcophagus in the Soane Museum—supposed to be that of the father of the Pharoahs—men's merits and demerits are represented as being brought to the ultimate test of measure before the Supreme Judge. This shows the antiquity of the idea of proportion in connection with ethics. More than 500 years B.C. Pythagoras taught that numbers were the principles of things—that things are the copies of numbers. This would appear to me to be the doctrine of definite proportional relation distorted by tradition. Dr. Burney regards the story of that philosopher's discovery of the musical chords as a fable, yet it points to an endeavour to resolve harmony into definite metric elements. Mr. Lewes, however, in his Biography of Philosophy, thinks that Pythagoras did not merely regard numbers as the symbols of quantity, but as entities. This is possible, but Pythagoras

* Nimroud Antiquities, British Museum.

might nevertheless have had a just abstract mathematical conception of a pervading proportioned order in nature, such as that tradition attributes to him.

But not only do we find historical evidences of the antiquity of the mathematics, but of a period in which they appear to have been in the ascendant in the ruling of mundane affairs, and that ages before Vitruvius, Griffith, Hay, and others had turned their attention to the subject of harmonic proportion it had been thought upon and thought out. This is not said in disparagement of their labours, for the main fact insisted on by Vitruvius and Griffith is, that the ancients did possess a system of harmonic proportion. My own position, however, is this, that a science of proportion should be established on a more satisfactory basis than precedent, than conformity to ancient models. Among the Egyptian antiquities in the British Museum may be found diagrams of the proportions of the human figure,* as early as the 18th dynasty. Then, as bearing upon the same subject, turn to that remarkable passage the 13th verse of the 44th chapter of Isaiah, which virtually declares that the beauty of a man inheres in certain proportions; the passage has direct reference to plastic art, though that were the making of idols—"The carpenter stretcheth out his rule; he marketh it out with a line; he fitteth it with planes, and he marketh it out with the compass, and maketh it after a figure of a man, *according to the beauty of a man;* that it may remain in the house." And as showing the principle of measure extended in a remarkable way to public affairs in remote ages, we find King David trying his enemies by three standard measures. In the 8th chapter 2 Samuel it is recorded that "He smote Moab, and measured them with a line, casting them down to the ground; even with two lines measured he to put to death, and with one *full* line to keep alive." That is to say, those in excess or defect of an average or *full* standard were slain. This passage will be more completely comprehended by and by. There are many other important references to measure scattered through the sacred writings indicating the proportioned order of nature—that the winds, the mountains, the hills are balanced, and the waters weighed by measure. With these facts before us from the sacred literature, and a remote period of civilisation, Professor Smyth's theory that the pyramids were raised as indestructible exponents of a metric system appears to have a reasonable foundation.

In Classical Literature, too, numerous passages exist indicating a cotemporary, or more ancient metrological system—the famous "in medio tutissimus ibis," for instance; also the Ethics of Aristotle, in which the recognition of the mean, as the principle of rectitude, is the recognition of a quantitative or metric system of morality. It may be said that the Greeks only recognized the *mean* as a measure of rectitude in the same vague kind of way as the moderns; if so it must either have been a tradition of a more ancient science, or a partial perception of the truth. And we must recollect that Confucius, the Chinese philosopher had, centuries before Aristotle, entitled one of his essays upon morals, "The Immutable Mean." Later, we find Vitruvius professing a privileged insight into the metronomy of the ancients, but whose precepts appear, at present, without some connecting link, or more fundamental principles, to be merely conjectural; and whilst vaguely hinting at common harmonic principles governing music and architecture, really gives no sound scientific exposition of their connection. The subject of harmonic proportion, from the time of Vitruvius, remained stationary through centuries; with the revival of learning, and of the arts, came occasional works on the proportions of the human figure—one, if I remember rightly, by Albert Durer. These were, for the most part, founded on the Vitruvian tradition, or on measurements taken from the antique. The most important and concluding work of this series would, perhaps, be that of the Père Bouffier, which, I regret to say, I have not yet seen. My only knowledge of its existence is derived from a note of one of Sir Joshua's lectures.

* Figured in Lepsius's Auswahl.

Within the last twenty years, however, a current has been gradually setting towards a metrological investigation of the principles of beauty, and, looking at the scientific tendency of the age, the wonder is that it has not shown greater volume, and that such efforts should not have been more popular. Day by day every department of inquiry is being subdued to quantitative estimate, and brought within the domain of measure and number—astronomy, music and mechanics long since, and, gradually, chemistry, light, heat, sound, and even the subtle electricity. Then look at the activity of mechanical invention in respect to meters of various kinds, too numerous to mention, not only in the familiar forms of barometers, chronometers, thermometers, &c., but others of a different kind, exceedingly delicate and sensitive. It may be said, indeed, that the common occupation of all the scientific men of the day is that of measuring and numerically recording. I say, witnessing this metrological tendency of science, and knowing that most thinking men affirm that order is heaven's first law, it does appear strange that we should not have made greater efforts to comprehend the order and measure of that beauty which is also affirmed to be a principle divine. Let it not be said that this subject is not one with which science can dare to meddle. The metric principle of beauty is distinctly affirmed in the sacred writings, and we also know that the same principle has been successfully applied to a higher subject than art, that of morals, by Aristotle, and that his Ethics have remained a text-book in the great schools since the revival of learning.

Before the theory of light and colour was placed upon a sound basis, pictorial art had some pretext for claiming exemption from scientific analysis—mathematical investigation. Architecture, I believe, never made such a claim, but now that colours are known to be dependent on the number of vibrations affecting the retina in a given time, the last innermost line of excuse is levelled; for configuration, form, was long since perceived to be mere relative extension or proportional relation. It is not the higher senses of sight and hearing which any longer defy a quantitative analysis, it is the lower—those of taste and smell. Would it avail in argument to bring this fact forward to convince you that these are, therefore, of a higher order than those already laid open to scientific scrutiny?

Then let us consider the last great generalization or hypothesis which finds favour with some of our scientific men. I refer to that of the correlation of forces, which assumes matter to have but three elementary properties—force, extension, and duration—which, in their infinite permutations, produce all the phenomena of light, colour, sound, heat, electricity, scent, flavour, &c. &c. Admit this hypothesis, and it necessarily follows that all our experience must be fundamentally quantitative, or of degrees of force, extension, and duration.

Let us, however, analyse the experience we derive from each sense separately, aided by the inferences derived from general observation.

The sense of Sight. Of course we do not see the things, the noumena, themselves, but an impression upon the retina produced by a combination of rays of light modified by, and reflected from the object. These rays can only affect the retina in three modes: 1. The extent of surface on which they impinge; 2. The rapidity or force with which they impinge; 3. The duration of their action on the retina. Difference of colour is due to difference of vibrating force, and light and shade are due to the relative force of the rays reflected from the object. That which we call "form," is the general result of the reflected forces on the retina within certain boundaries, configuration, or limits. Every sensation of sight, therefore, is resolvable into the three elementary and quantifiable forms of force, extension, and duration.

The sense of Hearing. All impressions of this sense are resolvable into force and duration: the forces of impulse and vibration, and the duration of these upon the sense. The ear has, I believe, little if any sense of space; but of course force and duration are quantifiable.

The sense of Touch.—Impressions of this sense are reducible to the three forms of force, extension, and duration, and are, therefore, capable of being expressed in measure and number.

The senses of Taste and Smell. Here we are at present unable to trace the exact *modus operandi* of external agencies on the nerves; but this we do know, from the testimony of language, which must in some degree express our inner consciousness of results, that we do affirm flavours and odours to be *equal*, *more* or *less* pronounced and pungent, *stronger* or *weaker;* and that they last for a *longer* or *shorter* period of time. The quantitative estimate which we make of the experiences of these senses may, therefore, be received as testimony that these would also be capable of numerical statement, if we only knew the right means of obtaining an exact measurement of the operating forces. *We cannot, indeed, conceive of any change taking place in our sensible impressions apart from a quantitative change.* There are several remarkable passages in Aristotle which indicate a perception of this truth. Having passed the senses in review, he then touches on certain general questions relative to sensation, and of its divisibility *ad infinitum.* "If bodies are infinitely divisible, are the impressions they make on us equally so? The solution of these questions makes manifest why the kinds of colour, taste, &c. are limited, or finite. It is because in all things which have extremes there must also be intermediate points of limitation; now, contraries are extremes, and in all sensible impressions there are contraries, as white and black in colour, sweet and bitter in taste."

We have now analysed the five senses, and find that our ultimate experiences in each are capable of a more or less exact quantitative estimate; and if we attentively observe in what scientific men are most busied in reference to the phenomena of motion, light, heat, sound, electricity, &c. &c., with regard to the great planetary system itself, we shall find it to be measuring either force, extension, or duration. Nor can it be otherwise, for these are the elementary forms of our experience, and therefore of our ultimate knowledge of phenomena. Metaphysicians tell us that the two pure intuitions are space and time; but quantity is a form underlying both, and therefore more general than either.

I may now, I think, venture to affirm with confidence the general proposition with which I opened this discourse, viz. that quantity is the fundamental form of consciousness, all criticism virtually an act of mental mensuration; that right and wrong, beauty and deformity, harmony and discord, must have their measures and numerical expressions; and that all exact knowledge will ultimately be a branch of one great science—Metronomy.

"But it is not merely in preserving us from exaggerated impressions that numerical precision is desirable. It is the very soul of science; and its attainment affords the only criterion, or at least the best, of the truth of theories and the correctness of experiments. Thus, it was entirely to the omission of exact numerical determinations of quantity that the mistakes and confusion of the Stahlian chemistry were attributable,—a confusion which dissipated like a morning mist as soon as precision, in this respect, came to be regarded as essential. Chemistry is, in the most pre-eminent degree, a science of quantity; and to enumerate the discoveries which have arisen in it, from the mere determination of weights and measures, would be nearly to give a synopsis of this branch of knowledge. We need only mention the law of definite proportions, which fixes the composition of every body in nature in determinate proportional weights of its ingredients."

"Indeed, it is the character of all the higher laws of nature to assume the form of precise *quantitative* statement. Thus, the law of gravitation—the most universal truth at which human reason has yet arrived—expresses not merely the general fact of the mutual attraction of all matter, not merely the vague statement that its influence decreases as the distance increases, but the exact numerical rate at which that decrease takes place, so that when its amount is known at any one distance it may be calculated exactly for any other. Thus, too, the laws of crystallography, which limit the forms assumed

by natural substances, when left to their own inherent powers of aggregation, to precise geometrical figures, with fixed angles and proportions, have the same essential character of strict mathematical expression, without which no exact particular conclusions could ever be drawn from them."

Having arrived at the general conclusion that all phenomena have their quantitative estimates and numerical expressions, the next step is to establish the abstract theory of quantitative relation, in order to bring all the relations of measure and number within the grasp of the understanding. This may, at first sight, appear to be hopeless, as it once did to me. But it may be easily effected. The very same process which enables us to enlarge, or diminish any work by scale*, also enables us to contemplate a miniature of the infinitude of quantitative relation. The theoretical foundation on which we work, in enlarging or diminishing by scale, is that of *the infinite divisibility of the unit*. I made use of this principle in the ordinary course of things long before I came to perceive that the variation of ratio, or the relation of two quantities to each other, has limits. This will become evident on careful consideration, for in executing a work of art to different scales, each scale, though of a different absolute magnitude, must clearly contain precisely the same *relative* proportions, or the work could not be enlarged or diminished at will. The following algebraical formula will, perhaps, better express my meaning; it is a formula which appears to me to be fraught with suggestions to the mathematician and physicist, as well as the artist.

The Limits of Ratio, or Proportional Relation.

The mean quantitative relation or ratio in that of equality; the extremes 1 and 0. For let $\frac{a}{2}=\frac{b}{2}$, and let $\frac{a}{2}$ increase as $\frac{b}{2}$ decreases by an infinitesimal quantity δ, till $\frac{a}{2}+n\delta=a$, and $\frac{b}{2}-n\delta=0$; then they will successively be to each other,

$$\begin{array}{ccc} \frac{a}{2}+\delta & : & \frac{b}{2}-\delta \\ \frac{a}{2}+2\delta & : & \frac{b}{2}-2\delta \\ \frac{a}{2}+3\delta & : & \frac{b}{2}-3\delta \\ \text{\&c.} & : & \text{\&c.} \end{array}$$

one half the terms being as much in excess of $\frac{a}{2}$, as the other in defect of $\frac{b}{2}$ or of $\frac{1}{2}$.

Cor. The tendency of proportional relation, or ratio, is either to parity or disparity, equality or inequality; these, therefore, are the only two possible tendencies of nature, and the above formula the universal calculus of quantitative relation between instances of the same kind.

You may have often been struck with the recurrence of the same proportions, or ratios, in an arithmetical progression. This, by the preceding formula, will always take place between the intervals which are duplicates of $0 : \frac{1}{2} : 1$; for instance.

$$\begin{array}{ccccccccc} 0 & : & \frac{1}{4} & : & \frac{1}{2} & : & \frac{3}{4} & : & 1 \\ 0 & : & \frac{1}{2} & : & 1 & : & 1\frac{1}{2} & : & 2 \\ 0 & : & 1 & : & 2 & : & 3 & : & 4 \\ 0 & : & 1\frac{1}{2} & : & 3 & : & 4\frac{1}{2} & : & 6 \\ 0 & : & 2 & : & 4 & : & 6 & : & 8 \\ & & \text{\&c.} & & & & \text{\&c.} & & \end{array}$$

* There is a board in the British Museum, prepared by a painter of XVIII. Dynasty, showing that this method was then in use—It has on it a Figure of Thothmes III. drawn to scale.

the middle term in each being to the maximum extreme as $\frac{1}{2}$: 1, and the three middle terms as 1 : 2 : 3. It is therefore clear that ratio is limited, and that whatever the value of the unit divided may be, whether 0 : $\frac{1}{2}$: 1, or 0 : $\frac{1{,}000{,}000}{2}$: 1,000,000, the division of the unit yields precisely the same numerical relations or ratios.

To illustrate this position experimentally—Let *ba*, *ac*, be two sides of a square formed by a string passing over a pulley at *a*, and let the side *ba*, decrease as *ac* increases; then by the time the end *b* reaches *a*, *ac* will be gradually increased to twice its original length, and *ba* will have successively been in every possible ratio to *ac*. or of the two sides of a parallelogram to each other—if not it is impossible for the two sides of a parallelogram to be in any ratio to each other,—which is absurd.

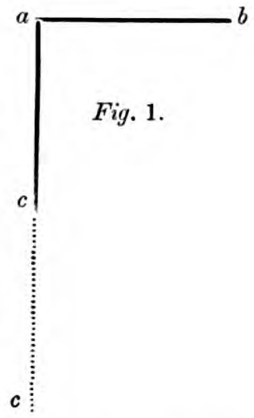

Fig. 1.

We have now reached a second stage of the inquiry, the first led to the conclusion that all our knowledge of nature is ultimately resolvable into quantitative relation, that quantity is the fundamental form of cognition. The second puts the entire compass of proportions before us. This compass therefore must be that of nature and judgment. The division of the unit gives the scale by which we measure the degree in which any phenomenon is manifested, and the calculus of ratio that by which to compare two quantities of the same kind.

Fig. 2 * gives another form by which the entire scale of quantitative relation may be illustrated. Let the maximum extreme represent unity, and imagine an *infinite* number of lines drawn parallel to and between it, and the minimum extreme 0, then these lines would represent every possible fraction or division of the unit. And if, starting from the mean, or $\frac{1}{2}$, we were to couple the corresponding terms on either side of it, these would be to each other in every possible ratio but that of equality; and it may be at once perceived that one half the terms are in excess, the other in defect of $\frac{1}{2}$: or, if certain intervals only in this gamut be represented, by an arithmetical progression, for instance, the following—

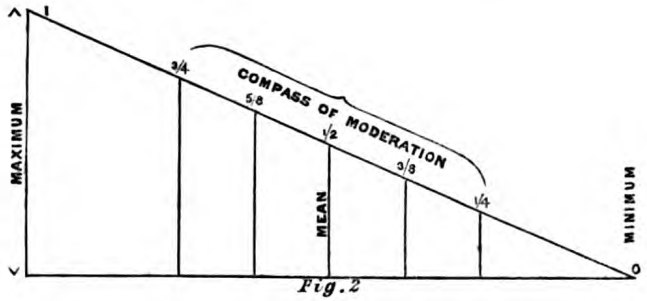

Fig. 2

Maximum 1, $\frac{11}{12}$, $\frac{10}{12}$, $\frac{9}{12}$, $\frac{8}{12}$, $\frac{7}{12}$, $\frac{6}{12}$ — $\frac{6}{12}$, $\frac{5}{12}$, $\frac{4}{12}$, $\frac{3}{12}$, $\frac{2}{12}$, $\frac{1}{12}$, 0 minimum,

the sum of every corresponding pair is $\frac{12}{12} = 1$. These may therefore be called *compensating terms*, the one gaining as much as the other loses.†

Perhaps these scales will be better understood in their application to facts. Suppose, then, that 1 represent the maximum, and 0 the minimum of temperature in any locality, then the temperature of

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* A very similar diagram may be found on a papyrus containing a treatise on Geometry and Arithmetic, British Museum.

† This term will be better understood when we come to consider the law of compensation.

that place may vary as many degrees above as below the mean. The maximum we should call extreme heat, the minimum extreme cold. And we here perceive that the extremes and the mean of the manifestations of one kind of phenomenon are expressed by different terms; so, in ethics, audacity would be represented by the maximum extreme, courage by the mean, and timidity by the minimum extreme of the scale: as regards light and shade, extreme light by the maximum; half light, twilight, half tint, by the mean; extreme dark by the minimum. But there are many phenomena in which the minima can only be represented by an appreciable quantity; for instance, the minimum stature of human beings, suppose that to be 3 feet 6, the maximum 8 feet, then the mean would be 5 feet 9 inches. The readiest illustration of the variation of ratio as represented by the preceding calculus are the alternate changes in the relative lengths of the day and night. From the vernal equinox, or equality of day and night, the day gradually increases by as much as the night decreases till it reaches its maximum, the longest day; then declines by as much as the night lengthens till equality is again reached at the autumnal equinox, still declines to its minimum (the shortest day), and night attains its maximum. This is an epitome of the tidal action, or alternate ebb and flux of opposite qualities, which is alone possible in phenomena fluctuating within limits.

There is nothing more simple than the elements of this universal science of proportion, and nothing more difficult to apprehend in all its bearings, unless the limitations of quantitative relation be thoroughly perceived. The first important fact we have to keep steadily in view is, that the form of quantity underlies all our experience, all phenomena. If, then, we can delineate to the mind's eye a scale which shall represent the whole range of quantitative variation, the degrees of any quality may be represented by that scale, and what is meant by extremes, contrast, moderation, &c. explained by reference to it; for, from what we have previously stated, these words must imply quantitative relation, every aspect of which may be indicated on that scale. The extremes in the manifestation of any phenomenon are represented by the maximum and minimum; contrast certainly not by equality, but by great difference, and greatest contrast by greatest difference, or 1 : 0; moderation not by the extremes, but by the mean or mid-relations; unison not by extreme difference, but by equality, or an approach to equality; harmony not by great difference, inequality, or disagreement in proportions, but by an evenness of progression, or a restoration of balance by compensation. Having the compass, or, if you please to call it so, the gamut, of quantitative relation before us, the next step is to inquire if experience furnishes us with any formulated metric expression of rectitude of universal application. It does; and you will recognise it as one of the most ancient of scientific and guiding principles. It has come down to us unscathed through the ages, and is a household word. "Observe the *mean* in all things" is the form of its expression attributed to Pythagoras; "virtue lies in the mean," is the gist of Aristotle's ethics. "He that striveth for the mastery is temperate in all things," and "Let your moderation be known unto all men," are the expressions of the metric principle by St. Paul; from which we no doubt derive the aphorism in common use, "Moderation in all things." This is all very well as a principle of morals, you will perhaps say, but what has it to do with art? I will first of all beg you to note that it is the observance of the *mean in all things*, which is insisted upon by the deep reflective thinkers. But let us trace this doctrine awhile as upheld by some of our great writers. Turn, for instance, to Spenser's Legend of Temperaunce, forming the Second Book of the "Faërie Queene," which opens with the description of the beautiful and modest Medina, who impersonates the Golden Meane, and her two quarrelsome sisters; the latter representing the vicious extremes of excess and defect, who, in the poet's quaint language,—

"Strive her to banish cleane."

Pass on to Stanza 22 of Canto ix., where he commences his description of the House* of Temperaunce, and you may fancy you are reading a versified edition of some work on Harmonic Proportion, and unless you possess, or are given the clue, you will not have the slightest suspicion that Spenser is describing the human frame. It opens thus:—

> The frame thereof seemed partly circulare,
> And part triangulare: O worke divine!
> Those two the first and last proportions are;
> The one imperfect, mortal, foeminine;
> Th' other immortall, perfect, masculine;
> And twixt them both a quadrate was the base,
> Proportioned equally by seven and nine;
> Nine was the circle sett in heaven's place:
> All which compacted, made a goodly diapase.

Perhaps even after what I have just said, you will scarcely recognize the description of the human head in this stanza.† The whole of the Second Book is an exposition of the doctrine of proportion in reference to morality and beauty, so far as the mystical science of Spenser's day would permit. I could very copiously illustrate the doctrine of the *mean* from our earlier poets, but that I wish to preserve the scientific thread of my argument. We must not, however, leave the poets without noticing a very remarkable and decided passage from Dryden touching this subject. "There is," he writes, "a mean in all things, and a certain measure wherein the good and the beautiful consist, and out of which they never can depart." Hogarth and Reynolds as stoutly maintained the same principle, and I should have stated also the Père Bouffier, to whose work I previously referred. I will for the present only quote one terse sentence of Reynolds: "In creatures of the same species beauty is the *medium* or centre of all its various forms." After Sir Joshua, however, writers on æsthetics appear to have abandoned the metric principle of the good and the beautiful. One of our most esteemed authorities on art saw something absurd in the notion of beauty being the average of deformity, but this seeming absurdity vanishes as soon as we get an insight into the limitations of phenomena. It is, indeed, not a whit more absurd than that truth should be the average of every possible deviation from it, which is unquestionably the fact. And the recognized scientific method of getting at the truth is to obtain the average of a great number of facts, instances, observations. Beauty is to all possible human disproportion, or deformity, what truth is to every conceivable form of error on a particular subject. Let us see what a great scientific authority says upon obtaining the *mean* by averages. "But how, it may be asked, are we to ascertain by observation data more precise than observation itself? It is the number of observations which may be brought to bear on the determination of data that enables us to conclude the value of that which we do not see with greater certainty than that of quantities which we actually see and measure. Whatever errors we may commit in a single determination, it is highly improbable that we should always err the same way; so that when we come to take an average of a great number of determinations (unless there be some constant cause which gives a bias one way or the other) we cannot fail at length to obtain a very near approximation to the truth; and, even allowing a bias, to come much nearer to it than can fairly be expected from any single observation, liable to be influenced by the same bias."§

Although the aphorisms enshrining the immutable and golden principle of moderation must have

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* The metaphor of "The House," in Ezekiel, may have a similar interpretation.

† I directed the attention of architects to this passage, in a letter to the editor of *The Builder*, some years ago.

‡ That we find a more frequent reference to this doctrine in our early writers is to be attributed to the greater attention given in former times in the schools to the study of Aristotle's works.

§ Sir J. Herschel's 'Outlines of Astronomy.'

often fallen upon my ears, the great truth they contained, as great truths often are, till the gates of the understanding are opened by some fortunate circumstance, was passed by, if not quite unheeded, only partially apprehended and as of little account. I happened at last, however, to think of the mean while casting about for some stable criterion of judgment in reference to art, and the ultimate quantitative form of our cognition flashed upon me as the light of a new discovery, and from that time to the present I have been endeavouring to bring the scattered doctrine of proportion or measure into form. I am sometimes inclined to suppose that this doctrine was long preserved by the Freemasons, and perhaps may be still, as an esoteric doctrine not to be communicated to the uninitiated. But, on the other hand, it may be said, that all great truths loom out dim and shadowy long before they assume definite shape, or their great importance is recognized.

You will observe that thus far I have done little more than historically trace the testimony of the ages to the metric principle, and to the *mean* being the immutable measure of rectitude in all things. But when the full import and universality of this principle first struck me, I said to myself, "If this be the great central truth I conceive it is, the records of astronomical science will bear witness to it, and on referring to them I found numerous passages affirming its truth in the following form, viz., that whatever aberrations or perturbations take place in the solar system they are periodically compensated, so that its *mean* state is in the aggregate preserved. And what principle should we expect to find guarded and immutable in the universe but that of rectitude? This great law which obtains in the larger phenomena of the planetary system also holds good in the lesser systems of phenomena within it, so that we are forced to conclude that every species of existence fluctuates within fixed limits, and that the only two tendencies in nature are to parity and disparity. The whole history of the earth and animated nature shows the former to be the ordained progressive tendency.

We have now attained a third stage of our inquiry. 1st. We arrived at the conclusion that the fundamental form of phenomena is quantitative. 2ndly. We have formulated the limits of quantitative variation and relation. 3rdly. It was shown that the central mid point or mean in the scale of relation is the symbol of rectitude, of beauty, of the moral form or ideal, and the metric representative of that stable point of equilibrium which is steadfastly guarded from subversion in the aggregate of the fluctuations and perturbations of the solar system.

Having surveyed the foundations of the science of Metronomy, let us turn to the current notions obtaining in regard to the proportions of the human figure. We have, as you are all aware, a set of traditional proportions* of eight heads, ten faces, &c. &c., but what surety have we that these are right? If they have been derived from the antique statues, we have, it is true, the warranty that they are the measures of what have been esteemed for ages perfect works.† This is, however, insufficient data for science, for it is well known that the eye and the ear may be so demoralized by a prejudiced habit, that ugliness may pass for beauty, and discord for harmony. But we can use the method of average to determine the true proportions of the human body with safety, because we know to a mathematical certainty that if our measurements be obtained from a great number of instances, individual, excessive and defective proportions will neutralize each other, and give us a close approximation to the mean, central, or ideal form. We cannot work out the human form, as many writers on aesthetics appear to think, from our moral consciousness, as it is humourously said the German did the Camel. The human form varies within certain limits, some individuals exceed in some, and fall short in other forms and qualities of the perfectly balanced mean. No proportions of the human figure can be relied upon which have not been derived by the scientific method alluded to. It is true the trained eye is, to a

* *Vide* Proportions of the Human Figure, according to Vitruvius, at the end.

† The Egyptians and the Greeks had several canons of human proportion.

great extent the meter of its experiences, and that it naturally averages, and rejects excess and defect. But in all branches of knowledge there is considerable advantage to be derived from possessing fixed standards for general reference. Then if we turn to works on architectural proportion, it does not satisfy the demands of scientific inquiry, though it were proved that certain famous structures were conformed in some way to the circle, the square and equilateral triangle, to be told that they were so conformed because these are the most perfect figures. We require to be informed why these figures have claims to be considered more perfect than the ellipsis, the parallelogram, or any less regular triangle. It is not satisfactory to say the circle, the square, and equilateral triangle are perfect figures, because they are. Let us, therefore, penetrate to the cause of this distinction. In the calculus of ratio we shall find that where variation is possible between two or more measures of the same kind, that equality is the mid or mean relation in which they may stand to each other. The circle has, therefore, been rated as the most perfect figure, because it is the very archetype of the mean, it is the very ultimate symbol of symmetry, and contains a greater amount of equality and including space, in relation to boundary, than any other figure. This equality and perfect symmetry gradually decline through the polyhedrons, to the square and equilateral triangle. There are, therefore, innumerable regular figures more symmetrical than the square and triangle, which are the least symmetrical of symmetrical figures. This is, perhaps, what Spenser means, when he says of the circle and equilateral triangle:—

"These two the first and last proportions are."

Of the regular solids, too, the pyramid and cube are the least symmetrical; the others the more so as they approach sphericity.

The only two possible tendencies in nature, as shown by the Calculus of Ratio, are to equality or inequality, to the symmetrical or unsymmetrical. This brings all discussion to a simple issue—Which is the Right, which the Wrong tendency? Which the tendency to Beauty, which to Deformity? Which to Harmony, which to Discord? All investigation on the subject of progressive development points to an advance towards equalization, or symmetry in nature. Man stands, with reference to animate creation, in the same position as the circle or sphere to geometrical figures: he is the most equalized in his organization, and is himself in the greatest perfection, when most symmetrical and balanced in his whole nature. All works of art, therefore, as all the works of nature must necessarily have a certain degree of relation or analogy to the circle when they are symmetrical, or *vice versâ*, become symmetrical when they are in some way conformed to the circle.

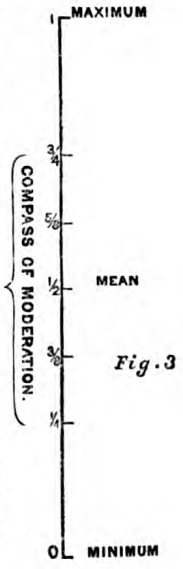

Fig. 3

But there are men who would fight to the death against the principle of equality, and yet repudiate the principle of disparity. Is there no argument to mitigate the idea that a final state of symmetry is that to which nature is tending? Is there no escape in a permissible moderate variation from absolute perfection? It is thought that there is—viz., variation within the compass of moderation, or half-way on either side of the mean towards the absolute extremes of excess and defect. Let 1, ¾, ½, ¼, 0 represent the principal points of the scale of variation. Then 1 will represent the maximum of excess, 0 the extreme of defect; ½ the mean of perfection; ¾ and ¼ the limits of moderation. We have then three distinct proportions within the compass of moderation, viz. 1 : 2, 2 : 3, 3 : 1—and if two other intermediate points be taken at ⅜ and ⅝, we have eight different proportions within its limits, that is to say 1 : 1½, 1 : 2, 2 : 5, 1 : 3, 3 : 4, 3 : 5, 4 : 5, 5 : 6. One to two* is, I know, a recognized architectural proportion; it is

* There are three figures whose axes are in this proportion—the ellipse, rectangular parallelogram, and lozenge of mean variation.

the relation of mean variation, and of the octaves of music. And I should observe here, if I have not already called your attention to the fact, that the same scale of quantitative variation appertains to all fluctuating phenomena, either absolutely or fractionally, so that it would not be strange if correspondencies were to be discovered in the harmonies of the different arts; indeed, in the harmonies throughout nature. It is no longer a fanciful analogy between the arts of music, colour, architecture, &c.; they are fundamentally identified in a common quantitative basis. Such, then, are the broad foundations of Metronomy, not only applicable to art, but to morals, politics, and education. But we must not leave these considerations touching the abstract principles of beauty without noticing the fact that the Great Architect had other objects in view than abstract beauty in the proportioned adjustment of animated being—viz., adaptation to special purpose. The porcupine, the gorilla, the hippopotamus, and many other creations, are all admirably adapted, proportioned to their different purposes, but are by no means beautiful. Beauty is a certain conformity to perfect human vision. Adaptation to purpose may be beautiful, as in the perfectly formed human being, but is not necessarily so. This is a very important distinction to be kept in view, or our ideas upon beauty get into inextricable confusion. Art can seldom absolutely adopt either of these principles, but has more frequently to effect a compromise between the desire for abstract beauty and the demands of adaptation to purpose, and to blend the useful with the beautiful. The mean, however, is equally the measure of perfection of the ugliest species of being as of the genus, or rather of a species *homo*; for in creatures of the same species "perfection is the medium or centre of all its various forms."

Sir Joshua Reynolds says—"To the principle I have laid down, that the idea of beauty in each species of beings is an invariable one, it may be objected that in every particular species there are various *central* forms, which are separate and distinct from each other, and yet are undeniably beautiful; that in the human figure, for instance. The beauty of the Hercules is one, of the Gladiator another, of the Apollo another, which makes so many different ideas of beauty."

"It is true, indeed, that each of these figures is perfect in its kind, though of different character and proportions; but still neither of them is the representative of an individual, but of a class. And as there is one general form which, as I have said, belongs to the human kind at large, so in each of these classes there is a common idea and central form, which is the abstract of the various individual forms belonging to that class. Thus, though the forms of childhood and age differ exceedingly, there is a common form in childhood, and a common form in age, which is the more perfect as it is remote from all peculiarities. But I must add, further, that though the most perfect forms of each of the general divisions of the human figure are ideal, and superior to any form of that class, yet the highest perfection of the human figure is not in any one of them. It is not in the Hercules, nor in the Gladiator, nor in the Apollo, but in that form which is taken from all, and which partakes equally of the activity of the Gladiator, of the delicacy of the Apollo, and the muscular strength of the Hercules. For perfect beauty in any species must combine all the characters which are beautiful in that species. It cannot consist in any one to the exclusion of the rest; none must, therefore, be predominant, that none may be deficient—A figure lean or corpulent, tall or short, though deviating from beauty, may still have a certain unity on the whole not unpleasing." And again in a letter to 'The Idler':—"The black and white nations must in respect of beauty be considered as of different kinds, at least a different species of the same kind, from one of which to the other no inference can be drawn." These passages express a wonderfully intuitive perception of the metric system, which only require a few slight verbal changes to make them complete. In nature, each individual of a species varies in some special way from its perfect type or central form. Now, if we attentively study the whole range of natural phenomena, we find that any departure from a *mean state*, either in living beings or other phenomena, is only

accomplished at the expense, or by the disturbance of, that balanced condition; that is to say, some particular organization, period of time, or locality, is over-endowed at the expense of some other organization, locality, or period of time. That a special excess in one direction should inevitably be accompanied by a special defect in another, in any species of phenomenon, is a necessary condition of the inexorable law of compensation which pervades nature, and to which I previously had occasion to refer, as that by which the constancy and immutability of the mean is maintained in the aggregate of variations and perturbations of the planetary system. And you will perceive in the scale of quantitative variation and in the calculus of ratio, that if each pair of corresponding terms on either side of the mean be added together, their sum will constantly be the same; that is to say, one gains on one side as much as the other loses on the opposite. This may perhaps be better illustrated by numbers arranged as below, the numbers on the left representing proportions in excess, those on the right proportions in defect of the mean, each excess being compensated by its special defect, and *vice versâ*, the mean in every case being constant.

Excess.		Mean.		Defect.
12	.....	6	.....	0
11	.....	6	.....	1
10	.....	6	.....	2
9	.....	6	.....	3
8	.....	6	.....	4
7	.....	6	.....	5

And thus we are enabled to have a harmony by the contrast of opposite proportions in colours, notes, magnitudes, &c., by balancing one extreme by its corresponding and compensating counterpoint, as well as by an even or tenor combination. And if we wish to excite astonishment, to make a striking and unusual impression the principle of contrast is the only method. The proportions within the tenor of moderation are too even for this, and they who wish to astonish must leap the wholesome bounds of restraint, and bring extremes together in painting, sculpture, architecture, and music. But the effect is fatiguing, and this mode has but a temporary success, and passes as a fashion. It is because this self-same law of compensation obtains in human nature that we confidently predict that people whom we see running to one extreme will at some time or other be found hurrying to the opposite. It is astonishing how easily one traces the correspondencies throughout nature when once the scales of variation and ratio are thoroughly understood. At present I purposely abstain from making a too minute comparison of the harmonies of all the arts, or from inferring that they are perfectly identical; this portion of the subject will require further investigation, and I will not indulge in fanciful analogies. For the present I shall be content if it should be found I have laid the foundations of the science of proportion on a rock, and traced the fundamental identity of all the arts in a quantitative or proportional basis.

Although it has been demonstrated that all phenomena have a quantitative basis, it is yet probable that the same harmonic proportions are not common to all, absolutely identical; that the special limitations of each has with certain correspondencies special concords of its own. The limits of possible quantitative variation lie between 0 and 1, but the limits of musical harmony would appear to lie only between a section of that scale—viz., the ratio 1 : 2.* Sounds of which the vibrations in the same period are in this ratio are regarded as identical; but the two sides of a parallelogram differing in the same proportion do not appear equal, nor does such a figure produce the same impression upon the eye

* The ratio most easily recognised by the ear is that of 1 : 2 : 4 : 8, &c., that, namely, of the fundamental note to its octaves. Sounds of which the vibrations in the same period are in the proportion of 1 to 2 are so similar that they act on the ear only as repetitions of one another.

as a square. The progression of the octaves 1 : 2 : 4 : 8 : 16 : 32, &c., is mean progression; that is to say, there are as many degrees of gentler as abrupter progression, each term being the exact mean of that next succeeding it. 1 : 2, therefore, is in reference to gradation what the circle is to configuration —viz., the central form. To build the identity of the harmonies of music, form, and colour on their arbitrary division into three primaries, is to build, it appears to me, on a very unsound foundation. The harmonies of music and colour depending, as they both do, on the ratios of the vibratory movements of an elastic medium, may be very analogous. But if it be true, as alleged by some authorities, that the prismatic spectrum is composed of an infinite gradation of vibrations, and that its intermediate hues cannot be decomposed, all the colours of the spectrum are primaries,* and the combination of two of its so-called "primaries" to produce a "secondary" is a mere mechanical combination, like that of mixing two differently coloured powders. And as regards three primaries in form we might select the hexagon, the pentagon, and the square, with as much, if not more, show of reason than those generally proposed, because their number of sides are respectively 6 : 5 : 4, and numerically represent the ratios of a musical triad very agreeable to the ear. If, therefore, there is, as we fully believe, certain correspondencies between the harmonies of music, colour, and form, these will most probably be found to lie in the fact that a combination of certain ratios will produce a satisfactory result in either. Let us divide the unit into twelve, and take the regular combinations of numbers in twos and threes within the compass of moderation—

Maximum $1\ \frac{11}{12}, \frac{10}{12}, \frac{9}{12}, \frac{8}{12}, \frac{7}{12}, \frac{6}{12}, \frac{5}{12}, \frac{4}{12}, \frac{3}{12}, \frac{2}{12}, \frac{1}{12}, 0$ Minimum

Compass moderation.

This division of the scale yields the following triads, in which the middle term is the mean of the extremes in each combination—

3 : 2 : 1 : : 9 : 6 : 3
4 : 3 : 2
5 : 4 : 3
7 : 5 : 3
6 : 5 : 4 : : G : E : C
9 : 7 : 5
8 : 7 : 6
9 : 8 : 7
7 : 6 : 5

The ratios 4 : 5 : 6 are those of the fundamental note, third and fifth, or C, E, G—a combination which I have no doubt would be agreeable in the proportioning of a room.

The dual combinations within the same limits are the following:—

1 : 2 : : C : C^1
1 : 3
2 : 3 : : C : G
3 : 4 : : F : C & G : D
3 : 5
3 : 7
3 : 8
4 : 5 : : C : E
4 : 9
5 : 6 : : D : F
5 : 7
5 : 9
6 : 7
7 : 9
8 : 9

* "Lastly it must be remarked that the intermediate tints produced by the union of two prismatic colours can be resolved by means of the prism into their original elementary colours, but that the intermediate colours of the true prismatic spectrum cannot be decomposed any further by the prism."

In the preceding dual combinations there are several which will be recognised as agreeable both in music and form. I have shown below, from the table of the lengths and rate of the undulations of the rays which produce the different colours, that the extremes of the number of undulations in a second are as 458 : 727,* or rather within the proportions of an octave.

TABLE

TRIADS WITHIN THE LIMITS OF MODERATION APPLIED TO THE PROPORTIONING OF ROOMS, &c.

3 : 2 : 1†	4 : 3 : 2†	5 : 4 : 3
30 : 20 : 10	16 : 12 : 8	15 : 12 : 9
33 : 22 : 11	20 : 15 : 10	20 : 16 : 12
36 : 24 : 12	24 : 18 : 12	25 : 20 : 15
39 : 26 : 13	28 : 21 : 14	30 : 24 : 18
		G : E : C
7 : 5 : 3	7 : 6 : 5†	6 : 5 : 4
14 : 10 : 6	14 : 12 : 10	18 : 15 : 12
21 : 15 : 9	21 : 18 : 15	24 : 20 : 16
28 : 20 : 12	28 : 24 : 20	30 : 25 : 20
35 : 25 : 15	35 : 30 : 25	36 : 30 : 24
9 : 7 : 5	8 : 7 : 6	9 : 8 : 7
18 : 14 : 10	16 : 14 : 12	18 : 16 : 14
27 : 21 : 15	24 : 21 : 18	27 : 24 : 21
36 : 28 : 20	32 : 28 : 24	36 : 32 : 28
45 : 35 : 25	40 : 35 : 20	45 : 40 : 35

It will be seen that the extremes in none of these combinations exceed the ratio of 3 : 1, or the limits of moderation.

At the end an abstract will be found of the precepts of a writer on architectural proportion of the last century, who was deeply imbued with the conviction that the harmonic proportions of music and architecture should be the same. You will therein find the fanciful analogies which have been repeated, with slight variation, to the present day. The following is a quotation from the same author:—" According to Palladio, there are seven beautiful proportions, viz., a circle, a square, the diagonal of a square, a square and one-third, a square and a half, a square and two-thirds, and, lastly, two squares, and has given a section of each of those proportions, which, *though different from the rules I have laid down, agree in the number seven*, and that the length of no room exceed a double cube, or what he there terms two squares; and with one observation worthy your notice, that the nearer a room (in particular a hall)

* If the number of the undulations of the rays which produce the different colours be arranged in the order of progression in which they stand in Sir J. Herschel's table, from the minumum to the maximum extreme, we have the following series:—Extreme red, 458, 477, 495, 506, 517, 535, 555, 577 (green), 600, 644, 658, 672, 699, 727 extreme violet, in which the sums of every corresponding or compensating pair on either side of the mean (green) are very nearly equal—viz., 1155, 1157, 1161, 1164, 1167, 1176, 1185. The 577 undulations (green) are to the mean of the whole as 577 : $583\frac{5}{14}$.

† 3 : 2 : 1, 4 : 3 : 2, or 9 : 6 : 3, 8 : 6 : 4, and 7 : 6 : 5 are triads in which the extremes are *compensating*, or their sums the same. A progression of forms in which the sum of the length and width is the same is always agreeable.

is to a square the more uniform and commodious it will be, though he, perhaps, conceals the reason why such proportions affect the eye and the imagination, which is only because they are such which nature herself dictates, unison being always harmony." You see this writer gives no solid reasons for such and such proportions; it is sufficient for him that his set of proportions and that of Palladio's, although differing in other respects, are the same in number as the notes of the octave. The passage concludes with the assertion of the general principle that "unison is always harmony." This is true in an abstract sense, equality being, as we have shown, the ideal of harmony, but absolute unison would appear to be a too perfect harmony for our present nature. The unison of the octaves in music and of the sides of a square or cube in form, if adopted in the dimensions of a hall, would be deemed by most critics too monotonous; the eye and the ear seem to require a departure from such absolute equality within moderate limits, or a breaking and restoring of equality or balance. And I believe that the triads derived from combining certain numbers, representing certain proportional divisions of the unit comprised within the limits of moderation, will be found more agreeable in the proportioning of rooms, &c. than any combination of the cube with its half, third, &c., or that of the double cube; the intervening mean suggesting that measure to the eye by which the two extremes in any of those triads could be equalized. The whole range of quantitative relation, however, is within your grasp to be examined, reasoned upon, and thought out for yourselves.

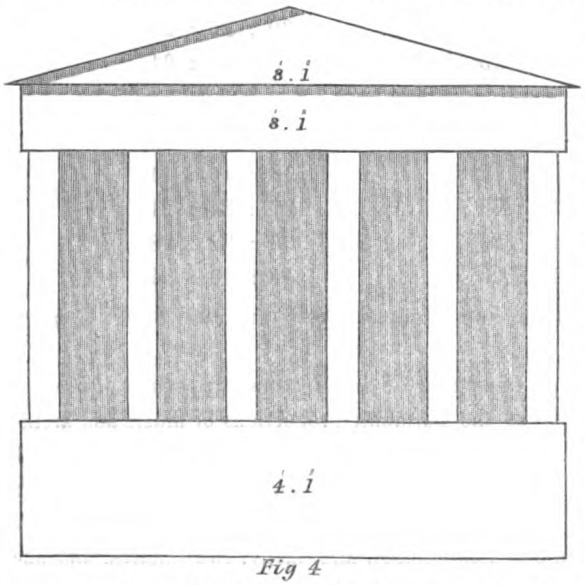

Fig 4

There is another matter to be considered in the proportioning of forms, viz., whether the proportions common to the human figure affect our sense so as to predispose us to repeat them in works of art. The proportions of the perfect human body are necessarily harmonious and beautiful to the eye; it is but to say that human vision and form are adapted to each other. Some architectural features should, perhaps, be proportioned in reference to this fact, for instance, a doorway. Though, if the Vitruvian canon of the human proportions be accepted, 4 : 1 the ratio of the sides of the parallelogram, which if adjusted to a man's greatest breadth, would just allow him to pass through erect, would appear too extreme to the eye, and it may be said that we do not estimate the proportions of the body in the gross in this fashion. Nevertheless, if the proportions of 8 : 1 and 4 : 1, those of the parallelograms which include the side and front views of a man, by this same canon be taken respectively as that of the column and inter-columnar spaces of a portico, and the variation in the *character* of the ratio differ as 8 : 1 and 4 : 1, or as 2 : 1, be observed in the principal divisions of the edifice, the result will be harmonious. Let the area occupied by the columns be as 8 : 16 (1 : 2) the frieze and entablature together 16 : 2 (8 : 1) the height of pediment to its length 2 : 16 (1 : 8), and the height of base 4 : 16 (1 : 4), &c. The foregoing remarks may serve to show that the subject of aesthetic proportion, as regards form, is complicated by the necessity there often is of rounding the edge of abstract reasoning with compromises suggested by mental associations, constructive necessities, &c. The eye may be regarded as the most perfect of the senses. It is the most symmetrical in its construction, its field of vision is a circle, and it takes in a

greater variety of impressions than either of the others; being thus, if I may so term it, the most cosmopolitan of the senses, it may be inclined not only to those proportions which are peculiarly human, but to the more abstract symmetrical forms. We know this to be the case, whether my reasoning may throw any light upon the subject or not.

In the progress of this investigation, whatever discrepancies may have been noticed as existing in the detail of the various harmonies, there are two important points which may be considered as established, viz., that our ultimate cognition in all the arts is quantitative, and that all experience points to the limits of moderation in proportion as the compass of rectitude and of enduring art. The following passages from Bishop Hall, and South, on "Moderation," might be translated so that the same metric principle underlying them would be equally applicable to the ethics of the arts as to human conduct:— "What is all virtue but a *moderation* of excesses? A *mean* that keeps the balance of the soul even, neither suffering it to rise too high on one side, nor to fall too low on the other." "What goodness can there be in the world without *moderation*, whether in the use of God's creatures or in our own disposition and carriage? Without this, justice is no other than cruel rigour; mercy, unjust remissness; pleasure, brutish sensualilty; love, frenzy; anger, fury; sorrow, desperate mopishness; joy, distempered wildness; knowledge, saucy curiosity; piety, superstition; care, wracking distraction; courage, mad rashness." Shakespere too bears witness to the truth and universality of the principle in many passages, for instance in his advice to the players, he says, "use all gently, for in the very torrent, tempest, and (as I may say) whirlwind of your passion, you must acquire and beget a *temperance*, that may give it *smoothness*" "Use all gently" that is the epitome of what the science of proportion teaches. The secret of all that is, refined in art, in conduct. And I believe the enduring charm of Grecian Art to be due to the observance of this metric principle, the classical always keeping within that temperate zone, the limits of moderation.

Many writers, I am inclined to think, believe that an intimate acquaintance with æsthetic science is absolutely necessary to make the painter, sculptor and architect; they appear to have some indistinct notion that this kind of knowledge is derived from something external and may be transferred to the artist's nature, they forget that it is not, as physical science, so much that of external things as of the impressions they make upon us, the relation of these impressions to our conscious self,—that æsthetic science is, after all, but the science of what our sympathies and antipathies, our likes and dislikes, our approvals and disapprovals should be; to arrive at this we have to eliminate all that is prejudiced and transient in this respect, in order to determine the normal taste of perfect human organization. If organization be perfect, taste requires little extrinsic aid. The great painters, the great colourists were instinctively right before any science of the harmony of colour existed. Nevertheless, as it is a human privilege to think, men not only desire to possess the instinctive appreciation of, but *to know* what constitutes harmony and beauty. Nor can there be effective art teaching without this exact knowledge, for the teacher is in a sense a physician who has to prescribe and cure, and to this end correct feeling is of very little use without perfect understanding. W. C. T., 1869.

ADDENDA.

Extracts from a work on Architectural Proportion of the last century.

"The ancients never exceeded three diameters intercolumniation, except in the Tuscan order; but then they never made it less than one diameter and a half, generally approving the mean between three diameters and one diameter and a half, or two and a quarter which was called eustylos, and appropriated to the Ionic order, the diastylos to the Doric and the systylos to the Corinthian"*

"If the distance or intercolumniation be three diameters, the column should be seven and a half or eight in height as the Doric, (dyastylos); if two and one fourth, the column nine as the Ionic (eustylos); if two the column nine and a half as the Corinthian (systylos)."†

"Nature has taught mankind in music certain rules for the proportion of sonnds; so architecture has its rules dependent on those proportions as are in arithmetical harmony, and those I take it are dependent on nature. The square in geometry, the unison or circle in music, and the cube in building, have all an inseparable proportion; the parts being equal, the sides, angles, &c., give the eye and the ear an agreeable pleasure; from hence may likewise be deduced the cube and a half and the double cube; the diapason and diapente, being founded on the same principles in music."‡

"From hence may be considered likewise the subduple proportions of 2, 3 and 4 and their duplicates, and 3, 4 and 5, likewise of 3, 4 and 6; all of which I propose to explain, and apply their uses to the external part of building; and it may be observed, that as these proportions have never been published with regard to building, I hope this application of numbers will be an agreeable speculation for your future inquiries."

"The cube should never exceed 50, the cube and a half 60, the double cube 80 feet front." "The cube of 50 feet front will of course have the same depth and height, fig. C. If the front of the cube and a half be 60 foot, the depth and height will both be 40, fig. D. The double cube of 60 foot front will be 30 feet in depth and height, fig. E.

"The arithmetical proportions flow in the same progressive channel; and are to be made use of as necessity requires, 4, 3 aad 2, with their duplicates, make an agreeable front. If the front be 60 feet, the depth is 45, and the height 30, as shown in fig. G. by dividing it into four the depth is 3, the height 2; or if it be an 80 foot front, the depth will be by the same rule 60 and the height 40 feet."

"The arithmetical proportion of 5, 4 and 3, if the front be 60 feet; the depth will be 48 and the height 36.—Or if the front be 80 feet; the depth 60 the height 48 feet."

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* These are nearly those of the three most distinct moderate proportions in the scale of quantitative variation—viz. 3 : 1, 3 : 2 : : 1 : 1½ and 1 : 2 (see pages 167 and 171), 3 : 1 is the extreme verge of moderate proportion.

† It does not appear possible to give any á priori reason for the proportion of a column, its adaptation to purpose being the sole guide to its dimensions.

‡ This is a sample of the combination of fact and fancy, of that vagueness so often characteristic of writers on this subject. As I have previously stated, I believe that a closer investigation of the subject will show that the harmonic proportions of music and architecture have both ratios of agreement and difference. It should be borne in mind, too, that the eye has a sense of space which the ear has not.

" The arithmetical proportion of 6, 4 and 3, will, if the front be 60 feet, give a depth of 40 and height of 30 feet—Or if the front be 90 feet, the depth 60 and height 45."

" As I consider there is an affinity between Architecture and Music, so I have produced the proportions in the table from the same rules. In Music there are only seven distinct notes, and in Architecture seven distinct proportions, which produce all the different buildings in the universe, viz., the cube, the cube and a half, the double cube, the duplicates of 3 : 2 : 1, of 4 : 3 : 2, of 5 : 4 : 3, and of 6 : 4 : 3 produce all the harmonic proportions of rooms.

" Let me, for example, propose a building whose principal floor is 12 feet high, how to proportion the rooms by the preceding rules :—

" If the height be 12 feet.....	the cube will be.....	12 feet long,	12 feet broad.
	the cube and a half .	18 „	12 „
	the double cube.....	24 „	12 „
The duplicate of 3 : 2 : 1, if the height be 12 feet,		36 „	24 „
„ „ 4 : 3 : 2	„ „	24 „	18 „
„ „ 5 : 4 : 3	„ „	20 „	16 „
„ „ 6 : 4 : 3	„ „	24 „	16 „

" I shall only illustrate this rule by one example more, by supposing

" The height of story 18 feet ...	the cube will be.....	18 feet long,	18 feet broad.
	the cube and a half .	27 „	18 „
	the double cube	36 „	18 „
" The subduple	of 4 : 3 : 2	36 „	27 „
	of 4 : 4 : 3	30 „	24 „
	of 6 : 4 : 3	36 „	24 „
	of 3 : 2 : 1	54 „	36½ „

" Rule 1. To find the height of the opening of the chimney from any given magnitude of a room, add the length and height of the room together, and extract the square root of that sum, and half that root will be the height of the chimney."

" Rule 2. To find the breadth of a chimney from any given magnitude of a room add the length, breadth, and height of the room together, and extract the square root of that sum, and half that root will be the height of the chimney."

" Rule 3. To find the depth of a chimney from any given magnitude, including the breadth and height of the same, add the breadth and height of the chimney together, take one fourth of that sum for the depth of the chimney."

" Rule 4. To find the side of the square of a funnel proportioned to clear the smoke, from any given depth of the chimney, take three-fourths of the given depth, and that sum is the side of the square of the funnel. Observe only, that in cube rooms the height is equal to the breadth, and the foregoing rules are universal."

	Proportions of Room.						Chimnies. Broad.	High.	Deep.	Square.
Cube	12 feet high,		12 feet long,		12 feet broad		3 0	3 0	1 6	1 1½
Cube and half	12	„	18	„	12	„	3 3	2 8½	1 5¾	1 1½
Double cube	12	„	24	„	12	„	3 5½	3 0	1 7½	1 2½
The Subduple of 4 : 3 : 2	12	„	24	„	18	„	3 8	3 0	1 8	1 3
The Subduple of 5 : 4 : 3	12	„	20	„	16	„	3 5½	2 10½	1 7	1 2½
The Subduple of 6 : 4 : 3	12	„	24	„	16	„	3 7	3 0	1 7¾	1 1
The Subduple of 3 : 2 : 1 &c.										

A Table of Harmonic and Arithmetical Proportions, for Magnitudes of Rooms and Chimneys by Universal Rules.

		ROOMS.			CHIMNEYS.							
		Length.	Breadth.	Height.	Breadth	Height.	Depth.	Square of Funnel.				
The Cube.		12	12	12	3 0	3 0	1 6	1 $1\frac{1}{2}$				
		14	14	14	3 3	3 3	1 $7\frac{1}{2}$	1 $2\frac{1}{2}$				
		16	16	16	3 $5\frac{1}{2}$	3 $5\frac{1}{2}$	1 $8\frac{3}{4}$	1 $3\frac{1}{2}$	1st.			
		18	18	18	3 8	3 8	1 10	1 $4\frac{1}{4}$				
		20	20	20	3 $10\frac{1}{2}$	3 $10\frac{1}{2}$	1 $11\frac{1}{4}$	1 5				
		22	22	22	4 1	4 1	2 $0\frac{1}{2}$	1 $6\frac{1}{4}$				
Cube & a half.		18	12	12	3 3	2 $8\frac{1}{2}$	1 $5\frac{1}{4}$	1 $1\frac{1}{2}$				
		21	14	14	3 6	2 $11\frac{1}{2}$	1 7	1 $2\frac{1}{4}$				
		24	16	16	3 9	3 2	1 $8\frac{3}{4}$	1 $3\frac{1}{4}$	2nd.			
		27	18	18	3 $11\frac{1}{2}$	2 $4\frac{1}{2}$	1 $9\frac{1}{4}$	1 $4\frac{1}{2}$				
		30	20	20	4 $2\frac{1}{2}$	3 6	1 11	1 $5\frac{1}{4}$				
		23	22	22	4 5	3 8	2 $0\frac{1}{4}$	1 6				
Double Cube.		24	12	12	3 $5\frac{1}{2}$	3 0	1 $7\frac{1}{4}$	1 $2\frac{1}{2}$				
		28	14	14	3 9	3 3	1 9	1 $3\frac{3}{8}$				
		32	16	16	4 0	3 $5\frac{1}{2}$	1 $10\frac{1}{2}$	1 $4\frac{7}{8}$	3rd.			
		36	18	18	4 3	3 8	1 $11\frac{1}{4}$	1 6				
		40	20	20	4 $5\frac{1}{2}$	3 $10\frac{1}{2}$	2 1	1 $6\frac{1}{2}$				
		44	22	22	4 8	4 1	2 3	1 8				
Proportion. 4, 3, 2.		24	18	12	3 8	3 0	1 8	1 3				
		28	21	14	4 0	3 3	1 $9\frac{1}{2}$	1 4				
		32	24	16	4 3	3 $5\frac{1}{2}$	1 11	1 5	4th.			
		36	27	18	4 6	3 8	2 $0\frac{1}{2}$	1 6				
		40	30	20	4 $8\frac{1}{2}$	3 $10\frac{1}{2}$	2 $1\frac{3}{4}$	1 $7\frac{1}{4}$				
		44	33	22	4 $11\frac{1}{2}$	4 1	2 3	1 8				

		ROOMS.			CHIMNEYS.				
		Length.	Breadth.	Height.	Breadth	Height.	Depth.	Square of Funnel.	
Proportions. 5, 4, 3.		20	16	12	3 $5\frac{1}{2}$	2 $10\frac{1}{2}$	1 7	1 $2\frac{1}{2}$	
		25	20	15	3 $10\frac{1}{2}$	3 $2\frac{1}{2}$	1 9	1 $3\frac{3}{4}$	
		30	34	18	4 3	3 $5\frac{1}{2}$	1 $11\frac{1}{4}$	1 5	5th.
		35	28	21	4 $7\frac{1}{2}$	3 9	2 $1\frac{1}{2}$	1 $6\frac{1}{2}$	
		40	32	24	4 11	4 0	2 3	1 8	
		45	36	27	5 $2\frac{1}{2}$	4 3	2 $4\frac{1}{2}$	1 $9\frac{1}{4}$	
		24	16	12	3 7	3 0	1 $7\frac{3}{4}$	1 1	
		30	20	15	4 $0\frac{1}{2}$	3 $4\frac{1}{2}$	1 10	1 $4\frac{3}{4}$	
		36	24	18	4 5	3 8	2 $0\frac{1}{4}$	1 6	6th.
		42	28	21	4 $9\frac{1}{2}$	3 $11\frac{1}{2}$	2 $2\frac{1}{4}$	1 $7\frac{1}{2}$	
		48	32	24	5 1	4 $2\frac{1}{2}$	2 $3\frac{3}{4}$	1 9	
		54	36	27	5 5	4 6	2 6	1 10	
		24	16	18	...	...	...	...	
		30	20	10	3 $10\frac{1}{2}$	3 $2\frac{1}{2}$	1 9	1 $3\frac{3}{4}$	
		36	24	12	4 3	3 $5\frac{1}{2}$	1 $11\frac{1}{4}$	1 5	7th.
		42	28	14	4 $7\frac{1}{2}$	3 9	2 $1\frac{1}{2}$	1 $6\frac{1}{2}$	
		48	32	16	...	...	...	...	
		54	36	18	...	...	...	...	
Examples.		12	12	12	3 0	2 0	2 6	1 $1\frac{1}{2}$	1st.
		18	12	12	3 3	2 $8\frac{1}{2}$	1 $5\frac{3}{4}$	1 $1\frac{1}{2}$	2nd.
		24	12	12	3 $5\frac{1}{2}$	3 0	1 $7\frac{1}{2}$	1 $2\frac{1}{2}$	3rd.
		24	18	12	3 8	3 0	1 8	1 3	4th.
		20	16	12	3 $5\frac{1}{2}$	2 $10\frac{1}{2}$	1 7	1 $2\frac{1}{2}$	5th.
		24	16	12	3 7	3 0	1 $7\frac{3}{4}$	1 1	6th.
		30	20	10	3 $10\frac{1}{2}$	3 $2\frac{1}{2}$	1 9	1 $3\frac{3}{4}$	7th.

"The use of the Table. Let the given height of the room be 12 ft. to the inch and a half, the 2nd proportion, then you will find the breadth of the room 12 ft., the length 18 ft., and in the same line the proportion of the chimney, viz. 3 ft. 3 broad, 2 ft. $8\frac{1}{2}$ in. high, 1 ft. $5\frac{3}{4}$ in. deep, and 1 ft. $1\frac{1}{2}$ in. the side of the square of the funnel."

The same writer also gives the following rules for proportioning the lights to rooms:—"Multiply the length and breadth of the room together, and the product by the height; the square root of that sum will be the superficial area in feet."

"Example.—Suppose the dimensions of a room to be in the arithmetical proportion of 5, 4, and 3—20 feet long, 16 broad, and 12 feet high. The cube, or product of its length, breadth, and height multiplied together is 3840, the square of which is 62. The height of the story being 12 feet, divide the 62 feet into three windows, and each window should have 20 ft. 8 superfice, 6 ft. 5 by 3 ft. 2, or windows of two diameters."

PROPORTIONS OF THE HUMAN FIGURE, ACCORDING TO THE ANCIENT GREEK CANON,* PRESERVED BY VITRUVIUS. (*Lib.* 3, *Cap.* 1.)

"From the chin to the highest point of forehead $\frac{1}{10}$ of the whole stature. From the wrist to extremity of the middle finger $\frac{1}{10}$. The head from chin to top of scalp $\frac{1}{8}$. From top of chest to highest point of forehead $\frac{1}{7}$. To top of scalp $\frac{1}{6}$. From the centre of a line on a level with the nipples to top of scalp $\frac{1}{4}$.

* Supposed to be that of Polycletus.

" The face divided into three equal parts from chin to nostrils, from nostrils to between the eyebrows, from eyebrows to top of forehead.

" The foot is $\frac{1}{7}$ of the entire heigth. In the antique it is generally more than $\frac{1}{7}$, and less than $\frac{1}{6}$.

" The cubit $\frac{1}{4}$ (from elbow to end of middle finger.)

" Across the chest $\frac{1}{4}$.

" The width of the arms extended the same as height." *

Length of foot $\frac{2}{13}$ of entire height; depth of chest do. do.; depth from front of thigh across glutæus do. do.; depth of waist $\frac{1}{9}$ entire height (additions W.C.T.)

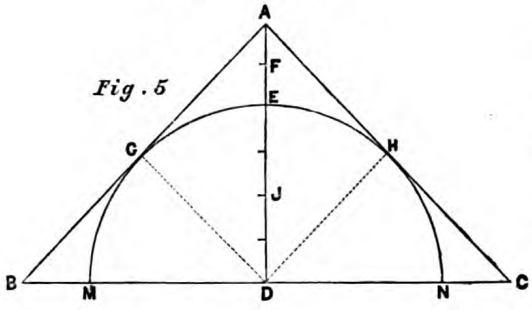
From ground to below knee, $\frac{1}{4}$; from this point to pubis, $\frac{1}{4}$; from pubis to level of nipple, $\frac{1}{4}$; from level of nipples to top of scalp, $\frac{1}{4}$; breadth of waist same as measure from navel to arm pit.

When arm is extended, hanging close to the side, the fingers reach to middle of second $\frac{1}{4}$ from ground, figure being erect; width of foot $\frac{1}{16}$ entire height.

Draw a right angled triangle, having the two sides, A B and A C, subtending the right angle equal to each other. From the centre D of the hypotenuse C B, join D A; with D as centre, and with the line D H, perpendicular to A C, as radius describe the semicircle M, G, H, N. Divide the radius D E into four equal parts; cut off from E A, E F equal to one of those parts.

GIBSON'S DIAGRAM.

Fig. 5



The diagram thus constructed contains all the principal proportions of the human figure.

1. The hypotenuse, or line C B, measures from the heel to the middle of the patella. From the middle of the patella to the superior spinous process of the ilium, and from the bottom of the abdomen to the pit of neck.

2. Either of the sides A C or A B measures from the instep to the bottom of the patella. From the top of the patella to the bottom of the pubis. From a little above the navel to the pit of the neck. From the knuckle of the middle finger to the elbow; and from the elbow to top of the shoulder.

3. The radius D E represents the length of the face, and the projection of the foot from top of instep to end of second toe.

4. The space D I (half the radius) will be the length of the neck from the top of sternum to chin.

5. The space D F represents the length of the head, from the chin at its junction with the neck to the top of the scalp.

VI. The line D A represents the length of the foot, measured from the heel to end of second toe.

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* These proportions have been derived from the careful work by Joseph Bonomi, Fellow of the Royal Society of Literature, and Member of the Syro-Egyptian Society, to which the reader is referred for further details. " The Proportions of the Human Figure, according to the Ancient Greek Canon, preserved by Vitruvius, Second Edition; also a Canon of the Proportions of the Human Figure, founded upon a diagram invented by John Gibson, R.A. With Description, Practical Application, and Illustrative Outlines. Chapman and Hall, Piccadilly. 1857."

† The Egyptians had at different periods three different canons; " One belonging to the most ancient Pharaonic Monarchy; another later than the twelfth dynasty, when Thebes first begun to flourish; a third which appears at first, in the time of the Psammetichi, with an entire alteration in the principle of the division, and which remained unaltered till the time of the Roman Emperors. The last is the same which Diodoros expressly mentions in his First Book."—'Letters from Egypt, Ethiopia and the Peninsula of Sinai,' by Dr. R. Lepsius. H. G. Bohn, London, 1853.

This diagram may be developed by dividing the centre height of the intended figure into 19 parts, and taking two of them as radius, as from the hypotenuse taken equal to the length of the leg, from the heel to the middle of the patella, and thus other portions of the body may be made the generating measure of the diagram. It is a singular coincidence that the ancient canon used by the Egyptians for the erect figure was divided into nineteen parts. The height of sitting figures fifteen of the nineteen.†

THE CHAIRMAN having invited discussion,

Mr. DAWSON, Fellow, said—The learned author of the paper has spoken of the perturbations of the planets, as an instance of the all-pervading law of compensation, or mean measure of proportion, for which he contends. I believe it is now generally understood that the present decrease in the variation of the compass from the true North point is attributable to the diminishing velocity of the earth round the sun. I should be glad to hear the views of the author as to the operation of the law of compensation in this instance:—If it is true that for many years past the velocity of the earth through its orbit has been diminishing, it is interesting to know the probable causes of the anticipated compensation for that annual diminution, and the probable period of its commencement.

Mr. CAVE THOMAS,—The compensation must take place at some time or other. I do not give that as my own experience, but as stated by Sir John Herschell. Lagrange demonstrated that whatever perturbation occurs in excess of a mean state, will at some time or other be compensated by an equal and opposite one in defect, that is to say the equilibrium will be restored. It is by such compensation that the stability of the system is maintained.

Professor KERR, Fellow, in rising to propose a vote of thanks to Mr. Cave Thomas, referred to the presence of Professor Ansted and the Rev. R. Burgess, who he hoped would favour the meeting with some observations; wherefore he would confine himself to a very few remarks. He was not one of those who are inclined to depreciate the endeavours of such thinkers as Mr. Thomas to penetrate into what he would call, not the unknowable, but more scientifically speaking the unknown: but although he would be one rather to encourage such efforts, yet at the same time he could not allow the lecturer to expect that architects, as practical men in the matter of proportion, dealing with it in their every day work, would be found to agree with all he had said, looking at his propositions as applied to architecture. Mr. Thomas's fundamental idea seemed to be to some extent identical with the hypothesis of that philosopher of the old Greeks, who started with "Number" as the essence of all things. Mr. Thomas did not expressly say so; but if they accepted this as being in another form a representative notion of what that gentleman had been teaching, they would not, he thought, be far wrong practically. At any rate he professed that the metric element lies at the root of all good. And, to persuade his hearers to entertain the principle, he first of all definitely quoted the ancient Greeks. That, Professor Kerr considered, was scarcely fair, because the Greek philosophy was well known to have been long obsolete—in fact superseded by a philosophy of an entirely different order. Therefore, when for example the proposition attributed to Socrates was quoted, viz.:—that it is impossible to start from one true thought and be ultimately involved in the contradiction of another true thought, Mr. Thomas must be asked to remember that modern science altogether repudiated such reasonings from first principles, *a priori*, unless previously ascertained to be laws by investigation *a posteriori*; so that even the most specious and apparently indisputable of such Socratic maxims were of no sort of practical value in discussions and inquiries of the kind in hand. However, having taken up the position that numerical correspondence is the essence or index of good and evil, Mr. Thomas did not attempt to test that dogma before going farther, but proceeded, quite in the ancient *a priori* manner to devise an entire system certainly somewhat skilfully elaborated, although not reduced to much precision of application, of which, it must be said

candidly that for want of being established on a proper basis at the outset, it remained unsupported to the end. It was no doubt true that the metric principle, as the most simple form of judgment, might be taken to bear a certain analogy to all kinds of judgment; in other words, our judgment of number must be so far similar to our judgment of anything else; and it might even be suggested with regard to the proportion of forms, that its utmost complexity is only similar to the complexity of algebraical equations; but certainly it did not follow that by accepting as a dogma the mere idea of metric proportion we could become capable of understanding the arcana of artistic philosophy. Therefore when the lecturer exhibited the shifting of one of two discs upward and the other downward, and thus showed that the pair were passing through a series of infinitely varied proportions, of course such was the fact; but what did it prove? Surely it could not be pretended to explain in any way what the meeting desired to know; namely, why it is that certain proportions are pleasing, and certain other proportions not pleasing. If Mr. Thomas were to point out a variety of ways in which two and two always make four, never more and never less, and to argue that upon some similar principle the mind perceived a similar relation in objects of form to that which the same mind perceived in such questions of numbers, perhaps most of the audience could follow him. For instance, as regards himself he had always held that the true rules or laws of proportion or form were to be found in arithmetical relations rather than in geometrical. But Mr. Thomas went in quite a different direction from this; he endeavoured to fix them to certain canons, which were not ascertained facts at all, nor even legitimate theories, but mere hypotheses, and after all by no means definite in their application; and therefore he called upon them to deduce with him a whole scheme of nature. Very likely his own vision travelled much farther over its accustomed field than the eye of another could follow; but at any rate he must not expect others to see with him that which in the ambiguity of language he was unable to render so clear as he could wish. Again, when he came to discourse upon the doctrine of The Mean, they were bound to tell him that that theory was an exploded one. It was very easy merely to affirm *a priori* that perfection lay in the mean, and having affirmed it to argue thereon. This had been frequently done before, and in various forms; and there was a certain analogical speciousness about all such principles. But coming to facts and to classified observations, they knew better. They actually ascertained that perfection was *not* in The Mean. They could not be mistaken about it. If we were to take a number of men at random, and to deduce the mean proportions of figure from those collected examples, he said the mean so obtained would assuredly not be perfection, but very far from perfection: and it was doubtful whether the extreme itself, in this country, at least, would be perfection. On the contrary the perfection of the human figure was a certain balance of proportions which was insensibly understood, recognised and appreciated by the intellect in consequence of a more or less large experience in the observation of that particular subject; and to say that all we had to do in order to arrive at perfection was to cast up as it were an arithmetical total and divide it by the number of instances involved in the sum, was an easy way of suggesting a plausible theory, but a most fallacious way of arriving at a reliable principle.* However he would give Mr. Thomas all credit for the efforts he was making; and even when such a thinker went so far as to profess to bring the principles of

* The doctrine of the perfection of THE MEAN, as I take it, is this. Given Perfection; aberration in any one direction is infinite; in the contrary direction infinite also; therefore perfection is the mean between these two infinites of imperfection. It needs no logical training to see that this involves a fallacy, and that, indeed, it fails altogether to attach to the assumed perfection any further warrant than the assumption with which it started. For example, take the case of the proper proportion of length between the head and the figure; to say that a collection of examples will produce a mean which will be found to correspond with our instinctive preference is well known to be a mistake: on the other hand, to say that the accepted head may be elongated and shortened to equal infinities, and that therefore this accepted proportion is the mean, would be equally correct, whether the proportion were one half or one twentieth.—R. K.

virtue and excellence of character into something like a metric system, he for one felt that he had no right to discourage him. Whether Mr. Thomas would ever be able to reduce one's behaviour to the rule of three he did not know. But there was another such theory, and still more incomprehensible, which had been started in this room a little time ago in a very bold manner. It was to the effect that a man's character was to be judged of by the quality of his art, and that a bad man never did make good art. The fallacy involved was obvious, and no one took the trouble to contradict it. This lecturer, however, was on superior ground: he did not outrage their feelings, even, if he started principles which they could not understand. He had great pleasure in moving a vote of thanks to Mr. Cave Thomas for his paper.

PROFESSOR ANSTED, Hon. Member. I do not feel that I have much to say upon a subject so large, and so difficult to bring to bear upon any points of practical utility. It seems to me that this great question of bringing the abstract laws of proportion, whether expressed in arithmetical or geometrical language, upon the practice of the fine arts and architecture, is one which may some day be of great interest, but which at the present moment can hardly be said to be sufficiently advanced to have practical importance. There is a time, no doubt, in the history of all art and science at which general principles—principles involving various departments of science and mathematics, may come into play; but that time is, I fear, distant. And if this is the case generally, it is much more so in the case of that science which relates to abstract numbers. I make these remarks without any special knowledge of the full meaning of the author of this paper, and because the subject suggested is too abstruse to follow by hearing the communication once read over. At any rate, I am sure that if there is anything of importance in it, it must be thought out carefully by subsequent consideration: still, from hearing the paper, it seemed to me that it afforded hardly sufficient grounds to justify the drawing of any general conclusions with regard to those views of proportion which have been put before us. We all know the general abstract rules which have been handed down to us from time immemorial, and we know the application of those rules in the ordinary way; but when we come to connect them with morals on the one hand, and politics on the other, and extend them to all other departments of knowledge, I repeat that I think we are not sufficiently advanced to be able to make general use of this abstract science of numbers as a principle to guide us. At the same time, like all metaphysical subjects, it is fascinating to those who pursue that branch of knowledge. As far as this Institute is concerned it is its duty to recognise any question which may bear upon the harmony of art, and in that respect the paper may be a help to those who think deeply upon the abstract elements of their science. As far as I am personally concerned, in my department of knowledge, though I do not quite see the application of it, I can, I think, perceive the direction in which it points, and the generalities to which it turns in connection with abstract science and physical science. We understand the laws by which certain forces in nature are exerted; we believe that there is a certain quantity of motion which resolves itself into force, and is developed in various directions. If you have it in the one case you have it not in the other, and this seems to me to be the point at which these relations, for the present, terminate. At the same time, as I have already said, to those of you who are in the habit of thinking upon abstract questions, and connecting them with art, it is well to know not only what were the views of Greek philosophers, but what is being done in modern times upon this subject.

The REV. RICHARD BURGESS, Hon. Member, made a few remarks upon the effect produced by architectural proportion, taking, for instance, the portico of the church of St. Martin's-in-the-fields, he did not think that the delight experienced by contemplating an object of that nature could be explained on metrical principles.

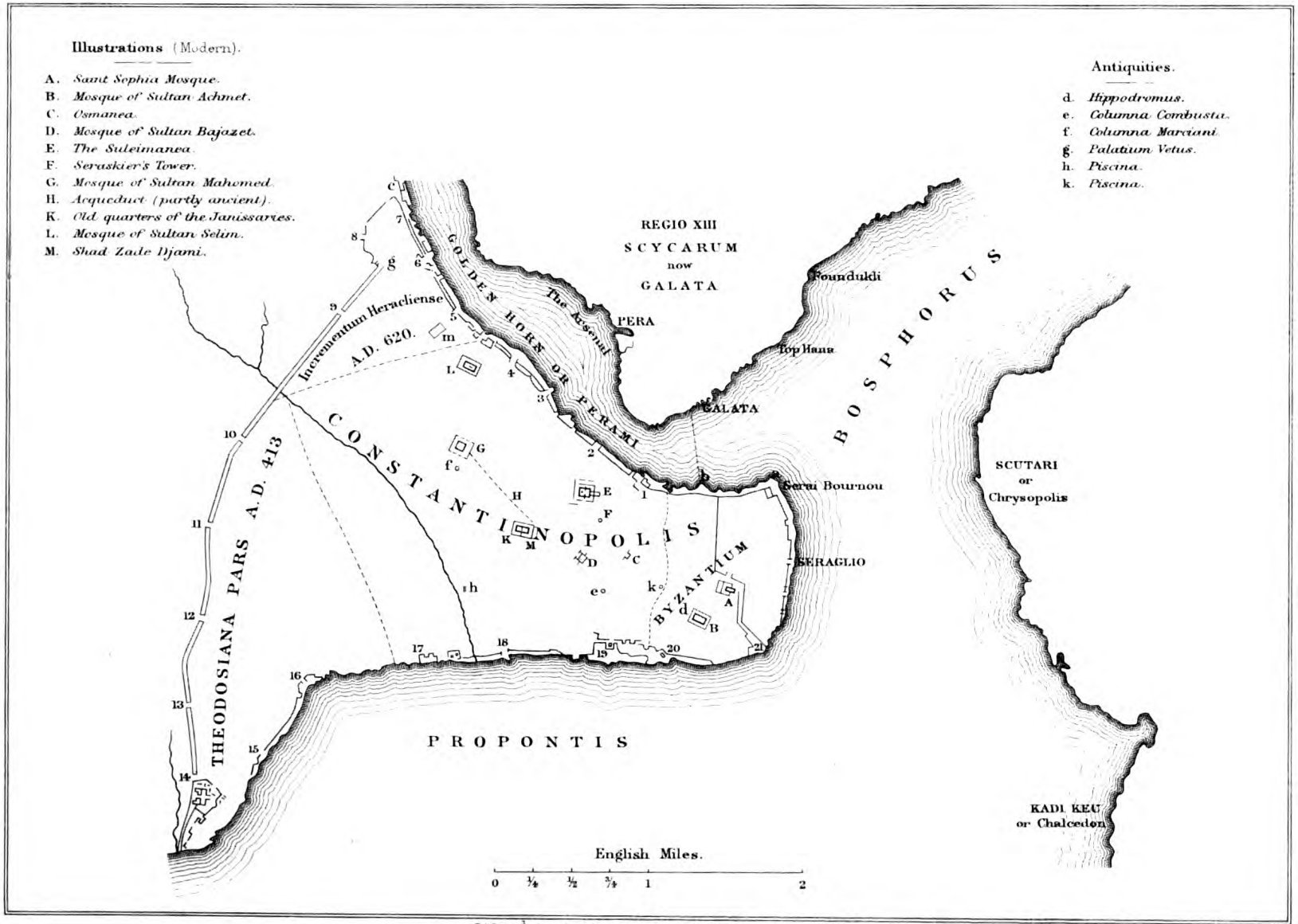
Mr. EDWIN NASH, Fellow,—If, Sir, you will allow one who knows nothing about the subject to

make an observation, I will say that I think there may be in this very learned paper much more than we at once perceive. The science of numbers has no doubt an intimate connection with æsthetic proportion. Of course it has—otherwise what is proportion? It lies in numbers, and those numbers are what we particularly wish to find out, and Mr. Thomas offers to us some means of ascertaining them. I remember that Professor Cockerell in his lectures at the Royal Academy some thirty-five years ago, in speaking of proportion, said that contrast of form and size was one of the great elements of beauty: he harped very much upon this, and indeed if we look at buildings of acknowledged beauty, we can see how accurate the observation was; for it is illustrated in all those buildings which we acknowledge as models. Two and two will not do as a beautiful proportion. We want gradation of size and change of form. Mr. Cockerell did not give rules for attaining these, though he gave numerous examples in which they existed, but I think it will be found that, in designing a building where you are left free (not in the ordinary exigencies of practice), but where you are free to make a piece of architecture—say for instance in a church, and in many other buildings, if you take some multiple of a fixed dimension you will at all events find it very convenient, and very often most conducive to harmony. Take some principal and essential part of a moderate size, and use it and its multiple in the various arrangements throughout your building, both horizontally and vertically, and I think it will generally be found useful in attaining a proportion that pleases the eye, and that it is also good, acoustically, and is likewise very conformable to what may be observed in ancient buildings which have been erected, and which are considered as fine specimens. I do not know whether the motion of Professor Kerr has been seconded, but if not I shall be happy to do so. I think the theory laid before us may be worked out to a considerable extent, though the mode of doing this appears to be somewhat hazy.

Mr. CAVE THOMAS said,—I rise to correct an erroneous impression of Professor Kerr's; viz., that I have been reasoning upon numbers. I thought I had sufficiently explained that I only regarded numbers as symbols. I referred in the earlier portion of my paper to the false hypothesis, supposed to have been enunciated by Pythagoras, "that numbers are the principles of things,"—"entities." My theory is not founded on a Grecian dogma, but upon a scientific analysis of the five senses; this analysis showed these experiences to be fundamentally quantitative. The limits of quantitative relation were explained, and all the variations of ratio experimentally demonstrated by this mechanical contrivance. If, therefore, good architecture consist in a combination of harmonious measures, all such measures must be represented by points somewhere in this scale of ratio; and not only these but every proportion in the human figure in the universe. I only profess to have laid before this meeting an outline, not a complete science. But having set before you the limits of proportional relation, you can reason upon this scale for yourselves, if my arguments should appear incomplete or inconclusive. I thank you for the patience with which you have listened. I know, full well, it is difficult to follow a paper on an abstruse subject like the present, and which I have, perhaps, made more tedious by the method of exposition.

THE CHAIRMAN,—The interesting paper just read and discussed is an excellent illustration of the wide range of subjects which are very acceptable and useful to us to hear and discuss. I quite agree with what fell from Professor Ansted, that this is a paper which requires a great deal more consideration than can be given during the reading of it. It treats of a subject which we may think over and reflect upon, and work out in our own minds, and thus it may be productive of beneficial results to all of us. I have great pleasure in conveying the thanks of the meeting to Mr. Cave Thomas for his paper.

The meeting then adjourned.



Lithog.d for the R.I.B.A. by Kell Bro.s London E.C.

TOPOGRAPHY OF CONSTANTINOPLE.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 7th June, 1869, Wm. Tite, M.P., President, in the Chair, the following paper was read :—

STAMBOUL AND THE BOSPHORUS.

By the Rev. Richard Burgess, B.D., Hon. Member.

It has been my good fortune for the last quarter of a century to obtain permission from this Institute to read papers on subjects chiefly illustrative of the topography and antiquities of Rome, occasionally, however, extending beyond the record to Greece and Egypt. The "Eternal City" still continues to furnish new materials for antiquarian research and the study of the fine arts; the discoveries on the Palatine Hill, and more recently on the site of the ancient Emporium under the Aventine Hill, the stores of precious marbles, which are perhaps destined to embellish a new city, must all come in time before this Institute, but no one would venture to undertake the task who had not first visited and studied the materials on the spot; until this should be my lot, I must seek another field for my antiquarian excursions. A sight of the Sultan as he walked up the Conservatory in the Horticultural Gardens, in the summer of 1867, suggested a thought. I wondered whether his Highness had ever been educated so far as to learn that his imperial city once had seven hills and fourteen *regiones* like old Rome, and whether he had ever been told that the Seraglio which stands on the Cape Demetrius is where the original Byzantium was founded 1227 years before the birth of Mahommed. Ever since these thoughts suggested themselves to my mind the idea of reading a paper at this Institute has followed me, and at length settled itself upon the topography and old walls of Stamboul and Bosphorus. I have once in my life carefully studied, by a personal inspection, the objects I purpose to bring into view; and although it is thirty-five years since I visited Constantinople and consigned my remarks to writing, nothing is changed in that metropolis of the east which will affect the description I have to give of objects either ancient or modern. There are, however, some other reasons to be rendered why at the distance of fifteen years I recur to a subject upon which I read a paper on the 26th June, 1854, at this Institute; it was entitled "The Topography and Antiquities of Constantinople," and that paper is now among your sessional archives. On that occasion I said that I left untouched for want of space many objects of classical interest, which an excursion up the Bosphorus to the Black Sea would bring into view, and I added that I might at some time be permitted to tell the Institute what I knew of the Thracian Bosphorus, and the fortresses on both sides of it, built by French engineers, during the latter half of the last century. I have lived to redeem that pledge, but there is another circumstance in the vicissitudes of human affairs which has induced me to return to an old theme. It is confidently stated that the old walls and gates of Stamboul are soon to disappear to make way for fortifications more adapted for defence, in these days of improvement in the art of destruction; and another generation will look in vain for the mural circuit of Constantinople, as it is connected with the history of the Greek Empire, and the dominion of the Sultans.

It seemed to me desirable if those old walls are to be 'dis-established,' and if Stamboul is no longer to remain in its present form, that a record of what the city of Theodosius was should be deposited in this Institute. And, accordingly, by a special license granted to myself that I might use this occasion for winding up the old gates and walls, a diagram plan has been produced which

will enable me to make the circuit of the city with more effect, and you to follow me with more pleasure. I do not use the word Stamboul from any affectation, but because it designates the city, to which I shall limit my description. Constantinople, in its full sense, comprises three cities. Constantinople proper which is *Stamboul*, *Galata*, and its appendages on the opposite side of the canal, and Scutari on the Asian side of the Bosphorus. I have therefore given as a heading to this paper, *Stamboul and the Bosphorus*. Before I proceed up the Bosphorus, I shall make a rapid circuit of the old walls. The space enclosed by those walls is made up of the sites of four cities. 1. The ancient Byzantium, which occupied no more than the promontory or Cape Demetrius. This was the city of the East, until Constantinople swallowed it up, after 1000 years' existence. Septimus Severus besieged it in his Eastern War against his rival Niger; the Roman antiquities were all destroyed, and Byzantium lay for many years in ruins. The space added to that occupied by the original Byzantium covered by Constantine forms the ancient Constantinople, which was finished and dedicated A.B. 334. The next addition was made by Theodosius, A.D. 413, and finally the increase made by Heraclius, A.D. 620. All these portions put together, give to Stamboul the form of a harp, the base extending from the canal (Perami) across the peninsula, four miles to the Propontis. If you will put the harp-shaped city in the position in which a harpist would place his instrument for action, the head or top would represent the Seraglio point, from which I propose to begin my circuit. There were anciently three gates at this promontory, but they were closed at an early period, and so they still remain; their original names are preserved, but I need only mention one, marked b, the Porta Navalis, called by the Turks Tchifout Capoussee; it was from this gate that the chain was suspended, which shut up the harbour, and effectually prevented Mahmoud II. in 1453, from forcing an entrance into the Perami Canal. I have now to enumerate the gates which opened upon the canal, most of which remain in the original position; some of them are closed, and I shall only stop at those which possess any historical or topographical interest. 1. The Gheme Iskeli, or Fruit Gate, anciently the πυλη καριβιων, or Gate of Boats. The name is significative, for it is still the principal landing place from the opposite Pera. 2. Anciently the Porta Farinaria, now closed. 3. The Glazier Gate, Turkish name, Djubali C. Number 4 is the πυλη αγια or Holy Gate, so called because it was the gate that led direct to the Church of Saint Theodosia. Then came 5, the gate of the Fanar, called by the Turks Petri Capoussee: this gate led into the quarter inhabited by the Greek Fanariotes; but the district was called anciently the Regio Petri; Mahomed II. (not being able to break the great chain drawn across the harbour) transported his light ships overland from the Bosphorus (ten miles) and launched them on the canal opposite the Regio Petri. There is some historical interest attached to this gate of the Fanar. At the siege of Constantinople, 1453, this gate was bravely defended by the Grand Duke Lucas Notaras, first minister of the empire; but his valour is overcast by his abject submission to the conqueror afterwards, in order to save his life. This gate, like all the rest on the port, is a narrow and low opening in the curtain of the wall, just within it stands the house of the Greek Patriarch, and the Patriarchal Church of S. George. In continuing our circuit we arrive at the Jews quarter, called the Balat, probably a corruption of the word Palatium, for the gate No. 6, which leads into it was formerly the βασιλικη πυλη, or Royal Gate. The next, 7, and last in this direction is the Haivar Hissan, anciently called the Cynegeton. It led, no doubt, as the name imports, to the amphitheatre; but I know of no history that is attached to it.

We now come to the line of walls which run across the peninsula from the harbour to the Sea of Marmora. There were originally eighteen gates in this tract of wall. These are now reduced to seven; of these seven the Chiloporta has only preserved the remembrance of its name in this remote quarter of the city, called the Blakernes. From the position where the gate is supposed to have stood, the trans-

verse direction of the walls begin. The gate anciently named Charsias, was succeeded by the present Egri Capoussee, No. 8. Not far from this are seen, in continuing our circuit, some high walls rising above those of the city, forming part of a large building. It is commonly called the Palace of Constantine, the construction is alternately courses of stone and layers of brick, very much resembling the city walls, where the name of Theodosius so constantly appears, and as this portion of the city lies beyond the limits of the city of Constantine, I shall take upon myself, until better advised, to call these ruins the Palace of Theodosius. It is at this point where the celebrated triple line of walls begins to be seen from outside the vallum. The inner wall is the highest, and at regular intervals is strengthened and defended by lofty towers, indifferently circular, square or octagonal. The middle wall is much lower, and the the towers less, being generally circular, the third or outer wall, with a battery running along the top; serves as the defence of the ditch that runs in front of it. The most picturesque views are often combined with the historical interest which a gate or a breach in the wall gives to them; and as we proceed, the adjacent country grows into a solitude as complete as the vicinity of the walls of Rome, rendered, however, more melancholy still by the cypresses which stand over the graves of thousands. The next, in this line, No. 9, the second gate which is now opened, is called in Turkish, Edrena Kapoussee Adrianople Gate, more anciently the Poliandron. It was here where the factions of the blues and greens under Theodosius the younger, had their fierce disputes about rebuilding the walls which had been thrown down by an earthquake, A.D. 447; but the succeeding gate, No. 10, called S. Romanus, invites us to stay for a few moments, before we pass on. It was at this gate where the heat of battle was which decided the fate of Constantinople. The Mahomedan Conqueror and the Christian Emperor came here into deadly conflict, and here the last of the Constantines bravely fought and fell; his body was found after some days' search under heaps of slain, and was only recognised by the silver eagles upon his slippers. The Turks now call the gate Top Capoussee, or the Cannongate. A little further on, and we arrive at the Mevlanè Yeni Gate, No. 11, anciently called Melandisia. The top of this gate is formed by a large lintel, on which is a long Greek inscription, not legible from below. On one of the two supports is a Latin inscription of some importance in verifying the age of those fortifications. The inscription implies that the walls were made by order of the Theodosius, whose name frequently occurs in the circuit. The great Theodosius having divided the Roman Empire between his two sons, Arcadius and Honorius, the former took the East, and was the father of Theodosius II.; but only twenty years elapsed between the death of Theodosius and the accession of his grandson. The intermediate Arcadius was a mere cypher. It is not unlikely that Theodosius the younger finished what his great predecessor had planned, and he gave him the honour of the work by leaving or inscribing his name on these existing walls. We may, then assign as the period when these walls were built, the beginning of the 5th century, so that we are dealing with antiquities of 1450 years old.* The Selivri gate, No. 12, anciently the Porta Quintii, and the Kapaneu, No. 13, or Porta Attali, will bring us to the Golden Gate, No. 14, enclosed within the awful Seven Towers. In the time of the Greek Emperors, there was at this extremity of the city a fortress called Cyclobion. The Porta Aurea, or Golden Gate, bears some indication of having been a triumphal arch, on the top of it stood a statue of Theodosius. This was thrown down by an earthquake, and was replaced by a statue of victory. The Golden Gate, which perhaps meant nothing more than the triumphal gate, was overthrown by the Latin armies which attacked the city, and was rebuilt by John Cantacuzene His son destroyed it again. It was in ruins for many years, but finally Mahomet II. rebuilt it in the same place, and added several towers. These are said to be seven; but from the inaccessibility to the interior of this huge fortress, the stranger must be content with discerning but four, rising high above the

* It is a singular coincidence of time and acts that while Arcadius saw these walls rise about 420, his brother Honorius was restoring the whole circuit of the walls of Rome under the care of his General, Stilicho.

walls, nor can he give any description of the Golden Gate, except that it stands between two large square marble towers, and is just to be descried between the trees which appear to flank it. The Greeks call this fortress Heptapirghion, the Turks, Yedi Kouleler, both acknowledging the popular number seven. One of the towers was the prison for refractory ambassadors, and many victims of Turkish jealousy, we may believe, have been sacrificed in this "Bastile;" but these things belong to history rather than to topography, and I must hasten to complete our circuit, which now runs along the shore of the Propontis, from the Seven Towers to the Seraglio Point. The gates occur in the following order :—

15. Narleu Capoussee, or the Gate of Bombshells.
16. Psamatia C———, the Sand Gate.
17. Daoud Pacha C.,* anciently S. Emilian.
18. Yeni Kapousse, New Gate.
19. Koum Capousse, Shingle Gate.
20. Tchtladi, anciently Condoscalia Porta.
21. Akbour, Stable Gate, which leads to the stables of the Harem.

Then begins the enclosure of the Seraglio. The water is deep beneath these walls, and is said to have received many a victim ; it reminds us of the canal beneath the prisons of Venice, which they say was used for similar deeds of darkness. In the cemented brick work near the Seraglio Gate, may be discerned the original work of Constantine. But the whole is a deformed mass of building. The towers are often built upon rows of columns inserted lengthways. Fragments of marble are seen among the ruinous heaps of building that have been destroyed by fire. Inscriptions are seen here and there inserted in the walls of houses which rise to a great height, "remnants of things that have passed away," unintelligible records of the Byzantine Empire. After this brief survey of Stamboul, I shall do no more than refer you to the diagram plan for the form and position of the two great suburbs of Constantinople. On the European side of the Bosphorus you have the Genoese city of Galata, with its old walls and towers still standing, and at two miles across from the Tophanè, you arrive at the Asiatic suburb of Scutari. Scutari, the ancient Chrysopolis, is said to be as large and populous as Smyrna; it is chiefly remarkable for its forest of cypresses, extending for some miles over the heights, which were once covered with the crusading armies of Godfrey de Bouillon. The celebrated view from the top of Mount Bourgaloue will amply repay the fatigue of pushing your way through the port, and toiling through the crowds of visitors to the Mussulman graves.

The second part of this paper is now to be occupied with the description of a voyage up the Bosphorus, and I purpose to leave some remarks I have in store upon the existing antiquities of Constantinople until I return from the Euxine Sea. The great stream of the Bosphorus, after flowing for a distance of twenty miles from the Black Sea, breaks with all its force against the Seraglio point, and distributes its waters into the Perami Canal and the Propontis. We embark at Tophanè in a light caique, and proceeding close to the European shore, soon pass Foundoukli, so called from a palace built by a wealthy citizen, under Mahomet IV., 1649-1687. Dolma Batchè, and its towering mosque arrest the eye. Near it stands the Kiosk of the Melons, attached to a favourite residence of Sultan Selim III. Below this was the ancient port of the Rhodians. Next succeeds the village Besiktash, so called from Hadgee Beshik, who originally formed the Janissaries into the Prætorian Guards of the Sultans. The village of Ortakeu is passed, and then succeeds the promontory of Defterdar, anciently called Clidion

There are seven acute angles or elbows in the Channel of the Bosphorus occurring between

* Capoussee or Kapoussee is the Turkish word for Gate.

Dolmabatche and the Black Sea; these give rise to as many different currents; the Defterdar promontory terminates the first bend of the canal, and in ascending we enter the great current, Μεγαρευμά. Gliding past the villages of Kourou Tzchesme and Ortakeū, we reach the promontory of Akindi, between this and Kislar Bournon, the ancient "Hermæum promontorium," the rapidity of the stream and collision of the waters have caused the Turks to name the current Sheitan Akendi, or the Devil's Race. Gyllius says that crabs are unable to advance against it, and are obliged to make their way over the rock. More anciently still, Dionysius of Byzantium bore witness to the force of this current. I can bear my testimony also, for I remember it was necessary that my light caique should be towed through the dancing waters until the retiring shore allowed the stream to settle itself under the heights of Bebek. Near the promontory of Kislar stands the Roumeli Hissar, or Castle of Europe, built by Mahomet II. in the middle of the fifteenth century; from a spot a little above the gate of this castle (called by the Greeks Neocastrum) to a place called Ciconium on the opposite shore is a distance of three-quarters of a mile only; it was over this strait that Darius threw his bridge, and from the promontory Kislar contemplated the passage of his army, and across this narrowest part of the Thracian Bosphorus the Crusaders passed from Europe to Asia. Directly opposite stands the Anatoli Hissar, or Castle of Asia, of about the same date as the one corresponding. The boatmen account this half way to Therapia. The current again beats strong against the quay of Balti Liman; here is the Portus Mulierum of Pliny. Why the Roman women should have had a harbour for themselves I cannot say. The nearest resemblance we have to it on our Bosphorus I take to be Billingsgate. But how different the scenery, for at the women's harbour it increases in beauty on both sides the Bosphorus. We come next to a large creek, anciently called the Gulf of Leostheneos, now Stenia or Stene. This is an excellent port, the hills rising above it encloses its bay in a perfect triangle; a river runs in at the vertex. There was a twenty-gun frigate lying at peace when I saw it. Neochori is a large village running towards the Yenikeu Bournou; this point was called Camarodes, from the arbutus groves near it. It was here where the Byzantines vanquished the General of Philip of Macedon. Moving along to Kalendar, the handsome buildings which line the shore of Buykdere burst upon the enchanting view, and the expanding waters form a bay called by the ancients Pharmacia, from Medea's potions, or poisons, but by the Greek Therapia. Gyllius conjectures the change of names was to avoid the evil omen which such a name as Poisons would convey. The "nominis umbra" of Medea hovers around these shores as we ascend towards the Euxine. Byron has given the reins to his playful muse when he visited the Bosphorus in 1810, and scrambled up the Cyanæan Symplegades at as great a risk, he says, as ever the Argonauts escaped in their hoy; and when on the summit, he wrote that witty paraphrase from the opening lines of the Nurse's Dole on the Medea of Euripides, which I will give you, by merely changing one word, a word which should never be used in a polite audience, except in quoting Milton.

Oh! how I wish that an Embargo
Had kept in Port the good ship Argo:
Who still unlaunch'd from Grecian docks,
Had never pass'd the Azure rocks;
But now I fear her trip will be a
Sorry business for my Miss Medea.

Therapia, a village of rather mean habitations scattered along the sides of a triangular-shaped bay, is not very attractive. Rounding the Cape Limi the sea opens into a deep bay, the ancient Bathycolpos, but now the gulph of Buykdere. It is on this bay or gulph where the ambassadors of the civilized nations have chosen to reside. The European shore of the Bosphorus here exhibits a type of civilization;

the houses of the Ambassadors, and the habitations of the residents in general have an air of cleanliness not easily to be found in the land of Mahommedanism. The mountains which almost overhang the palaces on the deep bay are richly clothed with vines and luxuriant foliage, and when seen in the early morning sun tempt the traveller to linger; but a long day is before him, if he means to explore the entrance into the Black Sea, and return by the Asia shore of the Bosphorus, and cross in time to sleep at Therapia or Buykdere.

The first bay after leaving Buykdere is Sangeri, anciently called Selectrinum. This bay is enclosed by two promontories, Mega Bournou, anciently called Simas, and the still more conspicuous cape, called by Dionysius Milton or Amilton. The village of Yennichala is seen on the shore on turning the Mega Bournou. The battery which stands on the further promontory was constructed by the Genevan engineer Monnier in 1795. It points its guns close upon the water. Near the river Chrysorrhoas, which flows through the neighbouring valley, stands the Roumeli Kavali, or European Castle; it was built by the Genoese, and answers to the old castle Anatoli Kavak on the opposite shore. Near the European Castle there is a battery, formed by Toussaint in 1783, and enlarged by Monnier in 1794. In advancing up the Bosphorus the extensive ruins of those fortresses are seen on the heights. From Xeras we have a rock-bound coast, growing in altitude, but offering nothing of interest until we arrive at Buyuk Liman, or the Great Harbour, one hour from Buykdere. Here is a landing place; it was anciently the port of the Ephesians, but now it has no harbour. It is defended by a small battery constructed by Lafitte and Monnier. Here the river Karatze enters, which is also the name of the promontory. A little further is a fort built by De Tott in 1773; here was anciently the port of the Lycians. Crossing this port, we come to the promontory Papas Bournou, or the promontory of the Priest; and here the European Fanar on the Berium promontory (lighthouse) overlooks the entrance into the Euxine Sea, and the Cyanæan rocks of poetic fame. On the shore are those numerous caves and hollow rocks which are said to have been the retreats of the Thracian robbers; they have all the marks of having been the hiding places of a lawless fraternity lying in wait to disendow the pockets of the more respectable inhabitants. The promontory called the Papas, or the Priest, was a shelter and protection from which they could always receive warning at the approach of the established authorities. The Cyanæan Islands, or Symplegades, are described by Strabo as two little isles at the mouth of the Euxine, one close to Europe, the other to Asia, separated from each other by twenty stadia, say two and a half miles; they are in fact each joined to the main land by a kind of isthmus, the rocks rise out of the waters in five distinct heads; they are not so high but that the spray of a roaring sea may almost reach the top, the waves break against them with a violent noise and render the passage very dangerous. They are difficult of access, from the loose shelving surface and abrupt steepness of the path seldom trod. Like our illustrious poet, I scrambled up, and stood on the top of the highest of them; and there I saw an altar, commonly called Pompey's Pillar, but in reality it is an altar in honour of Augustus, for old travellers read upon it this inscription, now defaced, CAESARI. AVGVSTO. F. CL. ARMIDIVS. L. F. CLA. FRONTO. It seems originally to have been the "frustum" of a column, and when turned to the account of a dedicatory altar had rams' heads and festoons added, probably at the dedication. Numerous travellers, more ambitious of distinction than myself, have scratched their names all over it, and helped the corroding foam to efface the old inscription. There is a wild look upon those waters of the Black Sea, which open wider their waste as you continue along the coast to the Osania promontory. In the far distance on land, you see the azure hills of old Thrace, and the sullen coast, as far as the eye and telescope will carry you. Turning from the wild region, both of sea and land, you steer due E. towards Asia, again approaching the European Azure Rocks to which the fort built by Toussaint seems to be attached. Here the waters rush through the passage which at some period they have made

for themselves, as if they were resolved that Asia and Europe should not be separated by a barrier they could so easily remove. The Cyanæan isles on the Asian coast lie beyond the town of Riva, with its port and river. It is here where we must look for the rock from which Jason took his stone anchor, and where the name of Medea is still known among the inhabitants. The promontory on which the Fanar of Asia (Anatoli Fanaraki) stands, is the corresponding "jaw" of the mouth of the Bosphorus (Ancyreum), which it is not difficult to ascend. The sun was hot, but suddenly the waves began to whiten, and the wind rolled over the water darkly, giving in a moment a faint idea of the roughness of the Black Sea, and its sudden changes, answering well enough the description of our poet in his merry mood—

> There's not a sea the passenger e'er pukes in
> Turns up more dangerous breakers than the Euxine.

We now return by the Asiatic shore, passing the promontory Pilaf, on which is the fort Porias-Liman, built by De Tott in 1773. Next succeeds the promontory Phil Bournou,—Cape Elephant,—anciently the Corakion, from the number of crows that hovered about it; here is a battery, also by De Tott. This part is connected with the old Gulph Pantichium, a fine expanding bay, now called Keteli Liman; a ruined fortress of the Genoese stands above it at the south-west end. The coast now falls into smooth hills, and we are near the country which afforded a retreat for Belisarius: for here was the Pantichium shore, but another place of the same name on the shores of Chalcedonia contends for "the glory and the shame." From the Asia castle to the Roumeli Kavaki is not more than a mile and a quarter across. On the Asia side stood the city of Hieron and the Temple of Jupiter Urius; Herodotus, Polybius, and, I think, Strabo, all allude to this celebrated temple; the present name of the village, Jero, preserves the memory of this classical region. It was here that the Argonauts, 1267 B.C., offered sacrifices on their return from Colchis, and from hence Darius took his survey of the Euxine. The Byzantine emperors secured the narrow passage of the Bosphorus here; and when the Genoese, in later times, erected the two forts now in ruins on the respective shores, they held the keys of the strait. The French engineers who assisted the Turks in the Russian war of the last century, applied their genius to secure the important passage, which we may call the Dardanelles of the Thracian Bosphorus. Here, at the Anatoli Kavak, is the last of the memorials of those French engineers, who dedicated a portion of their lives and much of their talents to the service of a power which knew but little how to appreciate or suitably reward their services; it seems as if their ghosts have now been wandering along these shores for nearly one hundred years, and no one to throw a handful of earth upon their unburied heads. Lafitte, after serving in the Turkish war with much honour, and having struggled against insuperable difficulties, was forgotten both by friend and foe; he ended his days at Perpignan. Le Chevalier sought in vain for his grave, or any remembrance of his name, his *nominis umbra* only flutters on the foreign shore of the Black Sea.

Immediately below Jeron is the ancient Argyronium, which forms one of the declivities of the Giant Mountain; but veering round the point, anciently Cape Bithynia, the Magias promontory, with its castle, appear at the extremity of the bay. From the village of Jero to the top of the mountain (seeing the ruins of the Genoese fortress) requires an hour well spent. From the Temple of Jupiter Urius the ancients seem to have measured the 120 stadia to Chalcedon. Continuing along the shore, gliding past Omegeri, we arrive at the Selvi-Bournou, or Cape Cypress, directly opposite to Therapia. Behind it lies a beautiful valley, watered by two streams; here Sultan Selim III. availed himself of the skill of an Englishman, who had run away from home and turned Turk, to construct a paper mill. Passing the promontory, anciently Glarium, now Kandlige Bournon, we find at Beicosbay a favourite kiosk of Sultan Soliman, where the giant Amycus, they say, pastured his herds. The castle

of Asia now responds to the one on the Europe shore. Joksu, in the valley of sweet waters, is the largest stream that flows into the Bosphorus; on its banks are the most splendid kiosks, and it is to this source of daily joy that the Moslems resort, especially the Turkish women, where every sort of equipage figures, as they do in June on the borders of the Serpentine. The village near is Candele, "the supposed site of the Bithynian Necropolis;" the rest of the Asiatic shore from the Candele promontory to Scutari, with five villages and numerous habitations in groups, have no great interest attached to them. The inhabitants of the Bosphorus, as we have now traced its ontlines, dwell in twenty-four villages or small towns—a great number of villas and detached dwellings—but the whole population so located should not be taken to exceed 70,000. The views gained from the promontories and mountains are so varied and extensive,—the bends of the great stream and the different directions given to the course of the caique bring the same objects into such a variety of positions,—that the stranger is overwhelmed with the magnitude of the landscape; but the inhabitants are not thickly spread, and the mere view often deceives the imagination. The view the most celebrated is thought to be that from the Giant's Mountain, which I will invite you for a moment to re-ascend with me, that we may bid farewell to the Bosphorus and the Euxine. The Giant's Grave, or the Tomb of Amycus, has passed through at least three editions since the Argonauts were kindly received by this great king of the Byrbyces; it was afterwards called the bed of Hercules, and now it is registered in the Turkish Kalendar as the Giant's Grave. It is a raised flower-bed, fifty feet in length, and hardly twelve in width; there is a border of stone all round, and at each end a sculptured turban; ex votos, as in a Christian country, are suspended on the border, not valuable for their material, but pieces of dirty rags, in honour of the parties having recovered from fever. Close by the grave is the Tekeh, or Dervish Chapel; the holy man looks closely after the backshish, and, when he has satisfied himself, proceeds to beg for his child and his assistant apart. It is not altogether to worship at the Giant's Tomb that the crowds of holiday makers ascend this height on the Asiatic shore. They enjoy the wide and varied prospects which are to be viewed in all directions; they see the Gulf of Buykdere on the west, with its habitations lining the shore; towards the south, the Bosphorus, running down as far as the Asiatic Palace; towards the north and east, the eye wanders up the canal until it reaches the wide waters, and attests the beauty and accuracy of the poet's description:—

"The wind swept down the Euxine, and the wave
Broke foaming o'er the blue Symplegades.
'Tis a grand sight from off the Giant's Grave
To watch the progress of those rolling seas
Between the Bosphorus, as they lash and lave
Europe and Asia, you being quite at ease."

But now the day is calm and bright, and here you have the scene drawn mild:—

"The European with the Asian shore
Sprinkled with palaces: the ocean stream
Here and there studded with a seventy-four;
Sophia's cupola, with golden gleam;
The cypress groves; Olympus, high and hoar;
The twelve isles, and the more than I could dream,
Far less describe, present the very view
Which charmed the charming Mary Montague."

But farewell, Bosphorus! at the Giant's Grave we part!

I cannot pass by another grave—which is a more affecting reality at this moment—without throwing a handful of flowers upon its borders. It is a grave just prepared for receiving the remains of one who described the Bosphorus before me, and whose descriptions will remain when my short-lived sketches are forgotten. He once gave me, at Rome, a word of advice as to the form into which I ought to throw my antiquities of Rome; and I cannot forget the delight with which I always read his illustrations of the brilliant pilgrimage of Childe Harold. We know him as the classical companion in travel of Lord Byron, under the name of Hobhouse; in prosaic life, he shines as Lord Broughton.

Returning for a moment to Stamboul, I cannot trespass on your patience beyond a mere reference to the diagram plan for the sites of the seven imperial mosques and other modern structures, as marked by the capital letters from A to M. The seven great mosques may serve to point out the positions of the seven hills, which on a former occasion I traced out, and the topographical survey may be found among your Sessional Papers of 1854. On the same diagram will be found references, by small letters, from *a* to *k*, to the position of the remaining objects of antiquity; these may be summed up in the Hippodrome, two columns, two subterranean reservoirs, and an old palace; but neither do I intend to detain you with any lengthy remarks upon these antiquities, which have been described by so many travellers, and seen in later times by so many of our native warriors. The Hippodrome, called by the Turks Atmeidan, or the Place of Horses, is the most interesting, not only on account of its association with some of the important events and names in Byzantine history, but far more for the most genuine relics of ancient times. The Hippodrome existed as a circus of the old Byzantium, having been begun by Septimus Severus, A.D. 195–8. The space which the arena occupied is still open, and there remains the spina, on which stand in their original places some of the monuments symbolical of the race, as in all the Roman Circuses. I pass over them all, except the pillar of brass, formed by the three serpents twisted into one. Gibbon cites both Pagan and Christian historians in favour of the authenticity of this relic of antiquity. "The triple heads," he says, "had once supported the golden tripod which, after the defeat of Xerxes, was consecrated in the Temple of Delphi by the victorious Greeks." The proofs are abundant (Gibbon, chap. xvii., note 48) that the ornaments in the temple of Delphi were removed by order of Constantine to his new city; and three ecclesiastical historians, as well as one pagan (Zosimus), particularly mention this serpentine pillar; and there is no trace, and no reason to suppose that it has ever been removed from its place, where it was erected by the Roman Emperor. Gibbon, on the authority of Thevenot, says that Mahomet II., the conqueror of the last of the Cæsars, broke the lower jaw of the serpent with his battle-axe. Hobhouse (Lord Broughton) doubts this fact, because subsequent travellers who saw the relic are silent upon it. I think the Turkish conqueror may have some credit for not being capable of such a useless and wanton act of barbarism. When standing in the desolate mansion of the one hundred successors of the great Constantine, he had feeling enough in that hour of victory to repeat the elegant distich of Persian poetry: "The spider has wove his web in the imperial palace, and the owl hath sung her watch-song in the towers of Afrasaib."—(Gibbon, chap. lxviii.) But then the indignity with which the Turks treat any object of art, however exquisite, renders them unworthy of the possession of this or any other relic of antiquity; and if the least effort had been made during the period of the Crimean war, the serpentine pillar of twisted serpents might now have been in the British Museum. As a supplement to the remarks I made upon the Hippodrome fifteen years ago, I would fain adjust the measurement, as compared with the Circus Maximus at Rome. There is only one way of accounting for the discrepancies, and that is, that no European traveller has ventured to measure the length by line and rule, but only by pacing it. Gibbon says Tournefort found the length to be 400 paces, and if by that he meant geographical paces of 5 feet each, it would be 300 toises. I always understood a toise to be 6 feet, which would produce 1800 feet; but 400 geometrical paces at 5 feet each would be 2000 feet.

This is not of much importance; but it is surprising to find the most accurate of historians adding, this (300 toises) is more by 40 toises or 240 feet than the great Circus at Rome. Dionysius gives the length of the Circus Maximus at 2178½ feet (3½ stadia), and the width 4 plethra, or 240 feet. Pliny gives the length at 1875 and the width at 625. Suppose we make a compromise between the Greek and Latin authors, and let the Circus Maximum stand at 2000 feet, a length which sufficiently coincides with the site of the great Circus, as it may now be traced by existing vestiges in the valley between the Aventine and Palatine hills. On measuring the Atmeidan, or Hippodrome, at Constantinople, I was reduced to the pacing system :—

From the stone pyramid to the twisted column I made	47	
To the obelisk	22	
To a fragment of a granite column	196	
From thence to opposite the fountain belonging to the Mosque, where the ground begins to fall away	69	
Behind the stone pyramid, to complete the whole length... ...	65	
Total	399	paces, say 400

and this squares with Tournefort, if his paces were like mine, *au naturel;* now I think it is a very fair conclusion for an antiquary to draw from these facts that these two measurements, taken at a distance of two centuries, so nearly coinciding, Tournefort and myself must have been about the same size and corpulence, and instead of taking the historian's paces at five feet, I should be inclined to take them at what I estimated my own. Paces are strides of uncertain dimensions. I recollect having paced the ground twice over with great care, and I was careful not to estimate my strides at a gigantic length, I put them down at 2½ ft.; I made the length of the Hippodrome 1000 ft., that is, one half the length of the Circus Maximus; and if any of my intelligent audience should be inclined to doubt of the closeness of my argument, he has no other remedy than to take a summer's excursion to Constantinople, and make the measurement for himself. I have already stated that the objects of antiquity in this Metropolis of the East are few, but these are well authenticated and admit of no controversy; there were several triumphal columns in Constantinople as well as in Rome: there was one in honour of Theodosius which stood on the seventh hill, but is now no longer existing. But near the Avret Bazaar, west of the acqueducts, there remains a pedestal sustaining the "torus" of a column base; this is supposed to be the triumphal pillar of Arcadius; about a quarter of a mile from Shah Zade Djami, or mosque of Sultan's son, stands a column called by the Turks "Kistash, or the Virgin's Stone;" it has suffered much injury from fire. This triumphal column was erected by Tatian to Marcian, who became Emperor in the year 450; it is a curious example of what Architects then thought of proportion,—a ponderous weight of marble placed on a tall, lanky shaft, which was, of course, surmounted by a statue of the Emperor; there are winged figures at the angles, three Christian monograms on the pedestal, and below the inscription a winged female figure, which might have been taken for an angel, only she is reaching her hand, now mutilated, towards a Centaur; there is much that is striking in this caprice of the fifth century (a drawing of it may be seen in "Wheeler"); the greatest resemblance I have seen to it in the nineteenth century is the memorial column of the Immaculate Conception, in the Piazza d'Espagna at Rome; and the pillar which stands in the Broad Sanctuary at Westminster. The next monument of this kind is called "The Burnt Pillar," and it is that, after the twisted column, which has most attracted the notice of enquiring travellers: it is of porphyry; the shaft is composed of several blocks, and the joinings are concealed by garlands; it is bound in many places by iron girdles, to keep together the calcinated pieces, nearly dissolved by the fire; it stands upon the second hill, and is said to have been brought from

Rome; it was probably struck by lightning in the reign of Alexius Comnenus, A.D. 1081, and one of his successors rudely repaired and disfigured the upper part. This restorer, as an inscription tells us, was Manuel Comnenus, A.D. 1143. Pocock observes that Arius died near this column, A.D. 337.

The Acqueduct of Valens, A.D. 370, is best seen from near the At Bazaar, or Horse Market; the ancient construction is easily distinguished from the more modern patchwork,—the two rows of arches give it a lofty appearance, and the repairs of the Sultan a heavy one; but after having seen the Marcian Acqueduct in the Campagna, who would linger for a moment among the shapeless arches of the conduit of Valens?

Near the Burnt Pillar are the dry subterranean cisterns, which were used, when I saw them, for spinning silk and making ropes. The first has five divisions supported by thirty-two granite columns of perfect regularity, but I had rather adopt the description of these reservoirs which I saw in a letter in *The Times* some months ago, referring to the interesting discoveries of Lieut. Warren at Jerusalem. Mr. Henry Conybeare considers that the vaulted roof supported by columns which Lieut. Warren, from its arched construction, could hardly believe was built merely for a tank, is really nothing but an underground cistern, and he says, "The most splendid examples of these Piscina, out of India, are the cisterns of Bin-Binderell, or of the One Thousand and One Columns, and that of the Yèrèbatan Serai, or Subterannean Palace, at Constantinople. Of these the first is now dry, and used as a silk factory; it occupies an area of 20,000 square feet, and is capable of containing 1,237,000 cubic feet of water, a quantity sufficient to supply the population of Constantinople for fifteen days. The Yèrébatan Serai still remains a cistern of water, its vaulted roof is supported by 336 marble columns, all with exquisitely sculptured Corinthian capitals, and some of them with sculptured shafts. In both the construction of the roof is the same as in Lieut. Warren's tank, viz.: a groined vault with rectangular transverse ribs, and though unquestionably built as cisterns only, they greatly exceed the Jerusalem example in scale and magnificence."

I am fully aware that I have laid myself open to some sharp criticism by this daring attempt to dash in among your Sessional Papers without any definite object; the man who first attempted to enter upon the Euxine Sea in his frail bark is said to have had oak and triple brass on his breast, but whatever Jason, who went to fetch the golden fleece, might have had about him in the way of courage, I think I can beat him in the brass, for without a good supply of that material I could never have dared to take you on a new Argonautic expedition. I may have been most imperfectly describing what subsequent observers in the course of thirty years and more have either given more accurately, or altogether exploded, but Constantinople and its environs are unlike Paris; the one is ever running, while the Capital of the East stands still; but if it be true that the Crescent is now about to follow the Cross and level down the bulwarks of a 1000 years, if it be true that the Muezzin will soon cease to call the hour of prayer from the established minarets, then what I have done to-night will leave a record in the Institute of what things were when Mahmoud II. made his reformation in the fifteenth century, and my rough sketch will show the way the Bosphorus did run when Solyman the Magnificent was King.

THE PRESIDENT said he was sure that he only echoed the feelings of every one present in expressing his extreme obligation to their excellent and learned friend for the very able and entertaining communication with which he had favored them. He had never had the pleasure of seeing Constantinople, and he was, therefore, the more obliged to those who took the trouble to explain and bring back to our recollection the beautiful ruins and remains of the past in that wonderful city. Those extraordinary water-tanks which Mr. Burgess described reminded him of the similar constructions found on the promontory of Misenum,

near Naples, where the elder Pliny embarked to see the eruption of Mount Vesuvius, and was killed by that eruption. It was said that at Misenum the Roman fleets were victualled and watered; and on that promontory there was an enormous construction, called now the Cente Camarelle, which was of the same wonderful extent and remarkable character, such as his friend had described, and recently referred to by *The Times* correspondent at Constantinople. It was constructed, not with polished marble columns, but with piers and arches of beautiful brickwork. It was lighted by holes broken in the roof, and one might walk with tolerable comfort through it; but the most curious fact was, that up to a certain height of the piers (he supposed some eight or ten feet) it looked exactly as if those brick columns had been most carefully plastered, and he thought it might have been done to prevent the water corroding the brickwork and mortar. It was a coating of one-tenth of an inch of uniform thickness, and very smooth. He broke a piece off and brought it home, and it remained in his cabinet until about six months ago, when the question of the purity of the water supply of London came under discussion; and one of the gentlemen employed by the Metropolitan Board of Works having called on him, examined this piece of incrustation or coating on the piers, and offered to take it home and analyze it. He did so, and afterwards informed him (the President) that it was merely a deposit of carbonate of lime, very like the stalactites found in our caves. The uniformity of polish, and the large extent of the deposit, showed the great length of time which the water remained in those caverns, for it was a perfectly indurated and smooth coating, of the thickness he had stated. It showed two things—viz. that the Romans must have taken very great care of their sailors, and abundantly supplied them with the means of preserving their health, and that they must have taken enormous pains, and spent large sums of money to that end. We were not so careful, for, even in our own day, the water of ships of war was carried in barrels, and, later, in rude iron tanks or cylinders, into which the water was pumped. After a time the water—of the Thames, at least—putrified, and then became sweet again, and so was used on the voyage. But modern science had done more than we then dreamt of, and the President believed that now, by a simple process, fresh water was produced by the evaporation of the steam of sea water. He hoped his friend, Professor Donaldson, who, he believed, had been very recently in the locality described this evening, would favour the meeting with a few observations, as this was a subject to which he knew the Professor had given a good deal of attention.

PROFESSOR DONALDSON, P.P., said there were so few objects of architectural or antiquarian interest in Constantinople, that one could hardly offer any observations upon the paper. Constantinople had been the victim of so many assaults, so many burnings, so many earthquakes,—in fact, both natural and artificial circumstances had tended to destroy the city, and left few of the remains perfect. The few which remained—to which his reverend friend had called their attention—were those of reparations from time to time of imperfect forms of the Middle ages. With respect to the Golden Gate, so called (the Porta Aurea), he believed it was in Constantinople, as in other places of the east, that that name was given, on account of the yellow colour which the limestone assumed, from the action of the sun and the weather upon it. He had never been so fortunate as to visit Constantinople, though he had frequently been within a few days' journey of it. It was a city full of beauty from without, and full of dirt within; and if travellers wished to admire it, they ought not to go inside the walls. It was certain there was a good deal of interest in the mosques built by the Christians and covered over and disfigured by the Mahommedans. Under the plaster of the domes were found the mosaics, which the Turks hid out of sight, as they did not admit of decoration in their sacred edifices. Even the Mosque of Omar, at Jerusalem, might now be inspected with a degree of liberty; and, no doubt, in a few years Christians would be permitted to go freely into the mosques of Constantinople, and examine them at their leisure.

He entirely concurred with the President that their best thanks were due to Mr. Burgess for his interesting information.

Mr. E. I'ANSON, Vice-President, begged to add his humble tribute to that which had already been given for the valuable paper which Mr. Burgess had read. It was pleasant to travel over again, in so agreeable a manner, the scenes which he himself had visited more than thirty years ago. He recollected all the localities of the Bosphorus and the entrance to the Black Sea, as described by Mr. Burgess. The objects of architectural interest in Constantinople, prior to its occupation by the Mahommedans, were few, and those great cisterns referred to were really the only objects of ancient architecture which struck him as being of remarkable interest. The other objects described by Mr. Burgess had interest to the antiquarian and archæologist, but to the architect scarcely any. But after the period of these ancient monuments, there did come a time when the Turks did not disfigure the buildings they found, but left behind some beautiful monuments of art, and Constantinople possessed a large collection of interesting works from the fifteenth to the seventeenth centuries. Some of the Byzantine remains contain a great deal of Italian ornamentation adapted to Byzantine architecture, as seen in some very exquisite examples, particularly in the fountains. Constantinople for a time exercised a large influence upon the architecture of the eastern part of Europe, especially Russia, which he had particularly observed in the churches of Moscow. Both the mosques and fountains of Constantinople were works of remarkable beauty. With reference to the great reservoirs in the Bay of Baiæ, referred to by the President, that country was one of great volcanic activity, and within a short distance of those fountains was the Temple of Jupiter Serapis, which gave remarkable evidences of great changes of level, and it was possible the same causes may have affected this cistern. At all events, the craters of this district were so charged with lime and carbonic acid gas that they deposited the former substance in great quantities, and large tufacious rocks were formed of that material. His principal object, however, in rising was to draw attention to the works of art in Constantinople of later date than those to which the learned author of the paper had alluded to.

THE PRESIDENT said Mr. I'Anson had not referred to the modern European churches in Constantinople. He saw a gentleman present, Mr. W. Burges, who was connected with the Memorial Church in that city, and perhaps he could give them some information on that point.

MR. BURGES said he had seen but few modern churches in Constantinople, and they were generally surrounded with very high walls. There was nothing particular in them; and he certainly agreed with Mr. I'Anson that the architecture of the sixteenth to the eighteenth century, as existing in that city, was infinitely better than any either in Paris or in London.

The vote of thanks to Mr. Burgess was carried by acclamation, and the meeting then adjourned.

Royal Institute of British Architects.

At the Closing General Meeting, held on Monday, 21st June, 1869, W. TITE, M.P., President, in the Chair, the following Papers were read:—

ON THE TOMB OF TI. C. VITALIS, IN THE VILLA VOLKONSKI, ROME.

By Professor DONALDSON, P.P., Honorary Secretary, For. Corr.

EXTENSIVE as have been the excavations in the city of Rome itself and in the neighbourhood, and important as have been the antiquities brought to light, so great has been the accumulation of the soil since the downfall of the empire, and so comparatively limited the researches, that there is still a vast field yet unturned by the spade of the explorer, and every-day experience proves, that doubtless treasures of antique art still lie hid, to be revealed as the excavator pursues his useful labours. Among the ancient constructions brought to light within the last few years, my attention was rivetted, when I was at Rome in February last, by the inscription on a tomb, which has been cleared close to the line of the Neronian aqueduct in the Villa Volkonski, behind the Scala Santa, near the Basilica of S. Giovanni Laterano. This inscription proved it to be the tomb of T. C. Vitalis, *Architect.* I have felt, therefore, it would be interesting to the members of the Institute, for various reasons; and, remarkable to say, it has not been yet published by the antiquaries or architects of Rome. Its arrangement, its construction give it special claims to our attention; but more particularly its dedication as the family tomb of an ancient Roman Architect.

The line of the Neronian aqueduct enters Rome near the Porta Maggiore, ancient Prænestina, and, at a short distance within the walls, it makes a short bend towards the Scala Santa, near S. John the Lateran; afterwards pursuing its course by the Cœlian Hill to the Palatine Hill. On the whole of this line it even now rises to a considerable height above the surface of the ground, and especially in the valley between the Cœlian and Palatine Hills. In the interval between the bend, already alluded to, near the Porta Maggiore and S. John the Lateran, a vast accumulation of soil has taken place, as appears from the level of the old paved Roman road, near the tomb, and which at this point is 17 ft. 4 in. below the sloping surface of the hill.

The tomb itself is a square mass 15 feet 7 inches in front, and about 18 or 19 feet from front to rear. The floor of its lowermost chamber is 14 feet below the level of the old paved existing Roman road; but as the step of the door or entrance to the tomb is now 3 feet 2 inches below the ancient roadway, it appears probable that the level of the more ancient road must have been originally five or six feet lower than it is at present. The tomb consists of three chambers or storeys in height, with a staircase communicating from one up to the other. The doorway entered a few feet below the floor of the middle chamber, to which there are some four or five steps from the sill to the doorway up to it. The thickness of the front wall of the two lower chambers is 2 feet 3 inches, that of the side walls about 2 feet; but the walls of the uppermost chamber are reduced to 1 foot 7 inches in thickness. The body of the construction of the walls is of concrete faced on the inside with opus reticulatum, the wedge-like bricks of which are $2\frac{3}{4}$ inches square on the face, and 2 inches square at the end, by $4\frac{1}{2}$ inches long

The outside facing of the two lower chambers is of thin bricks of different thickness; but seven courses of which rise 11⅝ inches, and vary in length from 8 to 16 inches. The uppermost chamber has quoins on the outside in header and stretcher courses, rising five courses of bricks in height, and the stretcher 18 inches long; here the general face of the centre is of opus reticulatum. It will be observed that the opening of the doorway does not diminish in the height, and is 2 feet 2 or 3 inches from the angle. The height of the aperture is 5 feet 5 inches by 2 feet 3½ inches wide. The sill, jambs and lintel are of Travertine stone, surmounted by a moulded cornice of terra cotta two courses high. In the centre of the front is a marble slab 4 feet long by 2 feet 2 inches high, having mouldings all round, and it is inserted in a moulded terra cotta margin or frame 3½ inches wide, sunk slightly from the face of the brickwork. It contains the following inscription :—

TI · CLAVDIO · TI · F · VITALI	To Titus Claudius Vitalis Son of Titus
TI · CLAVDIVS · VITALIS · ARCHITECTVS	Titus Claudius Vitalis Architect
CLAVDIA · TI · L · PRIMIGENIA	Claudia Eldest Freedwoman of Titus
CLAVDIA · TI · ET · O · L · OPTATA · F	Claudia and Claudia beloved Freedwoman of Titus erected
TI · CLAVDIVS · AVG · L	Titus Claudius Augustus Freedman
EVTYCHVS ARCHITECTVS	Eutychus Architect

The entablature is 2 feet 6 inches high, consisting wholly of terra cotta, and has regular architrave frieze and cornice. The frieze has a sunk panel, enriched with a very effective ornamental pattern formed of tiles of two colours, and is of very graceful and unusual design. The roof and greater portion of the walls being destroyed, it is impossible to judge of the mode in which the upper part of the monument had been completed; but we may presume that it had an upper, but of course less high, storey or attic, with the rusticated angles and reticulated centre, surmounted by a cornice of less dimensions than the lower one, and probably crowned by a pediment.

We will now consider the interior. The ceiling of each chamber is of concrete or rubble work vaulted, the two uppermost ones being groined. The floors are laid with mosaics in white and black tesseræ. The plan of the mosaic of the middle chamber is given on plate 3, and the general arrangement of the floor of the uppermost chamber is indicated on the plan; the mosaic floor of the lowermost chamber is quite destroyed: the centre of the compartment of the middle chamber represents the walls and turrets of a fortified city. The faces of the walls and ceilings of the chambers were plastered and coloured in distemper: the damp, however, has destroyed the paintings formerly thereon, so that only a few faint traces of colour of distemper are perceptible. In order to afford some idea of the class of art employed in these tombs, a few examples are given of distemper sketches still remaining on the face of the walling between the lines of niches of a tomb in the Villa Doria Pamfili outside the Porta S. Pancrazio at Rome. I have selected those representing buildings, as most interesting to the architect; but there is an immense variety of subjects, as landscapes, birds, trees, animals, fishes and figures of men and capricious objects, as tritons, griffins, &c. &c.; they are only 4 to 6 inches high. The vaulting of the lowermost chamber of the tomb of Vitalis was pierced by openings to afford light and air, and the middle chamber had two windows in the side walls immediately under the groined vaulting. The arrangement of the lower and middle chamber is similar. There is a central projecting compartment on each of the three sides of the lowermost chamber, having a larger niche or recess and surmounted by a curved pediment. The smaller recesses or niches contain one or two small terra cotta cinerary urns, which are indicated on the plans and section, varying in size from five to eight inches in diameter; and a small marble tablet is let into the stucco immediately under some of the apertures with the name of the deceased. The central recesses contain from three to six urns. The following are a few of the inscriptions on the marble tablets, which vary in size from 13 inches by 6 to 8 inches by 3½ :—

IVLIA · C · B · CHRISION
CONTVBERNALIS
POLI · BI · CAISASAR · VETTIANI

CLAVDIA
POEMNE
SIBI · ET · SVIS

PEREGRINVS
L · VALLI · APII · SER
VIX · ANN · XVII

TI · CLAVDIVS · AVG
AMPHIONIS

TI · CLAVDIVS · AVG
LIB · CALAMVS

C . IVLIVS
AVG · L · PAPA

FORTVNATVS
SEX · MA[illegible] · DEIIC
VIX · ANN · IV
MENS · VIII
DIES · III

C · IVLIVS · CISSVS
IVLIAS · THALACSIASI
FIDISSIMÆ
VIX · ANN · XXX

MAIAE
HOSPITAE
MATRI
PVLCHRI

Niches or recesses for cinerary vases are continued in the thickness of the solid construction under the stairs. There is a curious receptacle as for a coffer (A) in the intermediate chamber, evidently a subsequent addition, as it partially covers the mosaic floor. It is quite open and no longer contains any body, bones or other objects, that may have been originally deposited in it. Milizia notices in his "Memorie" that a certain Claudius Vitalis, Architect, appears from some inscriptions to have died aged 40.

The inscription on the tomb of Vitalis, recording as it does the names of two architects, that of Vitalis himself and of Eutychus, who designed and executed the monument, led me to the subject of any other records of architects of ancient times to be discovered among existing monuments. On passing through the galleries of the Vatican I found several. Before describing them, I must notice a remarkable one at Aspendus, in Asia Minor, to which our honorary and corresponding member and gold medallist, M. Texier, has called my attention. In his octavo volume on Asia Minor, pp. 718-2, Monsieur Texier states, that the name of the architect of the Theatre of Aspendus is recorded on an inscription inside, in the following words: "The Senate and people have honored Zenon the architect of the Theatre and of the City-Works: they have honored him with a Statue in the Theatre, and have presented to him a garden near the Hippodrome." One cannot read this inscription without recalling the similar and well-earned tribute to the genius of our late Fellow, Sir Charles Barry, in the statue put up in the Houses of Parliament.

In the long gallery of the Vatican Museum, I found two architectural inscriptions, the one on a sepulchral altar or cippus of marble near the entrance, the other on a marble slab.

DM
AVLIAE · LAODICES
FILIAE · DVLCISSIMAE
RVSTICVS · AVG · LIB
ARCHITECTVS · PATER
INFELICISSIMVS · QVA
VIX · ANN · VI · MENS · VI
DIEB · IIII

DIS · MANIBVS
TYCHICO · IMP · DOM · SER
ARCHITECTO · CRYSPINII
TI · CLAVDIVS · PRIMVS
OLLAM · OSSVARIAM
DONAVIT

Here Rusticus Augustus, *Freedman*, architect, as a most unhappy father, dedicates this memento to his most beloved daughter, Aulia Laodice; and it is remarkable that he, as well as Vitalis, were Freedmen. The second records the name of Tychicus, as architect to the Emperor Domitian. The term "ollam ossuariam," the cinerary pot or vase would indicate, that this inscription was under the niche or recess, which contained the vase, like the inscriptions in the tomb of Vitalis.

It appears that a high official position, Praefectus Fabrum, similar to that of our Chief Commissioner of Works and Buildings, existed among the Romans. In the Vatican gallery, near the entrance, is a marble pedestal, with base and surbase mouldings, adapted to receive a statue, and on its face is a panel containing the following inscription:—

G · N · MVNATIVS · M · F · PAL
AVRELIVS . BASSVS
PROCAVG
PRAE · FABR · PRAEF · COH · $\overline{III}$
SAGITTARIORVM · PRAEF · COH · ITERVM · $\overline{II}$
ASTVRVM · CENSITOR · CIVIVM
ROMANORVM · COLONIAE · VICTRI
CENSIS · QAEST · IN · BRITANNIA
CAMALODVN · CVRATOR
VIAE · NOMENTANAE · PATRONVS · DEM
MVNICIPI · FLAMEN · PERPETVS
DVVM · VIR · ALIPOTESTATE
AEDILIS · DICTATOR · $\overline{IIII}$

We here see that an officer of the high dignity of Aedilis Dictator, twice Præfect of the Cohort of Archers, Quæstor at Doncaster (Camalodunum) in Britain, hence doubly interesting to us, has amongst his other titles that of Præfect of Builders as an honorable distinction.

And another inscription in the same gallery mentions a certain C. Nasennus Marcellus, Senior, as Præf. Fabrum et Curator operum publicorum et aquarum, as not only Præfect of Builders, but also as Curator of Public Works and the Waters, the latter a very important public office in connexion with the aqueducts and fountains of the city.

I also copied at Trieste an inscription, which shews that there was in that city (Tergeste) an ancient Builders' College. It is in the panel of a pedestal having base and sub-base mouldings, and which probably was surmounted by the statue of Papirianus:—

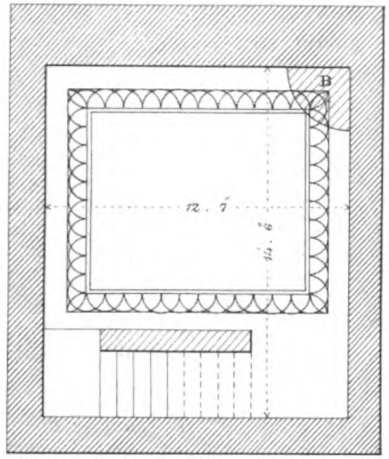
LVARIO
PAPIRIO
PAPIRIANO
II · VIR · ID · II · VIR · IDQQ
PRAEF · FABR · ROMAE
ET · TERGESTE
HAM · HADR · PONT · AVGVR
COLLEGIVM · FABRVM
PATRONO · MERENTI

I cannot conclude these memorials of ancient architects without noticing one to that distinguished architect and engraver Francis Piranesi. It is over the doorway on the first floor landing of the house No. 46, Via Felice, Rome, and is in the following words. It has the portrait in profile of Pope Pius VI. in a medallion. PONTIFICI MAXIMO, CUJUS LIBERALITATE INGENIA CIVIUM VIGENT BONÆQUE ARTES FLORESCUNT, FRANCISCUS PIRANESIUS ARCHITECTUS CUM CONCORDISSIMIS FRATRIBUS DOMINO INDULGENTISSIMO, QUOD MUSEI DOMESTICI NOMEN ET NOVORUM OPERUM FAMA ADITU EJUS ET LAUDE NOBILITATA SINT, MENSE XI OCTOBRI ANNO MDCCLXXXII. This Francesco was nephew of the celebrated Cavaliere Gian Battista Piranesi.

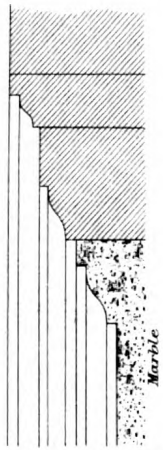
Over the adjoining door of the same landing is the following tribute to Thorwaldsen: PER

TOMB OF TI. CLAVDIVS VITALIS. ARCHT

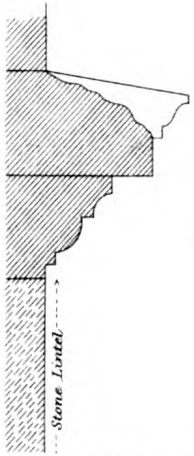
VILLA VOLKONSKY. ROME.



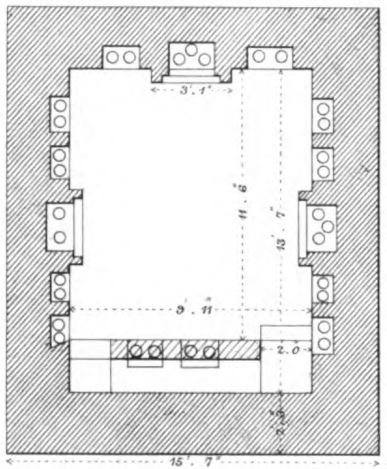
PLAN OF VPPERMOST CHAMBER.



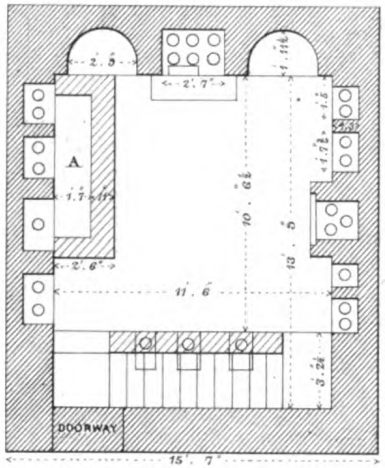
MOVLDINGS OF PANEL.
$\frac{1}{6}$ SIZE.



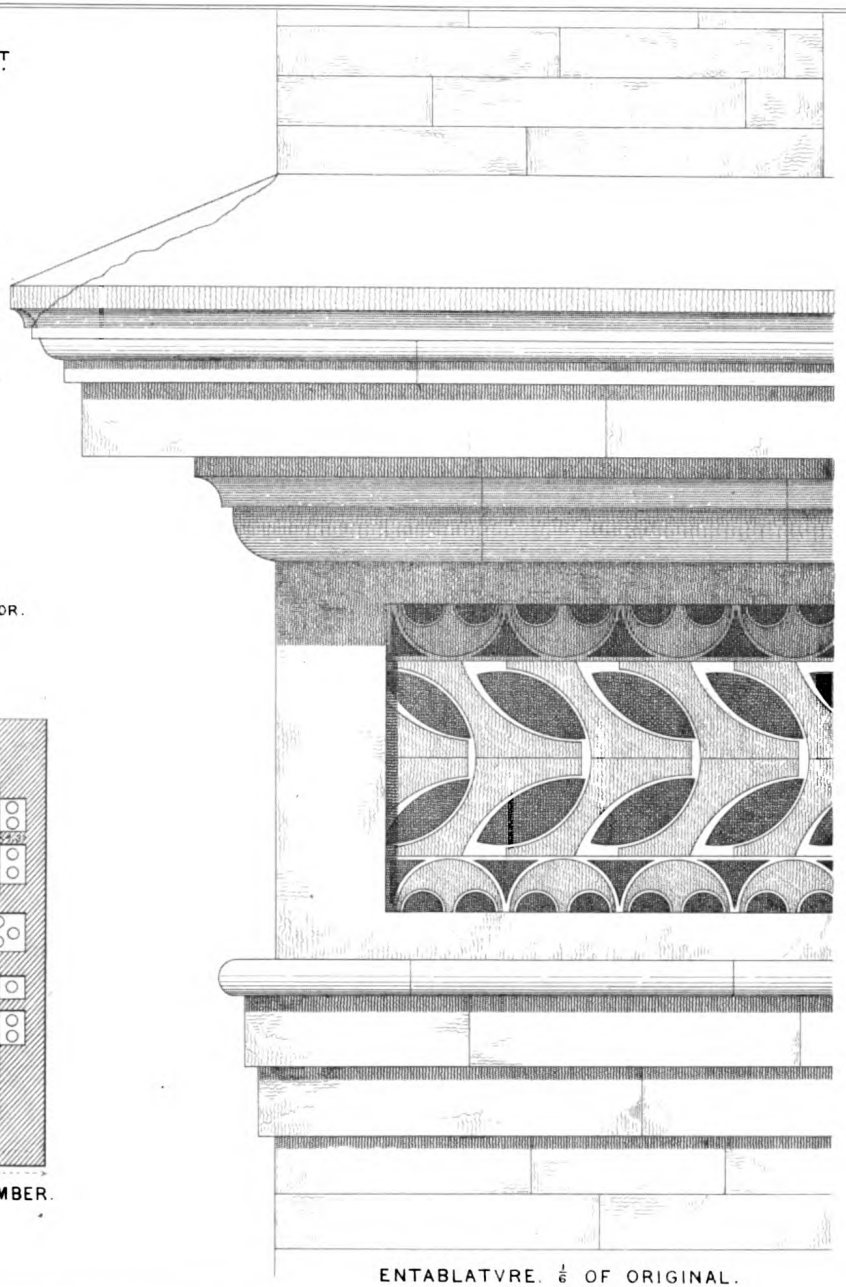
ENTABLATVRE OF DOOR.
$\frac{1}{6}$ SIZE.



PLAN OF LOWERMOST CHAMBER.



PLAN OF INTERMEDIATE CHAMBER.



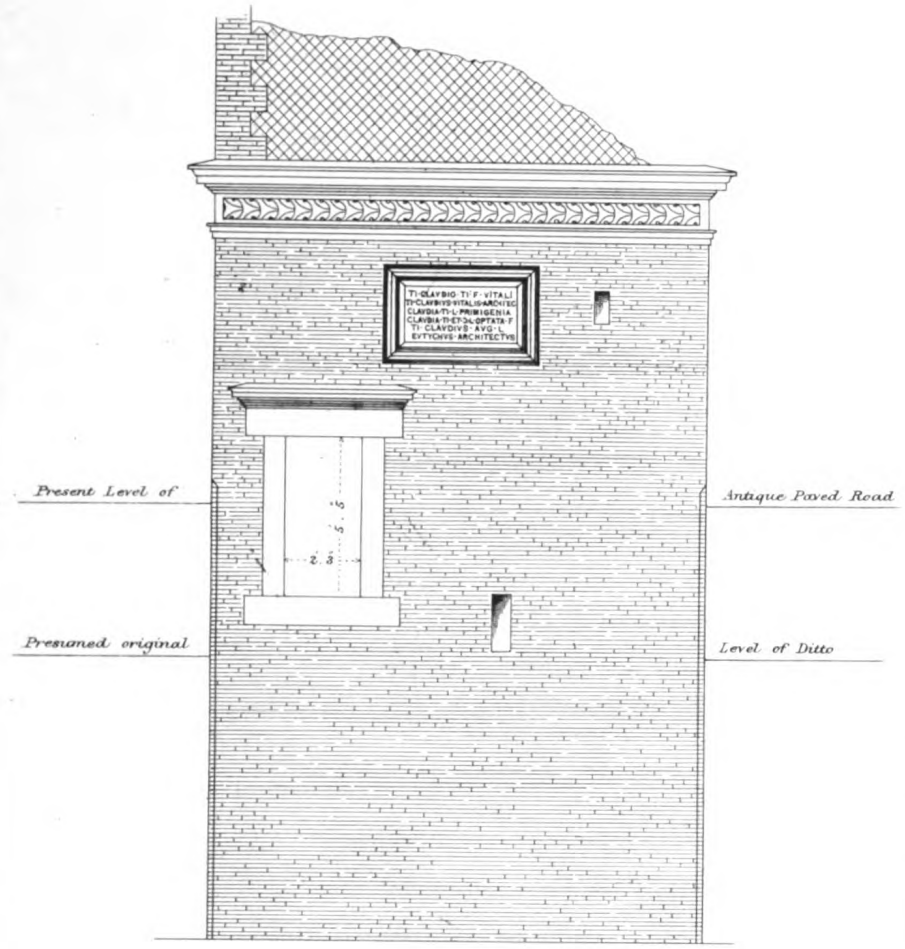
ENTABLATVRE. $\frac{1}{6}$ OF ORIGINAL.

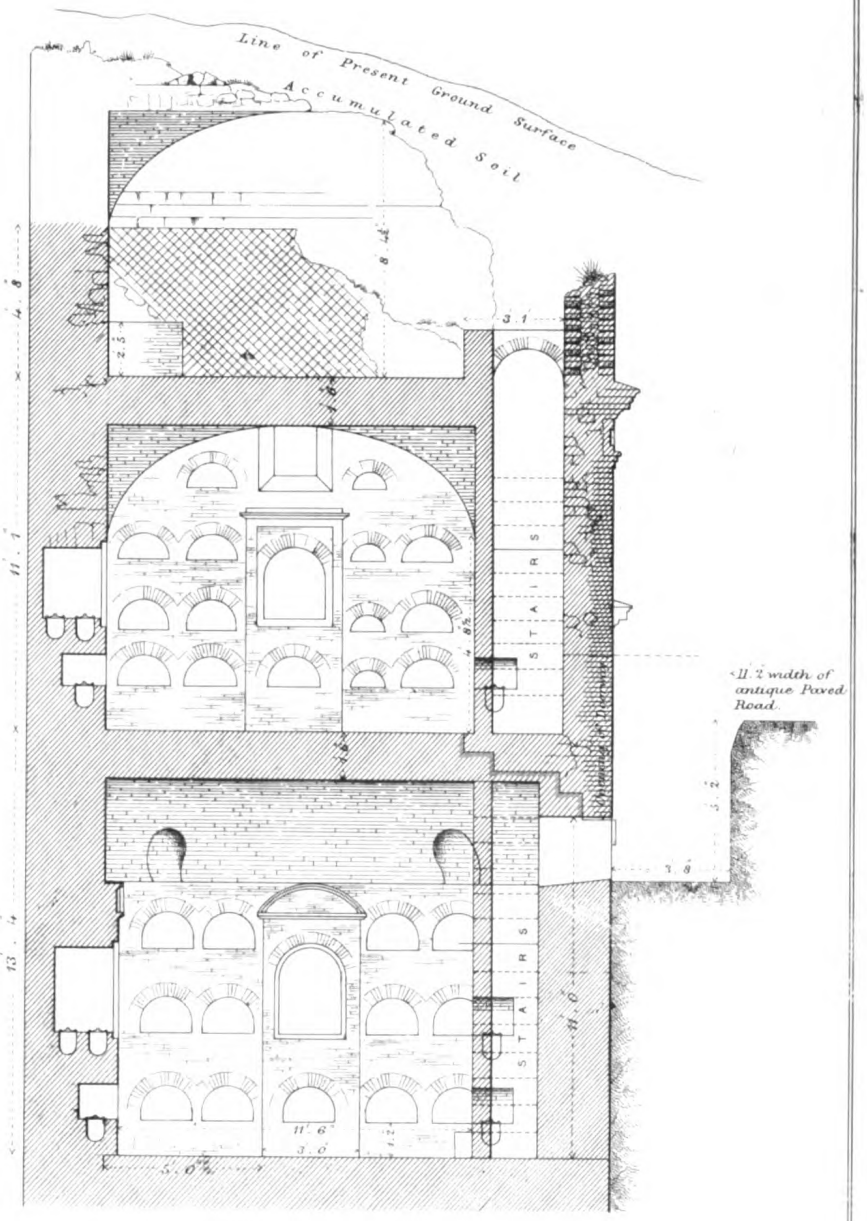
Thos L. Donaldson & H.B Marshall, mis^b

Lithog^d for the R.I.B.A. by Kell Bros London E. C.

TOMB OF TI. CLAVDIVS VITALIS. ARCHT

VILLA VOLKONSKY. ROME.





Thos L. Donaldson & H.B. Marshall, mists

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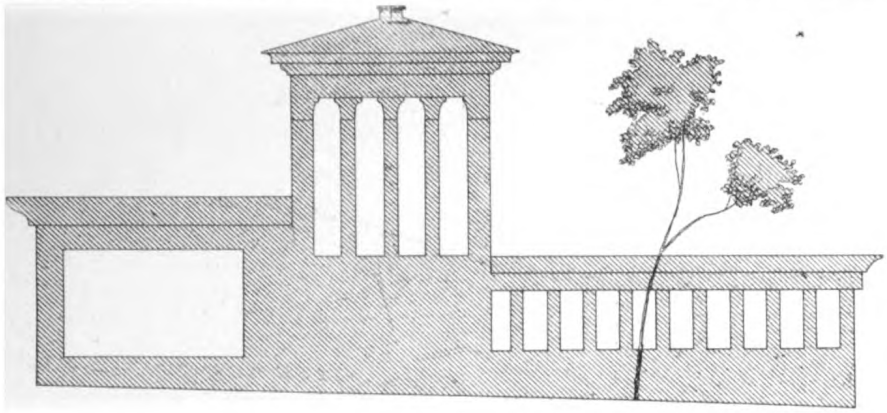
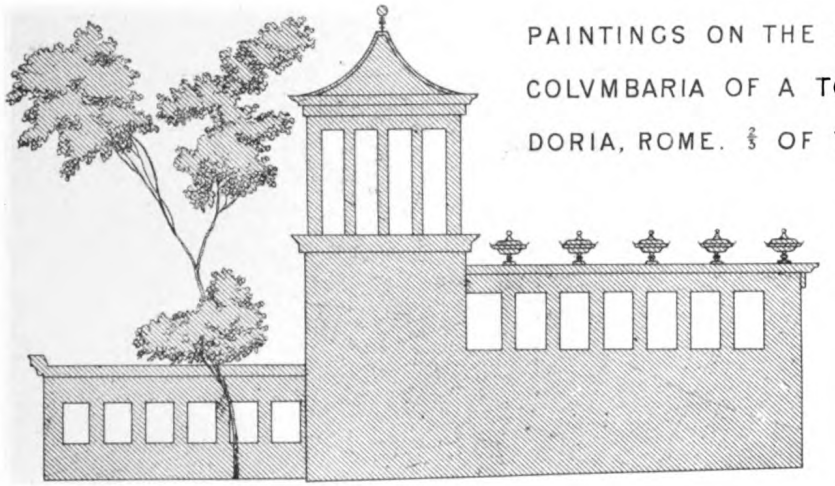
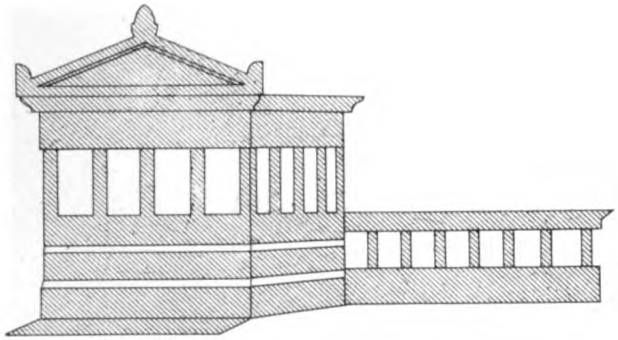
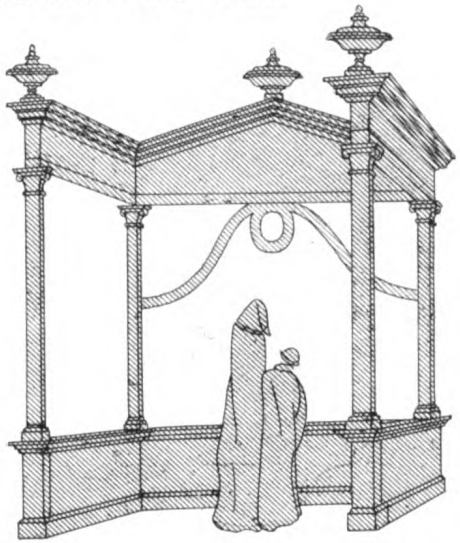
Lithogd for the R.I.B.A. by Kell Bros London E.C.



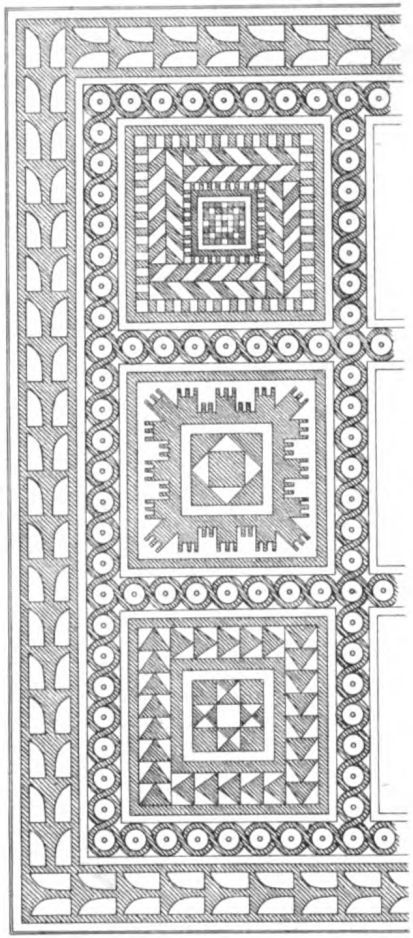


PAINTINGS ON THE FACE OF THE WALL VNDER THE COLVMBARIA OF A TOMB IN THE VILLA PAMFILI DORIA, ROME. $\frac{2}{3}$ OF THE ORIGINAL SIZE.





HALF INCH SCALE TO THE FOOT.



THREE OF THE 9 COMPARTMENTS OF THE MOSAIC ON THE FLOOR OF THE MIDDLE CHAMBER OF THE TOMB OF VITALIS, VILLA VOLKONSKY. ROME.

Thos L Donaldson.

Lithog.d for the R.I.B.A. by Kell Bros. London E.C.

MEMORIA DI AVERE ABITATO IN QUESTA CASA ALBERTO THORWALDSEN DURANTE IL SUO LUNGO SOGGIORNO IN ROMA MDCCCXXXXIV.

I am indebted to the kind assistance of Messrs. Marshall and Manby in taking the dimensions and details of the Tomb of Vitalis.

The PRESIDENT enquired whether any member had any remarks to offer upon this interesting description of a very curious monument of antiquity. He had himself visited the Tomb of the Scipios, whose bodies were not burnt after the Roman fashion, but were buried in this tomb; but these columbariæ seemed to have received the ashes of the dead after they were gathered from the funeral pile and the urns were cemented down, and a stone or tile put over the top in the roughest manner. There was the peculiarity in ancient Rome that some noble families, like that of the Scipios, buried their dead, while others burnt the bodies and preserved the ashes in urns. Whether that was peculiar to the races or stations of the families he did not know. Vitalis was a freed man; and, probably, to bury the dead was a costly process.

PROFESSOR DONALDSON observed that there was a strict law with regard to the burning of the dead; the pile was not permitted to be raised within a certain distance from the habitations.

The REV. RICHARD BURGESS remarked that the burying of bodies entire was not uncommon. The very name of sarcophagus given to the stone or marble coffin was significant of that [being composed of two Greek words, σαρξ and φαγω, flesh-consuming]; it was a mode of interment too costly, as the President has hinted, for the common people, and therefore confined to a section of the community. Byron had said,

"The Scipios' tomb contains no ashes now,"

and probably never did contain the ashes of burnt bodies, except in the cinerary urns of the *liberti*. He agreed with Professor Donaldson, that the study of the ancient inscriptions was very interesting, and he had spent many a day among the inscriptions on the walls of the Vatican galleries; some of them were difficult to decipher on account of the abbreviations, but there was a key in the form of a small book, 'Explicatio Literarum in Romanis Monimentis,' published at Florence, 1822, which was a great help to lapidary reading; it goes alphabetically through the different combinations of letters and the changes of position which alter the meaning—for instance, C L is Caii libertus, but ↀ L is Con libertus and CL Clarissimus. There was a remarkable decipherer of these enigmatical inscriptions at Rome in his (Mr. Burgess') time, named Girolamo Amati, who wrote the inscriptions for the Pope's catafalque; he was a sort of Diogenes, who lived alone with letters half legible on fragments of stones. On the occasion of some unreadable words being turned up at the excavations made by Lucien Buonaparte at the ancient Vitalonia in Etruria, he had a controversy with Baron Bunsen as to whether the language was Greek or not. Bunsen maintained the words were Greek; the characters certainly were, but the words did not render into Greek. "If Greek," said Amati, "read it." But Bunsen was not able to read it. Then it was not Greek. It turned out to be not Hellenic but Pelasgic Greek, which the wandering tribes from Hellas had brought over, and the language seems to have been lost. Visitors at Rome who pay any attention to reading on stones must have remarked on many of the tablets or altars in the Vatican emblematic signs, marks or figures, which have been the cause of much controversy as to their meaning, and some have unwisely been pressed into the service of Christian tradition—for instance, the ivy leaf, so often found on monumental stones, was the Pagan emblem of immortality, but the ivy leaf has a great resemblance to the shape of the human heart, and on this account the inscription on the stone or marble was declared to belong to the tomb of a martyr, and the more particularly when the letters were red, betokening the shedding of blood. This subject, which is seldom brought forward, is one of great interest, and might be followed up with great advantage both to ethnical and ecclesiastical antiquity.

DESCRIPTION OF SOME RUINED BUILDINGS IN PALESTINE.

By Professor DONALDSON, P.P., Honorary Secretary For. Corr.

WHEN, in October last, I left England for my proposed journey to Palestine and Syria, I was in hopes that possibly I might meet in the Holy Land with some specimens or fragments, which might afford a clue, however slight, to the architecture employed by the Jews. I use the word employed, for I could not think that they had an individual characteristic art of their own, for history tells us that they were not, like the Egyptians, Greeks, or other Semitic Races—an autotechnic people. When Solomon decided on building the Temple, he was assisted by Hiram, King of Tyre, not only with timber and stones and gold, but also with builders and stone-squarers (1 Kings v. 17, 18). He also engaged in his service Hiram, a brass worker from Tyre, most probably not the king, though having the same name; and he cast the two pillars of brass (1 Kings, c. vii.), and the molten sea which stood upon twelve oxen. And he cast also the ten bases, with the oxen, and lions, and lavers, and cherubim and palm trees, apparently a most important work; but no properly Jewish mechanic is mentioned in reference to the works of the Temple. We may also infer that, from the long captivity in Egypt, the taste of the Jews must have been influenced by the monuments of that people, such as their temples and statues; and that, if they had any special feeling for art, it must have reflected somewhat of the peculiar æsthetic predilections of their oppressors. Even in after times they were either as enemies or friends, brought into close contact with the Egyptians, and it is supposed by some, not without reason as likely, that when Solomon built the house for his Egyptian bride, the daughter of Pharaoh, he would naturally employ the famed Egyptian workmen, and erect it in the Egyptian taste, and according to the arrangements of her native land. In fact, in the Ninth Chapter of the First Book of Kings, it is especially recorded that "Solomon employed the Amorites, Hittites, Perizzites, Hivites and Jebusites, which were not of the Children of Israel, as his workmen; not using the Children of Israel as such, for they were men of war, and his servants, and his princes, and his captains, and rulers of his chariots and his horsemen, and five hundred and fifty of them acted as chief officers over the work, bearing rule over the people that wrought in the work." The Greeks also, during the time of the successors of Alexander, ruled in Judea; and, subsequently the Romans, particularly during the government of the Herods, stamped with their impress the architecture of the Jews. We saw in the Valley of Jehosaphat that the tombs have the Greek features; and in the ruins of Samaria, in the remains of cities on the banks of the Lake Tiberias, and of Cæsarea Philippi on Mount Hermon, details essentially Roman, and mostly of a late period of the art of that people. Churches, castles, and other monuments of the Byzantines, Crusaders and Saracens, of the middle ages, are to be found scattered over the face of Land; not in very great quantities, and almost all ruined. But one specially, and which we might conceive to be a radically Jewish building, nay Jewish fragment, who has ever found? I have earnestly desired to discover even the smallest relic of the artistic genius of that people; but all which I have seen, whether of marble, stone or pottery, bear the impress of the taste and execution of the races of other nations, already alluded to by me. And do not all these circumstances bear on the prophetic denunciations of Our Saviour, recorded by the Evangelists? In reference to the Temple and its stones and great buildings, He foretold that "not one stone should be left upon another, which should not be thrown down, and that the city should be laid even with the ground." Besides which, the Temple, described by Josephus (Book vi. c. x.) was not the temple built by Solomon. That had been demolished entirely by the Babylonians, and had been twice rebuilt, and had had

considerable enlargements, and colonnades added by Herod doubtless of Roman architecture. Titus ordered, as we find in the First Chapter of the Seventh Book of the Wars of the Jews, "that the army should demolish the entire City and Temple, but should leave as many of the towers standing as were of the greatest eminence (the loftiest); that is Phæsalus, and Hippicus, and Mariamne (all built by Herod), and so much of the wall as enclosed the city on the west side, and which was spared in order to afford a camp for such as were to lie in garrison; and the towers also were spared in order to demonstrate to posterity what kind of city it was, and how well fortified, which the Roman valor had subdued; but for the rest of the wall, it was so thoroughly laid even with the ground by those, who *dug it up to the foundation*, that there was left nothing to make those coming thither believe it had ever been inhabited." And this was the less difficult, as the rock upon which these erections were based, is immediately under the surface of the ground, here so scanty of soil.

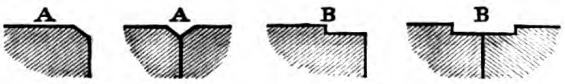
Hadrian razed to the ground the ruins left by Titus, and a plough passed over the foundations of the Temple; but he built a city there, calling it AELIA CAPITOLINA. The Jews throughout Palestine soon rising in rebellion, he crushed the insurrection, and ordered about a thousand of their principal cities, says Goldsmith, to be destroyed; and surely among these we may count Jerusalem. Julian the Apostate subsequently began a temple on the sacred site; but it is probable that it was not very far advanced, as he died within six months of its commencement. I shall not trouble you with allusions to the erections of Constantine and the Greeks of the Byzantine Empire, nor of the Saracens and Crusaders, remains of which lie scattered at distant intervals throughout the Holy Land. But the succession of tastes, which distinguish these several races, presents considerable difficulties in attributing the buildings to one or other of them. Still there are certain *indicia* in most cases to enable the experienced traveller to identify approximatively to whom they may be appropriated. But of any special Jewish artistic element none appears to me to have been as yet brought to light; and the mysterious darkness, in which researches for the purpose have been lost, seems to realise the fulfilment of the utter destruction foretold in prophecy.

We may assume, complete as may have been the overthrow of the successive temples of Jerusalem up to the Christian period, and afterwards by Titus, that although the smaller architectural features of the columns and decorations of the buildings in the city may have been destroyed, yet the main masses of the construction of walls must have been left strewn on the surface of the ground, filling up some of the valleys; for so hilly is the country round Jerusalem, that the transport of massive blocks imposed a difficulty and expense inadequate to any purpose. We may consequently suppose that the present substructures and walls do contain many of the huge blocks of former epochs, and present various periods of execution, as is found in Greece and Italy. Each succession of builders, from motives of economy of expense and labour, would re-use those blocks ready for use, and redress others that required alteration for their immediate purpose. But I saw none but such as were identical with the construction used by the Romans. The hugeness of some blocks are not unquestionable evidences of high antiquity, for none are so immense as the gigantic masses to be found at Baalbec and Palmyra of the period of the Antonines. And the Saracens in Baalbec converted the enclosure wall of the great Temple into fortifications by forming parapets with embrasures, and constructing towers out of stupendous blocks of the magnificent Roman construction, and which must have required immense mechanical means to move and set in their place.

The present walls of Jerusalem and of the Haram area are to my eye composed of blocks of stone, whether of large or small dimensions, and of fragmental shafts of columns, identical with those of the Roman times, and having no distinctive evidences of a more remote period.

I wish to correct the term 'bevelled,' as applied by recent excavators to blocks of stone at

Jerusalem. A bevel means a splayed angle or edge, as (A); but this technical phrase has been used in describing the blocks, which have a margin round the edge about two inches wide, and sunk about a quarter of an inch below the general face as (B).

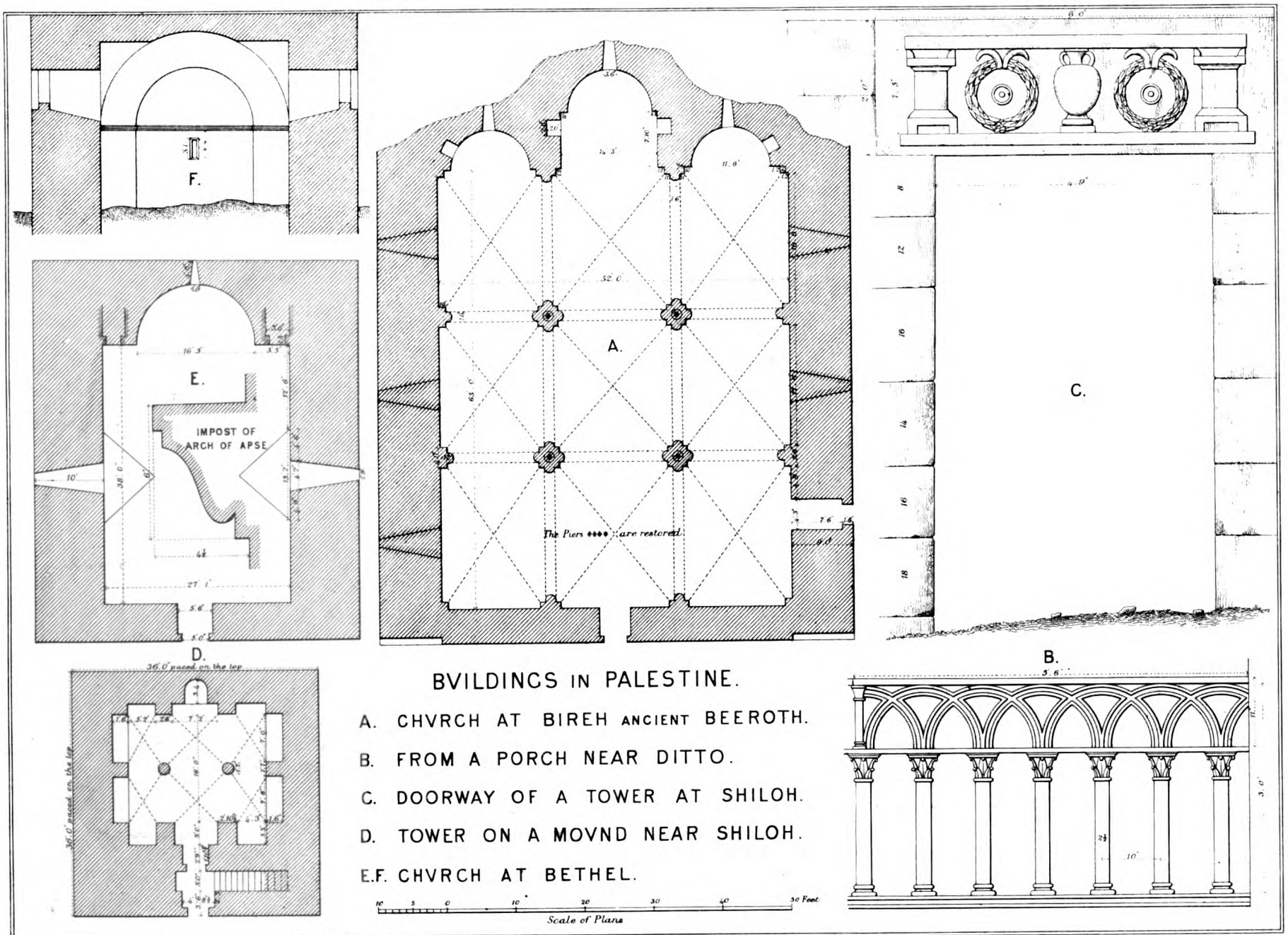


I have ventured to make these general remarks in order to account for my not being able to adduce any satisfactory evidence of antique Jewish art: besides which, my stay at Jerusalem was too brief, and the objects to be seen too numerous, to allow of a more thorough investigation of the subject. These suggestions may be offered also as an apology for the few buildings, of which alone I was able to take some very slight memoranda in the Holy Land, between Jerusalem and Nablous. In the company of fellow travellers, who are impatient of what to them seems unnecessary delay, to inspect buildings not generally interesting or important, and the fatigue of constantly riding on horseback for hours together, and over villanous roads, somewhat damps one's energy and enfeebles one's powers. And on an excursion like our's, time does not allow of one's interrupting the journey by stays of a day or two, or more, at every point, where ruins indicate objects really worthy of lengthened study. We had made a trip of three days from Jerusalem to visit Jericho, the Jordan, the Dead Sea and Bethlehem, and after passing a couple more days at Jerusalem we started on our journey northwards, up Palestine towards Damascus.

BIREH or BEEROTH is about three hours' ride, and there we halted, near a copious fountain, for our mid-day rest, and saw the ruins of a church, which the author of Murray's Handbook considers to be a Latin one, built by the Knights Templars during the time of the Latin kings of Jerusalem; but the triple absidal end seems more to indicate a Byzantine arrangement. The inside dimensions within the walls are 65 feet long by 50 feet 9½ inches wide, with a central nave and side aisles having absidal ends. There were two clustered pillars on each side of the nave, from which spring the groinings of the vaulted ceilings. In fact, we may assume, that all the larger buildings of the Holy Land had arched roofs, for apparently there was formerly, as at present, very little timber in the country. The nave has at the end a chancel 7 feet 10 inches deep, with a recess or niche in the walls on either side, and each of the side aisles has a like recess. There is a door at the west end, and one on the south side. The lateral walls measure 10 feet thick. There is a small window in each of the absides, and photographs* evidently shew lights in the side aisles. Under a porch near the church at Beeroth is a doorway with a slab of stone 5 feet 6 inches long and 3 feet high, used as the lintel. It is sculptured with small attached columns of the early pointed gothic style, surmounted by intersecting arches, which are stopped at one end by a short column on the line of the arches. There is also a considerable ruin, consisting of several vaulted chambers, and supposed by Murray to be the remains of an ancient Hospice.

The same day we reached BETHEL, and slept there for the night; recalling to mind that here Jacob slept, and had his prophetic dream of the Ladder. Three or four acres suffice to contain the ruins of past times, and the village. A small Byzantine church 38 feet 2 inches by 27 feet in the clear inside, with walls 10 feet thick, to resist the thrust of the arched roof; and the whole now dilapidated indicates a place of no great importance. There is an apse at the altar end, and a small closet on one side, 3 feet 6 inches wide in the thickness of the wall. There was a slit window in the apse, and openings for lights in the side walls, and the vaulting was cut into in order to receive the window

* The series of photographs taken for the Palestine Exploration Fund are most valuable illustrations of places and ruins in the Holy Land.



Thos L. Donaldson, mist

Lithog^d for the R.I.B.A. by Kell Bros London E.C.

opening. The impost moulding of the apsidal arch is the only decorative feature left. The springing of the vault was somewhat below the impost moulding of the apsidal arch. There was a doorway 5 feet 6 inches wide at the west end.

The next day we halted in the afternoon at SHILOH, the interesting Scriptural Town, where the Tabernacle of the Lord of Hosts rested for so many years. On the summit of the rising ground, apparently outside of the town, is a square building, of mediæval date, half church half a tower in its character, constructed of fragments of the classic times. I saw the fragment of a shaft of Cippolino marble 2 feet in diameter, and the lintel of the doorway is formed of a single slab of stone 6 feet long by 2 feet high. In the centre it is sculptured with a two-handled amphora or vase, which has on each side a wreath with a patera in the centre, and beyond these wreaths again is carved an altar, thus forming a very elegant and interesting group of two altars, two wreaths and the centre vase. While I was making my notes, my fellow travellers had ridden off, so that I was left alone, and could not more minutely examine the building, nor take the plan, for I was annoyed by an importunate stout fellow of an Arab, so as to be obliged quickly to mount my horse and gallop off. I regretted also that I could not inspect the buildings in the village, for I think it probable that there are some curious remains to be discovered there.

I rejoined my companions, who had halted upon the summit of a knoll on the other side of the valley, where there is a shady oak, under which our party took their mid-day repast. Here also is a tower resembling in its arrangement the building on the other side. It is 36 feet square, and is entered by a central doorway, which leads into a square chamber, having two columns 21 inches in diameter, from the capitals of which the arched groining springs. The niche at the further end would indicate its being used as a place of worship; and it is as much calculated for a Mahometan as a Christian site. There are recesses in the thick walls all round. Immediately within the doorway of entrance there is to the right a flight of steps leading up to the terrace or top, which is now quite flat without any parapet or enclosure.

P.S.—I would also call the attention of my professional brethren to the very interesting and still sufficiently preserved though desecrated church at Kirjath Jearim, Kuryet-el-Enab, on the road between Jafa and Jerusalem, and about three hours' ride from Jerusalem. It is of the Pointed period of mediæval art, very simple, with a central nave and side aisles, and having three square piers on each side of the nave, and consequently four arched openings. The nave and side aisles have apsidal ends, and the roof is vaulted and groined. Traces of the mural paintings still remain, and with sufficient distinctness to enable one to make out their subjects. The whole building is well worthy the architect's attention, and is a valuable specimen of that period. It deserves to be thoroughly measured and illustrated in every particular.

On the road between Jerusalem and Jericho, at about two and a half hours' from Jerusalem, is a ruined Caravansary, called Khan el-Ahmah, situate near a fountain, and consequently a convenient place for the mid-day rest. The fragments of walls and vaulting are still considerable, and afford sufficient indications for the general arrangement of the plan.

The important explorations at Jerusalem, now carrying on under the enterprising and earnest direction of Lieut. Warren, R.E., are at present so almost exclusively of an archæological rather than architectural character, that I have not alluded to them; and they have little reference to the purely artistic enquiry, which occupied my attention. I think it would be a subject of deep interest, and likely to afford very important results, if endeavours were made to ascertain the precise positions of the three great Herodian Towers, above alluded to. If their sites were discovered, they might afford the clue for fixing various other historical localities.

I cannot forbear alluding to the fulness and accuracy of the information given in Murray's incomparable handbook of Palestine and Syria, the fruit of the unwearied research and intelligent observation of its well-informed author.

On the conclusion of Professor DONALDSON'S Paper, Mr. J. P. SEDDON, Honorary Secretary called the attention of the Meeting to some specimens of American marbles, lent for exhibition by G. G. Scott, R.A., Fellow, and read the following description of them :—

"The marble occurs in beds and strata, varying in thickness from one to six feet, and will split across the bed or grain: blocks of any required size can readily be obtained. Its closeness of texture and hardness renders it susceptible of high polish, and it will resist to a remarkable degree the influence of atmospheric changes, and is hard to deface with scratches or acids; this fact should attach to it additional value, and its variegation in colour, as shown by the specimens, taken only from its out-croppings, give promise of a much richer development as the bed of the quarry is reached, and must equal in beauty and durability the highly prized Oriental marble of ancient and modern times; and from its facilities of access entirely by water to all the markets of our country, and to the seaboard whence it can be shipped to all foreign countries, must bring it into general use here and elsewhere whenever coloured marbles are required for building and ornamental purposes. It occurs in latitude 44°, a great body projecting up in the bosom or bay of Lake Champlain, forming an island of some acres, out-cropping upon each shore, giving evidence that the deposit extends across and forms at this point the bed of the lake."

Professor DONALDSON stated that when he was in Baalbec in December last, he picked up and brought home some specimens of the stones employed in building the gigantic structures there, now in ruins. He had sent these to his friend Professor Ansted, with a request that he would be good enough to favour the Institute with his opinion of them, and he believed that gentleman was now prepared to say a few words on the subject.

Professor ANSTED said, before referring to the specimens to which Professor Donaldson alluded, he would say a word or two with regard to the series of marbles from Lake Champlain which he had inspected since he had been in the room. He had previously seen specimens from the same locality on a larger scale than those now before them; and it might possibly have escaped the observation of gentlemen, who were doubtless struck with their great beauty, to notice that a portion of these marbles consisted of argillaceous material, which was present in such proportion as to render it unfit for use in the exteriors of buildings in this country. The marble itself was very beautiful. It was richly veined and was capable of receiving a high polish; but on close inspection it would be seen that the polish was variable: in some places it was not complete, and it should be understood that where they saw a crack or a dull part on the marble it afforded but a bad prospect of permanent wear. At the same time, being a beautiful material in itself he had no doubt it would answer very well for chimney pieces and internal ornamentation, although he questioned its adaptability for external work.

The PRESIDENT asked whether they were better than, or different from, the Devonshire marble.

Professor ANSTED replied they were different, but he doubted their being better. Most of the Devonshire marbles were deposited limestones; but these marbles were more perfectly crystallized and had less carbon than the Devonshire marbles and were capable of a higher polish.

The PRESIDENT remarked that the marbles he had seen in Torquay had as high a polish as the specimens on the table.

Professor ANSTED meant they would retain their polish better: the harder the material was the better it retained the polish. With regard to the Baalbec stone which his friend had submitted to him he had not much to say beyond the fact that it belonged to a class of fresh-water limestones, which were of tertiary origin, and were very widely extended over many parts of Asia Minor and the Greek Islands. It was not the same limestone exactly as was used in the Cyclopean buildings in Greece, but was much the same sort of thing. No one could have seen specimens of those walls without being struck with the perfect adaptability of the material to the climate in which it was employed. The specimen sent to him was of a similar kind. He did not know whether it belonged to a large stone or not. [Professor DONALDSON said it was a mere fragment which he picked up accidentally.] The whole country (continued Professor ANSTED) was composed of this stone, and it was capable of being worked with comparative facility, and, when dressed, would probably retain the sharp edges for 2,000 years without change; but there could be no doubt the stone would not weather so well in this country. The same class of stone had been used for the principal limestone buildings of Greece, with the exception of those for which marble was employed. They did not admit of much polish, but were capable of being squared very easily. In reply to the President, Professor ANSTED added that the enormous stones found in these ruins were limestones of the same general character, of fresh-water origin.

ABYSSINIAN CHURCH ARCHITECTURE.

By WILLIAM SIMPSON, F.R.G.S.

HAVING had the opportunity of visiting Abyssinia during the late expedition, I was able to make a few sketches and notes of the architecture of that country, and these I propose to lay before you in the following paper.

So far as the geography of the country relates to the subject, it will be sufficient for our purpose to divide it into the southern and northern sections. Tigré for the first and Amhara for the second may be used as the names of the two principal divisions. Tigré, or the northern portion, contains the remains of the city of Axum, the ancient capital of the whole country. It possessed, in its days of power, an army who, so far from being ignorant of the services of the elephant, used them for military purposes; nor were ships unknown, for the kings of this old metropolis had a navy on the Red Sea, by which they had become its masters. They even carried conquest to its opposite shores, and laid the sacred city of Mecca under tribute. The name of Baharnegus, or "King of the Sea," a title still held by one of the chiefs of Tigré, is all that remains now of this naval supremacy. This Lord High Admiral has no fleet, and for generations past has not even had a sea coast to defend. It is a high sounding title, left like a fragment standing amidst the political and social ruins of the country, and it suggests a fit figure to place beside the ancient Obelisk of Axum. That one solitary pillar is all that now remains out of many fragments prostrate around it. The purpose of these erections is unknown to the present race of Abyssinians, their builders are forgotten, and the language of their inscriptions is now dead in the country. They have, indeed, a tradition that it was put up by Ham after the Flood, and that Japhet, in Europe, and Shem, in Asia, erected similar monuments; but this is only to be classed with the other legend that the real Ark of the Covenant, and original copy of the Law, is in the Church of Axum, where it was placed by Menelik, son of the Queen of Sheba, who carried them off from Jerusalem.

I deeply regret that I was unable to see this celebrated spot. Lord Napier was anxious not only to pay it a visit himself, but to give those who were with his camp an opportunity of doing so. A flood, from the rains, had more than once swept down the Sooroo Pass, destroying stores and even human life. As this rendered all delay dangerous to the safety of his troops, the Commander-in-Chief would not run the risk of even a single day's stoppage; and thus a trip to Axum, which all had looked forward to with the greatest interest, was unavoidably prevented.

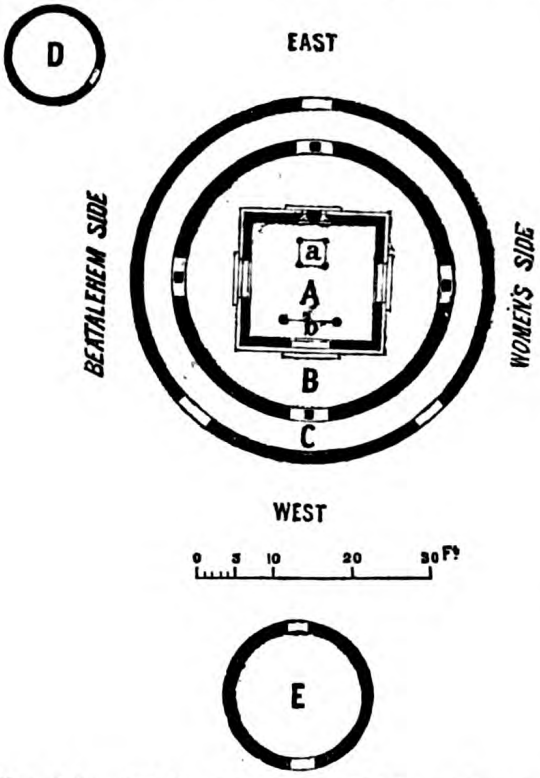
Amhara, which is the principal province in the southern portion of Abyssinia, is now best known from its associations with the doings of the late King Theodore. Gondar is the principal town in this locality, and was formerly celebrated for the number and sanctity of its churches. There were upwards of forty, which is a large number for an Abyssinian town; but, with the exception of one or two, all were *looted* by Theodore. Towards the end of his career, his large army was difficult to support, and the Church valuables lay temptingly at hand. By a sudden and unexpected attack the defenceless priests and people were overpowered, the churches and houses most unceremoniously plundered by a wild and lawless soldiery, and the whole place reduced to ruins. Although Axum was the ancient capital, Gondar has had in later times the principal claim to that title, amongst which is the "Beata Abuna," the house or residence of the Head of the Abyssinian Church, and the "Beata Itcheghé," the house or residence of the head of all the monks in the country. These two functionaries constitute the ecclesiastical government of the Coptic Church.

The distinctive character which marks the northern architecture from the southern, is that its churches are square or oblong. The Amharic, on the other hand, are round. This rule applies to houses and all buildings in both districts, for here, in a most rude and primitive country, we recognise that well-known principle of the identity in the architecture or building of the church with that of the domestic dwelling. In the northern part, where the churches are square, the houses are the same ; in the south they are both round. Even in the material of building the rule holds good. In some places stone is used, and there the House of God and the house of man are constructed of this more enduring substance. Where wood is used, wattle and mud, or even where the merest shed represents the architecture, and this last is the most common style of Abyssinian erections, the church and the dwelling are in every case similar in their construction. This identity is still further shown by the word which expresses house and church being the same. It is *beat*, and is only a slight variation of the Hebrew word *beth*, which had also the same double signification. When the Aryans entered India the house was the temple, and the hearth was the altar where the Vedic hymns were sung. I have been in a camp of nomadic Buddhists in the high regions of Tibet, and I was taken into a tent similar to the others which was fitted up as their *gonpa*, or church, the whole scene forcibly reminding one of the Tent of the Tabernacle, with the tents of the people around it. Theodore, from his wild, warlike habits, was seldom long stationary at any place ; he loved a camp life, and always near to his own tent was another fitted up as a church. This identity between the temple and the house has been all but lost in the advanced civilisation of Europe, but in its original conception it had a beautiful and valuable symbolical meaning.

A more detailed description of one of the round churches of Amhara will help us more fully to explain in what respect it differs from the northern ones. The first point of importance is that they are all built with a three-fold division, which they say is in imitation of the Tabernacle and the Temple. Each division is enclosed by the others, the sanctum forming the centre. It is in all cases square, and the two other courts are formed of concentric circular walls. There are no larger churches equivalent to our cathedrals, or smaller ones that might be called chapels. This may be explained by the fact that there is only one bishop, who can exercise all his episcopal functions in his own house; and therefore there is no great variety in the dimensions of the Abyssinian churches. A few might be found larger than the round portion of the Temple Church of London, but for the most part they are smaller. If any one will picture to himself the Temple Church, with a rough thatch roof, such as may be seen in Ireland or the Highlands of Scotland, and the walls formed of very rough posts, interlaced with a basket-work of smaller branches, perhaps mud being added by way of plaster, he will get a very fair idea of the general external appearance of an Amharic round church. The apex of the roof is surmounted by a cross, which is often decorated with ostrich eggs, and the whole is surrounded by trees, generally of juniper, cedar, the cypress, or the khol-khol. On the route of the army, which was for the most part mountainous, rocky, and bare, these clumps of trees, with the conical roof and the cross at times visible through the foliage, were most pleasing to the eye, and formed cool, refreshing nooks to rest in during the march. Almost in every case they were situated near a running stream, for the purpose of ablutions and purifications, in which the Abyssinians are said strictly to observe the Levitical law.

The sanctum, or *makdas*, as it is called, from a Hebrew word, meaning the holy or consecrated place, is a square apartment; the length of the sides may vary from perhaps ten to about fifteen feet. These sides face the cardinal points, and the altar is situated a little out of the centre towards the east. The altar is named the *tabot*, and is considered by the Abyssinians to be identical with the Ark of the Covenant. It is generally formed of four upright posts, with a shelf, called the *menber* placed about four feet from the ground, and a rude piece of cloth or matting is thrown over the top of

the posts serving as a kind of canopy. The menber or shelf is the real altar. Upon it is placed a piece of marble or alabaster, usually decorated with crosses and the name of the patron saint of the church, over which a cloth is spread, and on this the elements are placed in the act of consecration. On the western side a curtain is hung up to represent the Veil of the Temple, and serves to hide the tabot when the western door is opened. This door is only used for the priests and deacons to bring forth the sacrament, which is administered on its steps. No table is here used; the bread is in a basket covered with a cloth, and the wine in a chalice, both being held by the attendant deacons. When the ceremony is over the priests retire, and the door is closed again till the next celebration. There is a door on the south side, which I think is seldom or never used. That on the north is called the *beatalehem* door, because the bread and wine are there brought in. There is always a door formed on the east face, but it is in every case built up, and only a small slit or window is left. The reason for this may perhaps be found in the xliv. chapter of Ezekiel. "Then he brought me back the way of the gate of the outward sanctuary which looketh toward the east; and it was shut. Then said the Lord unto me: This gate shall be shut, it shall not be opened, and no man shall enter in by it, because the Lord, the God of Israel, hath entered in by it, therefore it shall be shut." And it may be worth noticing that the Golden Gate at Jerusalem, which "looketh towards the east," is also built up, and only two very small windows or slits are left. This eastern opening is called by the Abyssinians "the door of light." This description indicates, then, a door opening towards each of the cardinal points. The walls of this Holy of Holies are always plastered so as to make the place perfectly concealed. None but the priesthood are admitted. The ceremonies are performed in almost total darkness, the light of a small taper being all that is used. The small glimmering which penetrates through the slit of the door of light is very small indeed, for it is only a borrowed light from that which passes through the two outer walls. In those churches which I visited they all changed from the square ground plan into a circular form above, and terminated in what seemed to me a dome; this dome forming a roof to the sanctum, and being quite independent of the thatched covering of the whole edifice.



Plan of Round Amhara Church.—A, Makdas, or Sanctum. a, Tabot, or Ark—the altar. b, The Veil. B, Kudist, or Second Court. C, Kuneh-Mahelet, or Third Court. D, Beatalehem, or House of Bread. E, Deja Salaam, or Gate of Bowing-down.

The second court is called the *kudist*, and is formed by a circular wall leaving a narrow passage of only a few feet at the corners. This is pierced with doors, also facing the cardinal points, like the inner sanctuary. In the better class of churches a wooden post divides each of these into double doors. The eastern door is not built up in this wall, and the congregation may enter freely and pass all round it.

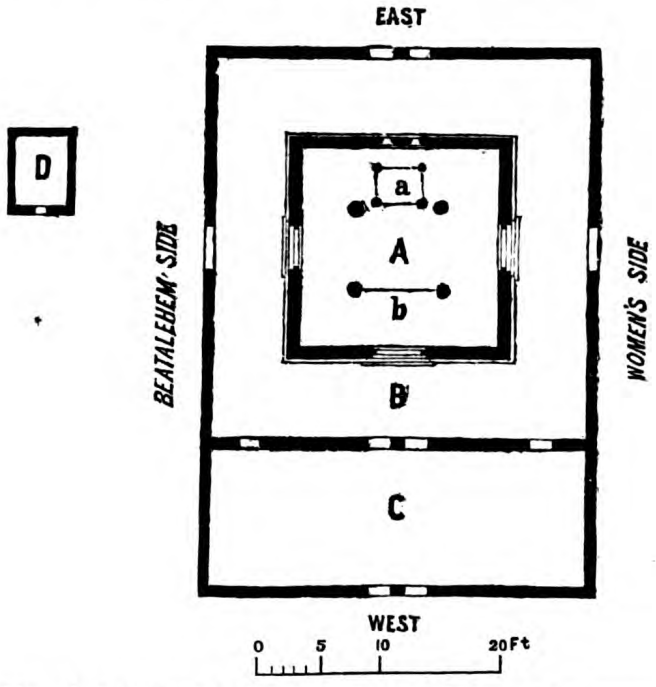
The third court is called the *kuneh-mahelet*, from a psalm or song, because it is in this part of

the church that the male part of the congregation sing during the service. This enclosure is not the same in every church. In some cases the doors open towards the cardinal points, but in others they are placed where required. A door on the south side is appointed for the women, for their place in the church is on that side. Thus the Abyssinian church follows the eastern idea of separating the sexes. In practice this is not very strictly adhered to, but its importance in former times may be estimated from the fact that the whole southern portion of the building is still distinguished by the name of the "women's side," and the door is the "women's door." The entrance for the male portion of the congregation is on the north side, but that portion of the church takes its name from another circumstance. All the Abyssinian churches have a small house built at a little distance from the north-east corner; this particular position in reference to the church is never deviated from. The purpose of this house is to prepare the bread and the wine for the sacrament, and it is called the *beatalehem*, or house of bread, and the "beatalehem side" is used to distinguish the whole of the northern half of the church, and the entrance by which the elements are carried into the church is called the "beatalehem door." It is worth noting that in most of the smaller village churches the wall of the third court is very seldom carried all round the building. The psalm-singing is only performed in the front, or west, on the beatalehem, or men's side; and here only a portion of the wall is erected as a shelter for them, forming something like a porch to the church. A wall round the church encloses a burial-ground, and in this wall to the west is a doorway, called the *deja-salaam*, or gate of bowing down. A building is generally attached called the *ekabeat*, which serves the purpose of a sacristy.

This description contains, I think, the main features of an Abyssinian church. What must seem strange is the curious adherence to Jewish forms. Here is the ark, the veil, the Holy of Holies in darkness, the three courts, all in direct imitation of Solomon's Temple, and the Tabernacle in the wilderness.

There were no steeples to any of the churches which I saw, nor anything that could be supposed to have been a tower. Instead of bells there were two stones suspended between a couple of low posts. They were struck by a smaller stone, and gave forth a clear musical sound, each stone having a different note. In Abyssinia they were called *dowell*.

In the northern part of Abyssinia all these forms are also to be found; but the arrangement of them is different; there is a greater variety in the mode of construction than in the south, and the causes of this variety will be suggested as we proceed. The church of St. Kirkos, at Addigerat, in Tigré, may be taken as a fair example of the square style of construction. The sanctum is square, and the same in every particular as that already described; but the kudist, or second court,



Plan of Square or Northern Church.—A, Makdas, or Sanctuary. a, Tabot, the Ark or Altar. b, The Veil. B, The Kudist, or Second Court. C, The Kuneh-Mahelet, or Third Court. D, The Beatalehem, or House of Bread.

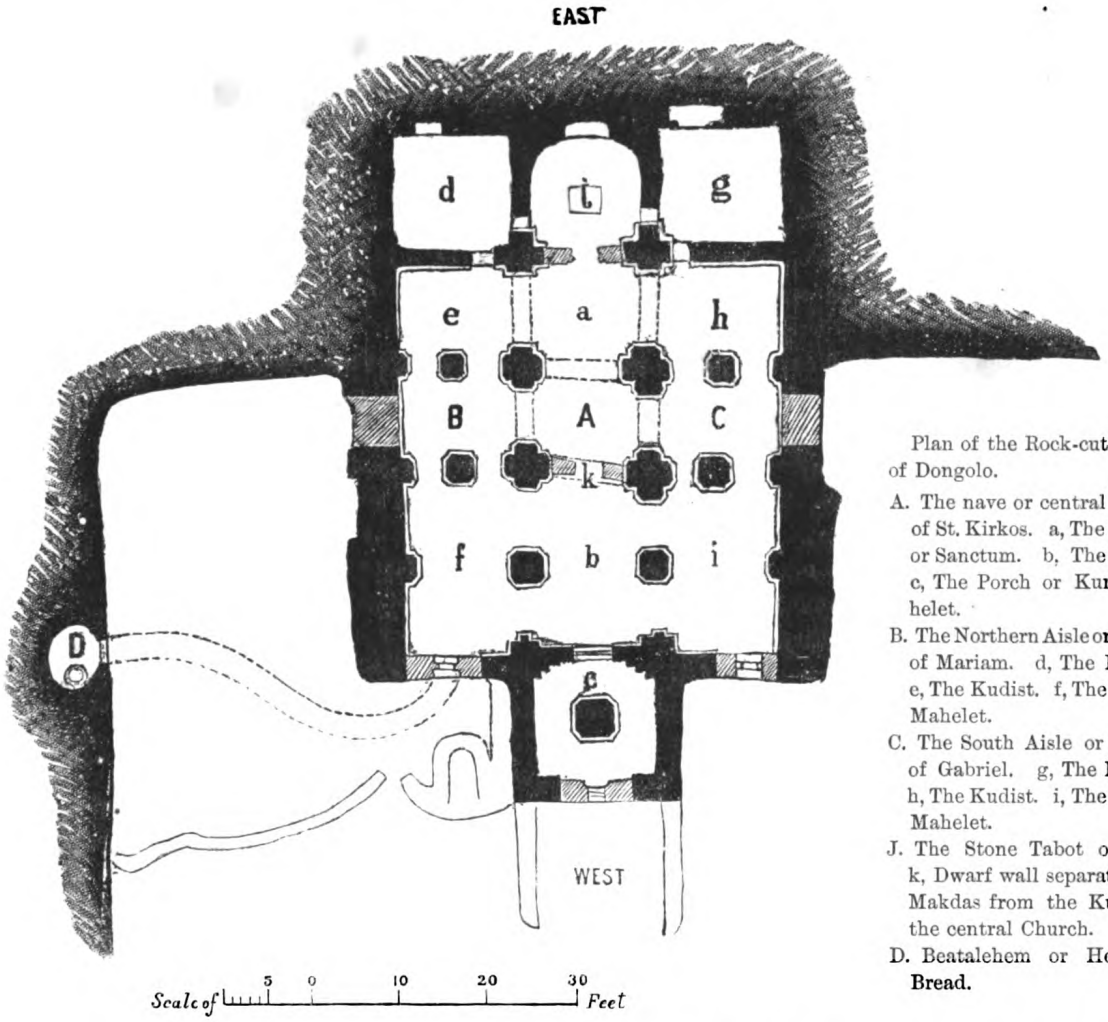
instead of being circular, is also square, forming a passage of a few feet in width all round; and the third court, instead of enclosing the others, is only an elongation of the building on its western face, thus forming a pronaos. The beatalehem is a small, square building, and the deja-salaam, as a house, is built likewise in the square style peculiar to the north.

The church of Miriam, at Focado, about twelve miles north of Addigerat, may be taken as another example of the Tigré, or square style of construction. This edifice was a good deal out of repair, but had been tolerably well built with stones, and the western entrance had a substantial stone pillar in the middle, making it a double door. Here the second court did not surround the sanctum; it was merely an extension of the building to the west; and the third court was a still further extension in the same direction. A solid wall in each case divided these compartments. Each division varied in width; the second court was a few inches wider than the Holy of Holies, and the outer court narrower again by two or three feet. Thus was maintained the character of each as a separate house, such as we see in the chancels of our churches at the present day. The form may be traced as far back as the plan of Solomon's Temple, and is also visible in the temples of ancient Egypt. Another peculiarity in the church at Focado was a square apartment to the east of the tabot or ark, the opening to which was arched. It was only about one-third of the width of the church, so that on the outside it had quite the appearance of a chancel built on to the end. The space left vacant at the corners was converted into two small rooms.

In comparing the plan of the round church of Amhara with that of Addigerat, it is evident that they are substantially the same. The difference between them is very slight,—the one is a circular and the other a square form of the same arrangement; but when we look at this Focado church, quite another aspect presents itself. We have, indeed, the threefold division, which is such a prominent point in the Abyssinian church, but that onion-like arrangement where each court encloses the other, formerly the peculiar feature of the Amhara construction, is here totally wanting. The third court of the Addigerat church being arranged in the manner of those at Focado, gives a slight appearance of resemblance; but the chambers to the east of the tabot is a new and quite a distinctive feature. Before attempting to give an explanation of this, I will proceed to describe the rock-cut church of Dongolo.

Dongolo,—also the name of a place on the Nile, well known for architectural remains,—was one of two small stations on the line of march between Addigerat and Antalo. The church was on a rising ground, with bare masses of rock projecting, one of these masses being scarped or excavated, formed the work under consideration. According to the inquiries which were made, the church was excavated in the year of Christ 333, corresponding to the European reckoning of 325 A.D. Its name is Kados Kirkos, a favourite boy saint of Abyssinia. Its founders were two emperors, named *Atsbaha*, "The Dawn," and *Abraha*, "The Light." They were twins, and reigned in Abyssinia together at the period when Christianity was first introduced All the information we got, and it came from different authorities, agreed in these facts respecting its traditions, date, and the parties who caused the church to be excavated. This also accords with the historical era usually given when the conversion of Ethiopia took place. Frumentius was ordained the first bishop about the same time, having been instructed in the doctrines of the Greek church at Alexandria; and the fact of its being a perfect Greek church in its plan and arrangement confirms the reputed antiquity of its formation. If we are to rely upon these traditions, this must be one of the oldest Christian churches in the world. It dates nearly a thousand years before any of our cathedrals, and its excavation is contemporary with many of the rock-cut temples of western India.

The first glance at the plan of this church would lead an eye accustomed to Egyptian temples to the conclusion that it had been formed, like many of the more ancient, by excavating a recess in



Plan of the Rock-cut Church of Dongolo.

A. The nave or central Church of St. Kirkos. a, The Makdas or Sanctum. b, The Kudist. c, The Porch or Kuneh-Mahelet.

B. The Northern Aisle or Church of Mariam. d, The Makdas. e, The Kudist. f, The Kuneh-Mahelet.

C. The South Aisle or Church of Gabriel. g, The Makdas. h, The Kudist. i, The Kuneh-Mahelet.

J. The Stone Tabot or Altar. k, Dwarf wall separating the Makdas from the Kudist in the central Church.

D. Beatalehem or House of Bread.

the rock and then adding a built front to it. But such is not the case; the whole is cut from the solid rock. The rock has been rudely scarped into the desired form, but no architectural feature or ornament has been given on the external walls. It is curious to note that the Greek church has penetrated such a distance south into Africa, and so far north into Russia, carrying in each direction a similar style of architecture. Whoever is familiar with the Cathedral of the Assumption, the principal church of the Kremlin at Moscow, will perceive how identical it is in plan to this rock-cut church of Abyssinia. A description of the Moscow church, or of one of the usual styles of Greek churches in the East, would serve as a faithful account of the one under consideration. The main part of the edifice is a square building, which forms the body of the church. In some cases this is round inside, and in many round both inside and out. On the eastern end the altar or holy place is formed; this is narrower than the main part of the building, generally extending over about a third of the width, and is almost always at its east end circular or apse-like in plan. On each side of this altar rooms are formed, so as to fill up the space to the full breadth of the church. This addition to the east end makes the whole plan of the building into an oblong. At the western door a porch is generally added. Now this general description of a Byzantine church so exactly agrees with the one at

Dongolo that we may almost take it for granted that it was erected under the superintendence of a Greek architect.

I shall now describe in detail some points of the church. The main body of it is a square of about thirty-six feet, and about fifteen feet high. The roof is supported by ten pillars, the four central being much larger than the others. There is a strange irregularity in the position of these four central supports, which, if it was not intended to avoid some flaw in the rock, indicates great want of care in the workmen. These pillars are square, the corners only being taken off. They stand upon a square base, and the capitals are massive blocks, spreading outward on the top. The four larger central ones may perhaps be best described by saying that they are as if four pilasters were joined together. From their capitals arches spring; there are also arches between the two eastern pillars and the pilasters on each side of the entrance to the altar. This entrance is also arched, and the apse is vaulted, as well as the central nave from the porch to the central pillars. There is a central pillar in the porch. There are three doors, now, however, bricked up into much less space than their original dimensions. The church must have been rather dark, and two large windows were pierced in the sides, which are now filled up. The two apartments on each side of the altar were so filled up with rubbish that it is hard to say much about them. A story was told of some one having been buried there, and also that during one of their frequent wars the conquering party had committed the sacrilege of digging for treasure. Though in a rock-cut building this may seem rather hard to accomplish, yet the mass of rubbish which was in the darkness of the east end rendered this story not at all improbable. The only sculptural decorations were a Greek cross in relief high up on the right hand within the entrance from the porch, and a piece of frieze on the lower part of the vaulted portion of the roof. This frieze is most unlike what belongs to the Doric order, and yet I know of nothing else to which it could be compared. It might be described as a row of small pilasters, and a square panel between. The roof had been decorated with elaborate designs in colour, but now they are all so injured and blackened that their original appearance can scarcely be guessed at. The designs seem to have been crosses of various patterns, formed by lines intersecting one another, some of them in a very complicated way. One of the designs was very simple, and formed a beautiful decoration. It was formed of two sets of lines, which produced squares at every intersection, and it is a curious fact that the very same pattern is to be found on the cover of the bell of S. Patrick (see Westwood's Anglo-Saxon Ornaments.)

Such is a rough description of the church in its original form; but I have now to describe the changes which it has undergone. At the entrance to the Sanctuary a small dwarf wall is built, with a door in it for passing to the altar. Of course being built it forms no part of the original plan of the church. This is confirmed by the very different style of the architecture, for a Saracenic arch surmounts this door, and is elaborately decorated with an ornament repeated all over it. Luckily I took a careful sketch of this, and it turns out to be a Kufic inscription, in an ornamental character. On being submitted to Dr. Rieu of the British Museum, he translated it as either *El-Malik*, "The King," or *El-Mulk*, "The Kingdom." He also gave it as his opinion that it belongs to the 11th century. The very great change indicated in this arch from the original style of the church, and its very early date, is a still further confirmation of the great antiquity of the church itself. A Saracenic arch in a Christian Church in Abyssinia is a point of some importance; unfortunately I did not see enough of the architecture of the country to enable me to speak with certainty on the matter; but from what I did see, and so far as I have examined drawings in books, I have come across nothing of the kind elsewhere. It has been suggested that the Mahomedans may have had possession of this church for a time, and used it as a mosque. This is not impossible, for it is not, even at the present day, far from the boundary of a Mahomedan population; and the orientation of a church in that latitude would be near

enough in its direction to Mecca to serve the purpose of a house of prayer. So that the apse with its arch may have become the mihrab or niche pointing to the Kibla.

I have another change in the history of this rock-cut building to describe, in which the facts of the case are founded on much clearer and more satisfactory evidence. Though it is now used as a place of worship, the Abyssinian priesthood have made a new and arbitrary arrangement of its parts, quite different from the original conception. In the first place they have divided it into three churches. The central nave with the apse is the principal church dedicated to St. Kirkos, and the side aisles, each with a square room as the sanctum at the end, are dedicated, that on the south to Kadosh Gabriel, and the other, on the north, to Miriam or the Virgin. The Greek Church had got the idea of the three-fold division in imitation of the Temple and the Tabernacle. The body of the church is considered to be the same as the second court, the bema or apse is equivalent to the Holy of Holies, and the porch stands for the outer or third court. This could not be preserved by the Abyssinians in the new arrangement except in the central portion, and there, to a certain extent, the original Greek idea was retained. The porch was still the outer court, and a rude wall was raised between two of the central pillars, the door in this wall being the entrance to the makdas or Sanctuary. A piece of dirty cloth served the purpose of a veil at this place, and a square stone erection within the Ark was the Tabot. The division of the aisles was again different, the square room at the end was the altar, and the aisle was supposed to have an imaginary division in the centre separating the second from the third court. By this arrangement the courts in the side churches are not parallel with the corresponding courts of the central one. A small cave in the rock on the outside to the north is the beatalehem or House of Bread. This I should be inclined to think was also an adaptation to the requirements of the place as an Abyssinian church, for it is a mere hole in the rock, showing none of the architectural features of the original church in its construction.

There are many rock-cut churches in Abyssinia. There is one not far from the route of the expedition on the Takazze, excavated by Lalibela in the 10th century. Salt, in his work, gives the plan of one called the Church of Abha Os Gaba, or Abhahasuba, near Chelicut. It may be said to be identical with the Dongolo one, with this exception, that the body of the church is elongated and not square. Salt also copies from the work of Father Alvarez the plan of the church of Dummuda Miriam. As this plan is not very carefully done, we cannot speak with certainty about it, but it conveys the idea of a monolithic structure, similar to the Kylas at Ellora. There is a house in front as well as one on each side, all forming a very good design, and implying a vast deal of work. There are other rock-cut churches known by the name of St. Emanuel, St. Saviour's, St. Mary, The Holy Cross, St. George, Golgotha, Bethlehem, The Martyrs, Marcoreos, &c.

After this description of the churches of Abyssinia, which I believe include the main types of construction, we are in a position to say something upon the origin of the architecture of the country. I would give it as the most probable conclusion, first, that the rock-cut church of Dongolo represents the pure Greek type introduced by the first missionaries from Alexandria; secondly, that the round Amharic church represents a pre-existing Jewish or Pagan type; and, thirdly, that the various square churches of Northern Abyssinia are the result of this pre-existing form, more or less inflenced by the Greek. When the missionaries first got a footing in the country, and began to build places of worship, they would no doubt construct them according to the style to which they had been accustomed. The rock-cut specimen at Dongolo is a palpable proof of this. However, as they penetrated into the country, and conversions became numerous, they would not be able to form a new church at every locality. Nor would that be necessary; they would do there what has been often done in other countries upon a change of faith; they would seize upon the already existing temple, and re-consecrate it in keeping with the new

worship. Perhaps there might sometimes be needed some slight internal alteration expressive of the new faith; but, on the other hand, the former faith, as it seems to have been very strongly impregnated with Jewish ideas, may have had temples which scarcely required a change of adaptation. There are, at the present day, a numerous Jewish population in Abyssinia, known by the name of *Falashas*. Their temples are constructed exactly like the round Amharic churches, in three divisions; but with this difference that the principal entrance is towards the east. They have also an upright stone at the back of the building, on which the Pascal lamb is slaughtered.

To convert such a building to Christian worship would be easy. A piece of matting as a covering on the eastern door, while a few minutes with a sword or a hatchet would soon open an entrance from the west. A preacher who could fire his hearers with an impulse might have such churches converted as soon as the congregations. The stone altar on the outside might be destroyed or forgotten. When the church had to be repaired or rebuilt, unless the people had seen another style they would only repeat the former construction. Thus we find that in the southern parts of Abyssinia, where a new manner of architecture did not penetrate, we have the round church as the existing style of building. If we accept the idea that this round style is the primitive African manner of building, and found all over the interior of that continent in various stages of barbarism, it becomes an additional reason for regarding the square northern style as an innovation. This innovating style represented a higher development of civilization, under the wing of a new and prosletising faith, which spread along the Nile and expended itself against the barbarism of a continent on the mountains of Habesh. The line where this wave broke is clearly defined by the mixed northern buildings. The Abyssinians give the etymology of their name as meaning "mixed." They are of Arabic stock, but are supposed to have intermingled with the more primitive races around them. This mixing of a Shemitic with a Hamitic blood is only the co-relative fact in ethnology with that which has been described in their architecture, and there need be little doubt that both are the result of the same geographical or climatic causes. This subject is an important one, for it bears upon an old question, whether the civilization of Egypt went up or came down the Nile, involving also the problem as to where the wonderful architecture of that country had its origin. Did it begin in Memphis or Thebes, and go upwards to the source of the river, or was its first birth in the rock-cut shrines of the south? The architecture of Abyssinia certainly bears upon the answer to these questions, and I can only express my regret that I had no wider opportunities than that permitted by the march of an army, for collecting information and throwing light on the subject.

The plan of the Focado church is now easily understood; the three chambers behind the altar are clearly the retention of the apse and side rooms of the Greek arrangement. As the tabot was not in this most easterly portion of the building, it shows that the form was retained without the function which belonged to it. They told me that the priests used it for putting on their vestments; but no Abyssinian church has such an arrangement. They always robe themselves in the Holy of Holies; similar is the custom in the Greco-Russian Church, indicating another Greek form retained by the Abyssinians in the north.

At Agoola, one march south of Dongolo, there are the ruins of a stone-built church. Possibly a town may have been here, but at present the remains of the church is all that is to be seen. A basin had been dug in the earth, in which the building had been erected. The result is a deep broad fosse all round, suggesting that defence had been one of the objects of this mode of digging a foundation. A massive base of tolerably well hewn stones had been raised up to the original level of the ground, and on this the church stood. Only two central piers remain, and the bases of some columns. The plan is not quite distinct, but I should say that it must have been very near to that of the Focado Church. Some one

mentioned that it was an old Greek church, but a flight of steps to the "women's door" on the south, and the debris of a built platform across the fosse towards the north-east corner, indicated to me the passage from the Beatalehem into the sanctuary, and I came to the conclusion that it was only a Greek church in the sense that all the churches of Northern Abyssinia are more or less so. There had been a fine flight of steps leading up to the front or western door. The pillars were square with the corners cut off like those at Dongolo, and the capitals also resembled in shape those at that place; only one remains, lying in two pieces on the ground, with some carved ornament upon it; but I did not see enough of the sculpture or ornament of the country to be able to judge of its probable age.

From the descriptions which I got of the sacred church at Axum, I think it must be somewhat in the style of this one at Agoola. It is square, or rather oblong, and stands on a platform built of stone, with a great flight of steps. Into its Holy of Holies no one is permitted to go, with the exception of the Abuna. This is on account of their curious tradition that the real Ark of the Covenant was brought from Jerusalem by the priests who returned with Menelik. Instant death is said to have on more than one occasion been the fate of the daring intruders who ventured within. The Governor of Axum is called the "Keeper of the Ark" as one of his titles of dignity to this day. This church has been often rebuilt. Nonnosus, an ambassador sent by Justinian to Ethiopia, mentions the ruins of a Christian temple at Axum, and it is curious to find the church in ruins at that early date. The same authority also states that there were sixteen or seventeen obelisks standing at this period, whereas now there is only one erect.

In the smaller churches, the mud walls of the sanctuary, and the rude posts with twigs interlaced of the other divisions, will be enough to explain that ornamentation was not necessary nor to be expected in such primitive buildings. But in some of the more important and better constructed churches, a lavish expenditure of mural painting is to be found. Such is the case in the Addigerat Church, and the same in the one at Chelicut. In the latter there was some wood carving, which they pointed out to me with manifestations of pride. In these two places the outer square walls of the Holy of Holies were quite covered with pictures, painted in bright colours. The favourite subjects are the Crucifixion, Virgin and Child, St. George and the Dragon, Satan, and all the saints and martyrs. Not only is the devil included in their calendar, but Pontius Pilate and his wife, Balaam and his ass, Samson and his jaw-bone, figure on many of their walls in a way that we are unaccustomed to in European art. Moses and the Patriarchs are represented with a processional cross in their hands, similar to those used in Abyssinia at the present day; and the Philistines, as well as Pharaoh's hosts, are represented with muskets such as have long been common in the country. In the pictures of the Crucifixion, the scroll on the top of the cross always contains the inscription INRI in Roman, and not in the Amharic letter. This would indicate—and many other illustrations could be given—that art had filtered up through the schools of Alexandria. The rule which is so well known in the modern Greco-Russian Church of having no figure in relief, is also strictly adhered to in Abyssinan decorations.

On visiting the church at Chelicut, which was the most important one on the route of the Expedition, we saw among the priests' vestments, which were brought out and exhibited, two mitres, seemingly gold, or perhaps gilt. One was square in the lower portion, and the other round; but in both cases it was evident that they were meant to represent the main body of a Greek church, the dome forming the principal part of the covering for the head. They were ornamented in an elaborate manner; having arched panels like flat niches with saints engraved upon them, and surmounted by very rich crosses.

The port of Adulis was long celebrated as the outlet for the commerce of Northern Africa. It belonged to the kings of Ethiopia. The Bahar-Negus, or King of the Sea, was then a title with a function, as his fleet swept the Erythrean Sea. Here the Queen of Sheba is supposed to have embarked

on her visit to Solomon. Justinian's envoy, Nonnosus, went to Abyssinia by this route, and reports that he saw 5,000 wild elephants on his way. It is curious that these animals should seem so strange to the people in the present day, when they were so plentiful in former times, and indeed they had so prominent a place in warfare at one time, as to give to one campaign the name of the "War of the Elephants." By a common change of sounds, the word Adulis has gone through a mutation to Dula and then to Zoulla, a name which must be familiar to all as the place where the late Expedition landed. The site of this ancient city was known, and the many rude heaps about three miles north of our place of embarkation was all that indicated the departed greatness of this celebrated naval port. The Commander-in-Chief appointed Captain Goodfellow, of the Engineers, and a party of the Native Bombay Sappers to explore the place. Numerous trenches were made, and many fragments of alabaster and marble, with other relics, were brought to light. At last, remains of what was either a temple or a church were found. Some large stones were exposed, forming the lower course of a wall, in front of which was a piece of paving formed of irregular slabs. Extending at right angles were the bases of two rows of pillars, with many blocks of the pillars themselves among the debris, and at last, at the east end the foundation of a circular apse appeared, with a curious piece of marble paving within it. The peculiar feature of this was a groove hollowed out all along its outer edge, suggesting the idea that it may have been intended for a gutter. While there were still doubts as to the real character of this temple a discovery seemed to settle the question; a fragment of marble was found close to this apse with a very well cut Greek cross upon it, and it was then agreed that it was in all probability a Christian church, and no doubt a very early one. The pillars were of a coarse, volcanic-like stone, square in plan, with the corners cut off exactly the same as those at Dongolo and Agoola, thus indicating the same style of architecture. Lord Napier was anxious to have made further explorations on this ancient and interesting locality, but time would not permit.

Plan of Ancient Church at Adulis.—A, Paving at Apse, with grove or gutter around its margin. B, Wall. C, Paving.

I heard the idea expressed in Abyssinia, that the round church founded on the model of the round house, so peculiar to almost the whole of Africa, is the true Semitic form of construction, and is the real origin of the round plan of all temples. I cannot say that I feel inclined to adopt this theory, but in a paper of this kind the suggestion is worthy of notice, because, although perhaps not altogether a correct expression of the truth, it contains something worth remembering. The term *Semitic* is very vague, and particularly so when it is, as in this case, used to include all the descendants of Ham. It is rather against the theory, when we recall the fact, that the Hebrews, who are the great representatives of the Semitic race, neither constructed a round tabernacle, nor a round temple. It is also a remarkable feature of the Egyptian temples that the circular form is unknown. Still this very ancient plan of construction may have grown out of an equally primitive round hut as the Abyssinian one in some other quarter of the globe. The accidents of climate and material, added to the necessities of construction, would produce the form; and whatever ideas of symbolism may be attached to this particular shape, their growth would take place afterwards. Abyssinia clearly illustrates the fact that the construction of the

church is founded upon the building of the house, and there is no reason to suppose that this process was confined to the continent of Africa. On Palm Sunday of last year I saw at Adigerat, the priests and people with book, cross, incense, bell, and palms in their hands circumambulate the outside of the church. In the consecration of the elements, the officiating priests, deacons, &c., go three times round the tabot, or altar, at the end of every chapter of the service, and this is done with the cross and incense, accompanied by a peculiar slow step, which is explained by some as being in imitation of David dancing round the Ark. Ignorance of the language prevented me from learning what ideas they associated with this particular ceremony; but little doubt was left in my own mind that the Abyssinian of to-day was only repeating a form which had come down to him from a far antiquity, as the circumambulating of the Caaba had come down from a period long anterior to the time of Mahomet. The Buddhists of India had the same ceremony round the Dagopa or Tope, and the Celts of Britain when they performed Deisul, and went sun-wise round their circles of stones. This form of planetary culte, although unknown as such, still remains in Abyssinia. It was common to the whole ancient world, and the round temple no doubt has some relation to this worship, but the architecture under consideration would indicate that the construction and the symbolic characters were not of simultaneous birth.

Since writing the above, Mr. Fergusson has pointed out to me the plan of a church in his 'History of Architecture,' at D'jemilah in Algeria, in which the holy place, instead of being in an apse, as it usually is in Greek churches, is a square within the building almost identical with the plan of the Adigerat church. It is very difficult to account for such an exceptional form of an eastern church; we cannot conceive of any Abyssinian influence here, particularly as this building is supposed to date before the time of Constantine, and consequently before the conversion of Abyssinia. Our cathedrals, such as Canterbury, and churches such as St. George's, Windsor, have often got the chancel as an inner enclosure; but then they are never in the shape of a formal square. The old church in Rome, of St. Clementi, although a basilica, has the place for the priests in the centre, still it cannot be identified with the plan at D'jemilah. The modern Jewish synagogue, with its *amud* for the readers of the services, is perhaps the nearest approach to this evidently old form; but then in this case the amud is open and not enclosed, which is a marked distinction.

A recent visit to Cairo since this paper was written has enabled me to inspect the church of the Coptic patriarch there, and the Coptic convent at old Cairo; and I add a word or two upon them, as they may throw light on the Abyssinian churches. The Patriarchal Church, which is quite a new erection, is built in the Greek style, that is, with three apses at the east, each being intended for an altar. The church is not square, but oblong, with an oval dome over its centre. The women's place is in a gallery above, which runs along each side. The two churches in the Coptic convent are very ancient, and interesting from the remains of old marble pillars, and the beautiful arabesque wood-carving in the screens. In plan they have each the three altars at the end. They are both elongated, and not square in the body of the church. I asked one of the priests if they understood the three-fold division to exist in these churches, and this he answered in the affirmative; with this additional fact, that the divisional character was understood in these churches as existing in a longitudinal, as well as in the latitudinal direction;—that in fact there were nine divisions or courts in each. This may be more clearly stated in another way—viz. that each altar belongs to a church with a three-fold arrangement of places before it. As this agrees so exactly with the description given to me of the Dongolo church, I consider it to be a very valuable addition to the facts already given in this paper.

THE PRESIDENT said the thanks of the Institute were eminently due to Mr. Simpson for an interesting and remarkable paper on a subject new to most of them, and to his excellent friend Professor

Donaldson, with regard to whom he would remark that the wonder was that in a journey of such extent and under the difficulties he had spoken of, he could have done so much as he had. It was, however, characteristic of his great energy of purpose and his earnest desire to collect matters of interest for their instruction and entertainment.

The votes of thanks were unanimously accorded, and the proceedings of the session were brought to a close.